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Factors Influencing the HIV Positivity of Exposed Children in Two Health Facilities in Yaoundé – Cameroon

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Abstract

AIDS is a pandemic. Over 90% of HIV infections in children less than 15 years are as a result of Mother-to-child transmission (MTCT) and more than 90% of MTCT occur in sub-Saharan Africa. Several strategies have been developed to reduce HIV infections in children, with variable successes. We aimed to understand factors influencing the infant HIV positivity at the operational level of the Cameroonian health system.

We carried out a prospective and descriptive study that lasted one year. We followed mother-baby (Zero to 18months) pairs enrolled in PMTCT program in Biyem-Assi and Efoulan district hospitals. We addressed questionnaire and structured interviews to mothers and their caregivers to answer research questions. Data were recorded on excel, and analyzed using SPSS version 23. The Chi square was used to analyze the effect of the level of the education, marital status of the mother on the seropositivity of the exposed child.

We recruited 113 HIV exposed children out of which 111 (98.23%) had early infant diagnosis. 7 over 111 children (6.30%) were tested positive, and most of them had low socio-economic situation. We found an association between the sites of the PCR analysis with the sero-status of the HIV-exposed child.

EID is acceptable in these two health facilities and seropositivity of the child is found mostly among women with low socio-economic status (jobless). Better strategies should increase the family sensitization during perinatal period, to reduce the related cost of EID, and the long waiting time.

Keywords: MTCT, District Hospital, Factors, HIV.

Introduction

AIDS is a pandemic. Every year nearly 400,000 children are infected with HIV in the world. Over 90% of HIV infections in children under the age of 15 years are due to mother-to-child transmission (MTCT), and more than 90% of this HIV transmission occur in sub-Saharan Africa (UNAIDS, 2017). Joint efforts (Governments, communities, NGOs etc.) and effective interventions have been engaged since 2010 around the world to eliminate new infections among children and keeping their mothers alive, but HIV incidence is not dropping (WHO, 2010). PMTCT programs have been implemented in many low and middle – income countries with variable successes. According to a study published in 2011 in a remote setting in Thailand on HIV-1 early infant diagnosis by Polymerase Chain Reaction (PCR), 8% of HIV exposed infants in limited resource settings had access to early HIV diagnosis services eight weeks after delivery (Ngo-Giang-Huong et al., 2008). High attrition, particularly after delivery, has limited the impact of many interventions for HIV-exposed infants who remain at risk through the end of breastfeeding (Naiwatanakul et al., 2016), (Obai, Mubezei, & Makumbi, 2017), (Matos et al., 2018). The inaccessibility and inadequate uptake of EID services have resulted in lack of care for the millions of HIV-exposed infants who remain unidentified (Ghadrshenas et al., 2013). Several strategies have been developed around the world, and particularly in low and middle-income
countries to reduce HIV infections in children (Tudor Car et al., 2011), (Mnyani, Simango, Murphy, Chersich, & McIntyre, 2014).

Africa countries face the burden of HIV/AIDS with cultural barriers and lack of resources. Despite a good ART coverage, child’s mortality is still high (Landes et al., 2012). Particularly in sub-Saharan Africa, socioeconomic and sociocultural factors have been described as the biggest barriers to the success of PMTCT programs (Mulu, 2014). Other factors such as limited male involvement, flaws in the design of PMTCT and health workers inefficiency were also identified (Okoli & Lansdown, 2014). Low socio-economic status (poor awareness, poverty, illiteracy, or poor accessibility to PMTCT program) of an HIV positive mother can affect the elimination of the MTCT of HIV. Poverty and lack of social support are challenges in accessing EID services (Hassan et al., 2012). Since one of the sources of mother – to - child transmission of HIV is through breastfeeding, poor women unable to afford infant milk and supplement, are left with no option than exclusively breastfeeding their babies. Efforts to achieve population - level success in sub-Saharan Africa (SSA) need to critically address operational issues and challenges to implementation (health system) and utilization (social, economic and cultural barriers (Aizire, Fowler, & Coovadia, 2013). Integration of perinatal PMTCT measures with other health care services are experimented in many developing countries (Tudor Car et al., 2011). There is paucity of data in some regions (Gourlay, Birdthistle, Mburu, Iorpenda, & Wringe, 2013), and Factors affecting the PMTCT vary from rural to urban settings (Mugasha et al., 2014).

Since 2010, Cameroon adopted the PMTCT program with early free screening test, free ART, and free follow-up for HIV positive pregnant women and their HIV exposed children (Ministry of Public Health Cameroon, 2012). In 2013 in Cameroon, the prevalence of HIV was 4.3% and 7.6% among pregnant women, with a great number of lost to follow-up (PEPFAR, 2013). A significant proportion of children are lost at each step of the EID continuum of care. The PMTCT is not provided in every health facilities. The goal of the Ministry of Health (MoH) and partners /NGOs is to expand EID testing to link to the country’s PMTCT service already provided in the majority of health facilities and other health services (Ministry of Public Health Cameroon, 2012). In the last evaluation activities, there was still a significant gap between the number of HIV positive children and the number of children on an effective HAART. As lessons after the implementation of the option B+, a previous analysis of this study in BDH, shows an important gap between the number of HIV – exposed children registered in the delivery room and the number of children screened for HIV test, means there is still a good number of HEI lost to follow-up.

The BDH and EDH are two reference district hospitals with a good frequation and trained health care workers to provide PMTCT services. Till January 2018, all the DBS sample were sent to CIRCB for PCR analysis. We aimed to improve the quality of care of the HIV infected women, their HIV-exposed children, and to understand factors which influence the success of the PMTCT at the operational level of the health system to obtain HIV negative new born child from an HIV- positive pregnant woman. We also wanted to provide data base for further studies on this field.

To present this experience, we will explore the generalities on topic, followed by the method used and results. At the end, conclusion, recommendations and some perspectives will be given to contribute to the national targets concerning HIV/AIDS.

Method
Description of site

we randomly selected two study sites at the operational level of the Cameroonian health system: the Biyem-Assi District hospital (BDH) and the Efoulan district hospital (EDH), located in Yaoundé which is an urban area. These two public health facilities have good PMTCT services (high frequation) with trained personal. The Centre International de Reference Chantal Biya (CIRCB) was the unique laboratory performing the specific PCR test in the Center region till January 2018.

Study design

During the period from April 2017 to May 2018, we conducted a prospective study with qualitative and quantitative aspects. Every HIV- infected mothers of an identified HIV-Exposed child (zero to
eighteen months), who gave their consent for our study, were asked or assisted to fill the questionnaire.

Data source

We used questionnaires addressed to HIV-positive mothers coming with their children; we also used registers, patient’s files with clinical and laboratory information to answer the research questions. With Focus group discussions and interviews addressed to these mothers and their caregivers, we collected information about the barriers to the utilization of the EID.

Data collection method

In this study, registers were used to identify HIV- exposed children. Structured questionnaire was addressed by trained medical personnel to HIV- positive mothers during consultations. Each questionnaire contained socio - demographic information on the parents, information on the pregnancy, on the delivery or the post-partum tests concerning every HIV- exposed child. Any identified child had a number to be followed during the study period.

We followed these pairs (mother-baby) to collect clinical and laboratory information to answer the research questions. With the Focus Group Discussion (FGD), In-depth interview (semi structured interview) addressed to these mothers and their caregivers, we collected information about factors affecting the success of the EID. We obtained a consistent number of HIV positive mothers, a good number of children from 0 to 18 months of age to assess the quality of the service provided or received, and the difficulties encountered at any steps (Identification of the child, HIV - testing, Blood sample transportation, result’s registration and reporting, and the antiretroviral treatment) of the EID.

Statistical method

Data were recorded in the platform of excel. Quantitative data were analyzed in the SPSS version 23. The test of proportion helped to compare the frequencies in the two different hospitals. The Chi square helped to analyze the effect of the mother’s age, mother’s occupation, mother’s marital status of the mother on the utilization of the EID and antiretroviral treatment of the child.

Qualitative data analyzed helped to identify some socio cultural, economic or educational factors, and compare information collected from both study’s sites and draw some specificities for the effectiveness of the EID in our study population.

Ethical consideration

Ethical clearance was obtained from the Cameroon National Ethical Committee. Signed informed consent was received from each mother prior to the inclusion to the study. All subjects who accepted to be interviewed, certified by signing on the informed consent form. Confidentiality was assured by safely and surely storing the questionnaires out of the reach of non-staff persons. Laboratory tests were kept confidential. Mothers received feedback on all the results and were referred where necessary to local health care services for appropriate follow-up. Administrative authorization was sought from each study site administration.

Results

During the period from April 2017 to May 2018, we collected information from HIV positive mothers who visit the health facility with their babies. We recruited a total number of 113 children, with 54 children in BDH and 59 in EDH. All of these HIV- positive mothers gave their consent only to their caregivers.

The table below shows how we recruited the cases in different study’s sites.

<table>
<thead>
<tr>
<th>Selection of Cases</th>
<th>BDH</th>
<th>EDH</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deliveries</td>
<td>2621</td>
<td>1914</td>
<td>4535</td>
</tr>
<tr>
<td>HIV positive women</td>
<td>111</td>
<td>126</td>
<td>237</td>
</tr>
<tr>
<td>HIV exposed children</td>
<td>93</td>
<td>131</td>
<td>224</td>
</tr>
<tr>
<td>HIV exposed children recruited</td>
<td>54</td>
<td>59</td>
<td>113</td>
</tr>
</tbody>
</table>
Table 2. Distribution of cases according to different study site

<table>
<thead>
<tr>
<th>Distribution of cases</th>
<th>(n=113)</th>
<th>Absolute percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BDH</td>
<td>54</td>
<td>47.78</td>
</tr>
<tr>
<td>EDH</td>
<td>59</td>
<td>52.21</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Site of analysis</th>
<th>(n=109)</th>
<th>Absolute percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CIRCB</td>
<td>51</td>
<td>46.78</td>
</tr>
<tr>
<td>BDH / EDH</td>
<td>58</td>
<td>53.21</td>
</tr>
</tbody>
</table>

From April 2017 till the 16th January 2018, PCR analyses were performed out of the health facility, in the CIRCB. After the 16th January till today, it was possible to perform PCR analysis in these respective hospitals.

**Demographic characteristics of key respondents**

Our key respondents were all the HIV positive mothers who gave their consent to the participation of the study. Their Characteristics are summarized in the table below.

Table 3. Demographic Characteristics of the HIV-exposed infant’s Mothers (key respondent)

<table>
<thead>
<tr>
<th>Level of education</th>
<th>(n=111)</th>
<th>Absolute percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>03</td>
<td>2.65</td>
</tr>
<tr>
<td>Primary</td>
<td>26</td>
<td>23.42</td>
</tr>
<tr>
<td>Secondary</td>
<td>60</td>
<td>54.05</td>
</tr>
<tr>
<td>University</td>
<td>20</td>
<td>18.01</td>
</tr>
<tr>
<td>Post university</td>
<td>02</td>
<td>1.08</td>
</tr>
<tr>
<td>Other</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Profession</th>
<th>(n=109)</th>
<th>Absolute percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jobless</td>
<td>38</td>
<td>34.86</td>
</tr>
<tr>
<td>Student</td>
<td>12</td>
<td>11</td>
</tr>
<tr>
<td>Seller</td>
<td>11</td>
<td>10.09</td>
</tr>
<tr>
<td>Farmer</td>
<td>1</td>
<td>0.09</td>
</tr>
<tr>
<td>Worker</td>
<td>19</td>
<td>17.43</td>
</tr>
<tr>
<td>Other</td>
<td>28</td>
<td>25.68</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Marital status</th>
<th>(n=111)</th>
<th>Absolute percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Married</td>
<td>31</td>
<td>27.92</td>
</tr>
<tr>
<td>Single</td>
<td>48</td>
<td>43.24</td>
</tr>
<tr>
<td>Concubine</td>
<td>31</td>
<td>27.92</td>
</tr>
<tr>
<td>Widow</td>
<td>1</td>
<td>0.09</td>
</tr>
</tbody>
</table>

About our key respondents, 34.86% of mothers were jobless, 11% were students, followed by others who were esthetician, teacher. Half of them had the level of the secondary school. Concerning the marital status of these mothers, less than 30% are married and most of them were either single (43.24%), or concubine (27.92%), means a total of 71.16% unmarried.
About 40% of our key respondents were originated from the center region, followed by the west region.

**HIV prevalence among HIV-exposed children**

From the beginning of the study till January 2018, PCR analysis was performed out of the Health facilities. After the 16th January, PCR were performed in each study sites (points of care). The HIV sero status of the male partner was received from the mothers.

### Table 4. HIV status of Fathers and children

<table>
<thead>
<tr>
<th>HIV status of fathers</th>
<th>(n=100)</th>
<th>Absolute percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>HIV Positive</td>
<td>35</td>
<td>35</td>
</tr>
<tr>
<td>HIV Negative</td>
<td>43</td>
<td>43</td>
</tr>
<tr>
<td>Unknown</td>
<td>22</td>
<td>22</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>HIV Status of children</th>
<th>(n=111)</th>
<th>Absolute percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>HIV positive</td>
<td>07</td>
<td>6.30</td>
</tr>
<tr>
<td>HIV negative</td>
<td>104</td>
<td>93.7</td>
</tr>
</tbody>
</table>

In our study population, fathers were relatively older than mothers; The Mean age of fathers was 36.82 compare with 31.47 for mothers. Fathers of HIV exposed children were more educated than their sexual partners; 30% of them reached the level of the university compared to 20% of mothers. But we lack much other information on fathers because we obtained them through mothers; only 78.00% of fathers had their HIV status known. Among fathers who had their HIV status known by their partner, 43 over 78 (55.12%) were HIV negative.

The mean duration of the PCR analysis out of the hospital (in the CIRCB) was 1070.72 hours (more than a month), compare to 2.00 hours (less than one day) when the test was performed in the health facility.

In total, 111 children have their HIV status known with 104 (93.69%) HIV negative and 7 Children were positive giving a prevalence of 6.30%.

About the HIV positive children obtained in our study, we selected some variables summarized in the table below
Table 5. Summary of variables on HIV-infected children

<table>
<thead>
<tr>
<th>Characteristic of child</th>
<th>HIV infected child</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Health facility</td>
<td>EDH</td>
</tr>
<tr>
<td>Test site</td>
<td>CIRCB</td>
</tr>
<tr>
<td>Age</td>
<td>6 weeks</td>
</tr>
<tr>
<td>Characteristic of mother</td>
<td>1</td>
</tr>
<tr>
<td>Age</td>
<td>22</td>
</tr>
<tr>
<td>Profession</td>
<td>Jobless</td>
</tr>
<tr>
<td>Marital status</td>
<td>Single</td>
</tr>
<tr>
<td>Education level</td>
<td>Secondary</td>
</tr>
<tr>
<td>Characteristic of father</td>
<td>1</td>
</tr>
<tr>
<td>HIV status</td>
<td>Negative</td>
</tr>
<tr>
<td>Period of the hospital visit</td>
<td>During Delivery</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
We found in our study population, a total of 7 HIV positive children, diagnosed at different stages of live. 5 of them are relatively late diagnosed. 6 over 7 mothers of these children were jobless (85.71%) during the study period even though they reached the secondary level of education, 5 over 7 (71.42%) of them are not married, these mothers were either single or concubine. 4 fathers over seven (57.14%) visit the hospital after the delivery of their child.

**Associated factors to the HIV positive sero-status of the children**

We performed the chi square test analysis. With 5% significance, we found no association between the child’s age when performing the HIV test, mother’s or father’s marital status, occupation, region of origin, level of education, and the HIV sero-status of the HIV – exposed child.

There was no relationship between the times spent from the sample collection to the result with the sero-status of the child.

<table>
<thead>
<tr>
<th>Sero-status of the HEI</th>
<th>Site of the PCR analysis /HIV test of the child (n=106)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>CIRCB</td>
</tr>
<tr>
<td>Positive</td>
<td>5</td>
</tr>
<tr>
<td>Negative</td>
<td>50</td>
</tr>
<tr>
<td>Total</td>
<td>55</td>
</tr>
<tr>
<td>Chi square value</td>
<td>31.584</td>
</tr>
<tr>
<td>Significance</td>
<td>*** (0.000)</td>
</tr>
</tbody>
</table>

We found a statistically significant association between the site of the PCR analysis and the sero-status of the child.

Analysis of interviews and focus group discussions revealed key ideas to complete the list of different factors which could influence the HIV seropositivity of the child at different levels like: health system, health care facility, community, family and individual level, where specific actions need to be done for the successful of the PMTCT program.

**Discussion**

This study investigated factors associated with the non-success of the EID among HEIs at Biyem-Assi and Efoulan District Hospitals in the Capital town of Yaoundé in Cameroon.

We observed missing data in the ART and early infant’s diagnosis register concerning the control of second PCR analysis or the confirmation’s test to be performed at 18 months of age. This can be explained by the complexity of the data to collect and the overwork load that was described by the Health care providers. With the multiple HIV tests (minimum 2 before the age of 18 months) to be performed for an HEIS, there were neither motivation, nor an additional health personnel in the pediatric service of EDH. Additional testing is associated with an increase workload which can affect the quality of the service (Gill et al., 2018). This led to missing data in the file and the increasing number of loss to follow up of HEIs. Hassan et al. in the study of the dynamics and constraints of early infant diagnosis of HIV infection in rural Kenya, found that loss to follow up and missing data on EID could partly be explained by the inadequate training of the health care personnel (Hassan et al., 2012) or misunderstanding of EID by the caregivers (Tomlinson et al., 2016). Another reason could be a lack of social support, or poverty in accessing EID source. Due to the vulnerability that is known from these HIV-positive responders, they accepted only to discuss with the nurse or the pediatrician in charge of the baby’s care. We could not call for additional information and no home visit were allowed.

Concerning our responders, half of them had the level of the secondary school, less than 30% were married and most of them either single (43.24%) or concubine (27.92%) means a total of 71.16% unmarried. This is probably a reason of missing data on male partners; since we obtained information through mothers, only 78% of fathers had their HIV status known. Sometimes these women wanted only to be pregnant and did not want to know more about the man (sometimes already married). It has
been described that relationship within couple and particularly the HIV status disclosure to the male partner may play an important role in the maternal uptake of early infant HIV testing. Hampanda et al. (2017) shows that uptake of early infant HIV testing was associated with female – directed emotional intimate partner violence (aOR 0.41; 95% CI 0.21-0.79; p<0.01), HIV status disclosure to the male partner (aOR 13.73; 95% CI 3.59-52.49; p<0.001) (Hampanda, Nimz, & Abuogi, 2017).

During our study period, over the 113 participants, 57 have their PCR analysis performed in the health facilities with the mean duration of 2 hours, comparing to 50 PCR analysis performed out of the health facilities. Among the 50 PCR analysis performed out of the health facilities (CIRCB), the mean turnaround time (TAT) between blood draw for DNA-PCR tests to delivery of a test results to the respective health facility was 44 days, giving more risk of baby’s infection. This TAT is more than 36 days as a Median TAT found by kedede et al. (2012) in a multicentre retrospective cohort study in Ethiopia. It was a larger sample size of 266 HIV-exposed infants. In a study conducted in Myanmar by Thiha et al. from 2013 to 2015, long distance between ART center and PCR facility was associated with long Turn Around time for EID(Thiha et al., 2017).

Among the 113 participants recruited, 111 (98.23%) children had their HIV status known at different stage of their life; compare to only 109 over 266 (41.0%) in Ethiopia. 92.04% of children were negative during the data collection and 7 children HIV positive giving the prevalence of 6.30%, fast the same as 6.5% found among HIV- exposed children in rural Uganda (Kahungu, Kiwanuka, Kaharuza, & Wanyenze, 2018). This prevalence is nearly the same as the national prevalence of HIV among HIV- exposed children in Cameroon, less than 8.7% found in Brazil (Matos et al., 2018) and 13.2% found among 266 HIV- exposed Ethiopian children (Kebede, Gbeyehu, Jain, Sun, & Haubrich, 2014). This high prevalence and high loss to follow up found in the Ethiopian study can be explained by the fact that in 2012, the option B+ was not yet implemented.

After a focus Group discussion (FGD) conducted with health care workers involved in PMTCT process, when we addressed the question to know factors associated with the unsuccessful EID, they talked about Denial, guilt, lack of money to access the service, HIV related stigma in their environment. The overwork load, poor motivation, Lack of personnel and the staff training were the main difficulties facing by the care givers. Ahmed et al. (2017) in a qualitative study on mothers and caregivers of HIV positive children in Swaziland found also the tuberculosis and HIV co-infection as barriers to ART initiation among children from 2 to 18 months of age (Ahmed et al., 2017).

Among the 7 HIV –positive children registered in our study, it was indicated 6 over 7 (85.71%) late diagnosed (over 8weeks of age). Even with a good education, and counseling, it is also found some unexplained retardation on the follow up of HIV-positive mothers which can affect their babies heath care. Mirkuzie et al. found that among the 219 HIV exposed live born in Addis Ababa, only115 (52%) were brought for EID at Six weeks of age (Mirkuzie, Hinderaker, Sisay, Moland, & Mørkve, 2011). Tariq et al. found in a study conducted in United Kingdom (UK) and Ireland, a strong relation between black ethnicity and late presentation to ANC, which could also be explained by many socio cultural consideration of the pregnancy and baby’s care in the family (Tariq, Elford, Cortina-Borja, Tookey, & National Study of HIV in Pregnancy and Childhood, 2012).

Concerning the socio - economic and cultural factors, there was no statistical association between the mother’s occupation and marital status with the sero-status of the HIV- exposed child in our study. But among the HIV positive children, 6 over 7 (85.71%) of their mothers were jobless and 5 over 7 mothers (71.42%) were unmarried, mean they have poor financial or psychosocial support to give help and taking care of their children. Mothers without a transport fees to attempt the health care facility will delay the visit of the center and also delay the early diagnosis or the initiation of ART. Poverty and distance to the clinic were described by Ahmed et al. as one of the barriers to the initiation of ART among children from 2 to 18 months of age (Ahmed et al., 2017). Okoli et al. (2014) found in a critical literature review that socio-economic and socio-cultural factors were the biggest barriers to the success of PMTCT programs in Malawi and Nigeria (Okoli & Lansdown, 2014). Poor partner and community support were also described as barriers to the uptake of ART drugs to prevention of MTCT of HIV in Sub Saharan Africa (Gourlay et al., 2013).
Conclusion

This study aimed to describe factors which negatively influencing the EID services and impact the HIV positivity of the exposed child. We attained most of our objectives. The lack of service commodity like the absence of PCR analysis in the health facility is linked to a long turnaround time from the DBS collection to the reception of the Baby’s HIV result. This reduces the adherence to the EID continuum services and increases the risk of HIV infection among HEI. Good community follow up need to be organized, integrated community sensitization should be addressed. More staff training with more implication of gynecologists and pediatrician in the family counseling during the perinatal period, availability of better commodities may accelerate the early identification of HIV in infants, their retention in care and the elimination of the mother to child transmission of HIV.

Difficulties

During data collection, we faced difficulties to obtain consent or additional information from HIV positive mothers in the absence of their health care providers. There were multiple studies during the same period on the same target population. The high work pressure and insufficient motivation of health care personnel make the work too heavy. The difficulty to obtain information on male partner and patients lost to follow - up could be explained by the ignorance or resistance of our key respondents, lack of transport fees. No home visit was allowed.

List of abbreviations

- **ABC**: Abacavir
- **AIDS**: Acquired Immune Deficiency Syndrome
- **ANC**: Antenatal Care
- **ART**: Antiretroviral Therapy
- **ARV**: Antiretroviral
- **AZT**: Zidovudine
- **BDH**: Biyem-Assi District Hospital
- **CDC**: Center for Disease Control and Prevention
- **CIRCB**: Centre International de Référence Chantal Biya
- **CD4**: Cluster Differentiation 4 cells-T4 helper cells
- **DBS**: Dried Blood Spot
- **EDH**: Efoulan District Hospital
- **EFV**: Efavirenz
- **EID**: Early Infant Diagnosis
- **FTC**: Emtricitabine
- **HAART**: Highly Active Antiretroviral Treatment
- **HCW**: Health Care Worker
- **HEI**: HIV Exposed Infant
- **HIV**: Human Immunodeficiency Virus
- **IEC**: Information, Education and Counseling
- **LPVr**: Lopinavir ritonavir
- **LTFU**: Lost to Follow Up
- **MCH**: Mother and Child Health
- **MOH**: Ministry of Health
- **MTCT**: Maternal to Child Transmission
- **NVP**: Nevirapine
- **PCR**: Polymerase Chain Reaction
- **PMTCT**: Prevention of Mother to Child Transmission
- **TDF**: Tenofovir
- **UNICEF**: United Nations Children Education Fund
- **WHO**: World Health Organization
- **3TC**: Lamivudine
Recommendations

Health system and NGO’s politics

Increasing funds allocated to phone calls, transport and health care of HIV positive mothers and children to reduce the percentage of patients lost to follow-up.

Organizing HIV screening strategies particularly around the perinatal period at any point of contact with the health system by gynecologists and pediatrician to capture HIV exposed children and their parents.

Health care facility

Organizing integrated services for all couple mother-child (before 18months of age) visiting the Health facility (post-partum rendezvous, immunization’s visit, circumcision, pediatric consultation, etc.). The personal in charge will quickly check their needs and follow the parent or child HIV screening tests. This could reduce the high work pressure, the number of lost to follow-up, and complete the EID cascade.

Limits of the study

Due to the complexity of data collection in the PMTCT cascade, we had some missed information to complete our interpretation as the opinion of the fathers on their HIV - exposed children. There was information’s bias, for example HIV-positive mothers sometime forgot the real time of the beginning of the ART intake.

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Scale-up Zinc Sulphate Use for Management of Childhood Diarrheal Diseases in Zambia Through Community Health Workers and Women’s Support Groups

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Abstract

Background: In Zambia, diarrhea is one of the commonest diseases that affect under five children. It represents 12% of all causes of under-five mortality; and only 60% of children with diarrhea received oral rehydration treatment in 2012.

Objective: To assess if training of community health workers and establishment of women’s support groups will enhance the use of zinc sulphate as adjuvant therapy for childhood diarrheal diseases and decrease child mortality in underserved areas. We therefore conducted a literature review of published clinical trials that were conducted in developing countries.

Search methods: We searched Medline through PubMed database and COCHRANE CRCT database. Our main focus was to identify literatures reporting on the effectiveness of oral zinc in reducing duration and severity of childhood diarrheal episodes; literatures published in developing countries, in English and French languages. We restricted our search to clinical trials. There was no time limit attached to our search.

Main results: After literature screening, 112 articles were excluded for not being clinical trials whilst 24 did not meet the main focus of our study. Only 28 articles were selected. Analysis reported a wide variety of diarrheal-related outcomes depending on number of considerations.

Conclusion: Zinc supplementation in children reduces duration and/or severity of diarrheal episodes hence decreases child mortality.

Keywords: “diarrhea”, “child”, “zinc” and “therapeutic use”.

Introduction

Diarrhea, a condition characterized by frequent discharge of loose or watery stools for at least three times a day, is one of the major public health problems especially in children (1). According to World Health Organization (WHO) and the Centers for Disease Control and Prevention (CDC), diarrhea accounts for more than 760,000 of total child mortality every year and kills 2,195 children every day, which is more than AIDS, malaria and measles combined (2, 3). In the majority of cases, this is preventable through exclusive breastfeeding, improved hygiene and sanitation and access to clean water, yet diarrhea is still one of the leading causes of death among children under five and it is the leading cause of malnutrition in the same age group (2). Causes of diarrhea are multiple (bacterial, parasitic, viral) but the contamination and spreading are mainly through unsafe food or water (1, 2). Diarrhea related deaths are more significant in low and middle income countries as access to safe water and good sanitation has remained poor in those countries (4).

Generally under-five children die from diarrheal diseases because of excessive loss of water and electrolytes that are associated with diarrheal diseases and; WHO and UNICEF recommend a diarrheal treatment package made of fluids replacement to prevent dehydration and zinc therapy (1). Zinc is known to be essential for the synthesis of proteins, cell growth and differentiation, immune function, and intestinal transport of water and electrolyte. For more than two decades, researchers have been assessing the benefit of zinc supplementation during diarrhea episodes. Studies have shown that zinc supplementation reduces diarrheal duration and treatment failure or death in persistent diarrhea. These studies also revealed that children receiving zinc experience a decrease in the severity of their diarrhea episodes. A ten days course as well as a five days course has proven to provide a prophylactic protection against future bouts of diarrhea for two to three months after the episode.(4).
**Background and significance**

In Zambia, diarrhea is one of the commonest diseases that affect under five children (other diseases include malaria, respiratory infections, HIV/AIDS and neonatal causes with malnutrition underlying) (5). It represents 12% of all causes of under-five mortality; and only 60% of children with diarrhea received oral rehydration treatment in 2012 (6).

Poor access to safe water and adequate sanitation has continued to be one of the main drivers of diseases such as diarrhea in Zambia (7). According to Zambia Demographic and Health Survey 2013-14, 65% of households have access to improved sources of water and only 25.4% of households have improved and not shared sanitation facilities. This situation is more common in rural than in urban areas (e.g. 89.5% in urban vs 46.6% in rural for safe water and 35% in urban vs 18.5% in rural for having improved and not shared sanitation facilities) (8), and has significantly contributed in increasing the burden of diarrheal morbidity and associated mortality (7). Different strategies have been put in place by the government to help reduce the incidence of diarrheal diseases including diarrheal case fatality rate. Zinc supplementation is one of the strategies and has been implemented in the country since 2004. The implementation of these strategies in general and of zinc supplementation in particular has been challenged by a number of barriers. This is partially due to inadequate supply, geographical barriers, and constraints of time, distance and cost of transport and availability of qualified staff in rural areas. To prevent delays in accessing on time some vital health services, Zambia with the support of UNICEF and other partners, has introduced Integrated Community Case Management (ICCM) of pneumonia, malaria, diarrhea, and malnutrition in 23 selected districts out of 89 by 2010; this ICCM being run by Community Health Workers (CHW) Though, the health sector in Zambia is facing a major human resource crisis, with shortage of health workers at every service delivery level. Ministry of Health (MOH) has developed National Community Health Worker strategy aiming at repositioning and expanding the currently available CHW cadre. CHWs will deliver essential and priority health services, where there are gaps and reported deficiency through a task-shifting approach (from nurses to CHWs) (9). By the end of 2010, over 5,635 community health workers (CHWs) have been trained to support child health program in the country (10). CHWs undergo a year of formal training, and then return to their rural home communities to work. The majority of their work consists of household visits, but they also spend one day a week in the community health post and organize community health-education meetings. They are the first line of healthcare for Zambians living in the most remote areas of the country.

A recent review by the Child Health Epidemiology Reference Group (CHERG) estimated that community case management could result in reduction of childhood mortality. Oral rehydration salts (ORS) and zinc are effective against diarrhoea mortality in home and community settings, with ORS estimated to prevent 70 to 90% of deaths due to acute watery diarrhea (11) and zinc estimated to decrease diarrhoea mortality by 11.5% (12).

For these reasons, UNICEF, WHO and partners working in an increasing number of countries are supporting the ICCM strategy to train, supply and supervise front-line workers to treat children with diarrhoea, using ORS and zinc.

Despite this, the delivery of health services is often weakest where the needs are greatest, and low coverage of the most needed interventions results in a significant unmet need for treatment of diarrhea as one of the major child killers. E.g. in developing countries, current treatment levels are unacceptably low: only 39% of children receive correct diarrheal treatment (13).

Is this gap due to poor acceptability of ICCM services, lack or poor level of the community awareness, inadequate human resource? Increasing awareness in the context where this service is available and community health workers at community level, will they have a positive impact in accessing, utilizing zinc supplementation services and then reduce diarrheal related mortality in children aged under five?

We therefore intend to conduct a cluster randomized clinical trial that is going to assess the impact training of community health workers and establishment of women’s support group on the use of zinc supplementation as adjuvant therapy in childhood diarrheal diseases at community level in rural areas of Western Province of Zambia where ICCM is being implemented as compared to where there is no implementation. The results from this study will provide evidence on how to scale up zinc
supplementation services in the ICCM implementing areas and later in the new districts. Knowing that, our messages to the community will be based on the efficacy of zinc supplementation in reducing the duration and severity of childhood diarrheal episodes.

We therefore conducted a literature review of published clinical trials that were conducted in low and middle income countries where Zambia belongs; methodology and results are presented below.

**Literature review**

**Formulation of an answerable question**

PICO standardized format was used to formulate our research question as follow:

- **Research question:** Can oral zinc supplementation be used to reduce duration and severity of childhood diarrheal episodes in children under five years old with acute or persistent diarrhea in rural areas of Zambia?
- **Population:** Children under five years old with acute or persistent diarrhea in rural areas of Zambia
- **Intervention:** oral zinc supplementary therapy for diarrhea
- **Comparison:** Children under five years old with acute or persistent diarrhea in rural areas of Zambia who did not receive oral zinc supplementary therapy
- **Outcomes:** Reduction on the duration and the severity of childhood diarrheal episodes and its subsequent impact on child mortality in children under five years old in rural areas of Zambia.

**Methods**

**Inclusion and exclusion criteria**

We searched Medline through PubMed database on [http://www.ncbi.nlm.nih.gov/pubmed/](http://www.ncbi.nlm.nih.gov/pubmed/) and COCHRANE CRCT database. Our main focus was to identify literatures reporting on the effectiveness of oral zinc in reducing duration and severity of childhood diarrheal episodes; literatures published in developing countries, in English and French languages. We restricted our search to clinical trials. There was no time limit attached to our search. In PubMed, MeSh terms used were: diarrhea, zinc /therapeutic use and child. For COCHRANE CRCT, we used “diarrhea”, “child”, “zinc” and “therapeutic use” as keywords.

**Search strategy**

**PubMed search**

1. search: “diarrhea” [MeSh terms]
2. search: “zinc/therapeutic use” [MeSh terms]
3. search: (“child” [MeSh terms])
4. search: (#1) AND #3
5. search: (#4) AND #2
6. search: (#4) AND #2 Filters: clinical trials

**COCHRANE CRCT search**

1. search: “diarrhea” [keyword]
2. search: #1 search AND “child” [keyword]
3. search: #2 search AND “zinc” [keyword]
4. search: #3 search AND “therapeutic use” [keyword]

**Results**

After screening for clinical trials, focus to the topic under review; and duplication, 112 articles were excluded for not being clinical trials whilst 24 did not meet the main focus of our study either because they were not related to the effect of zinc supplementation in reducing duration and/or severity of diarrheal episodes or published in developed countries or in language other than English or French. Only 28 articles were selected (12 free full texts and 16 abstracts) by the end of the screening (Figure 1). Most studies were conducted in developing countries.
Articles selected were organized in four sub topic groups according to their respective focus:
1. Impact of zinc supplementation in childhood diarrheal diseases
2. Impact of zinc and other micronutrients supplementation in childhood diarrheal diseases
3. Zinc and oral rehydration solution in acute diarrhea
4. Zinc in malnourished children with acute diarrhea

Summary and synthesis of literature review
Randomized Controlled Trials (RCTs) assessing the therapeutic effects of zinc supplementation in childhood diarrheal diseases have reported a wide variety of diarrheal-related outcomes. Outcomes vary with different considerations:
Impact of zinc supplementation in childhood diarrheal diseases

From the articles retrieved in our search, it shows that zinc supplementation, given alone, reduces drastically the duration and severity of acute or persistent diarrhea (16, 17, 22, 23, 24, 25). Associated with other additional information from other published randomized trials, these results indicate that zinc can have substantial clinical benefit and suggest that this supplementary therapy could reduce morbidity and mortality from diarrhea (16, 18, 19 and 23). Its effectiveness when given on daily or weekly schedule is still the same (16, 22 and 24). This applies also on the duration of adjuvant treatment; five days zinc treatment is as efficacious as ten days in preventing diarrhea in the subsequent three months (15).

Pooled analyses have a number of strengths. These include:
1. Evidence supported by statistical data (14)
2. Conclusions were made based on plasma zinc concentration and clinical findings (19)
3. Study conducted in areas of high prevalence of zinc deficiency (22)

Despite these strengths, analyses revealed also weaknesses such as:
1. The sample sizes in the stratified groups were insufficient to detect statistical significant differences in the 3-5-month and 6-11-month age-groups (16)
2. No blinding was done; plasma levels do not always necessarily indicate zinc deficiency (20)
3. Diarrheal episodes were detected by weekly surveillance during the supplementation period (23)

Impact of zinc and other micronutrients in childhood diarrheal diseases

Articles reviewed revealed different outcomes depending on the micronutrients used in combination with zinc supplementation (27-33). Therapeutic Zinc or Zinc and Copper supplementation may not have a general beneficial impact on the duration of acute diarrhea in children (27); while Vitamin A and zinc supplementation was associated with distinct parasite-specific health outcomes (28). When compared with vitamin A alone, supplementation with zinc, or with zinc and multiple micronutrients, did not reduce diarrhea morbidity (29). Nevertheless, it was noted that zinc supplementation as adjunct therapy had a significant impact on the rate of prolonged diarrhea and some impact on duration and may be beneficial in children with diarrhea in developing countries (33).

Some of the strengths in our analyses are:
1. No difference noted in treatment adherence across the groups in the hospital stay or at home after discharge (27)
2. Treatment groups were similar at baseline with regard to the characteristics of the presenting episode, anthropometric data, and plasma zinc concentration (32)

Though weaknesses such as collection of only 1 stool per month for surveillance, was likely to miss enteric infections. There were no biochemical indicators of initial vitamin A and zinc status of children, no distinction between pathogenic and non-pathogenic E histolytica (28). Low dose of zinc as compared with other therapeutic studies as possible causes of the failure of a favourable response to treatment (27) was also noted.

Zinc and oral rehydration solution (ORS) in acute diarrhea

An approach where caregivers are educated on the use of zinc supplementation in presence of easy access to oral rehydration salts appears more effective in diarrheal treatment (34). This approach does not adversely affect the use of oral rehydration salts; in fact, it greatly increases use of the same. Though, a controversial outcome from a study conducted in India (36) concluded that Zinc-ORS does not reduce the severity or duration of acute watery diarrhea in children who are brought to hospitals with diarrhea.

One of the strengths in our analyses was the engagement of private providers in the study which was an important factor in achieving high rates of intervention compliance (34). But the fact that zinc tablets were provided free of cost, possibility of a reporting bias in favor of the intervention groups for diarrhea prevalence could have been high (34).
Zinc in malnourished children with acute diarrhea

Literature reviewed showed that zinc supplementation in malnourished children with acute diarrhea may reduce the severity and duration of diarrhea, especially in children with low zinc levels (39). It reduces stool output, prevents weight loss and promotes earlier recovery (40).

Strengths related to studies include the fact that there was 24 hours observation and accurate weighing of stool output during the period of hospital management, while time to recovery was confirmed by direct observation (38). Intervention and control groups were comparable at admission in terms of severity and duration of diarrhea, as well as nutritional and anthropometric parameters (38). Despite these strengths, it was also noted that the control group in one of the studies did not receive multivitamin syrup though it was appropriate for malnourished children (38) and the sample size in another study was insufficient to generalize findings (40).

Discussion

From our literature review, we have noted that zinc supplementation is a new intervention for treating diarrheal episodes in children. It’s an addition to the diarrhea treatment strategy. Findings of these trials, which were performed in several developing countries, indicate that therapeutic use of zinc is a diarrhea treatment strategy that promises to greatly improve diarrhea management and may have wide applicability. Though, they did not provide comparisons of zinc effects in different age-groups based on baseline investigations. Neither, interactions with other micronutrients nor its accessibility in the community were provided. In Zambia, despite World Health Organization (WHO) and UNICEF recommendation of use of zinc supplements in management of childhood diarrhea (42) and, the government policy of supportive community case management (CCM) and implementation for diarrhea, its use is not yet expanded countrywide (43).

At country level, few literatures have been published in line with the use of zinc in management of childhood diarrhea in the community. But results from other developing countries may be used to support the effectiveness of zinc supplementation in the treatment of diarrhea (14-41). Despite all, gaps still remain and they might be addressed by efficient implementation of training of CHW and establishment of women support groups. Gaps include issues of acceptability, community awareness, inadequate human resource hindering on access to ICCM services at community level.

Conclusion

Zinc supplementation reduces diarrheal duration and treatment failure or death in persistent diarrhea. It also decreases the severity of diarrhea episodes. A ten days course as well as a five days course has proven to provide a prophylactic protection against future episodes of diarrhea for two to three months after the initial episode.

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Prevalence of Hypertension in relation to Overweight and Obesity among Non-teaching staff of College of Medicine, University of Ibadan, Oyo State

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Abstract

Hypertension and overweight/obesity prevalence are associated with high rates of morbidity and mortality which has become a vital public health concern worldwide. Among many studies conducted on hypertension prevalence, there is paucity of data on this subject among workers in the hospital environment. This study thus centered on determining the prevalence of hypertension among non-teaching staff of the College of Medicine, University of Ibadan (CoMUI).

A sum of 315 non-teaching staff of CoMUI on the University College Hospital premises participated in the survey. Blood Pressure (BP) was determined as specified in the ESH/WHO guidelines. BMI was assessed using a known-weight standardized weighing scale and heightometer. Data were analyzed using SPSS. Descriptive statistics, Chi-square and logistic regression were considered.

Hypertension prevalence among respondents was 25.4% (68.8% male; 31.3% female). For the male respondents, the mean SBP was 132.2±19.0mmHg and it was significantly higher than that of the females 124.5±17.8mmHg (t = 3.63, p<0.05). Also, the mean DBP of the male respondents (86.04±11.19) was significantly higher than females (80.95±11.62), t = 3.92, p <0.05. Prevalence of overweight and obesity was 33.1% and 20.3%. Age group of 21-30 years and 31-40years are three times and two times less likely to develop hypertension than those within the age group of 51-60 years (O. R=0.361(3x) and 0.467(2x); 95% CI=0.137-0.951 and 0.219-0.995) see table 6.0.

Prevalence of 25.2% indicated that one quarter of the non-teaching staffs of College of Medicine working within the University College Hospital are hypertensive. This suggests an urgent intervention to avoid resulting complications.

Keywords: Hypertension, Hypertension prevalence, Body Mass Index (BMI), Hospital environment, Obesity, Overweight.

Introduction

High blood pressure which is also known as hypertension results from environmental impacts acting over time on the genetically predisposed individual (Pickering, 1967). Hypertension is recognized as a silent killer, as it damages the target organs on a continuous and progressive basis until symptoms are manifested (Hoel and Howard, 1997). In adult, blood pressure is generally agreed to be high when the systolic pressure is equal to or greater than 140mmHg and diastolic pressure is equal to or greater than 95mmHg (World Health Organization/International Society of Hypertension,1999). The rate of Mortality and morbidity caused by hypertension on families and the society at large is so overwhelming. Apart from being a disease on its own, it is also a major risk factor for stroke and heart diseases Hypertension is recognized as a silent killer due to the damages it causes on the target organs on a continuous and progressive basis until symptoms are manifested (Macmillian, Peto and Cutler, 1990). Population-based studies have shown that hypertension accounts for about 35% of all events relating to atherosclerotic, including 49% heart failure and related cases. It increases two- to three times in an individual risk of various cardiovascular consequences (Padwal, Strauss and McAlister, 2001).

There have been many studies and projections on hypertension prevalence and its related complications globally and in many nations of the world. It was calculated, chronic diseases contributed about 60% of the 56.5 million total reported deaths in the world in 2001 and roughly 46%
of the burden of disease globally (World Health Organization, 2002). Also, it has been projected that chronic diseases will account for almost three-quarters of all deaths worldwide by 2020 and 75% of deaths from stroke, and 70% of deaths from diabetes will occur in developing countries (World Health Organization, 1998). Most of these chronic diseases have their roots on hypertension. Also, data from South Africa shows that the burden of non-communicable diseases, mostly cardiovascular diseases, including stroke, caused by hypertension, is greatly increasing among the urban Black African populace (Bradshaw, Groenewald et al, 2000). Worldwide, Hypertension is increasingly becoming a common health problem due to increase in longevity and prevalence of associated risk factors (Yusuf, et al 2001). In many developing countries particularly in urban societies, the current prevalence is already as high as those recorded in developed countries (Vorster, 2002). In 2002, hypertension was estimated to account for 13% of deaths worldwide (WHO Report, 2002). The estimated total number of adults with hypertension in 2000 was 972 million. Of these, 333 million were estimated to be in economically developed countries and 639 million in economically developing countries. By 2025, the number of people with hypertension will increase by about 60% to a total of 1.56 billion as the proportion of elderly people will increase significantly (Kearney et al, 2005).

In Nigeria, a study conducted in 1997 estimated that over 4.3 million Nigerians above the age of 15 years were hypertensive with systolic blood pressure of 160 mmHg and above, and/or a diastolic of 95 mmHg and above. In 2010, another study estimated about 20.8 million cases of hypertension in Nigeria among people aged at least 20 years with a prevalence of 28.0%. It was also estimated that by 2030, the cases of hypertension among age 20 years in Nigeria will increase to 39.1 million having prevalence of 30.8%. Also, in Nigeria, the prevalence of hypertension ranged from 17-20% in the urban communities and 11.2% in the rural communities. A worksite study on prevalence of hypertension which was conducted among non-academic staffs in Obafemi Awolowo University, Ile-Ife, Nigeria, revealed a prevalence of 21% (Erhun, et al 2005).

Though the exact causes of hypertension are not usually known, a number of factors have been highly associated with the condition. These include: Smoking, obesity or being overweight, sedentary lifestyle, lack of physical activity, diabetics, high levels of salt intake (sodium sensitivity), Vitamin D deficiency, aging, Insufficient consumption of potassium, calcium, and magnesium, stress, high levels of alcohol consumption, high consumption of medicines including birth control pills, as well as family history of hypertension, adrenal, chronic kidney diseases and thyroid problems or tumours (Mabuza, 2006).

However, a range of lifestyle changes has been shown in clinical trials to bring low blood pressure (Ebrahim and Smith, 1998) and to reduce the occurrence of hypertension (Stevens, et al 2001). These include loss of weight in overweight, physical activity (Hagberg, Park and Brown, 2000), reduced alcohol intake (Xin, et al 2001), a diet rich in fresh fruits and vegetables as well as less of saturated fat food content and reduced dietary sodium intake (Sacks et al 2001).

It is quite clear that hypertension is a major public health problem in Sub-Saharan African countries, particularly in Nigeria. Levels of its detection treatment and control are very low and of great concern, suggesting that high levels of adverse effects including heart failure, stroke, and renal failure will become obvious in the years to come.

Due to the symptomless nature of hypertension, the proportion of people in any given population who are aware of their blood pressure is usually low not minding their locations.

Sequel to this problem, this study was conducted to screen for hypertension as well as determine blood pressure pattern among hospital – based workers in Ibadan, Oyo State.

**Objectives of the study**

1. To determine the prevalence of hypertension among non-teaching staff of college of medicine Ibadan Oyo State
2. Determine prevalence of overweight/obesity among non-teaching staff of college of medicine Ibadan Oyo State
3. To determine the relationship between gender and prevalence of hypertension among non-teaching staff of college of medicine Ibadan Oyo State
4. Determine the relationship between prevalence of hypertension and overweight/obesity among non-teaching staff of college of medicine Ibadan Oyo State

**Methodology**

**Study area**

College of Medicine of the University College Hospital where this study was conducted is situated in Ibadan North Local Government Area of Oyo State, Nigeria. Being one of the pioneer institutions in Nigeria which was instituted on November 17th, 1948, the University existed originally as an independent external college of the University of London. College of Medicine as an arm of the University has 476 Non-Teaching Staff distributed within 44 departments. One of the departments is situated in Ibarapa community, 36 departments are located at the University College Hospital while 7 departments are at the main campus. The conduct of this study was limited to the non-teaching staff in the 36 departments located in College of Medicine.

**Study population**

The study population was comprised of non-teaching Staff in University College Hospital environment who are working in different department of the College of Medicine Ibadan.

**Sampling method**

The sampling method used for this study was purposive.

**Sample size**

Three hundred and fifteen (315) non-teaching staff was involved in the study being the total number of the entire staff of the College of Medicine, University College Hospital. As such, sample size calculation was not necessary.

**Study tools**

Semi-structured questionnaire was used after it was pretested among population with similar characteristics with the study population.

**Collection of data**

The semi-structured questionnaires which was validated were self-administered with the help of two trained nurses who also helped in checking the blood pressure of the respondents.

**Measurement of blood pressure**

Measurement of blood pressure was done using Accoson mercury sphygmomanometer. The measurement was conducted in the staff respective offices. It began after the subject had rested for at least 5 minutes. The patients were seated in a comfortable chair with their backs supported and arms bared and supported at heart level. An appropriate adult cuff size was used to ensure accurate measurement. The cuff was inflated to 30 mmHg above pulse occlusion. The systolic blood pressure was recorded at the first appearance of a sound and the diastolic blood pressure was recorded at the disappearance of the sound. Blood pressure was measured twice at two minutes intervals and if the readings differed by more than 5 mmHg, an additional reading was taken. Hypertension was diagnosed based on the laid down criteria by the World Health Organization -International Society for Hypertension (1999). A Patient was labelled hypertensive if an average of three readings showed the systolic blood pressure to be 140 mmHg or greater and the diastolic blood pressure to be 90 mmHg or greater (World Health Organization -International Society for Hypertension, 1999).

**Height measurement**

Respondents’ height was measured with a measuring tape. Individual standing erects with the back against the wall and with the shoes removed. The measurement was recorded in meters to two decimal points.
Weight measurement

Respondents’ body weight was measured using simple bathroom scale which was standardized using a known weight. Placing the scale on a firm horizontal surface, the weight of each subject was measured with shoes removed and was recorded in kilograms to one decimal point. The pointer of the scale was adjusted to zero before and after each measurement to avoid error.

Table 1. Blood pressure measurement

<table>
<thead>
<tr>
<th>Categories</th>
<th>SBP (mmHg)</th>
<th>DBP (mmHg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Optimal</td>
<td>&lt;120</td>
<td>&lt;80</td>
</tr>
<tr>
<td>Normal</td>
<td>&lt;130</td>
<td>&lt;85</td>
</tr>
<tr>
<td>High normal</td>
<td>130-139</td>
<td>85-89</td>
</tr>
<tr>
<td>Mild (grade 1)</td>
<td>140-159</td>
<td>90-99</td>
</tr>
<tr>
<td>Moderate (grade 2)</td>
<td>160-179</td>
<td>100-109</td>
</tr>
<tr>
<td>Severe (grade 3)</td>
<td>&gt;180</td>
<td>&gt;110</td>
</tr>
</tbody>
</table>


Data analysis: Analysis of the collated information followed the process of numbering of questionnaire, coding the information, data entering and analysing using Statistical Package for Social Sciences (SPSS) software. The differences were considered significant at p less than or equal to 0.05. Multiple logistic regression analysis was used to check the correlates of hypertension.

Results

Socio-demographic characteristics of the respondents

Findings from the survey show that ages of respondents ranged from 20 to 60 years with a mean age of 42.8±13.2 years. Majority 285 (90.5%) of the respondents were of Yoruba ethnic group. Details are shown in Table 2.0 and figure 1.0.

Table 2. Education, marital status, religion and ethnic group

<table>
<thead>
<tr>
<th>Variable</th>
<th>Number</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>184</td>
<td>58.4</td>
</tr>
<tr>
<td>Female</td>
<td>131</td>
<td>41.6</td>
</tr>
<tr>
<td>Total</td>
<td>315</td>
<td>100.0</td>
</tr>
<tr>
<td>Educational Qualification</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primary education</td>
<td>20</td>
<td>6.3</td>
</tr>
<tr>
<td>Secondary education</td>
<td>63</td>
<td>20.0</td>
</tr>
<tr>
<td>Tertiary education</td>
<td>232</td>
<td>73.7</td>
</tr>
<tr>
<td>Total</td>
<td>315</td>
<td>100.0</td>
</tr>
<tr>
<td>Marital status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single</td>
<td>58</td>
<td>18.4</td>
</tr>
<tr>
<td>Married</td>
<td>250</td>
<td>79.4</td>
</tr>
<tr>
<td>Divorced</td>
<td>2</td>
<td>0.6</td>
</tr>
<tr>
<td>Widow/Widower</td>
<td>5</td>
<td>1.6</td>
</tr>
<tr>
<td>Total</td>
<td>315</td>
<td>100.0</td>
</tr>
<tr>
<td>Religion</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Christianity</td>
<td>266</td>
<td>84.4</td>
</tr>
<tr>
<td>Islam</td>
<td>49</td>
<td>15.6</td>
</tr>
<tr>
<td>Total</td>
<td>315</td>
<td>100.0</td>
</tr>
<tr>
<td>Administrative rank</td>
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<td></td>
</tr>
<tr>
<td>Senior</td>
<td>187</td>
<td>59.4 8.9</td>
</tr>
<tr>
<td>Intermediate staff</td>
<td>28</td>
<td>31.7</td>
</tr>
<tr>
<td>Junior staff</td>
<td>100</td>
<td>31.7</td>
</tr>
</tbody>
</table>
Prevalence of hypertension among the respondents

The overall prevalence of hypertension was 25.4% (80/315) with grade 1HT 14.0%, grade 2HT 9.5% and grade 3HT 1.9%. The prevalence of hypertension across gender was 68.8% for male and 31.3% for female. Prevalence of hypertension steadily increased across different age groups with 6.5% for 21-30, 28.6% for 31-40, 37.7% for 41-50 and 27.3% for 51-60. Figure 2.0 shows the prevalence of hypertension.

Figure 1. Age distribution of the respondents

Figure 2. Prevalence of hypertension
Prevalence of overweight/obesity among respondents

Prevalence of overweight among respondents was found to be 33.1% of which 58.7% were male and 41.3% were female. Also 20.3% of the respondents were obese, out of which 26.6% were male and 73.5% were female. (See figure 3.0).

Relationship between gender, age and prevalence of hypertension

The prevalence of hypertension among male respondents was found to be higher (68.8%) than females (31.3%). Also, hypertension prevalence among age group 41 – 50 years was highest (37.7%) compared to all other age groups. Details are shown in figures 4 and 5.

X2 = 4.717
P-value = 0.030
X² = 0.005  
P-value = 12.994

Figure 5. Prevalence of hypertension among participants by BMI

The result of the multiple regression showed that age, body mass index (BMI) and sex are correlates of hypertension. Respondents within the age group of 21-30 years and 31-40 years are three times and two times less likely to develop hypertension than those within the age group of 51-60 years (O.R=0.361(3x) and 0.467(2x); 95% CI=0.137-0.951 and 0.219-0.995) see table 3.0.
Table 3. Multiple regression analysis

<table>
<thead>
<tr>
<th>Variables</th>
<th>Odds ratio</th>
<th>95% CI</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age group</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>21-30</td>
<td>0.361</td>
<td>0.137-0.951</td>
<td>0.039</td>
</tr>
<tr>
<td>31-40</td>
<td>0.467</td>
<td>0.219-0.995</td>
<td>0.048</td>
</tr>
<tr>
<td>41-50</td>
<td>0.771</td>
<td>0.375-1.585</td>
<td>0.479</td>
</tr>
<tr>
<td>51-60</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BMI</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Undernourished</td>
<td>0.000</td>
<td>0.000</td>
<td>0.999</td>
</tr>
<tr>
<td>Normal</td>
<td>0.290</td>
<td>0.135-0.624</td>
<td>0.002</td>
</tr>
<tr>
<td>Overweight</td>
<td>0.370</td>
<td>0.175-0.782</td>
<td>0.009</td>
</tr>
<tr>
<td>Obese*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sex</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>0.400</td>
<td>0.211-0.756</td>
<td>0.005</td>
</tr>
<tr>
<td>Female*</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Discussion

Prevalence of hypertension

Prevalence of hypertension was found to be 25.2% thus one quarter of the non-teaching staff of College of Medicine who is working within the University College Hospital are hypertensive. This is similar to the findings of Mohan, Deepa, Farooq, Prabhakaran and Reddy, (2010) and findings of the World Health Organization (WHO) and Indian Council of Medical Research (ICMR) on non-communicable disease (NCD) risk factor surveillance where the prevalence of hypertension among the industrial population was 26% in all ten centres in India and 25.4% in Chennai. Their findings suggest that hypertension is more obvious in workplace than in the general community given the prevalence of 8-10% reported by Akinkugbe (1992) in rural communities in Africa, the prevalence of 5.9% reported by Oviasu (1978) in a rural community in mid-western Nigeria and 11.0% reported by Kuti (1993) in Aiyetoro community (also rural) in Ondo state.

The prevalence of hypertension among the respondents was seen to be higher in males (68.8%) than in females (33.1%). This is in line with the study conducted by Omuemu, Okojie and Omuemu (2006) where the prevalence of hypertension was higher in males than in females (24.8% male; 13.2% female). Also, study on the systematic review of hypertension in Sub-Saharan African by Juliet, Liam and David (2007) reported a higher prevalence in males than in females (21.6% male; 12.5% female). The lower prevalence of hypertension observed in women could be attributed to the hormonal factor. Research has shown that oestrogen which is females’ hormone has a regulatory effect on hypertension (Radwanska, 1993).

Prevalence of overweight/obesity

It is quite glaring that prevalence of overweight and obesity are significantly high among the non-teaching staff of college of medicine. Furthermore prevalence of obesity was higher in female than in male which might have been resulted from sedentary life style typically associated with women. The higher prevalence in female could also have contributed to the low prevalence of hypertension in female than in male because sex hormone binding globulin concentration is lower in obese women thus increasing the amount of bio available oestrogen (Ewa Radwanska, 1993).

Relationship between age, gender, overweight/obesity and prevalence of hypertension

Prevalence of hypertension is seen to increase with age. It was also observed that the prevalence of hypertension increased with age which is in agreement with reports from several studies (Annila et al, 1988). This was expected since blood pressure tends to increase with advancing age due to hardening of the arteries. This trend of increasing blood pressure with age could also be a reflection of increasing risk factors for hypertension such as obesity which also increases with age (Okojie et al, 2000).
The prevalence of hypertension among the respondents was seen to be higher in male (68.8%) than in female (33.1%). This is in line with the study conducted by Omuemu, Okojie and Omuemu (2006) where the prevalence of hypertension was higher in male than in female (24.8% male; 13.2% female). Also, study on the systematic review of hypertension in Sub-Saharan African by Juliet, Liam and David (2007) reported a higher prevalence in male than in female (21.6% male; 12.5% female). The lower prevalence of hypertension observed in women could be attributed to the hormonal factor. Research has shown that oestrogen which female hormone has a regulatory effect on hypertension (Radwanska, 1993).

The study also showed that there is significant relationship between BMI and hypertension. A BMI of 25 correlates closely with increased blood pressure (Abdul-Rahim, Abu-Rmeilehnu, Husseini, Holmboe, Sen, Jarvell and Bjertness, 2000). Other studies also support the fact that weight gain is associated with increased blood pressure and increased incidence of hypertension (Mertens and Van Gaal, 2000). In general, being overweight is associated with a two to six-fold increase in the risk of developing hypertension (Dickey and Janick, 2001). Clinical trials have proved that weight loss is effective in the primary prevention of hypertension as well as in the reduction of both systolic and diastolic blood pressure in patients with normal and high blood pressure (Dickey and Janick, 2001). Several epidemiological studies have shown an association between BMI and blood pressure in normal and overweight patients. Weight loss has been recommended for the obese hypertensive patient and has been shown to be the most effective non-pharmacological treatment approach (Patel, 2000).

**Conclusion**

This study has once again highlighted the fact that hypertension is a problem in our society, even in the health environment. This is seen in the prevalence of hypertension among them whereby one out of every four non-teaching staff is hypertensive. Also, overweight and obesity has been significantly proven as one of the risk factors of hypertension. It is quite disheartening that those considered being more prone to receiving health information and practicing such by virtue of their work environment as well as looming consequences rampant in the hospital where they work are at high risk of this menace called hypertension. This leaves a question in the heart of many that, if the prevalence of hypertension, overweight and obesity are high among people in learning and hospital environment, what is likely going to be the prevalence among rural communities where there is little or no health information of such? This calls for public health action to help workers of this category live up to expectation health wise.

**Recommendations**

To address the findings of this research, the following recommendations should be considered.

1. Periodic departmental hypertension screening should be included in the hospital policy to help the staff working in the hospital environment
2. Live presentations of consequences and complications of overweight, obesity and hypertension should be conducted monthly among the staff as a reinforcing factor for practicing healthy living.
3. Sports/ recreational programme should be part of work schedule for staff working in the hospital environment.

**References**


Prevalence of Cigarette Smoking among Adolescents in Ras Tanura Community, Saudi Arabia: A School-based Cross-Sectional Study

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Abstract

Background: The proportion of youth involves in cigarette smoking has been escalating in recent years a slight few was known regarding its epidemiology in Rastanura area. The goal of this study was to discover the prevalence of cigarette smoking among adolescents in Rastanura Community, Saudi Arabia.

Method: Primary mode of data collection was used through a well-administered questionnaire to the adolescent both in school and the hospital premises. A school-based cross-sectional workup was conducted during the period of February to October 2018 of which 6 governmental intermediates and high schools’ pupils participated. A total of two hundred and fifty (250) questionnaires was administered. The prevalence of smoking was appraised and statistical analysis was executed including chi-square, frequency, and percentage. The responses from the survey were analyzed using SPSS 20.

Result: The overall feedback rate was 82%, 30.2% of the respondent reported having tried smoking 29.9% were male while 4.4% female where 69.8% never smoked. The investigations on the rate of frequency of smoking among adolescents in the study area shown with X2 =317.837, p<0.05.

Conclusion: Findings from our survey show that the level of smoking among male adolescent is higher than their female counterpart. The adolescents in the study area are aware of negative impact of tobacco, but are still addicted to the act despite the knowledge of the danger it portrays. Therefore, parents and guardian should take up the responsibility to reduce their ward’s exposure to tobacco product and excess money that could be used for extravagant spending. Keywords: Adolescent, Feedback, Prevalence, Smoking, Saudi Arabia.

Introduction

Background of the study

Globally, tobacco is a deadly drug which has negative impact on the human body with tendency of inducing close relative into the dangerous act. The world health organization in 2011 found that death caused by smoking-related disease was more than that cause by all infectious diseases altogether. According to the report, if urgent attention is not put in place to reverse this trend, the mortality rate by 2030 will increase by 250 %, among citizens of developing and under-developed nations. Smoking is one of the leading preventable cause of death and disease of the 21st century (Jha p & Peto R. undated). Although, smoking is a habit that can be easily corrected at its early stage, but if not given the needed attention by parent or guardians this act may become addictive.

Adolescences witness various levels of changes - physical, mental, psychosexual and social (Cicchetti D, Toth SL 1998) - in their bodies as they grow up, this encourage them to involve in various act in order to give them recognition in the community. The teenager at this developmental stage is socialized through various socialization agents – parents, peer groups, family members – which encourages him/her to discover himself/herself and to determine the social integration and acceptance within the community. Studies shows that a handful of adult smokers were initiated during their adolescent age (Park Sh 2009) habit like smoking acquired at the early stage of life has tendency of being kept to adulthood which are usually difficult to correct. This habit comes with unhealthy behaviour such as use of illicit drugs, pre-marital sex and alcohol usage (Lim et al 2017). Separated parents and living in non-standard family structures such as single parent families have been linked with an exposure to unpleasant behaviors among youths such as smoking, drinking alcohol, substance abuse, and risky sexual behaviors (Kirby, 2002).
Smokers are usually not aware of the risk and resulting effect of the consumption of tobacco and its derivatives but this habit seems unstoppable – nicotine is a drug that is found in tobacco plant which is the main ingredient necessary for the addiction to tobacco products, including cigarettes. The severance of this issue is further aggravated by the fact that children do not have the ability to prevent themselves from a smoky environment and to move away from where smokers are (Thomson 2006). Adolescence is implicated by its surrounding socialization agents through intense stress and various psychogenic factors leading to the emergence of psychiatric disorders, immoral and antisocial behavior in teenagers (Cicchetti D, Toth SL 1998).

For the past 20 years, the school environment has been the primary focus point to molding the behavior of adolescents by exposing them to the danger in the use of tobacco and its substance, therefore, reducing the exposure of teenagers to the unhealthy behavior. Smoking is not just harmful to the smoker but also to those that around which are known to be secondhand smoke (SHS) also term “environmental tobacco smoke”. (ETS) There are 2 forms of smoke that comes from burning tobacco written by American cancer society: 2015 these are Mainstream smoke: The smoke exhaled by the smoker whereas Sidestream smoke are the smoke that come out from the lighted end of a cigarette, pipe, cigar or tobacco burning in a hookah. This type of smoke has higher concentrations of cancer-causing agents (carcinogens) and is more toxic than mainstream smoke. It also has smaller particles than mainstream smoke. These smaller particles make their way into the lungs and the body’s cells more easily.

When non-smokers are exposed to SHS it’s called involuntary smoking or passive smoking. On-smokers who breathe in SHS take in nicotine and toxic chemicals the same way smokers do. The more SHS you breathe, the higher the levels of these harmful chemicals in your body. (American cancer society, Nov 11 2015), Centers for Disease Control and Prevention. Secondhand Smoke (SHS) Facts. August 20, 2015.

Smokers can be divided into: direct, indirect (involuntary smoking or passive smoking) and thirdhand smoke (THS) or residual tobacco smokers. The direct smoker is the person engaging in the act of smoking. Research does show that particles from secondhand tobacco smoke can settle in dust and on surfaces and remain there long after the smoke is gone. Some studies suggest the particles can last for months. Even though it’s no longer in the form of smoke, researchers often call this thirdhand smoke (THS) or residual tobacco smoke.

According to the US department of health and human service, smoking is harmful to most organs of the body causing cancers of the lung, esophagus, larynx, mouth, throat, kidney, bladder, pancreas, stomach, and cervix, as well as acute myeloid leukemia. Research has shown that cigarette smoking can lead to premature death.

**Statement of the problem**

Prevention of smoking among the population of any country should be paramount on the agenda of any forward-looking government. Smoking prevention program should be directed towards addressing the issue among the general population (Hedman, Anders, Matthew Perzanowski, Sundberg, Eva Ronmark 2007). More so, tobacco consumption varies among different gender, culture, and province (region) of any nation. Hruba et al 2011 suggested “Smoke Free Homes” program which will restrict or totally prohibit smoking in homes where children below the age of 10 lives. A research conducted among Czech children to evaluate the success of an educational intervention programme called “Non-smoking is a Norm” designed for primary school age children shows that 75% of children ranging between 6 and 11 years are exposed to smokers who are intimate family members, close to 30% of this children have parents that use tobacco, with 20% of them having grandparents who smokes while 10% have both grandparent and parents who consume tobacco (Hruba et al 2011). Similarly, (Bromley, Sproston & Shelton 2005) found out from the research conducted in Scotland that more than 80% of children between the ages of 8 and 15 are exposed to smoking most especially among their closest family members. In the US, King 2009, concluded that the number of children exposed to tobacco smokes and its derivative in their immediate residence are five times more than adults who are exposed to the same within a period of 20 years. Also, in the US, the Center for
Disease Control and prevention (CDC) in their study found that 7.9% of junior high school students and 23.2% for high school student are engaged in smoking. In spite of the various anti-smoking projects embarked upon by government at various levels; many adolescents are being initiated to smoking at school age (Urrutia-Pereira, Oliano, Arada, Mallol & Sole 2016) Alexander et al., 2001 in their findings reported that more than 80% of adult smokers began cigarette smoking at or before the age of eight.

Various studies have shown high prevalence of tobacco consumption among females (Schofield, Lynagh & Misha 2003; Precht, Keiding, & Madsen 2003; Larsson L 1995). According to Linnea et al 2006 the patterns of tobacco use varies significantly between male and females; more so, they concluded that the use of tobacco substances and snuff are common among boys of adolescent age while the girls of the age range are used to smoking in Northern Sweden. In Saudi Arabia, among individuals aged 15 years or older, approximately 37.6% of males and 6% of females are tobacco current smokers (World Health Organization 2008). Conversely, Mohammed (2013) suggests smoking epidemic among boys in Saudi Arabia is still in the early stage, providing great opportunity for preventive actions to the taken in this line in order to prevent the epidemics from aggravating.

However, reasons have been put forward by researchers as to the factors accounting for the consumption of tobacco among adolescent. In the study conducted by Urrutia-Pereira et al 2016, factors such as having friends who smokes, easy access to cigarettes at home, having cigarette offered by friends etc. Vassilopoulos, Gourgoulianis, Hatzoglou and Roupa (2015) were of the opinion that lack of proper orientation on the danger that smoking has to human health is a factor contributing to the increase in smoking habit among adolescents. The influence of advert of tobacco product is also a significant factor accounting for the increase in the push of young people to smoking (Vassilopoulos et al 2015). At least, 3% of adolescent in the USA who had once seen a tobacco advert will end up smoking in future Wakefield et al (2016). According to Al Nohair (2011), 28.6% of secondary school students in National Guard area of Riyadh smokes, the ubiquitous reasons given for this are, approximately 82% were of the opinion that it was due to the available free time, 63% said for stress relief while 62% said it was because their teacher’s smokes. Contrarily, Al-Haddad & Hamadeh (2003) believes that family history of smoking accounts for adolescents smoking. According to the report of Al-Zalabani and Kasim (2015) the prevalence of cigarette smoking in secondary school students ranged from 12% to 29.8%, and among university students, it ranged from 2.4% to 37%, with female and medical students’ constituting the least percentage. The literature is therefore inconclusive has to which factor is significant or with greater impact at attracting adolescents to smoking.

To the best of our knowledge little work has been done in Saudi Arabia in relation to the effect of smoking on adolescent health, with none conducted on the Rastanura community, with dominant strength of young people. Nevertheless, this study aims at providing an empirical based result which will enable policy makers in formulating and implementing suitable policies in the public interest as to reducing the incidence of smoking related death among adolescents in Saudi Arabia. Furthermore, female Saudi Arabian youth are a difficult population to access which has been a limitation to the generalization of existing result. This study will therefore offer a rare look into the health behavior of Saudi Arabian girls with respect to their smoking habit which has universally been neglected by past works.

**Research question**

This study aims at addressing the following research questions;
What is the level of exposure of different gender to smoking in the study area?
What are the smoking rate of adolescents in the study area?
What is the nature of relationship between smokers and their health condition in the study area?

**Objective of the study**

The broad objective of this study is to examine the effect of smoking among adolescent in Rastanura community, Saudi Arabia. The specific objectives are to;
1. Explore the smoking habit of male and female in the study area;
2. Evaluate rate of smoking among adolescent in the study area;
3. Investigate the prevalence of tobacco product consumption among adolescents in the study area

Hypothesis
This study will consider the following research hypothesis:

Hypothesis 1
H₀: Rastanura female smoke habit is the same with their male peers.
H₁: Rastanura female smokes less than their male peers.

Hypothesis 2
H₀: Rastanura adolescents’ smokes frequently
H₁: Rastanura adolescents do not smokes frequently

Scope of the study
This study examined the smoking habit of adolescent in Rastanura, Saudi Arabia. The population of this study was drawn from the secondary schools in the Rastanura with emphasis on adolescents or students with age ranging from 8 to 10 years. A sample of 250 adolescents was selected using a random sampling technique. This sample was used to make generalization on the smoking habit of the population.

Gaps from the literature
In summary, all the studies have examined the prevalence and factors responsible for the smoking habit and behaviours of adolescent in various regions, states and countries. A number of factors have been put forward as accounting for this unhealthy behavior among adolescent in the regions. Based on this, the study intends to contribute to the body of knowledge by further examining this habit among adolescents in Rastanura, Saudi Arabia. This will help come about valid factors responsible for the prevalence of smoking in the region.

Methodology
Research design and methods
This study made use of primary data. Data was collected using a self-administer questionnaires which was distributed to intermediate and high school students in Rastanura community. Categorical and quantitative data was obtained. The data will be gathered from school students and hospital patients based on their interaction with the youth in the community. The survey was structured to collect basic socio-demographic information, smoking –related factors and tobacco smoking history, peer behavior and individual attitude towards smoking and risk perception. The survey questions were taken from the National Youth Tobacco Survey and the Centers for Disease Control and Prevention question database. Using these tested questions lends validity to this study, and provided a basis for comparison with national survey result. Furthermore, the study collected data from respondents on smoking practices and their view-points.

Study area
Rastanura is largest oil shipping center in eastern province. It is located south of modern industries port city, Jubail, and North of Tarut with a total population of 73,933 people. RasTanura, also spelled Ras Tannura, Arabic Ra’s Al-Tanūrah. Developed by the Arabian American Oil Company (now Saudi Aramco) after the discovery of nearby petroleum deposits in the 1930s, it is now a principal Persian Gulf terminal of pipelines and has a modern port capable of accommodating the largest tankers. The town also has a refinery and storage tanks as well as hydro formers, producing high-octane gasoline. Aramco operates an industrial-training school and hospital.
Geographically, the Rastanura complex is located south of the modern industrial port city of Jubail (formerly a fishing village) and north of Tarut Bay from the old port city of (Al-) Dammam. Although, Ras Tanura's port area is located on a small peninsula, due to modern oil tankers' need for deeper water, Saudi Aramco has built numerous artificial islands for easier docking. Location of Ras Tanura Coordinates: 26°39'N 50°10'E. Postal Code 32819 Area code(s)+966-13.

Ras Tanura is connected by a single two-lane highway with the Dhahran-Jubail Highway which links it with neighboring cities such as Jubail and Dammam as well as with the regional Aramco headquarters in Dhahran. Although there is a small airport in the city Ras Tanura Airport, commercial air transportation is provided by King Fahd International Airport in Dammam as the local one is for the exclusive use of Saudi Aramco, mainly helicopters. The distance from the city center to the terminal in Dammam Airport is approximately 50 km (31 mi). However, a current project is ongoing to shorten that distance to 40 km (25 mi) if the new road is completed.

Target population

A total population of 9747 students, female and male, attends both government and private school in Rastanura. Out of this, 2074 of them falls between the age of 9 and 19 in both intermediate and high schools; which will constitute the focus group for this study. According to the National Youth Tobacco Survey and the Centers for Disease Control and Prevention question database, a smoker is defined as one who had at any time smoked a cigarette or who had, had one or two puff. While current smoker is defined as one who had taken a puff, or, smoked cigarette in the last 30-days, proceeding the day, of completing the questionnaire.

Sampling size and sampling method

The study adopted a purposive sampling technique, this is a type of non-probabilistic sampling technique where members of the sample will be selected based on researchers’ judgment or requisite information gather about the respondent. The study will purposively select a total of 250 students from the 2074 adolescents in various intermediate and high schools in Rastanura, Saudi Arabia.

Survey instrument

Intermediate and secondary school surveyed using the Smoking Behavior among College Students Survey found in Appendix A of the report. The questionnaire from the survey was adopted for this study with little modification. Students that were found at the schools’ premises and hospital community provided responses to the questions. In addition, a means of survey design and distribution, analysis and reporting tools that will provide basic statistical values and allow for the creation of tables and cross-sectional comparisons. The survey will begin with a consent form; students will be required to read the information and answer, “I agree” to verify that they fall between the ages 9 and 19. And that they had read and understood the form, aware of their rights as participants, and, agreed to participate in the research; before they respond to the questionnaire.

Technique of data analysis

The responses from the field survey was analyzed, summarized and interpreted with the aid of both descriptive statistics and statistical techniques. Descriptive analysis will be used to describe percentage and number of distribution of the respondents by socio-economic/demographic characteristics. To examine the relationship between explanatory variables and dependent variable; Chi-square was employed which is effective in testing the relationship between two or more categorical variables. In order to achieve a valid response using the instrument, the questions were tailored to achieve the objective of the study. The implementation will be done by using statistical software -SPSS 20 edition.
Results and discussion

This chapter gives a detail analysis of data and interpretation of the results. This chapter is divided into various sections which include the analysis and interpretation of the demographic data and statistical result. The analysis in this chapter was performed using SPSS 20.

Analysis of respondents

The questionnaires designed on the “SMOKING HABIT AMONG THE ADOLESCENT IN RASTANURA COMMUNITY” were administered to two hundred and fifty (250) adolescents in the study area. In order to ensure quick responses and avoid losses, copies of the questionnaires were administered by the researcher to respondents. Of the entire two hundred and fifty (250) questionnaires administered, the researcher was able to obtain back two hundred and five (205), representing eighty percent (82%) success rate; while the remaining forty-five (45) consisting twenty percent (18%) were not recovered due to some logistics and unavailability of the students at the time of collection. This is shown in the table below:

<table>
<thead>
<tr>
<th>Questionnaire</th>
<th>Frequency</th>
<th>Percentage (%)</th>
<th>Cumulative Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Returned</td>
<td>205</td>
<td>82</td>
<td>82</td>
</tr>
<tr>
<td>Not Returned</td>
<td>45</td>
<td>18</td>
<td></td>
</tr>
<tr>
<td>Administered</td>
<td>250</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>

Source: Field survey 2018

Background information of respondents

Age distribution of respondents

The analysis of the survey in table 4.2.1 shows the age of the adolescents. The age distribution of respondent’s shows that 57.1% of the respondents were of age 8 to 10, 22.9% of the respondents were between 11 and 13 years, while 20% of respondents have their ages ranging between 14 and 16 years. By implication, the survey has covered a wide range of age bracket within the adolescent age; this will help generate a valid conclusion on the smoking habit of adolescents in the study area. This is consistent with the finding of Dahlui et al (2015), which suggests that smoking is prevalent in children of age 11 and below.

<table>
<thead>
<tr>
<th>Age Range</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>8-10</td>
<td>117</td>
<td>57.1</td>
</tr>
<tr>
<td>11-13</td>
<td>47</td>
<td>22.9</td>
</tr>
<tr>
<td>14-16</td>
<td>41</td>
<td>20.0</td>
</tr>
<tr>
<td>Total</td>
<td>205</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Source: Field survey 2018

Sex distribution of respondent

Information relating to gender characteristics shows that 74.6% were male and 25.4% were female. Majority of the respondents are male this is due to the restricted access to female in the study area. According to Al-Zalabani et al (2015), sex is an important determinant on a person’s smoking habit.
Table 3. Sex distribution of respondent

<table>
<thead>
<tr>
<th>Sex</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>MALE</td>
<td>153</td>
<td>74.6</td>
</tr>
<tr>
<td>FEMALE</td>
<td>52</td>
<td>25.4</td>
</tr>
<tr>
<td>Total</td>
<td>205</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Source: Field survey 2018.

Grade level of respondents

Table 3 shows the grade of the respondents on review. 26.3% of the adolescents are in level below grade 2, 18.5% are within the grade range of 3 to 5 while majority of the adolescents representing 55.1% are in class grade of 6 to 8. By implication, most of the adolescents used for the survey are knowledgeable and would be able to give reliable responses on their smoking habit.

Table 4. Grade of Respondents

<table>
<thead>
<tr>
<th>GRADE LEVEL</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-2</td>
<td>54</td>
<td>26.3</td>
</tr>
<tr>
<td>3-5</td>
<td>38</td>
<td>18.5</td>
</tr>
<tr>
<td>6-8</td>
<td>113</td>
<td>55.1</td>
</tr>
<tr>
<td>Total</td>
<td>205</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Source: Field survey 2018.

Cash available to respondent for free spending

According to table 4.2.5 about 1 in 2 (42.4 percent) of the adolescents in the study area reported that they do not have any money on them for free purchase in last 30 days prior to the time of the survey. 5.9% reported they have between 1 and 5 Riyals, 9.3% reported having between 6 to 10 Riyals, 2% having 11 to 20 Riyals, whereas 5.9% have between 21 to 50 Riyals. While a significant percent (34.6 percent) have more than 50 Riyals to spend freely on monthly basis.

Table 5. The amount of cash available for free purchase in the last 30 days

<table>
<thead>
<tr>
<th>Variable</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>87</td>
<td>42.4</td>
</tr>
<tr>
<td>1-5 Riyals</td>
<td>12</td>
<td>5.9</td>
</tr>
<tr>
<td>6-10 Riyals</td>
<td>19</td>
<td>9.3</td>
</tr>
<tr>
<td>11-20 Riyals</td>
<td>4</td>
<td>2.0</td>
</tr>
<tr>
<td>21-50 Riyals</td>
<td>12</td>
<td>5.9</td>
</tr>
<tr>
<td>&gt;50 Riyals</td>
<td>71</td>
<td>34.6</td>
</tr>
<tr>
<td>Total</td>
<td>205</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Source: Field survey 2018

Smoking habit of male and female in the study area

This section will help to achieve objective one of this study- which is to establish the smoking habit of male and female in the study area. Table 4.3 summarizes the adolescent’s response in relation to the smoking habit of different gender in the study area. A total of 30.2% of the respondent reported having tried smoking, out of this 25.9% are male while 4.4% are female, and whereas 69.8% of the adolescent under survey revealed that they had never tried smoking before.

When asked about whether or not the respondent will like to smoke in the nearest future, 23.4% reported that they have already tried smoking with 19.5% of the sampled population male while
3.9% female. More so, 6.3% of male revealed that they will attempt smoking soon with 0.5% of female sharing this opinion. However, 69.8% reported that they may not try smoking soon.

Furthermore, the table also shows the answers of the respondents when asked about the tendency of smoking cigarette in the next year. 18.5% opined that they will surely smoking cigarette in the next year, with 16.1% representing male and 2.4% female. Additionally, 8.3% of male revealed that they might smoke cigarette in the next year with 1% of female sharing the same opinion. Majority of respondent 59% believes the may smoke in the next year, while 13.2% are so sure of not smoking within the next year.

The result of the findings also shows the impact of peer relationship on adolescent smoking habit, 22% of the respondent are so sure that they will smoke if their best friend introduces them to it; 19% of this response came from male while 2.9% came from female. Also, 6.3% of the respondents will probably smoke if it has been introduced to them by their best friend. More than half 66.8% said they probably not smoke even it is offered to them by their best friend. Whereas, only 4.9% are so sure of not being introduce to smoking by friends. This finding is consistent with the work of Saad et al (2015) who identified smoker friends as an important determinant of smoking among adolescent.

This study reveals the number of cigarettes smoked by respondent, 69% reported they not smoked at all. 3.4% have smoked less than a stick, 4.4% have smoked a stick, and 4.9% have smoked between 6 and 99 sticks. However, a significant minority 17.6% have smoked more than 100 sticks of cigarette.

Nevertheless, this study reveals that smoking is rampant among male adolescent in the study than their female counterpart. This result is in line with the work of Fida and Abdelmoneim (2013); Al-Zalabani and Kasim (2015).

Table 4.3. Response on the smoking habit of male and female in the study area

<table>
<thead>
<tr>
<th>Variables</th>
<th>Sex</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male</td>
<td>Female</td>
</tr>
<tr>
<td>Have ever tried smoking cigarette?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>YES</td>
<td>53(25.9)</td>
<td>9(4.4)</td>
</tr>
<tr>
<td>NO</td>
<td>100(48.8)</td>
<td>43(21)</td>
</tr>
<tr>
<td>Will you try to smoke soon?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I have already tried smoking cigarette</td>
<td></td>
<td></td>
</tr>
<tr>
<td>YES</td>
<td>40(19.5)</td>
<td>8(3.9)</td>
</tr>
<tr>
<td>NO</td>
<td>13(6.3)</td>
<td>1(0.5)</td>
</tr>
<tr>
<td>Will smoke a cigarette in the next year?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Definitely Yes</td>
<td>33(16.1)</td>
<td>5(2.4)</td>
</tr>
<tr>
<td>Probably Yes</td>
<td>17(8.3)</td>
<td>2(1.0)</td>
</tr>
<tr>
<td>Probably No</td>
<td>83(40.5)</td>
<td>38(18.5)</td>
</tr>
<tr>
<td>Definitely No</td>
<td>20(9.8)</td>
<td>7(3.4)</td>
</tr>
<tr>
<td>If your best friend offers you a cigarette</td>
<td></td>
<td></td>
</tr>
<tr>
<td>would you smoke?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Definitely Yes</td>
<td>39(19.0)</td>
<td>6(2.9)</td>
</tr>
<tr>
<td>Probably Yes</td>
<td>11(5.4)</td>
<td>2(1.0)</td>
</tr>
<tr>
<td>Probably No</td>
<td>97(47.3)</td>
<td>40(19.5)</td>
</tr>
<tr>
<td>Definitely No</td>
<td>6(2.9)</td>
<td>4(2.0)</td>
</tr>
<tr>
<td>Number of cigarette ever smoked</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Never</td>
<td>101(49.3)</td>
<td>42(20.5)</td>
</tr>
<tr>
<td>&lt;1 cigarette</td>
<td>5(2.4)</td>
<td>2(1.0)</td>
</tr>
</tbody>
</table>
Rate of smoking among adolescent smokers in the study area

This section aims at examining how frequent adolescents in the study area smoke, this will help achieve objective two of this study.

Table 4.4.1 shows the response of sampled adolescent that has once tried smoking. From the survey 20.97 percent of the adolescent who smokes have taken less than 1 cigarette, 6.45 percent at least 1 cigarette, 8.06 percent had taken between 2 to 5 cigarette, 6 adolescent representing 9.68 percent had taken between 26 to 99 cigarette while majority of the respondent representing 50 percent had consumed more than 100 cigarettes.

Also, the response of the sample adolescent who smokes indicate that in the last 30days 25.81 percent had not smoked, 14.52 percent smokes for 1 to 2 days, 6.45 percent for 3 to 5 days, 9.68 percent had taken cigarette between 10 to 19days while large percentage (37.10 percent) had smoked in each of the last 30days.

Furthermore, 19.35 percent of the sampled adolescents who smokes had not taken any cigarette in the last 30days, those who consumed less than 1 cigarette and 1 cigarette represent 6.45 percent each of the smoking adolescents in study area. 11.29 percent smokes an average of 2 to 5 cigarettes per day, 17.74 percent smokes between 6 to 10 cigarettes per day, 6.45 percent smoke between 11 to 20 cigarettes while a significant proportion (32.26 percent) smokes more than 20 cigarettes per day.

### Table 4.4. Response on rate of smoking among adolescent smokers

<table>
<thead>
<tr>
<th>Have you ever tried smoking?</th>
<th>Freq</th>
<th>Percent</th>
<th>$X^2$</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Variables</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>How many cigarettes have you smoked?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;1 cigarette</td>
<td>13</td>
<td>20.97</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 cigarette</td>
<td>4</td>
<td>6.45</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2-5 cigarettes</td>
<td>5</td>
<td>8.06</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6-15 cigarettes</td>
<td>1</td>
<td>1.61</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16-25 cigarettes</td>
<td>2</td>
<td>3.23</td>
<td></td>
<td></td>
</tr>
<tr>
<td>26-99 cigarettes</td>
<td>6</td>
<td>9.68</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;100 cigarettes</td>
<td>31</td>
<td>50.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>62</td>
<td>100</td>
<td>317.837</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>How many days of the past 30days did you smoke?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0day</td>
<td>16</td>
<td>25.81</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-2 days</td>
<td>9</td>
<td>14.52</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3-5days</td>
<td>4</td>
<td>6.45</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6-9days</td>
<td>2</td>
<td>3.23</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10-19days</td>
<td>6</td>
<td>9.68</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20-29days</td>
<td>23</td>
<td>37.10</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Accessibility of respondents to cigarette

Table 4.4.2 shows how the smoking adolescent get access to the cigarette they smoke, 48.39 percent indicated that they bought it by themselves, 20.97 percent said someone bought cigarette for them. 9.68 percent borrowed money to buy their cigarette, 3.23 percent said they were giving by someone without them asking for it. While 17.74 percent indicated that they got the cigarette from other means without specifying the source of the fund they used in buying them.

### Conclusion

The result of this study is in line with some earlier researchers that believe that the consumption of tobacco among adolescent is increasing and if not properly monitored will lead to personal damages and having negative external spillover effect on the public. Some of the personal damages are: damage to the lung, cancer of the kidney, uterus, lips and heart attack which may further degenerate into loss of life. The effect of increase smoking habit is not just felt by the direct consumer but also by the indirect consumer, whereby causing damages to the health of non-smokers. More so, out-of-pocket spending on health by individual and household increases as a result of the increase in smoking habit. This study points at the fact that all the adolescents in the study area are aware of the resulting negative impact of tobacco, but are still addicted to the act despite the knowledge of the danger it portrays. Therefore, parents and guardian should take up the responsibility to reduce their ward’s exposure to tobacco product and excess money that could be used for extravagant spending.

It is also important to point out the impact of cigarette smoking on the environment. Cigarette smoking causes both air and environmental pollution by emitting toxic air pollutants into the environment. Smokes from cigarette contaminates the air and makes air poisonous to the inhaler. Deforestation caused by producer of tobacco and its substance also reduces the amount of tree in the environment and reduces the amount of oxygen in the air while increasing the carbon dioxide in the atmosphere.

Aside that smoking is dangerous to the consumer, environment and the indirect consumer, it also has a negative impact on government spending. There is positive relationship between smoking and government spending. When people-adolescent- smokes it increases the amount of time they have to visit the hospital which will result into increase spending on the provision of health facilities on the part of the government. Furthermore, when smoking increase government needs to embark on extra-budgetary spending in order to create awareness and orientate the public on the negative impact of smoking to the health. In the area of environmental cleaning, government and its agencies need to ensure that the environment is safe and conducive for its citizen. This, causes the public spending to increase.

Now it is therefore recommended that the relevant health and government authorities should embark on wide scale campaign to dissuade young smokers. The government might also impose tax on the tobacco
and cigarette companies which might leads increase price cigarette and tobacco this might eventually discourage smokers.

Moreover, necessary legislations and monitoring should be put in place mandating tobacco company to write warning of danger of cigarette smoking on their product. This would also have a positive psychological effect on the smoker which might eventually decrease the numbers of young smokers.

References


Research for International Tobacco Control. 2003. At what cost? The economic impact of Tobacco use on national health systems, societies and individuals: a summary of methods and findings. RITC: Monograph Series No.1.RITC. Page 21


Investigate and Understand Barriers for Successful Uptake and Implementation of Prevention of Mother to Child (PMTCT) Services in Mulanje Mission Hospital, Malawi

Article by Chisomo Deborah Kondowe
Texila American University and Central University of Nicaragua, School of Public Health, Guyana, South America
E-mail: cdkondowe@gmail.com

Abstract

**Objectives:** The aim of this study was to investigate and understand the barriers that contribute to successful uptake and implementation of Prevention of Mother to Child Transmission (PMTCT) services for pregnant and breastfeeding mothers at Mulanje Mission Hospital in Malawi.

**Methods:** A Qualitative study was conducted with data collected through in-depth interviews and focus group discussions. A total of 64 participants were interviewed.

**Results:** The main barriers to uptake and implementation of PMTCT services were stigma and discrimination against those infected with HIV, traditional and religious beliefs, long waiting time at PMTCT clinic, lack of male involvement, opposition from male partner leading to divorce and gender-based violence and lack of privacy due to non-conducive infrastructure.

**Conclusion:** In order to promote successful uptake and implementation of PMTCT service, male involvement in reproductive issues has to be enhanced by raising community awareness. In addition, HIV testing and counseling should also be an agenda of community awareness so that women should not wait to be pregnant and then go for testing. Issues of stigma and discrimination should be dealt with during campaign and community meeting with chiefs. Staffing in health facilities should be improved to minimize the waiting time and also improve the quality of care given.

Introduction

In 2016 an estimated 36.7 million people worldwide were infected with HIV, 20.9 million people living with HIV were getting antiretroviral therapy, of these 17.8 million are women from 15 years and above while 2.1 million are children below the age of 15 (UNAIDS, 2016). Eastern and Southern Africa is the worst affected region in the world with 19.4 million adults and children living with HIV (UNAIDS 2016).

Malawi is in the Eastern and Southern part of Africa is among the countries affected by HIV epidemic with 10.3% prevalence rate. The number of people living with HIV and AIDS is estimated at about 1 million which includes 850,000 people aged 15 and above and 170,000 children below 15 years of age (MDHS, 2015).

Malawi in strategic plan for 2015-2020 aims to increase the number of pregnant women attending at least one antenatal visit by 50,000. The plan envisages increasing the HIV ascertainment rate amongst pregnant women from 67% in 2013 to 85% in 2020 and increase the uptake by HIV positive pregnant women from 81% in 2013 to 85% in 2020 (NSP, 2015).

The Malawi government through the Ministry of Health and with collaboration with its stakeholders have developed and implemented several preventive strategies into reversing the course of the HIV epidemic through the Primary Health Care Approach. Prevention of Mother to Child Transmission of HIV started in 2002 with the use of single dose Nevirapine during labour and then was changed to Option A which was a combination of Zidovudine and Lamivudine and a single dose of Nevirapine during labour. In July 2011 Malawi introduced Option B+; it was incorporated into WHO guidelines in 2012 and implemented by several other African countries, including Uganda and Tanzania, in 2013 (Speight, 2013). In Option B+ all HIV positive pregnant and breastfeeding mothers are offered triple therapy of Tenofovir, Lamivudine and Efavirenz for lifelong regardless of Clinical status or CD4 count.
Even though lifelong therapy has shown to be effective, health facilities in Malawi reported poor retention by 71% of pregnant and breastfeeding mother initiated on antiretroviral therapy within 24 months. 30% of HIV positive pregnant mothers attending antenatal care are not receiving treatment and 50% of exposed newborns are not tested for HIV (NSP 2015-2020). For Option B+ to succeed, it is necessary to identify optimal models of care that support maternal adherence and maternal and infant retention through the care continuum. There is a need to investigate efficacious, cost-effective, and sustainable interventions to improve maternal and infant retention and adherence to lifelong ART in the setting of Option B+.

Methodology

Study design and site

This was a qualitative study conducted in rural area of Mulanje District at Mulanje Mission Hospital. Mulanje District is in the Southern part of Malawi in the region with the highest HIV prevalence of 12.8% in Malawi (MDHS 2015). Mulanje Mission Hospital is the study facility providing PMTCT services including Option + which is integrated into the antenatal clinic.

Recruitment of study participants

Purposeful sampling was used for selection of participants. This procedure was used to achieve the selection of participants with varying characteristics. A total of 64 participants were selected; 20 breastfeeding mothers who are HIV positive, 4 pregnant women HIV positive, 30 pregnant women from antenatal clinic and 10 health care providers (ART providers, HIV Counselors and PMTCT providers).

Data collection

Questionnaire guides for focus group discussions and in-depth interviews were developed. Three trained and experienced data collectors were employed. The questionnaires were translated to local language (Chichewa). Focus group discussions were held for pregnant women in antenatal and health care providers. Each group composed of 10 participants. Face to face in-depth interviews were conducted for pregnant and breastfeeding mothers from PMTCT clinic. Data was audio-recorded, transcribed and translated into English. Data quality was ensured through training of data collectors, piloting and refining of data collection tools and ongoing review of transcripts by a senior researcher during data collection.

Data analysis

Nvivo was used for qualitative data analysis, which followed a thematic framework. First, tapes from focus groups and interviews were transcribed and translated from Chichewa to English before they were double checked for consistency and accuracy by the author and other independent native speakers of Chichewa. Where possible, transcripts were sent back to each interviewee for validation and to ensure accuracy in the data generated before analysis. Following this, the author independently reviewed the transcripts several times to become familiar with the content before the process of sorting, coding, and theme identification.

Following data validation, themes were developed based on an inductive and deductive process of issues that emerged from the interviews. The themes were then applied to the data.

Descriptive data matrices were also developed to summarize key respondents' information and facilitate the process of comparison across the various respondent categories. Descriptive statistics were used to summarize respondents' sociodemographic data.

Ethical approval

The study was approved by University of Malawi- College of Medicine Research and Ethics Committee (COMREC). Informed consent form was given to all eligible participants. They were assured that their participation was entirely voluntary. Further consent was obtained from the Medical Director of Mulanje Mission Hospital.
Results

A total of 64 participants were interviewed; 4 pregnant women on Antiretroviral therapy, 20 breastfeeding mothers on Antiretroviral therapy, 30 pregnant women in antenatal clinic and 10 health care providers from HIV testing and counseling, ART and PMTCT providers.

In-depth interview with 24 mothers who are taking antiretroviral therapy

The participants interviewed during in-depth, 14 had never been tested for HIV before until they were tested during ANC and discovered that they were HIV positive during first and subsequent antenatal visit. 5 of the participants went for voluntary counseling and testing after hearing about husband infidelity and shockingly discovered to be HIV positive, while the other 5 went for voluntary counseling and testing because they were sick for some time or a child, they had was sick for a long time. The common cited barrier after going testing and counseling was disclosure to their partner as most of the participants had tested alone. Most participants were happier to disclose to mothers, sisters and not their partners.

The 24 participants interviewed, 6 had tested together with the husbands while 18 participants tested alone. From the 18 participants, only 6 disclosed immediately the results to their husbands and most of these were those who had been sick or child had been sick. 12 of the participants disclosed results immediately to their sister, mother, grandmother or brother because they needed to bring a guardian to hospital. The guardian would undergo education on ARVs so as to support the client in adherence to treatment. 8 of the participants stated to disclosing to husband after several months on ARVs but 4 of the participants have not disclosed to husbands because they are unsure of the husband’s reaction to the results of HIV positive.

25 years old with 2 children on ARVs for 2 years, “I got tested when I came for ANC but I did not tell the results to my husband at first. I was afraid so I told my mother who supported me. After 1 year I told my husband that am HIV positive, fearing that if he discovered maybe he would abuse or even divorce me. Surprisingly we got tested together but he is negative and I am still positive, and he still supports me.”

20 years old with 2 children on ARVs for 4 months, “I was never tested with my first pregnancy because I was in remote area and I delivered at Traditional Birth Attendant, so when I came here and started ANC with my second pregnancy I was tested and was very shocked with the HIV positive results. I have not told my husband yet as I have seen one of my friends get divorced from her husband after knowing the HIV results”

Furthermore, participants found it difficult to immediately start taking antiretroviral therapy after testing positive for HIV. The decision to be on lifelong therapy was overwhelming and information was too much to be absorbed in such a short time. Most participants stated that to know that they were HIV positive and then start lifelong therapy on the same day was too much to take in.

35 years old with 5 children on ARVs for 5 years, “When I was discovered HIV positive with my 3rd pregnancy, I was shocked despite the support from the hospital. I was given ARVs on the same day but I did not swallow them. I used to come to collect but I never swallowed and after delivery the baby died at 3 months in addition to this, I was sick. I got tested again with my fourth pregnancy and was still HIV positive so when I was giving the ARVs I started swallowing that same day until today.”

The participants reported religious and traditional beliefs was another barrier in taking ARVs. Traditional medicine is considered strong and better that modern medicine as this has been there for a long time.

34 years old with 2 children on ARVs for 6 years, “Most people die because of religious beliefs where they are told to stop taking ARVs and pray for healing. Others are told that traditional medicine is stronger than modern medicine so they are told to stop taking the antiretroviral therapy and eventually they die faster.”

It was also reported that stigma and discrimination was a barrier to accessing PMTCT services. Mothers who are HIV positive are stigmatized by relatives and even the community where they come from.

39 years old with 4 children on ARVs for 6 years, “My aunt was HIV positive and she was isolated by her husband including all her relatives because of HIV. She was given her own plate of food and
slept in her own house. But she has since died and the child who was born to her because she did not take ARVs. I also feared that I would be stigmatized by my own people.”

In addition to stigma from community participants reported that they felt that the PMTCT clinic setting was another way of promoting stigma as they were isolated in a corner in the same building as women who came for antenatal as well as under five clinics.

29 years old with 3 children on ARVs for 2 years, “The corner where we sit as we come for treatment and everyone is looking at us and asking why are those sitting there. People are pointing and talking about us and we feel that this promotes stigma, we should sit with everyone else.”

Participants reported the long waiting time was another barrier to PMTCT services. They come early but usually have to wait for a long time before accessing the services.

39 years old with 4 children on ARVs for 6 years, “I used to come together with my husband but the waiting period is too long so he decided to be getting his medicine from another hospital where they are faster. As for me, I sit there with my baby waiting for the treatment even though it takes long time.”

Focus group discussion with pregnant mothers in antenatal clinic

Similarly, in the focus group discussions barriers to PMTCT were stigma and discrimination, religious and traditional beliefs. It was expressed that setting of the clinic was not conducive as women who come for services know where HIV positive women sit as they come for treatment.

29 years with fourth pregnancy, “Most of the mothers who come to the hospital know the place where HIV positive women sit to get therapy. It is very visible and those that do not know are informed of why that group is sitting separately. I think it promotes stigma”.

33 years with third pregnancy, “I know several mothers who died after stopping ARVs because they were told to join the church and pray. Some other mothers went to traditional healers and they stopped taking the ARVs but took the herbs. They became very sick and died very fast.”

Focus group discussion with health care providers from HIV testing and counseling, ART and PMTCT clinic

The health care providers perceived that the barrier to PMTCT was shortage of staff to fully support the services. Though they are able to counsel the clients but they are limited with the amount of time that they can spend with each client. The more time they spend with one client it means others are waiting for their turn as well.

ART provider, “There is shortage of staff in providing services because the same staffs working in the hospital are the same one expected to provide outreach services and this leads to work overload resulting ineffective service provision.”

Discussion

This study was designed to know whether there are barriers to uptake and implementation of PMTCT services from perception of pregnant and breastfeeding women who are ARVs, pregnant women who come for antenatal services and health care providers.

Mulanje Mission Hospital has an integration of PMTCT into MCH and this is associated with higher levels of ART initiation. This improves uptake and timely initiation of ART among pregnant and breastfeeding women.

Several factors influencing Barriers for successful uptake and implementation of prevention of mother to child transmission of HIV services were brought to light by the Pregnant and Breast-feeding women on ARVs, Pregnant women being attended in Antenatal clinic and Health Service Providers in HTC, PMTCT and ART clinic in Mulanje mission hospital.

Pregnant women are tested at initial ANC visit and after 3 months from date of initial testing to determine their HIV status. Once the woman is HIV positive, she is immediately initiated on ARVs and asked to return the next day with a relative or someone whom she really trusts to be a guardian.

This guardian will undergo counseling and education on ARVs, benefits, side effects and adherence including prophylaxis for the baby once it’s born.

Disclosure of results
When diagnosed HIV positive women might experience emotional turmoil which could affect their ability to disclose their HIV status to significant others especially spouse (Mbokane et al, 2016).

Most of the participants were unable to immediately disclose their HIV results to their partners. According to WHO voluntary disclosure of HIV status should be encouraged as this will result in partner testing. Disclosure of HIV status to sexual partner is very important as it’s associated with less anxiety, increased social support and lead to awareness of HIV risk to untested partner, which can lead to greater uptake of HTC including changes in risky behavior.

However along with these benefits disclosure of HIV status has led to divorce, gender-based violence and discrimination. These risks may lead women to choose not to share the HIV status with partner and family. This leads to lost opportunity for prevention of new infections, and for the ability of these women to access appropriate treatment, care and support (WHO 2011).

Despite the ability to disclose, Mbokane et al, 2016 stated in a study that unless women disclose their HIV status, their partners would be ignorant about this issue and these women are unlikely to use condoms consistently, adhere to ARVs and implement appropriate breastfeeding options.

In a study done by Tenthani et al, 2014 stated that under Option B+ on average 17% of all women were lost in follow up in Malawi 6 months after initiation of ART, citing reasons that they dropped out due to fear of stigma, divorce and physical violence from partner if discovered to be HIV positive.

Morfaw, 2013 found that no one method of facilitated HIV disclosure will be appropriate for every pregnant woman and the content in which the woman lives must be taken into consideration when HIV disclosure is being recommended.

Testing for HIV together as a couple was by far the most preferred method, primarily because it provides an opportunity to remove the burden of disclosure on any one individual thus no one can be blamed for infecting the other.

Mbokane et al, 2016 also encourages couple testing together in order to prevent negative outcomes of results of HIV disclosure to partner.

**Stigma and discrimination**

Most of the participants stated that stigma and discrimination is the one issue that acts as a barrier to clients accessing HIV/AIDS services. In some communities’ individuals are even stigmatized by their own relatives including the community as a whole. Stigma has led to refusal of HIV testing, non-disclosure to partner, non-adherence to HIV treatment. Internalized stigma has led to loss of follow up or defaulter from treatment of HIV infected clients (UNAIDS, 2014).

Participants stated that most people who stopped taking ARVs had internalized stigma and once they became very sick and despite being re-started on ARVs they died prematurely.

Dahlui et al, 2015 concluded in a study that education play a role in society with respect to stigma and discrimination. Educating the population with factual information on HIV/AIDS is needed to reduce HIV stigma and discrimination.

Santos et al, 2014 identified four areas in a study in South Africa to address HIV stigma and discrimination; such as fostering awareness and knowledge among the public, educating people living with HIV/AIDS, advocating for the rights of HIV infected persons and providing emotional as well as physical support.

**Shortage of health care providers**

In a study by Bwirire et al, 2008 stated that women gave the following reasons for loss to follow up such not being prepared for HIV testing, fear of stigma, discrimination, household conflict and even divorce on disclosure of HIV status, lack of support from husband, long waiting at hospital and inability to afford transport cost related to the long distances to the hospital.

Shortage of health care providers leads to a lot of challenges in accessing health services such as long waiting time, limited time in counseling clients and exhaustion by staff. Health care providers need to assess each mother as an individual with different circumstance requiring attention and time. Time is required to explain HIV transmission, treatment, breastfeeding, adherence and child treatment including testing. Without appropriate staff time for counseling, PMTCT service cannot be effectively implemented and utilized (WHO &UNICEF, 2003).
Ahimbisibwe et al, 2014 reported that women had difficulty around learning their HIV status and initiating ARVs on the same day. They were overwhelmed with information, needed time to think about their HIV status, ART initiation and wanted to first discuss with their partners before committing to lifelong treatment.

**Study limitations**

The study conducted in a rural health setting and the population demographics may not be similar to urban health setting. The study has small sample therefore results cannot be generalized to the broader population of Mulanje. The study did not include women who were loss to follow up resulting in omission of perspective from these women. Despite the important roles carried out by husbands and partners in this context, males were not interviewed. Furthermore, the purposeful sampling method of recruiting participants means that data were collected from unrepresentative study informants, and the results cannot be generalized to a wider population. However, the qualitative data collected was relevant to the study topic.

**Conclusion**

Participants in the study were quite knowledgeable about mother to child transmission of HIV. Prenatal HIV testing was considered as a good initiative for PMTCT. The perceived benefits were: enrolment into the PMTCT program if the mother was HIV positive and getting early antiretroviral therapy. Knowing one’s HIV status was seen as the most important reason for HCT as such knowledge would help reduce HIV risk behaviour. Barriers to PMTCT were cited as stigma and discrimination, failure to disclose HIV positive results, religious belief, traditional beliefs and abandonment and psychological distress leading to divorce. Intervention of PMTCT programmes can only be successful implemented if men were more involved and equipped with knowledge in PMTCT, more staff were deployed in PMTCT, women were given time to express fears and concerns, staff giving correct information, more community sensitization was done in relation to HIV/AIDS and thus combating more issues related to stigma and discrimination.

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Topic: Strategic Management of the Epidemiology of Communicable and Non-Communicable Diseases

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Abstract

The achievement of creating a healthy environment and life begins with a conscious effort of an individual and then influencing other members of the family, the society and ultimately, the mind-set of the whole country. Efforts from all these parties can help create a conducive environment, free from diseases and comfortable for everybody to live in (Kasenga, 2016).

There was a transition of Millennium Development Goals (MDGs) to Sustainable Development Goals (SDGs) in 2015; this has affected the environment of health plans and strategies. In today’s globalized world, rapid urbanization, mechanization of the rural economy, and the activities of trans-national food, drink and tobacco corporations are associated with behavioral changes which include less healthy diet, lower physical activity, tobacco smoking and increased alcohol consumption that increase the risk of chronic non-communicable diseases (NCDs). As a result, population health profiles are rapidly changing. Many in low- and middle-income countries (LMIC) are undergoing rapid changes associated with developing high rates of NCD while concomitantly battling high levels of certain communicable diseases, including HIV, TB and malaria. This has population health, health systems and economic implications for these countries. The rationales of the study are; (a) To highlight the different types of communicable and Non-communicable diseases (b) To highlight different strategic Management of these diseases.

Keywords: Communicable diseases, Non-communicable diseases, MDGs, SDGs, LMIC.

Introduction

The number of deaths and sufferings of human beings due to diseases can be significantly avoided or reduced. This can be achieved by incorporating some routine in our daily living by maintaining a high level of hygiene and sanitation thereby resulting in a healthy lifestyle to avoid some diseases. These routines are affordable, less costly and easy to incorporate (Kasenga, 2016). Hence there should be no excuse from anyone when they acquire any communicable or non-communicable disease. Epidemiology entails the study of the distribution and determinants of health-related states or events (including disease), and the application of this study to the control of diseases and other health problems (http://www.who.int). There are professionals in the field of medicine who look at the causes, modes of transmission and how the conditions can get prevented. It is crucial to come up with strategies on how to manage both communicable and non-communicable diseases. Everyone needs to have the right perception and knowledge of the conditions which affect them and also accepting the responsibility of curbing their occurrences to help minimize deaths caused by diseases. The broad classification of diseases into communicable (infectious) and non-communicable diseases (NCDs) is deeply ingrained. However, this classification may be unhelpful for setting public health priorities, particularly in low- and middle-income countries (LMIC).

Communicable diseases (CDs)

These are illnesses that are rapidly spread from one person to another; they can also be a spread from an animal to a human being. The spread can occur through a direct contact with contaminated water, feces; infected body fluids e.g. blood urine e.t.c. (Raturi, 2017). Transmission can also be through the air
like in tuberculosis, examples of Communicable diseases include the common cold, rabies, chicken pox, HIV/AIDS, measles, sore eyes, influenza, and measles. They can easily be prevented through proper hygiene and sanitation, or through vaccination.

**Non-communicable diseases (NCDs)**

These are illnesses that cannot be transmitted from one individual to another. NCDs are not caused by infectious agents as in the case of communicable diseases. They are medical conditions that are both non-infectious and non-transmittable. They are chronic in nature that progress slowly and persist for a long time; examples of NCDs are heart diseases, diabetes, kidney failure, hypertension, Alzheimer’s disease, various types of cancers and stroke (Raturi, 2017). These conditions need prolonged care management since they develop slowly to levels that might be toxic and dangerous to the body. NCDs can be avoided by educating the society via health talks on a healthy lifestyle.

**Strategies for managing communicable and non-communicable diseases**

**Shifting to sustainable development goals (SDGs)**

There was a transition of Millennium Development Goals (MDGs) to SDGs in 2015; this has affected the environment of health plans and strategies. MDGs focused more on health matters which make it relatively straightforward to carry out, three out of the eight goals were health-specific which are MDG 4-6. The fourth MDG focused on reducing the child mortality, and its aim was to reduce the number of children who died by two-thirds from 1990-2015 (Murray, 2015). The fifth MDG focus was aimed at reducing the maternal mortality rate by 75% from 1990-2015. The MDG 6 aimed at combating HIV/AIDS, malaria and other diseases. The target was relatively simple; to reverse the rapid spread of AIDS and to decrease instances of people getting infected with malaria and other diseases (Nakatani, 2016).

In the SDG only one of the seventeen goals talk about health. The aim of this goal is to ensure healthy lives and promote the well-being of individuals of all ages. It is important to interlink the health sector and health since none is a monopoly of the other (Nakatani, 2016). Good health dramatically contributes greatly to the achievement of different SDG goals and vice versa. The qualities of water and gender bias also have a positive synergy with health. United Nations Development Programme (UNDP) goals in some 170 countries and territories whereby all health strategies are required to apply for the next 15 years, counting from 2016 (www.UNDP.org).

**Primary prevention**

This refers to activities or a measure, both individual and communal that is directed at reducing the risk of exposure to a risk factor or health determinants in an individual or the population. Some diseases can be avoided by providing vaccination to individuals while they are still young. Governments should ensure all children receive immunizations and at the required age. At birth, a kid should be given vaccines to prevent tuberculosis which is an air-borne disease and polio which is non-communicable. In almost all countries in the world, Polio remains the primary cause of individuals having lives that are disability adjusted (Unwin & Oni, 2015). Measles, a dangerous communicable illness is also vaccinated against when an infant turns nine months or at six months in the event of a measles outbreak. Vaccines for tetanus and hepatitis B are injected into the body when one is only six weeks of age. Every country should put in place strategies to ensure there is free vaccination in all public hospitals to prevent certain diseases by doing these; the mortality rate will reduce tremendously.

Another example of primary prevention is smoking of tobacco and its risk to cause respiratory diseases. Individuals should know the risks and dangers of smoking tobacco through health education. People also know HIV/AIDS is transmitted when they engage in unprotected sex with infected individuals. Primary prevention here will require individuals to take precaution and abstain or use protection anytime they want to have sex with multiple partners. It is common knowledge that sleeping under a treated mosquito
net helps prevent malaria. Primary prevention goes beyond the scope of the healthcare systems. Everyone needs to put an effort to achieve the standard environmental changes which in turn helps reduce exposure to diseases. (Khasnabis C, Heinicke Motsch K., Achu K., et al., 2010). People need to get sensitized about these factors that would subsequently cause illness.

**Secondary prevention**

This focuses on the Sub-clinical stage and the early clinical stage. These measures enable early detection and prompt effective intervention to correct the body from the disease condition to a state of health. Health organizations in collaboration with the governments of various states need to provide free systematic screening programs. A large group of people gets tested and investigated to identify specific persons who face the risk of developing a particular infection (in the case of NCDs), or those who are already infected (Basiro, 2016). This screening could target those people the state considers to be at high risk. In the case of TB for example, it might focus on the homeless kids and students residing in congested hostels.

The government should ensure there are free services in all public hospitals which provide screening of chronic illnesses like cancer. Detecting these diseases at an early stage will help reduce the deaths caused by cancer. Individuals who show signs of any cancer should start their chemotherapy as soon as they can before symptoms begin to show. Also, equipment used to carry out mammography and cytology screening for breast cancer and cervical cancer respectively need to be easily accessible and set up in all major hospitals. Women should get educated on the early signs of both breast and cervical cancer. They should know how to examine their breasts and detect whether they are reasonable or not. It is advisable to engage a health care provider when deciding on a screening plan that is best for you. Screening should also get provided for other types of cancer like lung cancer, uterine cancer, and prostate cancer. Individuals should be encouraged to control their health by getting regular check-ups and taking cancer screening tests (Komen, 2017).

**Good health legislation**

It is up to the government of every country to formulate legislation and policies which will aid in the control and prevention of communicable and non-communicable diseases. There is need to come up with new policies and guidelines on how to manage a communicable and non-communicable disease. It will help reduce the impact of these medical conditions and stop further progression of NCDs. Health-related legislations need to be reviewed on a regular basis to support the control and prevention of these diseases. It is crucial for each government to put regulations on the alcohol and tobacco consumption because excessive alcohol drinking and smoking cigarettes is a risk factor to many diseases. There should be Advocate for all health systems to be sites of awareness on NCDs to the population. Doctors, midwives, nurses, and other health workers should be health promoters to the population on healthy diet, the importance of physical activity and the negative effects of smoking.

**Quality medical treatment**

Hospitals should always be ready to treat various illnesses. Treatment is especially necessary when managing communicable diseases like malaria and tuberculosis. Prescribed drugs get given to individuals who are sick by qualified medical professions and at an affordable price. In the case of non-symptomatic illnesses, these infections can be treated early with medicine like isoniazid and a multi-drug regimen in the case of symptomatic infections like TB (Basiro, 2016).

**Promotion of physical activity**

Many diseases can be prevented by merely incorporating physical activity and exercises in one’s daily routine. Physical activity significantly reduces the risk of developing heart diseases, cancer of the colon, high blood pressure and diabetes among individuals. Governments need to try to implement policies and legislation that promote incorporation of physical activity in one’s lifestyle. There should also be public
awareness of the society by health organizations and medical professionals. Using these platforms, they can discuss the various health benefits of physical activity and how it prevents occurrences of diseases. Physical activity mainly prevents non-communicable diseases like heart diseases, high blood pressure, and obesity. Programs that promote physical activity by members of the society should be implemented in institutions, communities and even at the workplace (Bela & Mathur, 2011).

Outbreak control

When there is a suspected case of a disease outbreak, the situation needs to be rapidly investigated and assessed. Typically, these epidemics get indicated after health surveillance teams get put in place. By evaluating the condition in question, the parties involved can decide on what steps to take to control the outbreak. One strategy that can get used in managing the epidemic would be through early detection of the diseases. Once someone is found to be infected, the person gets to receive proper care and effective treatment. The mortality rate will significantly reduce. Also, carrying out prevention activities for the disease in question would be very ideal. Rapid response to an outbreak of a disease is the key to efficiently controlling an emergency (Rayner, 2017). If an individual who has had diarrhea in a particular area is said to have cholera by a doctor, there is a likely hood of more cholera cases in that area, and so prompt measures should be put in place to prevent more individuals from getting affected by cholera. The government must prioritize mapping of communicable diseases outbreaks in human beings.

National public-health surveillance

It involves the collection of health information, analysis, and dissemination of the same data for appropriate action to be taken. Specific health workers are designated to conduct public-health surveillance. Others need to get placed in temporary relief centers and hospitals. They should be keen to present the list of illnesses these patients have. Active surveillance provides data to help plan on how to intervene in case of an epidemic or an emergency. The inspection can help to provide detailed information on movement patterns on the epidemiology of communicable and non-communicable diseases (Unwin & Oni, 2015).

Promoting a healthy lifestyle

Promoting healthy lifestyles among individuals is essential. Interventions need to be implemented to reduce the risk factors for both communicable and non-communicable infections. People get exposed to risk factors of NCDs at a young age though deaths caused by these diseases occur mostly in mature adults. It warrants putting in place appropriate regulatory measures in critical sectors that will be a source of empowerment to individuals and the society as a whole. These governments should have an objective of controlling tobacco intake among smokers and non-smokers, reduction in alcohol abuse and promotion of proper nutritional practices (Rayner, 2017). Such measures could also help to protect children from the adverse effects of partaking unhealthy foods and beverages.

- Proper nutrition: It is essential to eat a balanced and healthy diet to avoid instances of chronic illnesses like diabetes. Governments need to come up with national policies and guidelines to encourage production and consumption of healthy foods.
- Tobacco control: Governments should try and implement initiatives to help tobacco control in school curricula. It is also crucial to mitigate the interference of the tobacco industry in the implementation of public health facilities.

Provisions of a healthy environment

The control of most communicable infections highly depends on a healthy environment. All governments need to try and prevent infectious diseases amongst individuals by promoting hygiene routine practices. Adequate amounts of clean water should be supplied to members of the community to avoid the occurrence of cholera and diarrhea. These governments also have to ensure that individuals
have appropriate shelter and adequate sanitation facilities. It merely means that people need to have improved living standards.

Hygiene encompasses various actions undertaken by human beings to maintain a high level of cleanliness of their bodies, their place of work and the domestic environment to prevent the spread of various infections. Health organizations should have public awareness programs where members of the community get taught how to handle domestic animals, wash, prepare their food and even how to dispose of human waste and excretion (Basiro, 2016). These governments should try and provide piped water to domestic households and set up specific sewerages for disposal of waste and polluted water. It is crucial to know that maintenance of personal hygiene helps alleviate suffering such as those caused by bacteria which cause the inflamed skin on people with blocked lymphatic vessels (Basiro, 2016).

Who global action plan for the prevention and control of non-communicable diseases from 2013-2020

1. To raise the priority accorded to the prevention and control of non-communicable diseases in global, regional and national agendas and internationally agreed development goals, through strengthened international cooperation and advocacy
2. To strengthen national capacity, leadership, governance, multisectoral action and partnerships to accelerate country response for the prevention and control of non-communicable diseases
3. To reduce modifiable risk factors for non-communicable diseases and underlying social determinants through creation of health-promoting environments
4. To strengthen and orient health systems to address the prevention and control of non-communicable diseases and the underlying social determinants through people-centered primary health care and universal health coverage
5. To promote and support national capacity for high-quality research and development for the prevention and control of Non-communicable diseases
6. To monitor the trends and determinants of non-communicable diseases and evaluate progress in their prevention and control

Communicable diseases: preparedness, surveillance and response

Communicable diseases still represent the major public health problems leading to high morbidity and mortality rates among the population, particularly among children under 5 years old. Natural disasters often faced by undeveloped and developing countries turn the population vulnerable to water borne and drought related disease outbreaks such as cholera, dysentery, and meningococcal meningitis.

The major causes of morbidity and mortality are AIDS, malaria, tuberculosis, respiratory infections, diarrhea, and meningitis.

Challenges

- Weak epidemiological surveillance system lacking infrastructure and appropriate intra and inter-sectoral coordination;
- Poor health care services, the impact of HIV, and economic migration weakening the health systems;
- Shortage of human resources to implement activities at all levels;
- Lack of radio-communication to liaise remote districts.

Next steps

- Revitalization/establishment of the epidemic management committees at central, provincial and district levels;
- Establishment and training of Rapid Response Teams on preparedness and response at all levels;
- Adaptation and introduction of the case based and monthly reporting forms in each country’s health surveillance system;
- Revision and update the technical guidelines and the training manuals for district health workers;
• Training for health personnel on disease surveillance, reporting, data management, preparedness and response;
• Sensitization of clinicians at hospitals on disease surveillance with emphasis on cases detection and reporting on priority diseases;
• Development of a comprehensive national laboratory policy;
• Training at provincial labs in meningitis surveillance and provide adequate supplies.
• [WHO/ Communicable diseases: preparedness, surveillance and response (n.d)]

Challenges and limitations of implementing general health

Strategies and plans

• Inadequate and unstable sources of funding for health care providers.
• Poor living standards in most third world countries. It leads to contraction of communicable diseases like diarrhoea, cholera, tuberculosis, and malaria since most of these people do not have ways to prevent these infections.
• Aging: A majority of the world’s population today are individuals aged sixty-five years and above. These individuals end up getting various medical conditions and impairments that impede longevity.
• The existence of a health system which regards neoliberal principles as the driver of its actions.
• Poor health policies implementation by the government. The moment the government does not prioritize health matters, then a significant crisis is likely to occur. Policymakers must come up with guidelines and policies to get implemented for better provision of health care services in various countries.
• There is limited or no involvement of institutions outside the health sector in generating responses that link various areas as well as organizations that promote community involvement and participation in issues affecting the health sector.
• Lack of competent health workers who can engage in community orientation or focus on the health status of the family. Most of these workers rather just treat patients whenever they fall ill or are involved in accidents.

Summary

Now, at the dawn of the third millennium, non-communicable diseases are sweeping the entire globe. There is an increasing trend in developing countries, where the demographic and socio-economic transition imposes more constraints on dealing with the double burden of infectious and non-infectious diseases in a poor environment, characterized by ill-health systems. It is predicted that, by 2020, non-communicable diseases will cause seven out of every ten deaths in developing countries. Among non-communicable diseases, special attention is devoted to cardiovascular disease, diabetes, cancer and chronic pulmonary disease. The burden of these conditions affects countries worldwide but with a growing trend in developing countries. Preventative strategies must take into account the growing trend of risk factors correlated to these diseases. In parallel, despite the success of vaccination programmes for polio and some childhood diseases, other diseases like AIDS, tuberculosis, malaria and dengue are still out of control in many regions of the globe. This paper is a brief review of recent literature dealing with communicable and non-communicable diseases in developing countries. It gives a global view of the main diseases and their impact on populations living in low- and middle-income nations. [Abdesslam Boutayeb; 1 March 2006].

Conclusion

There is the need for urgent attention and extensive research looking at the magnitude of the epidemiology of both communicable and non-communicable diseases. There have been enormous efforts in the past to attempt and eradicate the occurrence of these illnesses by applying MDGs and from 2016, SDGs. However, this issue still needs to be looked into and addressed in an entirely different manner. The
epidemiology of the various communicable and non-communicable diseases has proven to be the leading cause of mortality worldwide. The case gets even worse for the low-income regions. Though it is common knowledge that proper hygiene, sanitation, improved standards of living and leading healthy lifestyles reduce occurrences of these diseases, there still are barriers to ensuring adequate safety measures get adhered to by all persons. Governments and other health organizations need to come up with strategies to deal with this situation. In this way, the mortality rates will get significantly reduced. People who are healthy are of good economic importance to their respective countries.

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Rising Rate of Cesarean Section in Nepal

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Abstract

Caesarean section is one of the most common and lifesaving surgeries performed in modern obstetrics. In a developing country like Nepal where health care resources are limited, this rising trend definitely has major implication but it is essential to perform when complications arise during pregnancy and labour without this large number of women and their unborn babies die every year, especially in low-income countries. The World Health Organization suggests 10-15% cesarean section rate and has suggested to be done only when justified by a medical condition. It states that, at a population level, if cesarean section rates higher than 10% does not reduce the maternal and neonatal mortality rates, and it should be performed only when medically justified. Otherwise unnecessary health of mother and babies including social and economic implications would challenge childbearing women, babies, their families and the state. Recently in Nepal there is a sharp rising trend of cesarean section rates from 20 to 81% in different hospitals especially in the private setting indicating over-medicalization of childbirth unnecessarily performing without medically justified. This arise the issue of human rights violence of childbearing women and professional integrity of a practitioner and safety of the clients. The World Health Organization recommended use of the Robson criteria which would be one of the best strategies in reducing the frequency of the procedure that should include avoidance of medically unnecessary primary cesarean section and improving case selection for induction and prelabour cesarean section besides educating childbearing women and their families about the consequences of unnecessary request of the procedure.

Keywords: Cesarean section; Rate; World health organization, Violence.

Introduction

A cesarean section is a life-saving obstetric emergency which is essential when certain complications arises during pregnancy and labour and without this, a large number of women and their unborn babies die every year, especially in low-income countries. Though, it is a major surgery and is associated with immediate maternal and perinatal risks and may have implications for future pregnancies as well as long-term effects that are still being investigated. The use of CS has increased dramatically worldwide in the last decades particularly in middle- and high-income countries, despite the lack of evidence supporting substantial maternal and perinatal benefits with CS rates higher than a certain threshold, and some studies showing a link between increasing CS rates and poorer outcomes. This marked increase in cesarean section rate may be due to excessive use of electronic fetal monitoring for early detection of fetal distress, practice for repeat cesarean section, doing cesarean section for most of the Breech. Nevertheless, the World Health Organization (WHO) suggests that no region in the world is justified in having a cesarean section rate greater than 10-15%. WHO statement concludes that cesarean sections are effective in saving maternal and infants lives, but only when they are required for medically indicated reasons. It states that, at a population level, cesarean section rates higher than 10% are not associated with reductions in maternal and newborn mortality rates, and it should be performed only when medically justified. The reasons for this increase are multifactorial and not well-understood. Many studies have shown that women who underwent cesarean section without medical necessities are at increased risk of having infection, pain, pre-hospitalization, breastfeeding challenges, and complications in future pregnancies and even death. Additionally, babies delivered by cesarean sections have higher rates of hospital admission, need for ventilation, respiratory
morbidity and mortality. Cesarean section born babies are more likely to have long-term negative health effects, such as asthma, type-1 diabetes, obesity, metabolic diseases and lead to unexplained stillbirths in the second pregnancy. These risks explain why cesarean on demand or without any maternal or fetal conditions is considered as an expensive and dangerous luxury, suggesting an urgency of controlling the rate of cesarean sections. Changes in maternal characteristics and professional practice styles, increasing malpractice pressure, as well as economic, organizational, social and cultural factors have all been implicated in this trend. Additional concerns and controversies surrounding CS include inequities in the use of the procedure, not only between countries but also within countries and the costs that unnecessary caesarean sections impose on financially stretched health systems.

The rate of cesarean sections around the world is increasing at an "alarming" rate. Since 1990, C-sections have more than tripled from about 6 percent of all births to 21 percent (three studies report in The Lancet). Now C-sections are more than vaginal deliveries in parts of southeast Europe, Latin America and China. Even in developing countries, the rates are extremely high at clinics. CS rates decreased only in two countries: Guinea, from 3.3% to 2.4%; and Nigeria, from 2.9% to 2%. Zimbabwe maintained the rate at 6% and all other countries increased their use of CS⁷. Especially in Urban area, cesarean birth is in rising trend in Nepal. Studies have shown that women living in urban with higher levels of education, on highest wealth quantile and nulliparous are the one who are going through unnecessary cesarean delivery⁶,⁷.

In some hospitals like Patan Hospital and Tribhuvan University Teaching Hospital in Nepal there is increase in cesarean section rate from 23% in 2005 to 44% in 2014 and 17% in 2005 to 25% in 2010 respectively which indicate that there is decline in normal spontaneous and instrumental vaginal deliveries⁸,⁹. This indicates that these women are becoming the victim of obstetric violence which is common in Nepal for which they are unaware because of their own ignorance and the medical professionals are becoming perpetrators¹⁰,¹¹. Paradoxically, in rural Nepal women are facing life threatening challenge to give complicated birth because of lack of access of obstetric emergency service where as in urban areas there is a medicalization of childbirth with unnecessary biomedical intervention treating physiological reproductive processes as biomedical problems that can be treated by the medical profession⁴. On enquiring about alarmingly increase in cesarean rates in Nepal some professionals, especially obstetricians assert mention that women prefer and request for cesarean delivery. However, studies in different settings including Nepal revealed that there was no valid evidence to prove that actually it is because of maternal request unnecessarily cesarean sections have been performed 12. The American College of Obstetricians and Gynecologists¹³ clearly states that cesarean delivery on maternal request should not be recommended after knowing the potential risks of the procedure in the absence of maternal or fetal indications for cesarean delivery, a plan for vaginal delivery is safe and appropriate and should be recommended for clients.

Everyone working to improve maternal health care should have common goal that is healthy mothers and healthy babies; however, medical model of care can either protect or violate the fundamental human rights of childbearing women. There is a growing concern among women’s rights and human rights advocates, and health research professionals regarding overmedicalization and commercialization of childbirth, particularly in the case of low risk pregnancy and that the cesarean section rate which has been recognized as a violation of human rights in childbirth and suggesting for social model of care to empower childbearing women¹⁴. In Bangladesh, India, Nepal and Pakistan only 15%, 39%, 37% and 35% of the recorded deliveries occurred in a health facility, respectively. However, many of these deliveries probably took place in private hospitals, where obstetricians and general practitioners are available to lead delivery care and the incentives to perform caesarean sections may be relatively greater. This may explain why such large proportions of the women who delivered in health facilities in Bangladesh, India, Nepal and Pakistan – 51%, 22%, 12% and 20%, respectively – had caesarean sections¹⁵,¹⁶.

Fear of litigation and professional agreements and disagreements were one of the key factors in the decision-making process. Insufficient human and physical resources, lack of unified guidelines, financial benefits to the hospital, and private versus public health care facilities were the contributing factors to the rise in rate of CS.
Nepal Context

Table 1. Percentage of cesarean section in different hospitals of Nepal

<table>
<thead>
<tr>
<th>Location and Hospitals</th>
<th>Rate in Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Om Hospital, Chabahil, Kathmandu</td>
<td>81%</td>
</tr>
<tr>
<td>Medicare Hospital, Chabahil, Kathmandu</td>
<td>79%</td>
</tr>
<tr>
<td>Valley Maternity Nursing Home</td>
<td>77%</td>
</tr>
<tr>
<td>B &amp; B Hospital</td>
<td>67%</td>
</tr>
<tr>
<td>Nepal Police Hospital, Kathmandu</td>
<td>64%</td>
</tr>
<tr>
<td>Kathmandu Model Hospital</td>
<td>60%</td>
</tr>
<tr>
<td>Kirtipur Hospital (managed by Phect Nepal), Kathmandu</td>
<td>51%</td>
</tr>
<tr>
<td>Patan Hospital, Lagankel, Lalitpur</td>
<td>47%</td>
</tr>
<tr>
<td>Kathmandu Medical College, Sinamangal, Kathmandu</td>
<td>46%</td>
</tr>
<tr>
<td>Civil Service Hospital, New Baneshwor, Kathmandu</td>
<td>45%</td>
</tr>
<tr>
<td>TU Teaching Hospital, Maharajgunj, Kathmandu</td>
<td>39%</td>
</tr>
<tr>
<td>Shree BirendraSainik Hospital (Army Hospital), Kathmandu</td>
<td>33%</td>
</tr>
<tr>
<td>BP Koirala Institute of Health Science, Dharan</td>
<td>30%</td>
</tr>
<tr>
<td>Nobel Medical College Hospital, Biratangar, Morang</td>
<td>20%</td>
</tr>
<tr>
<td>Paropakar Maternity and Women’s Hospital (PMWH), Thapathali</td>
<td>17%</td>
</tr>
<tr>
<td>Karnali Academy of Health Sciences (KAHS) Teaching Hospital, Jumla</td>
<td>15%</td>
</tr>
<tr>
<td>World Health Organization</td>
<td>10-15%</td>
</tr>
</tbody>
</table>

The rise in the cesarean rate is commonly attributed to several factors which includes multiple gestation, maternal obesity, preterm labor, gestational diabetes, or hypertension—as well as physicians’ concerns about liability and malpractice. But evidence indicates that these factors do not fully account for the wide differences in cesarean rates observed across states and countries. In 2012, about 23 million C-sections were done globally. Few evidences suggest a higher rate of 19% which may result in better outcomes. More than 45 countries globally have C-section rates less than 7.5%, while more than 50 have rates greater than 27%. Efforts have been made to improve access to and reduce the use of C-section.

The National Institutes of Health, policy leaders, and clinicians have expressed concern over increasing cesarean rates. Healthy People 2020 initiative, the Department of Health and Human Services put forth clear, authoritative public health goals recommending a 10 percent reduction in both primary and repeat cesarean rates, from 26.5 percent to 23.9 percent, and from 90.8 percent to 81.7 percent, respectively.

Health care providers, patients, and policy makers should recognize these variations which is an important indicator of health care quality. Such variation may provide potential underuse or overuse of a service, both of which may be clinically harmful and costly. Understanding the extent of variation and its causes may provide opportunities for identifying policy options to improve care.

The prevalence of caesarean section is generally agreed to be higher than needed in many countries, and physicians are encouraged to actively lower the rate, as a caesarean rate higher than 10-15% is not associated with reductions in maternal or infant mortality rates whereas some evidence supports a higher rate of 19% may result in better outcomes.

Conclusion

Caesarean sections should ideally only be undertaken when medically necessary and every effort should be made to provide caesarean sections to women in need, rather than striving to achieve a specific rate. To slow down the increasing rate of cesarean section in Nepal, the government of Nepal should develop specific policies and measures, need to educate people about its pro and con. Additionally, use of WHO
proposes the Robson criteria as a standard for assessing, monitoring and comparing cesarean section rates within healthcare facilities overtime, and between facilities would assist in managing cesarean section rates at both the individual facility and national level by identifying how use of this intervention in specific obstetric subpopulations affects overall cesarean section rates, and how obstetric populations and intervention rates change with time\textsuperscript{17,18}. Healthcare policy makers and professionals need to be called urgently to investigate and monitor its economic, social and medical implications for the society and nation to find out the causes of increasing rate of cesarean delivery in Nepal.

According to the latest data from 150 countries, currently 18.6% of all births occur by CS, ranging from 6% to 27.2% in the least and most developed regions, respectively. Latin America and the Caribbean region have the highest CS rates (40.5%), followed by Northern America (32.3%), Oceania (31.1%), Europe (25%), Asia (19.2%) and Africa (7.3%). Based on the data from 121 countries, the trend analysis showed that between 1990 and 2014, the global average CS rate increased 12.4% (from 6.7% to 19.1%) with an average annual rate of increase of 4.4%. The largest absolute increases occurred in Latin America and the Caribbean (19.4%, from 22.8% to 42.2%), followed by Asia (15.1%, from 4.4% to 19.5%), Oceania (14.1%, from 18.5% to 32.6%), Europe (13.8%, from 11.2% to 25%), Northern America (10%, from 22.3% to 32.3%) and Africa (4.5%, from 2.9% to 7.4%). Asia and Northern America were the regions with the highest and lowest average annual rate of increase (6.4% and 1.6%, respectively).

**Conclusion**

The use of CS worldwide has increased to unprecedented levels although the gap between higher- and lower-resource settings remains. The information presented is essential to inform policy and global and regional strategies aimed at optimizing the use of CS.

**References**


[4]. Data and sourcesS1 File. First and latest available CS rate data points per country, the year, total number of data points used for this analysis and sources of the data.


The Importance of Geospatial Data on Multidrug-Resistant and Extensively Drug-resistant Tuberculosis Distribution in Engela District (Namibia): Retrospective cohort study

Article by Olenga Olenga

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Abstract

Background: Multidrug-resistant tuberculosis (MDR-TB) has become a major public health problem and obstacle to global TB control. MDR-TB is associated with higher case fatality rates, especially among HIV-infected patients, and is much more difficult and costlier to treat than drug susceptible TB. Namibia is the country with the fourth highest TB burden in the world. The incidence rate in 2015 was 651/100 000. Multidrug-resistant tuberculosis (MDR-TB) has become a major public health problem, especially in developing countries, where the MDR-TB burden is the highest. In Namibia, among the regions highly affected by MDR-TB, Ohangwena region is facing many challenges. A recent study has demonstrated that the magnitude of the problem by numbers, about 40 per cent of patients admitted to the Katutura State Hospital’s TB unit and 30 per cent of patients who commenced treatment at the Engela District Hospital in the Ohangwena Region are Angolan nationals.

Objectives: To determine geospatial Multidrug-resistant and extensively drug-resistant Tuberculosis Distribution in Angola and Namibia; To investigate the impact of geospatial distribution on Multidrug-resistant and extensively drug-resistant Tuberculosis. Methods: this is a retrospective cohort study that will be performed on all cases of Multidrug-resistant and extensively drug-resistant Tuberculosis with confirmed laboratory test in Engela District Hospital between January 2013 and December 2017. Geospatial data will be used to illustrate all hypotheses.

Conclusion: this study could be crucial on its genre to establish different gaps between Angolan and Namibian in the management of MDR-TB in Engela district hospital.

Problem of statement

TB has been recognized as a significant public health problem in Namibia since its independence in 1990 and the National TB Control Programme (NTCP) has continually revised its TB control guidelines, in order incorporate updated WHO recommendations and address DR-TB. Few years ago, multidrug-resistant tuberculosis (MDR-TB) has become a major public health problem in Namibia. The emergence and controlling the spread of MDR-TB begins with its timely diagnosis (Sagwa 2016). TB can be cured with effective treatment, but with ineffective treatment, MDR TB could develop with grave consequences for the patient, his/her family and community as well as for the health care services. MDR TB develops when TB treatment is ineffective and/or inconsistent. A recent survey conducted in Namibia has shown that drug resistance among TB patients is increasing.

Among Namibian regions affected my MDR-TB, Ohangwena Region is highly concerned. In fact, Ohangwena region is among the region that contributed the most patients with 12% (MOHSS 2016). A recent report has demonstrating that the magnitude of Angolan nationals admitted in Namibia is high in this region (Lelamobile 2015). In fact, 40 per cent of patients admitted to the Katutura State Hospital’s TB unit and 30 per cent of patients who commenced treatment at the Engela District Hospital in the Ohangwena Region are Angolan nationals (Lelamobile 2015).

Our analysis in Engela District Hospital in Ohangwena region has revealed that there is need to improve basic TB control practices to ensure that all TB patients adhere to and complete TB treatment. The community-based DOTS is the main strategy of the TB programme, providing treatment for TB and
direct observation of intake of medication, dealing with drug-resistant strains of TB and working alongside other programmes to control the spread of TB (MoHSS, 2010). However, considerable difficulties exist in providing adequate DOT in a vast border between Angola and Namibia but sparsely populated country with high TB prevalence and shortages of trained health care workers.

Nowadays, Using GIS analysis combined with MDR-TB and XDR-TB surveillance can be an effective method for identifying tuberculosis transmission not identified during standard contact tracing methods. The application of these methods can be utilized in countries where contact tracing is routinely performed. These methods can enhance targeted screening and control efforts, with the goal of interruption of disease transmission and ultimately prevalence reduction.

Literature review

Tuberculosis (TB) is a major public health problem in Namibia, which is ranked 5th highest in the world in terms of the TB incidence rate per 100,000 population3 (MOHSS 2016). Multidrug-resistant tuberculosis (MDR-TB) has become a major public health problem and obstacle to global TB control (WHO 2014). MDR-TB is associated with higher case fatality rates, especially among HIV-infected patients (Risk 2012), and is much more difficult and costly to treat than drug susceptible TB (WHO 2010). The worldwide burden of MDR-TB has been growing, and in 2008, there were 440,000 estimated new cases of MDR-TB, or 3.6% of all incident TB cases, compared to 273,000 estimated new cases (3.2% of incident TB cases) in 2000 (Zignol 2006; Ricks 2012). However, these estimates may not accurately represent the true global burden of MDR-TB as they are based on surveillance reports from only 114 countries, of which only 10 are sub-Saharan countries with recent or complete national data (WHO 2010).

The incidence rate in 2015 was 651/100 000 (Mavenyengwa 2017). Cases of TB in Namibia are widely distributed throughout the country; however, the majority of cases are reported in the regions of Khomas, Ohangwena, Erongo, and Kavango (Mavenyengwa 2017). Tuberculosis is widely distributed throughout Namibia, with more males infected than females (Mavenyengwa 2017). Males have more resistance to RIF than females (Mavenyengwa 2017). Tuberculosis infection is mainly common in the age group of 20–40 years. A large proportion of MTB patients were also infected with HIV (Mavenyengwa 2017).

Multidrug-resistant tuberculosis (MDR-TB) has become a major public health problem, especially in developing countries, where the MDR-TB burden is the highest (Sagwa 2016). Namibia is facing many challenges about the management of MDR-TB and XDR-TB (Extensively drug resistant TB). In fact, MDR-TB is a form of TB infection caused by bacteria that are resistant to treatment with at least two of the most powerful first-line anti-TB medications (drugs), isoniazid and rifampin. And, XDR-TB is a rare type of MDR TB that is resistant to isoniazid and rifampin, plus any fluoroquinolone and at least one of three injectable second-line drugs (i.e., amikacin, kanamycin, or capreomycin). The emergence of drug-resistant strains of TB is a serious threat to controlling the TB infection; drug-resistant, multi-drug resistant and extensively drug-resistant (DR, MDR, and XDR) forms of TB have been reported in Namibia since 2007, and incidence has been drastically increased. (MoHSS, 2010; WHO Namibia, 2009). The number of cases of confirmed MDR-TB has doubled between 2007 and 2009. MDR-TB and XDR-TB constitute a serious challenge for controlling the disease because of the higher mortality rate and the financial burden of more costly treatments. (MoHSS, 2010).

Among Namibian regions highly affected by MDR and XDR-TB, Engela District Hospital in the Ohangwena Region is really concerned. A recent study has demonstrating that the magnitude of Angolan nationals admitted in Namibia was high. About 40 per cent of patients admitted to the Katutura State Hospital’s TB unit and 30 per cent of patients who commenced treatment at the Engela District Hospital in the Ohangwena Region are Angolan nationals (Lelamobile 2015). This study has shown that there is a need to ensure that the current situation does not significantly derail the commendable progress Namibia has made in TB and Human Immunodeficiency Virus (HIV) control (Lelamobile 2015). Additionally, the
study explained that untreated persons with TB or HIV, whether from Angola or Namibia, remain the most significant threat to keeping the diseases under control in the country (Lelamobile 2015). In 2012, a total of 11,145 cases of TB were notified among which 4,333 were new smear positive pulmonary cases and 1,410 were previously treated smear positive cases (2). This is important to highlight that 363 cases of drug-resistant TB were diagnosed, including 137 cases multi-drug resistant (MDR) TB and six cases of extensively drug resistant (XDR) TB in Namibia. Only Ohangwena region, 1,078 cases were notified, 533 were diagnosed as new smear positive and 165 cases were previous smear positive patients. Ohangwena region is among the region that contributed the most patients with 12%. Based daily practice, the Engela District in Ohangwena region is the most saturated in TB patients.

In fact, the Engela District Hospital is treating two patients who are both from Angola with Extensively Drug-Resistant TB (XDR-TB), which according to Kamwi is a serious health hazard, because MDR-TB and XDR-TB patients are hospitalized with the other TB patients (New Era 2014). In 2012 and 2013 at least 63 of the 81 patients who defaulted treatment were Angolan nationals, which according to the health minister, negatively impacts the achievement of national and international targets (New Era 2014). “This exerts significant financial and infrastructural pressure on the region and the district, because the hospital does not have infrastructure to isolate these patients (New Era 2014). Although a bilateral agreement between Namibia and Angola has been signed to facilitate the management of communicable diseases between the two countries, the health ministry is still challenged to maintain and ensure that patients are successfully treated, because there are patients who default TB treatment (New Era 2014). Then, the likelihood of developing MDR-TB in those patients is high.

At present, geographic information systems (GISs) are among the most useful tools in epidemiology, as they can be used to identify geographical areas and population groups with a higher risk of sickness or premature mortality and which therefore require higher preventive care or health information and monitoring of diseases in time and space (Moonan 2004). GISs could have many implications in public health policy of TB management. A study conducted in China characterized the geographic and spatiotemporal distribution of confirmed TB (Liu 2012). In this study, we will use geographic information systems will be used to illustrate different gaps in the management of MDR-TB and XDR-TB.

Objectives

Main objectives:
• To determine geospatial distribution Multidrug-resistant and extensively drug-resistant tuberculosis among patients treated in Engela district Hospital.
• To investigate the impact of geospatial distribution on Multidrug-resistant and extensively drug-resistant Tuberculosis.

Specific objectives:
• To estimate the prevalence of MDR-TB and XDR-TB in Engela district from 2013 to 2017.
• To assess the relationship between geospatial data and MDR-TB and XDR-TB outcomes

Methodology

Study design

A retrospective cohort study will be performed on data collected on all cases of Multidrug-resistant and extensively drug-resistant Tuberculosis with confirmed laboratory test in Engela District Hospital between January 2013 and December 2017. The study population will be adults (above 18 years old treated for MDR or XDR-TB in this specific period. We will compare Angolans and Namibians who developed MDR or XDR-TB. Angolans will be considered as exposed group and Namibians as no exposed. We hypothesize that geographic areas could impact on tuberculosis treatment. By the way, geographic location is considered as exposure.

We will use a data extraction form with the specific information on geospatial data: patient ID, age, sex, country, region, town, Avenue, Address number, latitude, longitude, phone number, occupation,
marital status, Income/month, HIV status, Other co-morbidities, date of admission, date of discharge, defaulters, Laboratory results on admission, laboratory results on discharge, MDR, XDR and tuberculosis outcomes.

**Study settings**

We will conduct this study in Engela District Hospital which is in the Ondangwa Region. Ondangwa region is populated to 308,951, only Engela district accounts 210,000. Engela District hospital accounts 230 beds, the study will be focused on tuberculosis ward where the admission rate could reach 100% per month.

**Study population**

This study will include all adults’ patients (above 18 years old) who were admitted for MDR and XDR tuberculosis in Engela District Hospital in period of January 2013 to December 2017.

**Inclusion criteria**

Adults patients (above 17 years old) admitted for pulmonary tuberculosis (PTB) will be considered.

**Exclusion criteria**

We will exclude pregnancy women and patients with severe co-morbidities. We will also exclude extra-pulmonary TB without a pulmonary component. In addition, we will exclude all participants whom geospatial data could not be found in the file or by tracing.

**Study outcomes**

The primary outcome of the study will be MDR and XDR geospatial mapping distribution between Angola and Namibia. Secondary outcomes will include rates of treatment completion, failure and defaulters.

**Sampling technique**

The sample size is calculated by Open Epi software version 5. It is assumed that the odds for having MDR-TB among the previously treated patients compared to the new patients were 2.7. (MOHSS 2016). Using 95% confidence interval, power of 80%, then Fleiss with CC method is estimated a sample size of 1222 MDR cases.

<table>
<thead>
<tr>
<th>Sample Size: Retrospective Cohort study</th>
<th>Kelsey</th>
<th>Fleiss</th>
<th>Fleiss with CC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Two-sided significance level(1-alpha):</td>
<td>95</td>
<td></td>
<td></td>
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<tr>
<td>Power (1-beta, % chance of detecting):</td>
<td>80</td>
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<td>Ratio of sample size, Unexposed/Exposed:</td>
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<tr>
<td>Percent of Unexposed with Outcome:</td>
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<td>Percent of Exposed with Outcome:</td>
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<td>Odds Ratio:</td>
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<td>Risk/Prevalence Ratio:</td>
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<td>Risk/Prevalence difference:</td>
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<tr>
<td>Sample Size - Exposed</td>
<td>218</td>
<td>217</td>
<td>243</td>
</tr>
<tr>
<td>Sample Size-Non exposed</td>
<td>218</td>
<td>217</td>
<td>243</td>
</tr>
<tr>
<td>Total sample size:</td>
<td>436</td>
<td>434</td>
<td>486</td>
</tr>
</tbody>
</table>
Data collection and management

Data will be collected on all consenting TB cases registered at the TB ward in Engela District Hospital between January 2013 and December 2017. All MDR and XDR cases will be included in case that the laboratory investigations have confirmed. Data obtained from medical and laboratory records will comprise demographic data (age, sex, ethnicity, occupation, place of residence), clinical information (type of TB, date of diagnosis, date of registration) and past history of TB. The geographical location of diagnostic and treatment facilities and the residential addresses of all study participants in the study area will be collected using latitude and longitude calculations. In case that the geographical location is not specific, the participants will be excluded from the study. The geo-reference will come from the latitude-longitude projection system obtained from google mapping.

All data will electronically transfer and double entered into an Excel spreadsheet and checked for errors. Geographical analysis will be performed using Geographical Information Systems (GIS) techniques. The geographical co-ordinates will be obtained using the latitude and longitude of each case.

Data analysis

Statistical analysis will be performed utilizing STATA 14 and GIS statistical software. Namibian and Angolan who were treated for Multidrug-resistant and extensively drug-resistant Tuberculosis will be compared regarding tuberculosis outcomes. Each categorical risk variable will use the relative risk ratio as a measure of association. We will compute the relative risk ratio of MDR, XDR and defaulters between Namibian and Angolans participants. Other factors such as occupation, marital status, Income/month, HIV status, other co-morbidities and TB contact in the family will be incorporated in multiple regression analysis.

The relative risk ratio, Chi squared and p-values will be used to test the hypotheses on differences between Angolan and Namibian. Chi-square testing will be used to compare rates from GIS-region based to those from Angola and Namibia during the same time period. The results will also include the odd ratios 95% CI.

Ethical considerations

This investigation will be requested by Namibia's Ministry of Health and Social Services (MOHSS). Investigators will obtain ethical approval from the Engela district Hospital. Then after, clearance will be also obtained from the Region and the Namibian Ethic committee. Texila American University Research Ethics Boards will review the present protocol for obtaining all necessary clearance. The investigation will consist to data abstraction from medical records and laboratory investigations. Data extraction will be conducted in the context of geospacial data and tuberculosis prevalence. A written informed consent will be obtained from each participant while the investigator determines which language the patient felt most comfortable speaking. In case that medical records data and patient tuberculosis data are linked by patient ID, All patients’ identifiers will be removed prior to analysis, which will be done anonymously. Confidentiality will be maintained throughout the study period (during data collection, data analysis, and reporting of the findings) by assigning the focus group a serial number. No other information of the participants that can identify the person will be recorded during the study.

Data dissemination plan

The findings of the study will be made available to the TB wards units all over Engela district Hospital. Also, we will publish the study results in any relevant academic journals and present at relevant conferences and academic workshops.

The funds will be obtained from the sponsor and the publisher will be active with the project. Our dissemination organization will be as follows: press releases such as media, booklets and magazine. The report will be shared with other organizations such as government, no governmental organizations,
students and members of other universities. Posters, brochures, community newsletters will be also used for distribution of information.

**Study limitations**

The main limitations in retrospective cohort studies are records that were not designed for the study, the available data may be of poor quality. There is frequently an absence of data on potential confounding factors if the data was recorded in the past. It may be difficult to identify an appropriate exposed cohort and an appropriate comparison group. In addition, differential losses to follow up can also bias retrospective cohort studies. However, we will minimize different bias by tracing the patients in case of missing data.

**Conclusion**

As a summary, this study is the first of its genre in Namibia. This study could be crucial on its genre to establish different gaps based on geospatial data between Angolan and Namibian in the management of MDR-TB in Engela district hospital. Furthermore, this study will suggest different public health ways of solving the management of MDR-TB in Engela district hospital.

**Budget**

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Unit cost</th>
<th>No. of Units</th>
<th>Total cost</th>
<th>Amount requested from stakeholders</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Consumables</strong></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>1. materials and supplies</td>
<td>Pen, Pencil, plain papers, toners, Erasers, flash disk, memory disk</td>
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### Schedule

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<td>4.</td>
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<td>5.</td>
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### References


Risk Factors for Esophageal Cancer among Adults Aged 40 Years and Above in Sebei Region, Eastern Uganda

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Abstract

The study conducted in Sebei sub-region, Eastern Uganda aimed at assessing the risk factors for esophageal cancer among adults aged 40 years and above in Sebei region and to share the findings with the relevant stakeholders for effective management and control strategies. Methodology: The study employed a descriptive, un-matched case control design using quantitative and qualitative approach. 138 respondents were sampled from patients who were both esophageal cancer cases and non-cases (controls). Data was collected using face to face administered pretested questionnaire. Descriptive and inferential (chi-square and logistic linear regression) was applied to analyse the socio-demographic and economic, behavioural, environmental and medical factors of the respondents. Findings: The study found out that only; alcohol consumption (AOR: 9.95 95%, CI: 2.59-36.08), p=0.001, tobacco use (AOR: 15.37 95%, CI: 3.40-64.00) p=0.00 and H. Pylori infection (AOR: 7.91 95%, CI: 2.02-27.77), p=0.001 were significant risk factors. Other factors in the study were not significant risk factors (p>0.05). Conclusion: The study concluded that behavioural and medical factors were significant risk factors for esophageal cancer and that the lifestyle of adults aged 40 years and above had a significant impact on their esophageal cancer status. Recommendations: Cessation from alcohol consumption and tobacco use coupled with early testing and prompt treatment of H. Pylori infection can help avert the occurrence of esophageal cancer in the region.

Keywords: Risk Factors, Esophageal Cancer, Adults.

Introduction

Esophageal cancer is one of the most prevalent cancers Worldwide; it is extremely aggressive in nature and has a poor survival rate of only 15-25%, (Pennathur et al., 2013). It is the sixth leading cause of cancer-related mortality and the eighth most common cancer in the world (Zhang, 2013). In 2012, esophageal cancer affected more than 450 000 people globally and the incidence is projected to increase rapidly (Pennathur et al., 2013).

There are two main histopathological subtypes: Squamous cell carcinoma (SCC), and esophageal adenocarcinoma (OADC). SCC is the predominant histological subtype worldwide. While adenocarcinoma is mainly a disease of developed countries, squamous cell carcinoma (SCC) is more common in developing countries (Melhado, et al., 2010). SCC is a result of abnormal growth of the squamous epithelial cells (hyperplasia) or total disappearance (dysplasia) while adenocarcinoma arises from undesired transformation of tissues that replace the squamous epithelium (metaplasia) (Blot, 1991).

Countries such as Turkey, Iran, and Kazakhstan, as well as northern and central China, with an estimated esophageal squamous carcinoma rate of more than 100 cases/100,000 people per year have been named “Asian esophageal cancer belt”. Another area with a high incidence of squamous cell carcinoma is south eastern Africa. Nevertheless, squamous carcinoma remains the most common subtype in American black males; however, adenocarcinoma is one of the few cancers that contribute to increased mortality from cancer among all American men and other developed countries like; United Kingdom, France, Australia and Finland (Shamsifar et al., 2015).
Several factors have been identified as risk factors for esophageal cancer. For instance, a research by Wei et al., (2011) found out that socio-demographic, behavioural, socio-economic, environmental and medical factors such as age, gender, level of education, family history, marital status, Occupation, smoking, hot tea drinking, red meat consumption, poor oral health, low intake of fresh fruit and vegetables, low socioeconomic status were risk factors. Others include Helicobacter Pylori (H. Pyori) and Human Papilloma Virus (HPV) infection. It was further discovered that Barrett’s oesophagus caused by gastro-esophageal reflux disease (GERD) is clearly recognized as a risk factor for esophageal cancer (Gibson, 2017).

Difficulty in swallowing (dysphagia) remains the only factor useful for identifying patients at increased risk of developing esophageal adenocarcinoma in clinical practice (Zhang, 2013; Talukhtar et al., 2013; Torre et al., 2015). Other clinical presentations include: weight loss, and heartburn unresponsive to medical treatment, as well as signs of blood loss; however, an increasing number of essentially asymptomatic cases are being discovered as part of screening and surveillance endoscopy.

In Africa, about 27,500 new cancer cases and 25,200 deaths from esophageal cancer were estimated to have occurred in 2012, 89% of these in Sub-Saharan Africa. It is more common in males than females and incidence rates are particularly high in East Africa the East Cape Province (former Transkei) area of South Africa. Almost all of the esophageal cancers in these high risk areas are squamous cell carcinomas. The reasons for the high burden of esophageal cancers in several parts of Eastern Africa and Southern Africa are not fully understood (Par kin, et al., 2012).

The WHO Country profile for Uganda (WHO, 2014) indicates that 18,100 people died of esophageal cancer in 2014, out of whom, 9,100 were males and 9,000 were females. The report ranked esophageal cancer in the country the second cause of all cancer related deaths among males and fourth among females. Hospital records from Bukwo and Kapchorwa hospitals show an increasing rate of esophageal cancer among the elderly aged 40 years and above who attend medical services in these hospitals from an estimated 3 percent in 2014 to about 10 percent in 2016.

Esophageal cancer is one of the biggest health problems among the elderly aged 40 years and above in Sebei region. In 2016, over 10% of patients aged 40 years and above admitted to the two district hospitals of Bukwo and Kapchorwa had esophageal cancer. Records also indicate that esophageal cancer prevalence significantly rose from about 2% in 2012 to 10% in 2016 (HMIS, 2012-17). It is also apparent that esophageal cancer is the leading cause of cancer related mortality in the three districts served by the Hospitals. In comparison with the national prevalence where esophageal cancer is ranked the second cause of mortality from all cancer-related deaths (WHO, 2014), the increasing trends of esophageal cancer prevalence in Sebei region is troubling and to address it appropriately, the respective district health offices and the Ministry of Health require adequate information on local risk factors.

Furthermore, efforts that have been put in place to address this seemingly rising problem have not been clearly documented or assessed. As a result, therefore, little is known about the most probable risk factors and prevalence rates of esophageal cancer among the elderly people in the three districts. The research therefore sought to narrow the knowledge gap.

The departments of health in the respective districts of Sebei region, together with the ministry of health, will utilize the findings to design appropriate management and preventive measures against oesophageal cancer. Enable the Communities of Bukwo, Kapchorwa and Kween Districts have increased awareness on the risk factors for oesophageal cancer which will in turn help them to adopt healthy life styles necessary for prolonged and quality lives. The policy making organs such as Parliament and Lower Local Government Councils can use the information from these findings to legislate for healthy living. Scholars will benefit from the findings of this study as it will provide reference materials for future studies in same or similar fields.

The study was limited by the fact that the oesophageal cancer cases were not available in the Hospitals but in the communities, this is because the two Hospitals did not have screening services but made clinical diagnosis there after refer suspected cases to Mulago or Kenya for confirmatory tests though they provide palliative care for services for the already confirmed cases. The researcher overcame this challenge by acquiring the list of cases from the Hospitals’ records and recruited research assistants who knew the residences of the cases to collect the data.

Evidence from earlier studies recommend modification of lifestyle through behaviour change as the best means to reduce esophageal cancer incidences (Heath et al., 2000). This includes changing
addictive behaviours like tobacco and alcohol use. Behaviour change requires a cautious approach as it involves the deep interrelation of all three factors (biological, psychological, social) that lead to a given outcome, each component on its own is insufficient to lead definitively to health or illness (Engel, 1980). Although best outcomes are associated with early disease diagnosis, it is often difficult and uncommon to do so in these rural areas of Sebei region in eastern Uganda.

Methodology

This section covers the research design used in the study, the location, , study population, sample size, sampling procedures, research instruments/tools, validity and reliability of instruments, data collection procedure and data analysis.

Research design

Esophageal cancer is a rare disease, for that reason, the study adopted a descriptive un-matched other than a matched case-control study design in which controls were enrolled without regard to the number or characteristics of the cases; the number of controls was not necessarily equal the number of cases. A mixed exploratory approach was used that combined both quantitative and qualitative methods. Cases were detected from disease registries where they had been confirmed through screening. The controls where be selected randomly from both the in and out patients available in the two Hospitals during the study time and were selected without regard to their exposure status (for example, exposed/non-exposed). The study was both descriptive and correlational. The respondents were enrolled basing on their current disease status, previous exposure status was subsequently determined for each case and control.

Locale of the study

The study was carried out in Sebei region and specifically, Bukwo and Kapchorwa District hospitals. Bukwo Hospital is located in Bukwo Town Council which is the headquarters of Bukwo District and serves mainly the population in Bukwo District. Kapchorwa Hospital is located in Kapchorwa Town Council which is the headquarters of Kapchorwa District and is actually a regional referral Hospital serving mainly three Districts namely, Bukwo, Kween and Kapchorwa. These Districts are located in Eastern Uganda, a range of land between 270 and 340 km from Kampala City. The three Districts have a combined population of 286,209 people according to the Uganda Population and Housing Census (UPHC, 2014). Figure 1 in the appendix is the map of the study location.

Target population

The target population included all the adults aged 40 years and above in the three districts of Sebei region comprised of; Bukwo, Kween and Kapchorwa. The Uganda National Population and Housing conducted in 2014 put the number of the adults aged 40 years and above population at 41,345 from all the three districts.

Study population

The adults in the age category of 40 years and above from Sebei region and attended medical services in Bukwo and Kapchorwa District Hospitals at the time of study comprised the study population. Any individual below the age of 40 years or from outside the three districts comprising Sebei region were excluded from the study.

Sample size and procedure

A sample size of 138 respondents was used for the study, being an unmatched case control study, the number of cases was 39 while the controls were 99.

The sample size was determined using the formula of Cochran (1977):

\[ N = \frac{t^2 \cdot pq}{d^2} \]

Where: \( t \) = value of 95% confidence level will be used, 0.025 in each tail = 1.96,

\( p = \) estimated proportion of the population having esophageal cancer as seen from the Hospital records= 0.1, \( q =1− p \) (estimated proportion of population without esophageal cancer) = 0.9, \( d = \)
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acceptable margin of error = 0.05. Therefore, substituting in the above formula,

\[ n = \frac{(1.96)^2(0.1)(0.9)}{(0.05)^2} = 136 \]

During the study, a list of cases was obtained from the disease registries of the two Hospitals while a purposive sampling method was used to select the controls from all the available clinics within the Hospitals, all individuals aged 40 years and above attending medical services in Bukwo and Kapchorwa District Hospitals at the time of the study were enrolled until the required sample size was attained. Excluded from the study were those who did not consent. Both in-patient and out-patient service attendees were enrolled for the study. 11 cases and 28 controls which represented 0.28 or 28% were interviewed from Bukwo District Hospital while 28 cases and 79 controls which represented 0.72 or 72% of the total sample size were interviewed from Kapchorwa referral Hospital.

The key informants were sampled purposively and the health workers with sufficient knowledge and experience in handling cases of esophageal cancer in the two Hospitals of Bukwo and Kapchorwa were targeted for the study.

**Instruments/ research tools**

The study employed two (02) instruments, they are questionnaires and key informant interview guides.

**Questionnaire**

The interviewer- administered questionnaire was used as the main instrument and was designed to attract suitable responses from the selected respondents. These responses were pre-coded as much as possible. The data on the questionnaire was collected by interview and has six sections comprising the socio demographic information, main variables are categorized under socio economic, behavioural, medical, and environmental factors. They include age, gender, education level, occupation, tobacco use, economic status, family history of esophageal cancer, alcohol consumption, physical activity, consumption of vegetables and fruits, taking of hot drinks, history of HPV infection, history of *H. Pylori* infection and dysphagia. The other section shows the disease status, whether sick or not. Also included are suggestions and recommendations for prevention and management of esophageal cancer.

**Key informant interview guide**

The second instrument used in addition to the questionnaire was the key informant interview guide administered to the health workers at the two district hospitals. Specifically, a structured interview guide consisting of open-ended questions relevant to the research objectives and utilized in the collection of qualitative data. The key informant guide is important because it enabled collection of rich data given the freedom of the respondents to air out their views.

**Quality assurance**

In the study, quality control measures were undertaken to ensure the findings of the study met acceptable standards. These measures included validity and reliability checks.

**Validity**

Information from the pre-test was used to adjust the instruments to improve their validity and reliability. To establish the Content Validity Index (CVI). The following formula was used;

\[ CVI= \frac{K}{N} \]

Whereby; \( K \) = total number of items in the questionnaire declared valid by the panel of supervisors and approved by the Institutional Research Committee (IRC) = 46, \( N \) = total number of items in the questionnaire = 49. In order for the research instruments to be valid, the CVI should be \( \geq 0.7 \).

Therefore; \( \frac{46}{49}=0.94 \). The Content Validity Index (CVI) was found to be \( = 0.94 \). The research instruments were therefore declared valid.

**Reliability**

To assess the reliability of the instruments, the researcher pre- tested it on 20 participants who were not part of the actual study sample. The instruments pre- tested in Kapkwoloswo Health Center Three
in Bukwo district which was randomly selected by writing each name of the Eleven HCIII’s from the region on separate pieces of paper. The pieces of paper were folded, put into a box and shaken, one was therefore picked by the researcher and used for the pre-test. The random technique was chosen in order that each of the existing HCIII’s had equal chances of being picked for the pilot study thereby minimizing selection bias. The respondents here had similar characteristics as the actual study respondents.

Ethical approval

The technical approval to conduct this study was obtained from Mulago Hospital Research and Ethics Committee (MHREC). All respondents who participated provided written consent, those who did not were left out of the study.

Data collection procedure

Secondary data from hospital records or disease registries was used to identify the proven esophageal cancer cases among patients aged 40 years and above hailing from Sebei region and seeking medical services at Bukwo and Kapchorwa Hospitals. The research instruments and tools were first pre tested and validated prior to the actual data collection. The data collection involved individual face to face interviews with the selected respondents and key informants using the designed questionnaires and guides. Responses were recorded accordingly for each interview conducted.

Data analysis

The collected data was entered, edited and cleaned. Some of the uncoded responses were post-coded. The cleaned dataset was analysed using SPSS version 20 because of its ease of use and the superiority in producing tables. Univariate analysis was used to generate descriptive statistics for objectives one to four such as frequencies and percentages. Chi-square tests were used to establish relationships between different categorical variables such as; gender, education level, tobacco use, alcohol use, exposure to aflatoxins, pesticides, fertilizers, family history of H. Pylori and HPV infection and dysphagia were the independent variables while esophageal cancer status was the dependent variable. Multivariate analysis was used for objective five, all the variables that were found to be significantly associated with esophageal cancer; with a p-value of ≤ 0.05 were filled into a logistical regression model; Log it(y) = a+b, X1+bX2, B, Xn+…………..BkXk

Where; B1X1……Xk are independent variables being tested in the model and y is the dependent variable. The predictor variables were; age gender, education level, marital status, alcohol use, tobacco use, exposure to aflatoxins, pesticides, fertilizers, physical inactivity, family history of esophageal cancer, history H. Pylori and HPV infection and dysphagia while the outcome variable was esophageal cancer status. The results are presented using tables, charts and text wherever appropriate.

The data obtained from key informants was transcribed into topics and subsequently to themes which were presented as texts, others were also quoted verbatim.

Results and discussion

This chapter covered descriptive presentation of respondents’ characteristics and inferential statistics for hypothetical validation between variables. Discussion of results was made and meanings attached to the findings. There were 138 respondents all together; 39 esophageal cancer cases and 99 controls. Ten key informants were also interviewed including the District Health Officers, the Medical Superintendents Hospitals, Clinical Officers and senior nurses.

Risk factors for esophageal cancer

To determine the risk factors for esophageal cancer among adults aged 40 years and above attending medical services at Bukwo and Kapchorwa Hospitals. The socio-demographic, behavioural, environmental and medical related factors were subjected to chi square statistical analysis to determine the significance of the relationship. Further linear logistic (bivariate and multivariate) regression analysis was done and variables with significant relationships are covered, as shown in Table 1 appended.
In reference to Table 1, factors that were identified under bivariate analysis were; age, oral hygiene, alcohol consumption, tobacco use, fertilizer use, *H. Pylori* infection, Pesticide exposure, exposure to aflatoxins. These factors showed significant association between cases and controls with the development of esophageal cancer.

In multivariate logistical linear regression analysis, only alcohol consumption, tobacco use and *H. Pylori* infection were risk factors for esophageal cancer after control of confounding variables.

**Age**

Under socio-demographic factors at bivariate level of analysis, age of adults had a significant bearing on the development of esophageal cancer among adults. Using the age group of 40-49 years as reference category, there is a high likelihood of one developing esophageal cancer as one gets older. Within the age of 50-59 years the odds ratio is (COR: 9.100 95% CI, CI: 2.774, 29.853) and the age between 60- 69 with (COR: 5.014 95%, CI: 1.555, 16.168).

However, controlling for other factors in the multivariate analysis, age was not a significant factor. Although some earlier findings indicate a peak age of over 50 years in 80% of esophageal cancer patients (Wei et al., 2011). Findings of this study are in agreement with the findings of Heiko et al.,2012) who while studying the risk factors for the development of esophageal cancer in America concluded that age was not a risk factor.

**Alcohol consumption**

As seen from Table 10, alcohol consumption as one of the behavioural factors showed a significant risk for the development of esophageal cancer at both bivariate and multivariate level of analyses. Bivariate analysis showed that the alcohol users were about 14 times more likely to develop esophageal cancer than none alcohol users (COR: 13.96 95%, CI: 5.268, 36.924) controlling for other factors in multivariate analysis, alcohol uses is a significant risk factor (AOR: 9.947 95%, CI: 2.592, 36.08) with a p-value of 0.001.

According to Kleinber et al., (2014), alcohol (ethanol) is converted into a toxic chemical called acetaldehyde which irritates and inflames the lining of the esophagus, this may cause esophageal cancer by damaging the DNA in cells that line the inside of the esophagus and stopping our cells from repairing this damage. DNA is the chemical in each of our cells that makes up our genes, the instructions for how our cells function (Kleinber et al., 2014). We usually look like our parents because they are the source of our DNA. However, DNA affects more than how we look. Some genes control when cells grow, divide into new cells, and die. Genes that help cells grow, divide, and stay alive are called oncogenes. Genes that slow down cell division or make cells die at the right time are called tumor suppressor genes. Cancers can be caused by DNA changes that turn on oncogenes or turn off tumor suppressor genes (Shaheen et al., 2016).

Alcohol also acts as a catalyst for assimilation of carcinogenic traces into the human body, for example, alcohol makes it easier for the mouth and throat to absorb the cancer-causing chemicals in tobacco including nicotine (Kleinber et al., 2014). The study findings are consistent with the findings of a 2011 meta-analysis of 4 cohort and 8 case-control studies conducted between 1990-2010 in Japan by Yingsong et al.,(2013) which revealed that alcohol drinkers had at least a 3.3 fold increased risk of developing esophageal cancer as compared with none drinkers.

**Tobacco use**

The findings as shown in Table 1 indicate that tobacco use was a statistically significant risk factor in the development of esophageal cancer. Bivariate analysis revealed that tobacco users were about 25 times more likely to develop cancer of the oesophagus than the non-users (COR: 24.800 95%, CI: 8.690, 70.708). This significance persisted even after the adjustment at the multivariate analysis level (AOR: 15.37 95%, CI: 3.692, 64.00) with a p-value of 0.000.

Cigarettes, cigars, and pipe tobacco are made from dried tobacco leaves. Other substances are added for flavor and to make smoking more pleasant. The smoke from these products is a complex mixture of chemicals produced by burning tobacco and its additives. Tobacco smoke is made up of several chemicals believed to cause cancer (Posnare et al., 2015). These cancer-causing chemicals are referred to as carcinogens. Some of the chemicals found in tobacco smoke include: Nicotine (the addictive drug that produces the effect people are looking for and one of the harshest chemicals in
tobacco smoke), Hydrogen cyanide, Formaldehyde, Lead, Arsenic, Ammonia, Radioactive elements, such as uranium, Benzene, Carbon monoxide, Nitrosamines, Polycyclic aromatic hydrocarbons (PAHs) among others (Shaheem et al., 2016).

The study findings are in agreement with other research findings by; Talukhar et al., (2013), Zhang, (2013) and Loppes and Fergundes, (2016) all of which revealed significant a relationship between tobacco use and esophageal cancer development.

Fertilizer use

According to Table 1, tests conducted for fertilizer use and non-use at bivariate level showed that fertilizer non-users are 3 times less likely to develop esophageal cancer compared to the users (COR: 0.304 95%, CI: 0.140, 0.662) (AOR : 0.594 95%, CI: 0.163-2.05) and with a p- value of 0.002, the significance disappeared during multivariate analysis. This could be explained by the quantities and active elements in different fertilizers used by the respondents. The odds ratios at 95% confidence interval in the study suggest fertilizer use as a protective factor against esophageal cancer.

The findings could not agree with those of Nan et al., (2012) who focused on the association of three nitrogen compounds in drinking water, namely, nitrates, nitrites, and ammonia, all of which are derived mainly from domestic garbage and agricultural fertilizer with esophageal carcinoma in Shxian China which revealed no significant risk of esophageal cancer with high concentrations of the said nitrogenous compounds hence need for further studies.

Exposure to aflatoxins

According to Table 1, when exposure to aflatoxins was subjected to bivariate analysis, those respondents who had not been exposed to aflatoxins were 5 times less likely develop esophageal cancer as compared to those exposed (COR: 0.230 95%, CI: 0.099, 0.536), (AOR: 1.12 95%, CI: 0.35- 4.10) with a p- value of 0.000, this significant association vanished at multivariate analysis level which could possibly be explained by the short period of exposure and when harvest is done under moist conditions. The low odds ratio at 95% confidence level in the study suggest that exposure to aflatoxins is protective against esophageal cancer.

Although research findings by International Agency for Research on Cancer show that aflatoxins are carcinogenic to human beings (IARC, 2012), another agricultural health study by the American National Cancer Institute also confirmed the carcinogenic nature of aflatoxins but did not identify it as a risk factor for esophageal instead other cancers such as Liver cancer, this suggests a need for more research.

Pesticide use

Table 1 shows that use of pesticides by the respondents was a risk factor for esophageal cancer development at bivariate and not at multivariate level of analysis. At bivariate level, those respondents who were not exposed to pesticides were 3 times less likely to develop esophageal cancer than those who were exposed (COR: 0.272 95%, CI: 0.125, 0.590), (AOR: 0.83 95%, CI: 0.23- 3.10) with a p-value of 0.001.

The odds ratio from the study suggests that pesticides are protective against esophageal cancer. The study findings are consistent with those of International Agency for Research on Cancer (IARC) study in a farming area in East Nebraska between 1988 and 1993 where no risk for esophageal cancer was established with pesticide use (Zahn et al., 1990; Lee et al., 2004).

Helicobacter pylori (H. Pylori) infection

The tests on the significance of H. Pylori infection showed that those exposed had a 4 times higher odds of developing esophageal cancer compared to those not exposed to H. Pylori at bivariate level of analysis and 8 times higher at multivariate analysis level (COR: 3.90 95%, CI: 1.772, 8.627) and (AOR: 7.91 95%, CI: 2.021, 27.768) with a p- value of 0.001.

Ye et al., (2004) first reported that esophageal squamous cell carcinoma was positively associated with both serological evidence of atrophic gastritis and with H pylori CagA-positive infection in the Swedish population. A similar association has recently been observed in Japan (Lijima et al., 2006). Therefore, the study findings are in agreement with the findings of Handa et al., (2011) that H. Pylori
is a major causative agent for esophageal cancer and other various benign and malignant gastrointestinal tract diseases.

Qualitative data findings

During the study, 10 key informants who were medical professionals working in both Bukwo and Kapchorwa Hospitals and knowledgeable on issues of esophageal cancer were interviewed and the results are analysed in Table 2 in the appendix.

As seen from Table 2, tobacco use and alcohol consumption were rated by the key informants as highly significant risk factors for esophageal cancer among adults aged 40 years and above who were attending medical services at Bukwo and Kapchorwa Hospitals. These views are in agreement with the findings from the quantitative study findings which identified tobacco use and alcohol consumption as significant risk factors.

Results from the qualitative study ranked H. Pylori infection as one of the least important risk factors for esophageal cancer, this contradicts with the findings from the quantitative study which indicated H. Pylori to be a significant risk factor. The inconsistency could a result of the fact that qualitative analysis does not involve rigorous testing as in quantitative and is based on the perceptions of key informants on the subject matter.

Whereas the key informants ranked exposure to aflatoxins, pesticide use and gender of patients as important risk factors, the findings from the quantitative study show these factors to be protective for esophageal cancer after subjecting the data to rigorous analysis; descriptive, bivariate and finally multivariate levels of analysis.

Conclusion

The study found out three final significant risk factors for esophageal cancer among adults aged 40 years and above from Sebei region attending medical services at Bukwo and Kapchorwa Hospitals. They are; alcohol consumption, tobacco use and H. Pylori.

The rest of the factors: age, gender, Occupation, marital status, Human Papilloma Virus (HPV), income levels, level of education, dysphagia, exposure to aflatoxins, fertilizer use, pesticide use, eating vegetables and fruits, physical activity were found to be protective factors for esophageal cancer among the study respondents.

The interaction of the biological, psychological and social aspects as theorized by George L. Engel in 1980 could not clearly explain the outcome of this study unless further research links the Bio psychosocial aspects to the consumption of alcohol, tobacco use and H. Pylori infection being the identified risk factors esophageal cancer among the study subjects.

References


Appendices

Appendix 1

Figure 1. Map showing the main area covered by Bukwo and Kapchorwa Hospitals.

Appendix 2

Table 1. Multivariate logistic linear regression of risk factors for Oesophageal cancer

<table>
<thead>
<tr>
<th>Factors</th>
<th>Esophageal cancer condition</th>
<th>COR (CI 95%)</th>
<th>AOR (CI 95%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Cases</td>
<td>Freq. %</td>
<td>Freq. %</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>40-49</td>
<td>6 (15.4)</td>
<td>42 (42.4)</td>
<td></td>
</tr>
<tr>
<td>50-59</td>
<td>7 (17.9)</td>
<td>27 (27.3)</td>
<td>9.100 (2.774-29.853)**</td>
</tr>
<tr>
<td>60-69</td>
<td>13 (33.3)</td>
<td>20 (20.2)</td>
<td>5.014 (1.555-16.168)**</td>
</tr>
<tr>
<td>70+</td>
<td>13 (33.3)</td>
<td>10 (10.1)</td>
<td>2.00 (0.697-5.82)</td>
</tr>
<tr>
<td>Oral hygiene (brushing teeth)</td>
<td>0.396 (0.252-0.621)**</td>
<td></td>
<td>1.089 (0.559-2.122)</td>
</tr>
<tr>
<td>Daily</td>
<td>13 (41.0)</td>
<td>83 (83.8)</td>
<td></td>
</tr>
<tr>
<td>Factors</td>
<td>Freq.</td>
<td>%</td>
<td>Ranking</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>-------</td>
<td>------</td>
<td>---------</td>
</tr>
<tr>
<td>Gender</td>
<td>06</td>
<td>60</td>
<td>3</td>
</tr>
<tr>
<td>Age</td>
<td>04</td>
<td>40</td>
<td>5</td>
</tr>
<tr>
<td>Family history</td>
<td>03</td>
<td>30</td>
<td>6</td>
</tr>
<tr>
<td>Religion</td>
<td>01</td>
<td>10</td>
<td>8</td>
</tr>
<tr>
<td>Marital status</td>
<td>0</td>
<td>0</td>
<td>9</td>
</tr>
<tr>
<td>Education level</td>
<td>0</td>
<td>0</td>
<td>9</td>
</tr>
<tr>
<td>Occupation</td>
<td>5</td>
<td>50</td>
<td>4</td>
</tr>
<tr>
<td>Tobacco use</td>
<td>9</td>
<td>90</td>
<td>1</td>
</tr>
<tr>
<td>Alcohol consumption</td>
<td>7</td>
<td>70</td>
<td>2</td>
</tr>
<tr>
<td>Oral hygiene</td>
<td>0</td>
<td>0</td>
<td>9</td>
</tr>
<tr>
<td>Hot beverages</td>
<td>3</td>
<td>30</td>
<td>6</td>
</tr>
<tr>
<td>Vegetables &amp; fruits</td>
<td>3</td>
<td>30</td>
<td>6</td>
</tr>
<tr>
<td>Physical activity</td>
<td>1</td>
<td>10</td>
<td>8</td>
</tr>
<tr>
<td>Income level</td>
<td>2</td>
<td>20</td>
<td>7</td>
</tr>
<tr>
<td><em>H. Pylori</em> infection</td>
<td>0</td>
<td>0</td>
<td>9</td>
</tr>
<tr>
<td>HPV infection</td>
<td>3</td>
<td>30</td>
<td>8</td>
</tr>
<tr>
<td>Fertilizer use</td>
<td>3</td>
<td>30</td>
<td>8</td>
</tr>
<tr>
<td>Exposure to Aflatoxin</td>
<td>7</td>
<td>70</td>
<td>2</td>
</tr>
<tr>
<td>Pesticide use</td>
<td>6</td>
<td>60</td>
<td>3</td>
</tr>
</tbody>
</table>

1 = very important, 6 = least important.
Factors Contributing to Inconsistent Use of Family Planning Services at St Joseph’s Hospital Catchment Area

Article by Palesa Monamane
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Abstract

Family planning is referred to as controlling the number of children a couple wishes to have, interval between births by means of artificial contraception or voluntary surgical contraception. It involves the use of contraceptives, other techniques which include sexual health education, prevention, and management of sexually transmitted diseases, pre-conception counselling and infertility management (WHO:2010)

Family planning services are comprehensive and enable an individual to have an informed decision regarding available methods. It considers maternal health as motherhood has risks especially early and late motherhood and has been seen as having benefits for the well-being of women, community and society at large.

Despite the benefits and modern methods that are used women still do not come for family planning services at recommended time. That is, there is still inconsistent use of family planning services by the clientele.

Background

St Joseph’s Hospital is a catholic institution and has a maternity unit where majority of women come to deliver. It is situated in the Southern region of the main town called Maseru, and about 35km from town. Prior and after delivery women are given health education on family planning services offered. This institution does not offer family planning services due to its religious belief but women are referred to the clinics around St Joseph’s catchment area for family planning services.

Majority of family planning services are provided by the government integrating services with existing maternal and child health services and are provided freely throughout the country. Awareness in family planning methods is high among women as they can reveal one method and how to use that method. The services are provided throughout the week catering even for working women between ages 18- 44. Health education is provided on the methods available so that a woman can select the method with full information.

Family planning is known to improve maternal health but inconsistent use makes it difficult to achieve especially in developing countries like Lesotho. In sub Saharan countries uncontrolled population growth has led to hindrance in attainment of development and health goals. Though it has been broadened to reach the most remote areas and it is supported by donors such as United Nations Fund for Population Activities (UNFPA) as well as to monitor the use of family planning services. It has also broadened its focus on addressing two reproductive and health rights being the rights of women to be informed and have access to safe, effective, affordable and acceptable methods of family planning of their choice. The choice of methods used for regulation of fertility should not be against the law. (The nation:2018)

Although much work has been done to increase access, countries have made significant progress such as Latin America in increasing contraceptive security thereby decreasing total fertility rate and through the help of the donors such as United States Agency for international Development (USAID). (deliver.jsi.com)

The regional initiative brings countries together to share lessons learned and solutions to consistent use into national results.

26th September, 2016 was dedicated as the World Contraception Day whereby progress has been made with regard to use of family planning services steered by international initiatives promoting access to sexual and reproductive health. Despite all these there still large differences between
countries as over 200 million women would like to avoid pregnancy but still need to use methods effectively (who.int/reproductivehealth).

**Problem statement**

Family planning services have been in use for a longer time with the aim of improving maternal and child health, maternal mortality is still high in the rural areas an prevalence of HIV remains at 24.6%, but inconsistent use of services is escalating. At St Joseph’s catchment area about 181 women are seen who were in need of family planning services in September, 2016. The expectation was to see about 200 women and necessary services such as counselling on the use of a method, other options, health education and when to return for follow up are provided but despite all these, some inconsistencies on the use have been observed. According to the statistics 19 women did not show up in that month and that is about 9.5% of women missed. In October 2016, 154 women were seen and commodities were issued to them. The expectation was also to see 200 women, so forty six women were not seen. A total of 23% was not seen for family planning services despite the time for follow up stated. It has also been observed in most African countries that they have lower rates of contraceptive use with highest mortality rates, infant and child mortality (Regional variations June 2016).

These have been observed on women aged 20-35 years of age. So, the researcher wants to find out factors that contribute to inconsistent use of family planning services.

**Purpose**

To investigate the contributing factors to inconsistent use of family planning services.

**Objectives**

To identify the contributing factors to inconsistent use of family planning services.

To recommend acceptable strategies that can be applied to increase family planning services use.

**Literature review**

This entails contributions of various authors in order to come up with relevant literature regarding inconsistent use of family planning services whereby two groups of women were interviewed in one hospital in order to determine consistency on the use of family planning services. Majority relied on misinformation and likely to make errors in estimating the risk of pregnancy.

Family planning services are used by majority of women in the child-bearing age. They use the services as they have got plans and would like to achieve those in order to reach their set goals. A variety of methods are used which provide a woman a choice of a method. Despite the variation in methods some take control over contraception in their relationship and rarely deviate from their plans while other group of women reported that they do not want to have babies at their age but do not consistently use family planning services. Of all the women who reported not to desire to be pregnant 17% reported unplanned pregnancies due to inconsistent use and were not happy with the outcome. (who int reproductive health-family planning 2016).

Age of a client plays a role as clients believe that at a certain age one cannot fall pregnant even if she uses contraceptives inconsistently and others believe that if they engage in unprotected sex without getting pregnant it means they are infertile. One of the clients was asked whether she had engaged in an unprotected sex and reported that she did not consistently use a condom as she thought she would not get pregnant. Other women have made conclusions that they are infertile as they could not become pregnant and this influenced their inconsistency in the use of family planning services. (Consistent and inconsistent contraception among women 20-29. 2011).

Pregnancies among contraceptive users account for nearly half of all unintended pregnancies and are due to inconsistent use, therefore a study was undertaken nationally to a representative sample of 1,978 women aged 18-44 using contraceptives to examine factors associated with inconsistent use. Results revealed that 18% were using hormonal methods, 7% long acting injectables, 5% IUD, 32% male condoms, and 12% other methods while 6% periodic abstinence. 38% of women reported using their current method mostly because they disliked other options, while some 58% of women were using were using condoms because they did not like other methods. Women who were not completely
satisfied with their method were more likely than others to use the method inconsistently, especially pill and condom users. (Darroch and Frost:2008).

Other factors that influences consistency in use of family planning services are attitudes of male partners, they can negatively influence consistency with their own behaviour and this can lead to inconsistencies in use. While others can influence positively in different ways by even reminding the partner on the use of services. Frequently reported side effects encourage a woman to quit using the services without notifying the service provider, though switching of the method can be effective but women prefer to use a new method and be effective within a very short time.

Some women have self efficacy with regard to the use family planning services as they see the benefits of using services while others have a low efficacy and end up being inconsistent on the use of family planning services. Health belief model expectation is that of perceived self efficacy to perform an action based on motivation. When there is lack of firm motivation family planning service use become inconsistent. The most recent survey of family growth found that 69% of pregnancies among Black women and 54% of Hispanics were unintended compared to 40% among White women and one of the reasons is inconsistent use of family planning services (Disparities in Family planning Outcomes. 2001).

Inconsistencies in use is also associated with low educational attainment, low income demography, greater number of sexual partners, access issues, mental status-stress.

Some women reported limited access transportation in order to access the clinics. Efforts are being done to increase access as Lesotho Planned Parenthood Association with the support of UNFPA has selected some days to reach remote areas in order to provide family planning commodities and also to meet the unmet need of family planning.

It has been observed that women come for family planning services without the knowledge of the spouse as spouses are against the use. Therefore, when their spouses are around or at home, they do not come for services due to fear that they will be forbidden to come for services, this associated with behavioural sabotage as they are not allowed to use the services. About 8.6% of women in United States have reported that partners did not want them to use family planning commodities. (Wikipedia.org/reproductive control sabotage).

Due to the findings related to inconsistent use of family planning services, family planning plays a major part in controlling reproduction and needs to be reviewed as well as identifying how it could be expanded to address problems that are brought about by inconsistent use.

Methodology

Introduction

Entails how the study was carried out, research design, target population, sample size, and data collection.

Research design

A simple descriptive design was used, with the aim of searching for accurate information regarding factors contributing to inconsistent use of family planning services.

Target population

All women who attended family planning services at St Joseph’s catchment area.

Sample size

Sample was 20 women

Sampling method

Non-probability convenience sampling method was used as those who were selected were readily available. They were given information about the study and those who wished to take part were identified.
Instrument

A semi structured interview guide was used as it consisted of open and closed ended questions, with open ended questions allowing them to respond as they come to identifying factors contributing to inconsistent use of family planning services closed ended facilitated coding and analysis of data.

Pilot study

A mini dummy run was done with five women in one of the clinics around St Joseph’s catchment area in order to assess the feasibility of the study. This was done in order to assist in making adjustments on the actual project.

Data collection

Data was collected every Monday for four weeks as the women come for family planning services every Monday. After identifying participants information was given so as for them to give consent voluntarily. Interview guide was issued to them to fill relevant information regarding factors contributing to inconsistency in usage of family planning services. Participants were each interviewed for 20 minutes using the local language- Sesotho on the same day in order to allow them get services and proceed to their places.

Data analysis

Data was analysed using narrative and graphic form. Categorization done after data was collected, as it was easier to organize it in a visual representation and be understood.

Validity and reliability

These were ensured by doing a pilot study to ensure that the tool can be useful.

Ethical considerations

Principle of respect was maintained as the project was done after obtaining informed consent from participants and their autonomy was considered as well.

Confidentiality was ensured by not divulging their information and anonymity maintained by using codes instead of their names.

Principle of justice was maintained as they were all treated fairly as they even arrived for the services at different times.

Data analysis

Distribution of women according to reasons stated on inconsistent use

<table>
<thead>
<tr>
<th>Response</th>
<th>Frequency</th>
<th>Percentages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Those who stated reasons</td>
<td>15</td>
<td>75%</td>
</tr>
<tr>
<td>Those who were not sure</td>
<td>5</td>
<td>25%</td>
</tr>
<tr>
<td>Total</td>
<td>20</td>
<td>100%</td>
</tr>
</tbody>
</table>

Distribution of participants according to knowledge of benefits

<table>
<thead>
<tr>
<th>Responses</th>
<th>Frequency</th>
<th>Percentages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Those who know</td>
<td>10</td>
<td>50%</td>
</tr>
<tr>
<td>Those who know few</td>
<td>10</td>
<td>50%</td>
</tr>
<tr>
<td>Total</td>
<td>20</td>
<td>100%</td>
</tr>
</tbody>
</table>

Findings revealed that women still inconsistently use family planning services due to lack of access due to geography of the country, partners resistance and low level of education, about 75% of women
had reasons though they are aware of those inconsistencies. Majority of women about 50% are aware of the benefits.

**Discussion of findings**

Success in preventing unintended pregnancies requires effective use of contraceptives, however this is also influenced by the method used, adherence and support by the partners as it has been observed that use of family planning services is a taboo, culturally a woman should have as many children as possible.

Women travel for long distances to get services and this contributes to inconsistent use, therefore advocacy for health posts is required to reach women at their places and counselling on the use of methods motivates women to continuously and openly use the method. Weaker adolescent corners should be revived as teenage pregnancy is on the rise with information and change of behaviour.

The importance of consistency and correct use of methods need to be emphasised as some methods are used as dual methods, that is prevention of pregnancy and sexually transmitted infections including Hiv.

Women and girls should be empowered to choose the number, timing and spacing of their pregnancies as not only a matter of health but as a human right vital to sustainable development including women’s education and status in society.

**Conclusion**

Majority of women are aware of the benefits but they use family planning methods when convenient to them. Others are challenged by various factors such as distance from their homes to the services. Male partners are resistant to the use of family planning services as they believe that damage is done to the body and women would be promiscuous.

Also, it has been observed that there is a strong relationship between demographic factors and inconsistent use of services.

Health education is needed to be continued to all so that service use can be increased and be used consistently. Universal coverage will also decrease inconsistent use of services, as family planning is a human right.

**References**


Female Genital Mutilation: A Secondary Research on its Effects and Impacts in the Lives of Young Girls and Women

Article by Mbangwana Mefor Bongbi Epse Malabo II
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Abstract

**Background:** World Health Organisation (WHO) has been putting a lot of efforts to end female genital mutilation and together with global efforts that has intensified in recent there is a rising awareness of the numerous complications that go with the process, usually later in the life of the adult female. To examine the effect and impacts on these individuals is vital as prevalence occurs in many countries and the awareness of the health risk has to be ascertain because it is associated with physical, emotional and social health risks which is paramount to the cubing of this practice. This research aims to conduct a review of data so as to address the probability of stopping the act completely in all countries in the world

**Methods:** A mixed method synthesis was applied comparing the effects and impacts in different countries mostly in the African continent in ten different articles obtained from the Open Access Library Journal database, manually scanning of reference lists and summary feed from international organisations such as WHO, UNICEF and UN. The articles included quantitative and qualitative studies with statistical results and analysis. There were also studies carried out on the environmental issues as related to the act. The articles were in three different languages which included English, French and Spanish.

**Results:** The study population was made up of victims of the female genital mutilation and health professional who understood the process. The percentage of those who were unaware of the risk was 57.4% and the percentage of those who did not have formal education was 77.6%. There was also a high percentage of prevalence which was represented by 52%.

**Conclusion:** Female genital mutilation is an act which is supposed to be carried out with much precaution of the socio-cultural beliefs have to be maintained with a possibility of reclassifying the act.

**Keywords:** Female Genital Mutilation, prevalence, health risk.

**Background**

Female genital mutilation refers to all procedures involving partial or total removal of external female genitalia or other injury to the female genital organs for cultural or non-therapeutic reasons. According to the WHO classification of 1995 used in a study designed in November 2008 there are of four types, type I consist of clitoridectomy, type II is excision, type III is infibulations and type IV which are all the others forms performed for non-medical purposes. The practice of female genital mutilation is an act deeply rooted in tradition which violates human rights for the girl child and is found in about 30 countries in the world especially in Sub-Saharan Africa, having negative consequences for the health and quality of life in women. This practice is carried out in some Asian countries (Indonesia and Malaysia), Middle East countries (Yemen, Arab Emirates and Iraq) and in the western, eastern and north-eastern African countries but with many people who have immigrated we find some of them who practiced in Europe, North America and Australia, with a total of about 140 million girls and women circumcised in the world [1, 2, 8, 9, 10].

It is a ritual with strong socio-cultural roots and superstition giving cultural identity, family honour and defines members of the society with the time of the operation being carried out varying across and within countries. This usually occurs before the end of childhood generally between ages 4 and 10 years [1, 2, 4, 8, 9]. This practice has an adverse impact on health with long term psychological, physiological, and sexual effects, usually which could be immediate or late, ranging from pains,
bleeding, obstetrical complications, haemorrhage, psychological trauma, infections and transmission of diseases due to the method practiced in this act usually without anaesthesia [2, 6, 8, 10]. The ten top countries that practice this include Chad, Burkina Faso, Gambia, Sudan, Djibouti, Somalia, Ethiopia, Mali, Egypt and Guinea and the prevalence varies amongst countries with the highest in Somalia. The world’s first campaign against this act was in Egypt, and in July 2003 at the African Union second summit, the Maputo Protocol was adopted promoting women’s rights and calling for an end of Female Genital Mutilation. This finally came in to force by 2005 with 25-member countries ratifying it. The purpose of this study is to examine the different effects and complications resulting from female genital mutilation and to evaluate the current status following campaigns against this act which goes against the liberty of the girls and women.

Methods

The study involved a total of nine articles which were selected between the year 2009 – 2015 in which female genital mutilation was talked about both from the victim point of view and from that of the medical practitioner. Most of the research in the articles was carried out in African countries where the act is frequently practiced and deeply rooted in tradition. Most of the studies ranged from three months and a few of them for more than a year. This study is thus designed to know more about the effects of female genital mutilation in the later life of the girl child and also to know the level of awareness of the health risk incurred by this process.

They used the random sampling method for the population size in which they considered as participants girls who have undergone female genital reproduction and of reproductive ages as from 14 years to 49 years while for the professionals the participants here were those who have come across victims and those who have practiced this process before. In most cases we see that the morbidity and mortality indices are difficult to obtain since during consultation of most patients it is the data of the disease occurrence that is taken into consideration. The professionals involved here are usually trained personnel which permits them to identify the particular type of female genital mutilation practiced.

The data analysed was obtained from secondary data and the collection method applied for the girls and women were interviews were visits were made to their homes and written permission was obtained for the data to be collected, the interview was verbal and the answers of the participants were transcribed. For the health professionals a comprehensive questionnaire covering health issues related to female genital mutilation was given.

The measures involved here constituted the dependent variables as to the effects of the practice in their lives and clinical variables which involves the different occurrence of health hazards encountered and classified in to immediate and long term complications in the patients. The immediate complications include excessive bleeding from the genitalia where the act was practiced causing acute anaemia (haemoglobin level below 11g/l), infections such as tetanus, lower urinary tract infections, sepsicaemia, vulvovaginitis, fibrosis, cheloids, while the long-term complications are usually obstetrical, synechia, organic dispareunia, and many others. We see that the prevalence cannot be minimised as it can cause long term effects right up to child birth.

The differences in values of the dependent variable which are the effects of this act on the girls and women were assessed by chi-square and the P<0.05 was considered significant.

Results and discussion

It is seen that the type of mutilation varies within and between countries with 90% of cases being type I, II and IV while 10% is the type III procedure. In data obtained from WHO, prevalence of female genital mutilation in Sudan was 89%, in Somalia was 100% and the difference in prevalence may be explained by cultural factors, believes, habits and environmental factors. The most frequently encountered problem was sexual difficulties with anorgasmia.

Taking the case of the different level of awareness of the physical health risk in female that was carried out in Nigeria, of 380 respondents, it was seen that 162 (42.6%) respondents were aware while 218 (57.4%) were unaware of the risk involved in the practice of female genital mutilation. 163 (42.9%) respondents were aware of the emotional health risk while 217 (27.1%) were unaware and with regards to social health effects, 105 (27.6%) of the respondents were aware while 275 (74.4%)
were unaware (Table 1). Among those who had non-formal education it was noted that 24 (22.4%) are aware of health risks while 83 (77.6%) are unaware of the risk involved in female genital mutilation (Table 2).

While in another research the data collected on a total of 871 health cases in Gambia, it showed that the health complications depend on the type of female genital mutilation carried out. Type I accounted for 66.2% (577) of the cases registered, type II for 26.3% (229) and type III for 7.5% (65) and the complications whether immediate or late was 23.7% (137) in type I, 55.0% (126) in patients with type II and 55.4% (36) with type III. 12.6% that is 110 patients sought for consultation for immediate complication while 21.7% (189) of them for late complications while 34.3% (299) sought for gynaecological consultations (Table 3).

From table 1 there is the level of awareness of prevalence of female genital mutilation with approximately 60% of participants unaware of the dangers in the carrying out of this procedure meaning they have no idea of the health risk they are running. Table 2 gives us an idea of the knowledge depending on the level of education and it is seen that those who are less educated just accept the procedure not knowing the dangers, eventually complications that occur later are not linked in their mind to the act. Table 3 talks about the different possible disorders that come along with the act of the mutilation from the immediate effects to long term disorders, and it is seen that the highest prevalence are infections as the hygiene of these girls are not taken in to consideration with the difficult environmental conditions in most of the areas.

Table 1. The awareness of health risks involved in female genital mutilation in women

<table>
<thead>
<tr>
<th>Health risks</th>
<th>Aware</th>
<th>Unaware</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical</td>
<td>162 (42.6)</td>
<td>218 (57.4)</td>
<td>380</td>
</tr>
<tr>
<td>Emotional</td>
<td>163 (42.9)</td>
<td>217 (57.1)</td>
<td>380</td>
</tr>
<tr>
<td>Social</td>
<td>105 (27.6)</td>
<td>275 (72.4)</td>
<td>380</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>430 (37.7)</td>
<td>803 (62.3)</td>
<td>1233</td>
</tr>
</tbody>
</table>

Table 2. The awareness of health risk according to education level

<table>
<thead>
<tr>
<th>Level of education</th>
<th>Aware</th>
<th>Unaware</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non formal</td>
<td>24 (22.4%)</td>
<td>83 (77.6%)</td>
<td>107 (28.2%)</td>
</tr>
<tr>
<td>Primary</td>
<td>32 (29.6%)</td>
<td>76 (70.4%)</td>
<td>108 (28.4%)</td>
</tr>
<tr>
<td>Secondary</td>
<td>42 (46.7%)</td>
<td>48 (53.3%)</td>
<td>90 (23.7%)</td>
</tr>
<tr>
<td>Tertiary</td>
<td>45 (60%)</td>
<td>30 (40%)</td>
<td>75 (19.7%)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>143 (37.6%)</td>
<td>237 (62.4%)</td>
<td>380 (100%)</td>
</tr>
</tbody>
</table>

Table 3. Prevalence in female genital mutilation in the different types and some complications

<table>
<thead>
<tr>
<th>Female genital mutilation type</th>
<th>Type I</th>
<th>Type II</th>
<th>Type III</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cases</td>
<td>577 (66.2%)</td>
<td>229 (26.3%)</td>
<td>65 (7.5%)</td>
<td>871 (100%)</td>
</tr>
<tr>
<td>Complications directly from FGM</td>
<td>137 (23.7%)</td>
<td>126 (55.0%)</td>
<td>36 (55.4%)</td>
<td>299 (34.3%)</td>
</tr>
<tr>
<td>Immediate complications</td>
<td>36 (26.3%)</td>
<td>55 (43.7%)</td>
<td>19 (52.8%)</td>
<td>110 (36.8%)</td>
</tr>
<tr>
<td>Infections</td>
<td>32 (88.9%)</td>
<td>48 (87.3%)</td>
<td>16 (84.2%)</td>
<td>96 (87.3%)</td>
</tr>
<tr>
<td>Haemorrhage</td>
<td>10 (27.8%)</td>
<td>23 (41.8%)</td>
<td>7 (36.8%)</td>
<td>40 (36.4%)</td>
</tr>
<tr>
<td>Anaemia</td>
<td>15 (41.7%)</td>
<td>17 (30.9%)</td>
<td>11 (52.6%)</td>
<td>42 (38.2%)</td>
</tr>
<tr>
<td>Late complications</td>
<td>101 (73.7%)</td>
<td>71 (56.3%)</td>
<td>17 (47.2%)</td>
<td>189 (63.2%)</td>
</tr>
<tr>
<td>Abnormal scarring</td>
<td>87 (86.1%)</td>
<td>63 (88.7%)</td>
<td>11 (64.7%)</td>
<td>161 (85.2%)</td>
</tr>
</tbody>
</table>

**Conclusion**

All forms of female genital mutilation lead to a high percentage of complications both immediate and long term especially infections, haemorrhage and anaemia with the frequency of complications...
varying depending on the degree of mutilation. With such adverse effects that occur the continuation of this process is supposed to be abolished or the procedure reviewed since it has a strong social and cultural root. The measures taken to eliminate this procedure have not really influenced the incidence of the act. For the reviewing of the process, harm reduction and behaviour change are applied as education on the associated risk is to be made known to those who practice the act. The process can be softened to reduce the prevalence level and probably reclassifying the act, this will permit the respect of the cultural differences and at the same time watching over the health of women. There is also the need of structural improvement which includes public education and changes to specific cultural beliefs. Viewing the control from the point of decision makers and leaders in the community including religious leaders, they need to use as channels radio stations, workshops, television stations as methods of intervention to modify the cultural beliefs.

Acknowledgements

My sincere gratitude goes out to all those who have assisted me in one way or the other in the fulfillment of my “Capstone Project”.

First of all, I would like to thank the academic staff of The Texila American University for giving me the chance to acquire more knowledge and for their support.

My sincere gratitude goes to my colleagues of The Texila American University Online who assisted me without relenting efforts whatever the time I try to get to them.

Special thanks go to my friends and husband who even without having an idea of the course I am going through helped me out with a lot of research work.

Above all to God Almighty without whom I wouldn’t have gone through this work.

Reference


Prevalence and associated Factors of Malnutrition, among Children 6-59 months old in Pastoral communities of Aweil Centre, South Sudan

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Abstract

Malnutrition is one of the leading causes of morbidity and mortality among children globally has been linked to 60% of the 10.9million deaths annually of children under five. The median stunting prevalence in WHO African region is 31.3%.

Aweil Center of South Sudan has consistently high malnutrition rates despite running nutrition projects with relative stability. Results from nutrition survey in November 2013 indicated a severe acute malnutrition (SAM) prevalence rate of 6.3% (95% CI, 4.5-8.9) and a global acute malnutrition (GAM) rate of 22.4% (95% CI, 17.8-27.7). Both prevalence rates were above the WHO thresholds of 15% and 2% respectively.

A cross-sectional study done with two-stage cluster sampling method showed that generally children 6-59 months in Aweil Center have poor nutritional status with GAM (<-2 z-score and/or edema) of 23.2% (95% CI, 19.0-27.9) and SAM (% < -3SD) of 7% (95% CI, 4.9%-9.9%). However, stunting based on height/length-for-age z-scores was 8.7% (95% CI, 6.5-11.6), which was within the acceptable new WHO’s threshold regarded as low probably due to genetic factors for tallness for Dinka tribe.

The study revealed high burden of infectious diseases at 94.5% with p-value 0.00022 (95%C. I, 0.1667-0.291). Poor feeding and family planning practices; poor access roads to markets contribute to childhood malnutrition.

Multifaceted approach is needed to root out the chronic malnutrition from Aweil center shift from food Aid to support of food production, scale up of primary health care and iCCM interventions and community awareness on feeding practices among others.

Keywords: Prevalence, Associated-factors, Malnutrition, Children 6-59 months, Infectious diseases, Genetics.

Introduction

Malnutrition is one of the most common causes of morbidity and mortality among children globally (WHO1999). Malnutrition has been linked to 60% of the 10.9million deaths annually of children less than five years old. Not only that; 50-70% of the burden of diarrhea, malaria, and respiratory infections among others in childhood are attributed to undernutrition with underlying poverty (WHO2003). Infants born with low birth weight (LBW) are 1.74 times more likely to be stunted (95% CI, 1.38–2.19) than those born with normal weight (Aryastami et al 2017).

Undernutrition is still persistent in the WHO African region with major implications for health care. Sadly Twenty five of the WHO African region’s 47 countries have high (>30%) or very high (>40%) rates of stunting (WHO 2017). Within Africa, Sub-Saharan Africa has one of the highest rates of under-five malnutrition with stunting as high as 57.7% in the East African Country of Burundi, 43.9% in Niger of West Africa and 39.9% in Chad of Central Africa (Akombi et al, 2017).

It has been noted that stunted mothers of reproductive age are more likely to have stunted children. This is because the genes for stunted growth are passed on to the next generation in their children (Thokozani 2014).
Data collected from 45 Countries between 2007 and 2015 showed median wasting of 6.3% and ranged from 2% in Swaziland to 22.7% in South Sudan. 17 Countries had wasting level less than 5% (acceptable prevalence), 19 countries had wasting prevalence of 5-9% (poor prevalence); 3 Countries exceeded the critical public health emergency threshold. These included South Sudan at 22.7%, Niger 18.7% and Eritrea 15.3% (WHO 2017).

Aweil Centre of South Sudan is one of the Counties with Chronic and acute Malnutrition especially among children under the age of 5 years. Results from a nutrition survey conducted in November 2013 indicated a severe acute malnutrition (SAM) prevalence rate of 6.3% (95% CI, 4.5-8.9) and a global acute malnutrition (GAM) rate of 22.4% (95% CI, 17.8-27.7). Both prevalence rates were above the WHO global acute malnutrition and severe acute malnutrition rates of 15% and 2% respectively. The high malnutrition rates continue to exist among the preschool children in South Sudan after surviving the 6-59 months of age (Harvey and Rogers 2007).

The government, UN agencies and implementing partners have a number of nutrition and health projects running in the County, but the malnutrition rates have remained high despite the relative stability in this region compared to the neighboring states of lakes, Western Bahr el Ghazal and Unity states that are at the heart of the conflict in South Sudan. There was need to find out the current prevalence of malnutrition and the associated actors of the persistent under nutrition among the children 6-59 months so as to address the root causes of the malnutrition in this pastoral communities. There was therefore a need to establish the Current malnutrition rates and the associated factors as to give recommendations to address the underlying causes of malnutrition in Aweil Centre County.

Timely and adequate feeding of children 6-59 months with foods rich in proteins, carbohydrates, oils and micronutrients increases their chances of survival, supports growth and development especially in the first 2 years of life. In addition, improving maternal nutrition, especially before, during and immediately after pregnancy reduces stunting and acute malnutrition (United Nations 2015).

Neonates need to be breastfed in the first 1hour of their life, creating early bonding with mother, provision of colostrum which is rich in nutrients and supports the immune system for the bay and keeps baby warm-protecting from hypothermia which can be life threatening.

Infants should be exclusively breastfed for the first 6months of their life. Adequate feeding from 6 months to 59 months and above prevents stunting and reduces the risk of infectious diseases like pneumonia and infective diarrhea among others, hence reducing morbidity and mortality among the children less than five years of life (UNICEF 2015).

Due to the collapsed health systems and poor health infrastructure in South Sudan following the years of conflict, community management of acute malnutrition (CMAM) was introduced in the year 2000. Community mobilization is key for the success of CMAM program because this is where the children who are malnourished are screened and referred by community-based distributer (CBDs) volunteers either to OTP, SFP at the PHC facilities or stabilization Centre at the state capital in Aweil (Keane et al 2013).

**Research methodology**

**Study area**

The study was conducted in Aweil center County, one of the five Counties of the former Northern Bahr el Ghazal state of South Sudan.

Aweil town is the capital of former Bahr el Ghazal state and now capital of Aweil state, located 800KM from Juba, the capital of Juba and lies on the North West part of the Country at coordinates of 8° 46’ 02.00”N, 27° 23’ 59.00”E (Latitude: 8.7671; Longitude: 27.3998). Its location is near the international border with the Republic of Sudan and the Abyei region to the north, bordering Wau to the South, Lol state of former Western Bahr el Ghazal to the West and Aweil East County to the east. Aweil Center County has 7 Payams which are administrative units. These include Achanna, Aroyo, Awada, Awulic, Bar Mayen, Chel South and Nya lath. The Payams are sub- divided into 29 Bomas, the smallest administrative unit in the republic of South Sudan.
The topography of Aweil is flat with savannah grassland devoid of most of its trees for firewood, charcoal and shelter, hence making this Country prone to flooding every year at the peak of rainy season from August to October. The soils are silty making them retain flood water for weeks and sometimes even months blocking transport from some villages to the town center which lies close to the confluence of Lol and Pongo Rivers. There are two weather conditions all in the extreme: prolonged dry season from November to May and flooding from August to October.

Unlike the neighboring counties that are predominantly one tribe, Aweil has Luo and Dinka tribes sandwiched with other tribes and nationalities socially living in harmony. This is the most peaceful state of the ten states in South Sudan. Different tribes living side by side and different faiths pray side by side. The main economic activities are cattle keeping since most of the villagers are pastoralist who move with cattle to look for pasture during dry season and mover to high grounds near the town during the floods at peak of the rain. A good proportion of the population does mixed farming with growing of crops and rearing of smaller number of animals. Others along the Lol and Pongo rivers do some fishing. Foreigners are mostly in the town and are involved in cross border trade with neighboring Countries like Uganda, DRC, Kenya and Sudan. Despite these economic activities, poverty level is the worst in the country at 76% (fig 2).

The former Northern Bahr el Ghazal had a population of 720,898 (55,398 urban and 665,500 rural) and an area of 30,543 square kilo meters with population density of 24/sq. km. Aweil Center has lion’s share of the land of the 5 Counties at 11,17 sq. km, but the smallest population 41,827 (22,199M 19,628F) and 5919 (16%) children 6-59 months with population density of only 4 / sq. km (GOSS and S SCCSE 2010).

South Sudan has one of the worst health indicators with infant mortality rate at 79 deaths per 1000 live births, but the highest infant mortality rates are in the former Northern Bah El Ghazal state at 120 deaths per 1,000 live births and also under five mortality rate at 152 deaths per 1,000 live births.

![Figure 2. Poverty headcount in south sudan. source: poverty in southern sudan: national baseline household survey (NBHS), 2010](image_url)

**Theoretical framework**

The high prevalence of pathogens especially bacteria, and parasites in developing countries of Sub-Saharan Africa contributes greatly to the malnutrition and vice versa contributing to 300,000 deaths per year which directly related to severity of malnutrition and poverty which is the main underlying cause of...
malnutrition (Müller and Krawinkel, 2005). Figure 3 below illustrates the theoretical framework of the causes of malnutrition in Aweil, 2018.

![Figure 3. Theoretical framework for causes of malnutrition in Aweil 2018](image-url)

**Research design**

A community based cross-sectional study design was applied for children and their care takers. A two-stage cluster sampling method was adopted to select the villages and the households. A total of 39 clusters (villages) were selected, 9 of which were reserves. One child (6-59 months) in the selected household was randomly included in the anthropometric assessment and the care taker interviewed using interviewer administered questionnaire to get more information on the associated factors of malnutrition. Using village lists provided by the County health department, village level enumerators were trained to do systematic random sampling to select 13 households per cluster who were then interviewed. The 30 cluster * 13 household per cluster survey design enabled the calculation of 95% confidence interval point estimates to give 390 households as the minimum number of households, children and their care takers.¹

An unmatched case-control study of children 6-59 months malnourished and well-nourished was done. The malnourished children were the cases of moderate acute malnutrition (MAM - a weight for height Z score of ≥ −3SD to < − 2 SD) or severe acute malnutrition (SAM-a weight for height Z score of < − 3 Standard deviations with or without bilateral pitting edema). The well-nourished children were controls and compared with the cases in a 3X3 design using various parameters of age, monthly family income, age of sibling that child follows, mother’s education level among others.

**Research Variables:**

The research variables are grouped into three: anthropometrics and health for the children 6-59 months, infant and young child feeding practices (IYCF) and food security. To ensure that the respondents understood the message, the structured questionnaire was translated to Dinka language and back to English to confirm the translation.

Anthropometric measurements included weight, and height or length and the dependent variables. Vitamin A supplementation in the last six months, Measles vaccination for children 9 months and above, any history of illness two weeks prior to the day of administering the questionnaire, for example fever, cough, diarrhea, skin infections, and eye infections.

The facility in which sick child is taken for treatment like primary health care unit (PHCU), primary

¹https://www.who.int/immunization/monitoring_surveillance/Vaccination_coverage_cluster_survey_with_annexes.pdf
health care Centre (PHCC), hospital, outreach clinic, private physician, village health worker, Community-based drug distributor (CBD), drug shop, traditional practitioner, relative or a friend.

Variables related to malaria control included the number of long-lasting insecticide treated nets (LLITNs) and whether or not the child 6-59 months is sleeping under LLITNs. Also related to malaria, diarrhea cough is accessibility to a CBD.

The variables under IYCF included age of the child in months, whether the child has ever been breast fed, if yes how long after birth it took before the child was first put in to breast feed; whether immediately (<1hr), 1-24hrs, 24-48hrs, or after 48hours. At what age other foods were introduced to the child and what foods were they?

**Food security variables**

Various food groups consumed in the past 24 hours before the day of administering questionnaire; for example breast milk, milk and other dairy products like yoghurt, fruits, green leaf vegetables, sugar, honey, oil, fats or butter pulses like beans, lentils, groundnuts, sesame or peas; cereals like maize, sorghum, millet, rice, pasta, bread, and tubers; for example cassava, potatoes, and sweet potatoes among others. The individual dietary diversity (IDDS) of the children in the community was calculated using the formula:

\[
IDDS = \frac{\text{Number of children (6-59) months who received food from at least four (4) food groups in 24 hrs.}}{\text{X 100}}
\]

**Sample size, design effect and precision**

The design effect and precision were calculated using the formula:

\[\pm 2 \text{ standard errors (s) } = \sqrt{p \ (1-p) \ D/n} \]

Note: \( s = \sqrt{p \ (1-p) \ D/n} \) is an extension of the simpler formula binomial formula \( \sqrt{p \ (1-p) \ /n} \) when the data is assumed to come from a simple random sample.

\( \sqrt{D} \) is a measure of the increase in the standard error of the estimate due to the sampling procedure used.

\[\pm 2 \text{ Standard errors (s) } = \sqrt{p \ (1-p) \ D/n} \]

(Bennett S et al 1991)

Where D is design effect = 1+ (b-1) roh
And roh= rate of homogeneity. 0.2 at 95% or 0.1 at 50%
b= average number of responses per cluster
n= total number of responses in the study
p= estimated proportion = 0.5 - not known
No. of clusters necessary(c) C=\( p \ (1-p) \ D/S^2b \) (Bennett S et al 1991)
Sample size, \( n = (2za/2)^2/s^2 \ [p \ (1-p)]^*D \)
Where za/2 = Z-score equivalent to 1.96
S = standard error=0.05
P= proportion= 0.5
n= \((1.96)^2/ (0.05^2) \ [0.5(1-0.5)*1.5 \]
n= 576.24
Expected response rate 95%
n = 576.24*0.95 = 547 households and children 6-59 months as well as care takers (mothers)

**Sampling technique**

Selection of the sample was performed by sampling with probability proportional to size (PPS). This was carried out by making a table of cumulative list of village populations and selecting a systematic sample from a random start. The total population of the clusters (villages) was divided by the estimated number of villages to be selected to obtain the sampling interval (SI). Random number was chosen between 1 and the SI then fitted into position to identify the first village in the sample frame. Then the SI was added to the random number to get the second village and the SI was added to cumulative number to get the subsequent villages. Constant number of households was selected from each selected village so that each household in the population had the same probability of being selected in the sample i.e. self-weighting sampling procedure.

**Inclusion/exclusion criteria**

Children from the selected clusters and homes from Aweil center County 6–59 months of age were included in the study. Only one child 6-59 months was selected per household to avoid double selection. Additional children in the same household were excluded. Children were not eligible to participate if they were not accompanied by responsible caretaker to get informed consent.

**Research equipment and materials**

The standardization test equipment and materials included 12 new MUAC tapes, wooden height boards with calibration, twelve (12) electronic weighing scales with two extra sets of batteries, one 50-pen box, standardization test forms and 16 clipboards (one per participant).

**Data analysis**

Data from the field was checked for errors before entry was made in the nutrition survey database in the world health organization (WHO) anthro software version 3.2.2.1. The anthropometric data and that for nutrition factors were then exported to SPSS for analysis. Bivariate analysis and multivariate regression analysis were then done to get prevalent of malnutrition, and the associated factors.

**Ethical considerations**

Ethical clearance was sought from the directorate of policy, planning and budgeting in the Ministry of health, republic of South Sudan. Bonafide certificate was provided by the Texila American University to introduce me officially to the authorities and confirming that I’m a student.

The state ministry of health and the County health departments were informed of the planned nutrition study and protocol shared with them to familiarize themselves with the purpose and the research process.

**Results**

**Demography**

A total of 517 children and their care takers were reached. 217(42%) of the children were males and 297 (58%) were females. Out of 517 children 514 care takers were able to give all the needed information which was 99.42% response rate. 55(10.7%) of the children were infants and the highest number of children in a single age bracket was 128 (25%) within 12-23 months of age. The rest of the children were between 24 and 59 months of age with more or less uniform distribution (fig6)
The results showed that generally children 6-59 months in Aweil Center have poor nutritional status compared to the WHO standard. This has been reflected in Fig 7 below with the curve of z-score in red shifted to the left of the WHO standard in green on the right with the prevalence of global acute malnutrition -GAM (<-2 z-score and/or edema) [119] 23.2%. Prevalence of severe acute malnutrition (SAM) (% < -3SD) was 7% in Aweil which was also higher than the WHO threshold of 2% (95% CI, 4.9-9.9) (table3).

Prevalence of underweight based on weight-for-age z-scores was 16.6% (95% CI, 13.8-19.7). Boys were more likely to be underweight compared to girls with prevalence 19.8% (95% CI, 15.6-24.8) and 14.1% (95% CI, 10.4-18.9) respectively (table4).

Prevalence of stunting based on height/length-for-age z-scores was 8.7% (95% CI, 6.5-11.6), which is was also within the acceptable new WHO’s threshold regarded as low. However, children between 12-23 months had the highest level of stunting at 11.7% (95% CI. 6.4-26.7) (Table5).
**Figure 7.** General nutritional status of the children in Aweil compared with WHO standard

**Set 1- General results**

**Table 6.** Prevalence of malnutrition by age group for gender combined children 6-59 months

<table>
<thead>
<tr>
<th>Age groups</th>
<th>N</th>
<th>Weight-for-length/height (%)</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>% &lt; -3SD (95% CI)</td>
<td>% &lt; -2SD (95% CI)</td>
<td></td>
</tr>
<tr>
<td>Total:</td>
<td>514</td>
<td>7 (4.9-9.9)</td>
<td>23.2  (19-27.9)</td>
<td></td>
</tr>
<tr>
<td>(6-11)</td>
<td>55</td>
<td>1.9 (0.3-12.8)</td>
<td>25    (15.7-37.4)</td>
<td></td>
</tr>
<tr>
<td>(12-23)</td>
<td>128</td>
<td>5.5 (2.6-11.3)</td>
<td>17.2  (11.1-25.6)</td>
<td></td>
</tr>
<tr>
<td>(24-35)</td>
<td>108</td>
<td>5.6 (2.7-11.1)</td>
<td>21.3  (13-32.9)</td>
<td></td>
</tr>
<tr>
<td>(36-47)</td>
<td>107</td>
<td>10.3 (5-20)</td>
<td>29.9  (19-43.7)</td>
<td></td>
</tr>
<tr>
<td>(48-60)</td>
<td>107</td>
<td>9.3 (5.2-16.2)</td>
<td>24.3  (15.4-36.1)</td>
<td></td>
</tr>
</tbody>
</table>

**Table 7.** Prevalence of acute malnutrition based on W/H z-scores and edema disaggregated by gender

<table>
<thead>
<tr>
<th>Variables</th>
<th>All N=514</th>
<th>Boys n=217</th>
<th>Girls=297</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prevalence of global acute malnutrition - GAM (&lt;2 z-score and edema)</td>
<td>[119] 23.2% (95% CI, 19.0-27.9)</td>
<td>[55] 25.3% (95% CI, 19.3-32.5)</td>
<td>[64] 21.5% (95% CI, 16.1-28.2)</td>
</tr>
<tr>
<td>Prevalence of moderate malnutrition ( &lt; -3 z-score and &gt;= -3 z-score, no edema)</td>
<td>[83] 16.2% (95% CI, 14.1-18.0)</td>
<td>[37] 17% (95% CI, 14.3-19.0)</td>
<td>[46] 15.4% (95% CI, 12.5-18.3)</td>
</tr>
<tr>
<td>Prevalence of severe malnutrition ( &lt; -3 z-score and edema)</td>
<td>[36] 7% (95% CI, 4.9-9.9)</td>
<td>[18] 8.3 (95% CI, 5-13.5)</td>
<td>[18] 6.1% (95% CI, 3.6-9.9)</td>
</tr>
</tbody>
</table>
Table 8. Comparison of prevalence of underweight based on weight-for-age z-scores for male and female

<table>
<thead>
<tr>
<th>Category</th>
<th>N</th>
<th>% &lt; -3SD (95% CI)</th>
<th>% &lt; -2SD (95% CI)</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total:</td>
<td>507</td>
<td>4.1 (2.8-6.2)</td>
<td>16.6 (13.8-19.7)</td>
<td>1.07</td>
</tr>
<tr>
<td>Male</td>
<td>217</td>
<td>2.8 (1.3-5.7)</td>
<td>19.8 (15.6-24.8)</td>
<td>0.98</td>
</tr>
<tr>
<td>Female</td>
<td>290</td>
<td>5.2 (3-8.8)</td>
<td>14.1 (10.4-18.9)</td>
<td>1.12</td>
</tr>
</tbody>
</table>

Table 9. Prevalence of stunting based on height/length-for-age z-scores

<table>
<thead>
<tr>
<th>Age groups</th>
<th>N</th>
<th>% &lt; -3SD (95% CI)</th>
<th>% &lt; -2SD (95% CI)</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total:</td>
<td>505</td>
<td>2.4 (1.4%, 4.1%)</td>
<td>8.7 (6.5%, 11.6%)</td>
<td>1.12</td>
</tr>
<tr>
<td>(6-11)</td>
<td>55</td>
<td>0</td>
<td>(-, -)</td>
<td>5.8 (2%, 15.3%)</td>
</tr>
<tr>
<td>(12-23)</td>
<td>128</td>
<td>2.3 (0.8%, 6.8%)</td>
<td>11.7 (6.9%, 19.1%)</td>
<td>1.07</td>
</tr>
<tr>
<td>(24-35)</td>
<td>108</td>
<td>5.6 (2.6%, 11.7%)</td>
<td>12 (6.2%, 22%)</td>
<td></td>
</tr>
<tr>
<td>(36-47)</td>
<td>106</td>
<td>0.9 (0.1%, 6.9%)</td>
<td>4.7 (1.9%, 11.2%)</td>
<td></td>
</tr>
<tr>
<td>(48-60)</td>
<td>108</td>
<td>1.9 (0.5%, 7.1%)</td>
<td>7.4 (3.6%, 14.5%)</td>
<td></td>
</tr>
</tbody>
</table>

Factors associated with malnutrition

Bivariate analysis

The study results show that vitamin A supplementation for children 6-59 months old was 273(53%), p-value 0.0006 and odds ratio (OR) 0.47 (95% C.I. 0.31-0.72) which was significant protective measure against malnutrition (Fig9 and Table 16: section 1).

Measles vaccination with evidence from a vaccination card 284 (55%) p-value 0.005 and OR 0.54 (95% C.I. 0.36-0.82) which was significant and contributes to reduction in the prevalence of malnutrition 273 (53%) of the children were reported to be sleeping under long lasting insecticide treated mosquito nets. P-value was 0.01 and OR 0.57 (95% C.I. 0.37-0.86) which is statistically significant and protective. (table16: section 2 and 7).

Within 30 days prior to the study, 361(0%) families enrolled in the study had lacked food or money for food for at least once. Malnutrition rate in these families was one of the highest with 101 children under five (28%) malnourished. P-value was 0.0001 and OR 2.96 (95% C.I. 1.72-5.09) which was significant and scarcity of resources increased the risk of malnutrition.

Table 16. Bivariate analysis of various factors of malnutrition with their p-values, Odds ratio and 95% confidence intervals

<table>
<thead>
<tr>
<th>S</th>
<th>FACTOR</th>
<th>NO</th>
<th>%</th>
<th>Malnutrition</th>
<th>No malnutrition</th>
<th>P-V</th>
<th>OR</th>
<th>LIMITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Vitamin A supplementation</td>
<td>No.</td>
<td>%</td>
<td>Malnutrition</td>
<td>No malnutrition</td>
<td>P-V</td>
<td>OR</td>
<td>LIMITS</td>
</tr>
<tr>
<td>Yes</td>
<td>273</td>
<td>53</td>
<td>46</td>
<td>227</td>
<td>0.0006</td>
<td>0.47</td>
<td>0.31</td>
<td>0.72</td>
</tr>
<tr>
<td>2</td>
<td>Children sleeping under LLITN</td>
<td>No.</td>
<td>%</td>
<td>malnutrition</td>
<td>No malnutrition</td>
<td>P-V</td>
<td>OR</td>
<td>LIMITS</td>
</tr>
<tr>
<td>Yes</td>
<td>273</td>
<td>52.9</td>
<td>50</td>
<td>223</td>
<td>0.01</td>
<td>0.57</td>
<td>0.37</td>
<td>0.86</td>
</tr>
<tr>
<td>3</td>
<td>A day of lack of food/money for food in the last 30 days prior to study</td>
<td>No.</td>
<td>%</td>
<td>malnutrition</td>
<td>No malnutrition</td>
<td>P-value</td>
<td>OR</td>
<td>Lower 95%</td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Yes</td>
<td>361</td>
<td>70%</td>
<td>101</td>
<td>260</td>
<td>0.0001</td>
<td>2.96</td>
<td>1.72</td>
<td>5.09</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>4</th>
<th>Agricultural production</th>
<th>No.</th>
<th>%</th>
<th>malnutrition</th>
<th>No malnutrition</th>
<th>P-value</th>
<th>OR</th>
<th>Lower 95%</th>
<th>Upper 95%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>282</td>
<td>54.7%</td>
<td>49</td>
<td>233</td>
<td>0.001</td>
<td>0.49</td>
<td>0.32</td>
<td>0.75</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>5</th>
<th>Still has Cereals of last harvest</th>
<th>No.</th>
<th>%</th>
<th>malnutrition</th>
<th>No malnutrition</th>
<th>P-value</th>
<th>OR</th>
<th>Lower 95%</th>
<th>Upper 95%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>181</td>
<td>35%</td>
<td>30</td>
<td>151</td>
<td>0.014</td>
<td>0.55</td>
<td>0.35</td>
<td>0.87</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>6</th>
<th>CBD within Easy reach</th>
<th>No.</th>
<th>%</th>
<th>malnutrition</th>
<th>No malnutrition</th>
<th>P-value</th>
<th>OR</th>
<th>Lower 95%</th>
<th>Upper 95%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>259</td>
<td>50.2%</td>
<td>49</td>
<td>210</td>
<td>0.032</td>
<td>0.62</td>
<td>0.41</td>
<td>0.94</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>7</th>
<th>Measles Vaccination</th>
<th>No.</th>
<th>%</th>
<th>malnutrition</th>
<th>No malnutrition</th>
<th>P-value</th>
<th>OR</th>
<th>Lower 95%</th>
<th>Upper 95%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not vaccinated Yet</td>
<td>201</td>
<td>39</td>
<td>60</td>
<td>141</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vaccinated with Card</td>
<td>284</td>
<td>55</td>
<td>49</td>
<td>235</td>
<td>0.005</td>
<td>0.54</td>
<td>0.36</td>
<td>0.82</td>
<td></td>
</tr>
<tr>
<td>Vaccinated without card</td>
<td>31</td>
<td>6</td>
<td>10</td>
<td>21</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>516</strong></td>
<td><strong>100</strong></td>
<td><strong>119</strong></td>
<td><strong>397</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Out of the 516 care takers interviewed, 282 (54.7%) were involved in their own food production. 49 (17.38%) of the children in these homes were malnourished with p-value of 0.001 and OR 0.49 (95% C.I. 0.32-0.75) which was statistically significant. 181 (50%) of those who had produced food had cereals still available by the time of administering questionnaire. 30 (10.64%) of the children in this group who still had their food from last harvest were malnourished with p-value of 0.014 and OR 0.55 (95% C.I. 0.35-0.87) which is significant (Table 16: sections 4 and 5).

Community based distributors (CBDs) were found to be within easy reach of 259 (50.2%) of the 516 care takers interviewed. 49 (18.92%) of the children with access to CBDs were malnourished with p-value of 0.032, OR 0.62 (95% C.I. 0.41-0.94). P-value is significant and OR shows risk reduction to malnutrition in the presence of CBDs (table16: section 6).

**Multivariate analysis**

Main sources of food for the 6-59 months old children were the families own produce with estimate of 282 (54.7%). This was followed by market or shop at 123 (23.9%) and work for food 67 (13%). Significant number of respondents 31 (6%) reported to have no food for the family hence resort to
begging from relatives, friends and well-wishers both in town and villages; only 1(0.2%) reported to be relying on food aid from the humanitarian workers. Source of food is a factor that affects the nutrition status of children with p-value of 0.00357 and (95% confidence interval of 0.081-0.2). Those who mainly buy from the market have the least rate of malnutrition among 6-59 months old children at 16% (20) followed by those who produce their own food at 17 % (47). However, those who rely on food aid have the highest rate of malnutrition at 50% (1) followed by those who work for food at 45 % (30) (table17 section 8).

The food is prepared and given to children daily, but there was wide variation in the frequency at which the food is given. 163 (57.6%) of the children were fed once or twice in a day, 79 (15.4%) were fed thrice a day and the remaining 139 (27%) were fed four or more times a day (fig 10). Feeding children once or twice a day contributes to malnutrition with P-values 0.00035, 0.4058 and odds rations 2.20(95% C.I 1.44-3.35) and 1.24 (95% C.I. 0.79-1.96) respectively. Meanwhile feeding young children 4 or more times a day has protective significant effect against malnutrition with p-values 0.000278 and OR 0.2 (95% C.I. 0.08-0.5) (table17: section 1).

The study revealed high burden of infectious diseases at 94.5% and only 28(5.5%) of the children were reported not to have any illness in the past two weeks prior to the study. 225 (43.7%) of the children were reported to have suffered from a febrile illness, 130 (25.1%) from diarrhea, 104 (20.2%) from cough, 23 (4.4%) from skin infections and 6 (1.1%) were reported to have suffered from eye infections (fig8).

Children 6-59 months old who were reported to have suffered from any illness were more likely to suffer from malnutrition than those who were not sick with p-values 0.043, and 0.040 for fever, and diarrhea respectively. The odds ratios for fever and diarrhea were above 1(one) meaning that the infections contributed to the malnutrition though at varying degrees for example, odds ratio (OR) for fever was 1.56(95% C.I 1.03- 2.36) and OR for diarrhea was 1.64 (95% C.I 1.05-2.57). Cough has slight effect on malnutrition with OR 0.93 (95% C.I 0.56-1.57) (table17: section 2).

The health seeking behavior for the parents or care takers however varied. 156(30.2%) of the respondents sought health services from a community based distributor (CBD), 108 (20.9%) went for treatment in a primary health care center (PHCC) or primary health care unit (PHCU). 88 (17%) of the respondents sought health services from hospital, 23(4.4%) from private physician within Aweil town, 53(10.3%) from drug shops, 20 (3.9%) from traditional healer and 6 (1.1%) from village health worker (table23).
Figure 9. Coverage of key primary health care interventions for children 6-59 months in Aweil May 2018

Figure 10. Frequency of meals eaten daily by children 6-59 months in Aweil center May 2018

Table 1. Table of P-values, O.R. (95% C.I.) of different factors - multivariate analysis

<table>
<thead>
<tr>
<th>VARIABLE</th>
<th>No.</th>
<th>%</th>
<th>Mal nutrition</th>
<th>No mal nutrition</th>
<th>P-VALUE</th>
<th>OR</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Frequencies of meals eaten by children</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Once</td>
<td>163</td>
<td>31.5</td>
<td>54</td>
<td>109</td>
<td>0.00035</td>
<td>2.20</td>
<td>1.44 3.35</td>
</tr>
<tr>
<td>Twice</td>
<td>136</td>
<td>26.1</td>
<td>36</td>
<td>100</td>
<td>0.40581</td>
<td>1.24</td>
<td>0.79 1.96</td>
</tr>
<tr>
<td>Three times</td>
<td>139</td>
<td>27.0</td>
<td>24</td>
<td>115</td>
<td>0.07507</td>
<td>0.62</td>
<td>0.38 1.02</td>
</tr>
<tr>
<td>Four or more times</td>
<td>78</td>
<td>15.0</td>
<td>5</td>
<td>73</td>
<td>0.00028</td>
<td>0.20</td>
<td>0.08 0.5</td>
</tr>
<tr>
<td>Total</td>
<td>516</td>
<td>99.6</td>
<td>119</td>
<td>398</td>
<td>0.47</td>
<td>0.040</td>
<td>0.02</td>
</tr>
<tr>
<td>2</td>
<td>Disease condition</td>
<td>No.</td>
<td>%</td>
<td>Mal nutrition</td>
<td>No mal nutrition</td>
<td>P-value</td>
<td>OR</td>
</tr>
<tr>
<td>-----</td>
<td>-------------------</td>
<td>-----</td>
<td>---------</td>
<td>---------------</td>
<td>------------------</td>
<td>----------</td>
<td>----------</td>
</tr>
<tr>
<td></td>
<td>Fever</td>
<td>225</td>
<td>43.7</td>
<td>62</td>
<td>163</td>
<td>0.04282</td>
<td>1.56</td>
</tr>
<tr>
<td></td>
<td>Cough</td>
<td>104</td>
<td>20.2</td>
<td>13</td>
<td>91</td>
<td>0.89</td>
<td>0.93</td>
</tr>
<tr>
<td></td>
<td>Diarrhea</td>
<td>130</td>
<td>25.1</td>
<td>39</td>
<td>91</td>
<td>0.04027</td>
<td>1.64</td>
</tr>
<tr>
<td></td>
<td>Skin Infections</td>
<td>23</td>
<td>4.4</td>
<td>3</td>
<td>20</td>
<td>0.36085</td>
<td>0.49</td>
</tr>
<tr>
<td></td>
<td>Eye Infections</td>
<td>6</td>
<td>1.1</td>
<td>1</td>
<td>5</td>
<td>0.90974</td>
<td>0.72</td>
</tr>
<tr>
<td></td>
<td>Non illness</td>
<td>28</td>
<td>5.5</td>
<td>2</td>
<td>26</td>
<td>0.02964</td>
<td>0.12</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>516</td>
<td>100</td>
<td>119</td>
<td>397</td>
<td>0.00022</td>
<td>0.167</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>3</th>
<th>How many months did the food from last harvest season last</th>
<th>No.</th>
<th>%</th>
<th>Mal nutrition</th>
<th>No mal nutrition</th>
<th>P-value</th>
<th>OR</th>
<th>Lower 95%</th>
<th>Upper 95%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1 to 3</td>
<td>30</td>
<td>11%</td>
<td>15</td>
<td>15</td>
<td>0.01939</td>
<td>3.18</td>
<td>1.29</td>
<td>7.81</td>
</tr>
<tr>
<td>2</td>
<td>4 to 6</td>
<td>50</td>
<td>18%</td>
<td>13</td>
<td>37</td>
<td>0.32</td>
<td>0.59</td>
<td>0.25</td>
<td>1.38</td>
</tr>
<tr>
<td>3</td>
<td>7 to 9</td>
<td>21</td>
<td>7%</td>
<td>4</td>
<td>17</td>
<td>0.2564</td>
<td>0.44</td>
<td>0.13</td>
<td>1.43</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>101</td>
<td>36%</td>
<td>32</td>
<td>69</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>4</th>
<th>Denominator 282- those who did agricultural production</th>
<th>No.</th>
<th>%</th>
<th>Mal nutrition</th>
<th>No mal nutrition</th>
<th>P-value</th>
<th>OR</th>
<th>Lower 95%</th>
<th>Upper 95%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Immediately (&lt;1 hr.)</td>
<td>98</td>
<td>19%</td>
<td>8</td>
<td>90</td>
<td>0.0002</td>
<td>0.25</td>
<td>0.12</td>
<td>0.52</td>
</tr>
<tr>
<td>2</td>
<td>1-24 hours</td>
<td>387</td>
<td>75%</td>
<td>98</td>
<td>289</td>
<td>0.046</td>
<td>1.74</td>
<td>1.04</td>
<td>2.94</td>
</tr>
<tr>
<td>3</td>
<td>24-48 hours</td>
<td>4</td>
<td>0.8%</td>
<td>2</td>
<td>2</td>
<td>0.49133</td>
<td>3.38</td>
<td>0.47</td>
<td>24.23</td>
</tr>
<tr>
<td></td>
<td>After 48 hours</td>
<td>1</td>
<td>0.2%</td>
<td>1</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Don’t know</td>
<td>26</td>
<td>5%</td>
<td>10</td>
<td>16</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>516</td>
<td>100</td>
<td>119</td>
<td>397</td>
<td>0.00015</td>
<td>0.192</td>
<td>0.286</td>
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</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>5</th>
<th>Age of introducing other foods</th>
<th>No.</th>
<th>%</th>
<th>Mal nutrition</th>
<th>No mal nutrition</th>
<th>P-value</th>
<th>OR</th>
<th>Lower 95%</th>
<th>Upper 95%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Below 1 month</td>
<td>98</td>
<td>19%</td>
<td>19</td>
<td>79</td>
<td>0.41</td>
<td>0.76</td>
<td>0.44</td>
<td>1.32</td>
</tr>
<tr>
<td>2</td>
<td>1-5 months</td>
<td>155</td>
<td>30%</td>
<td>50</td>
<td>105</td>
<td>0.02513</td>
<td>1.65</td>
<td>1.08</td>
<td>2.5</td>
</tr>
<tr>
<td>3</td>
<td>6 months</td>
<td>206</td>
<td>40%</td>
<td>38</td>
<td>168</td>
<td>0.05457</td>
<td>0.64</td>
<td>0.41</td>
<td>0.99</td>
</tr>
<tr>
<td>4</td>
<td>7-12 months</td>
<td>53</td>
<td>10.3%</td>
<td>10</td>
<td>43</td>
<td>0.55311</td>
<td>0.76</td>
<td>0.37</td>
<td>1.55</td>
</tr>
<tr>
<td></td>
<td>Above 12 months</td>
<td>4</td>
<td>0.7%</td>
<td>2</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>516</td>
<td>100</td>
<td>119</td>
<td>397</td>
<td>0.00044</td>
<td>0.169</td>
<td>0.289</td>
<td></td>
</tr>
</tbody>
</table>
Mothers’ education level

<table>
<thead>
<tr>
<th>Mothers’ education level</th>
<th>No.</th>
<th>%</th>
<th>Mal nutrition</th>
<th>No mal nutrition</th>
<th>P-value</th>
<th>OR</th>
<th>Lower 95%</th>
<th>Upper 95%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Never attended school</td>
<td>397</td>
<td>76.9</td>
<td>102</td>
<td>295</td>
<td>0.01362</td>
<td>2.07</td>
<td>1.18</td>
<td>3.63</td>
</tr>
<tr>
<td>Primary level</td>
<td>98</td>
<td>19</td>
<td>10</td>
<td>88</td>
<td>0.00126</td>
<td>0.39</td>
<td>0.21</td>
<td>0.72</td>
</tr>
<tr>
<td>Secondary level</td>
<td>13</td>
<td>2.5</td>
<td>4</td>
<td>9</td>
<td>0.72440</td>
<td>1.52</td>
<td>0.46</td>
<td>5.02</td>
</tr>
<tr>
<td>Institution</td>
<td>8</td>
<td>1.6</td>
<td>3</td>
<td>5</td>
<td>0.57950</td>
<td>2.03</td>
<td>0.48</td>
<td>8.61</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Age of the Mother or care taker</th>
<th>No.</th>
<th>%</th>
<th>Mal nutrition</th>
<th>No mal nutrition</th>
<th>P-value</th>
<th>OR</th>
<th>Lower 95%</th>
<th>Upper 95%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 20</td>
<td>166</td>
<td>32</td>
<td>49</td>
<td>117</td>
<td>0.0347</td>
<td>1.62</td>
<td>1.06</td>
<td>2.47</td>
</tr>
<tr>
<td>20-29</td>
<td>133</td>
<td>25.8</td>
<td>70</td>
<td>103</td>
<td>0.96712</td>
<td>0.96</td>
<td>0.6</td>
<td>1.54</td>
</tr>
<tr>
<td>30-39</td>
<td>144</td>
<td>27.9</td>
<td>29</td>
<td>115</td>
<td>0.38744</td>
<td>0.79</td>
<td>0.49</td>
<td>1.27</td>
</tr>
<tr>
<td>40-49</td>
<td>65</td>
<td>12.6</td>
<td>10</td>
<td>55</td>
<td>0.1573</td>
<td>0.57</td>
<td>0.28</td>
<td>1.16</td>
</tr>
<tr>
<td>50 and above</td>
<td>8</td>
<td>2</td>
<td>1</td>
<td>7</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| Food security factors |

Table 18. Individual Dietary Diversity Score (IDDS) of children who ate at least 4 types of food 24 hours prior to the study

<table>
<thead>
<tr>
<th>Age Category</th>
<th>No.</th>
<th>f, 4 or more food eaten</th>
<th>IDDS (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(6-11)</td>
<td>56</td>
<td>7</td>
<td>12.5</td>
</tr>
<tr>
<td>(12-23)</td>
<td>131</td>
<td>12</td>
<td>9.2</td>
</tr>
<tr>
<td>(24-35)</td>
<td>110</td>
<td>30</td>
<td>27.3</td>
</tr>
<tr>
<td>(36-47)</td>
<td>109</td>
<td>20</td>
<td>18.3</td>
</tr>
<tr>
<td>(48-60)</td>
<td>110</td>
<td>15</td>
<td>13.6</td>
</tr>
<tr>
<td>Total</td>
<td>516</td>
<td>84</td>
<td>16.3</td>
</tr>
</tbody>
</table>

84(16.28%) mothers and care takers reported to have fed the child 4 or more types of food in 24hrs prior to the study. This was equivalent to 16.3% individual dietary diversity score with p-value of 0.001459 (C.I, 0.104461-0.212) which was significant (Table 8).

125 (24%) of the households had consumed various food types 4-7 times 7 days prior to the day of the questionnaire. The commonest foods consumed by the family were milk and milk products by 200 families, fish by 148 families, and fruits by 141 followed by cereals consumed by 136 families. Meanwhile the least food consumed were tubers and roots consumed by 97 families. (Table9).
Table 19. Number of days in past 7 days household had consumed the group of foods-household dietary diversity score (HDDS)

<table>
<thead>
<tr>
<th>Food group</th>
<th>Never</th>
<th>1-3times</th>
<th>4-7 times</th>
<th>HDDS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cereals</td>
<td>5</td>
<td>375</td>
<td>136</td>
<td>26%</td>
</tr>
<tr>
<td>Legumes/nuts</td>
<td>53</td>
<td>350</td>
<td>113</td>
<td>22%</td>
</tr>
<tr>
<td>Roots &amp; tubers</td>
<td>39</td>
<td>380</td>
<td>97</td>
<td>19%</td>
</tr>
<tr>
<td>Meat/poultry</td>
<td>50</td>
<td>309</td>
<td>107</td>
<td>21%</td>
</tr>
<tr>
<td>Fish &amp; sea food</td>
<td>103</td>
<td>272</td>
<td>141</td>
<td>27%</td>
</tr>
<tr>
<td>Milk &amp; milk products</td>
<td>16</td>
<td>300</td>
<td>200</td>
<td>39%</td>
</tr>
<tr>
<td>Vegetables</td>
<td>84</td>
<td>320</td>
<td>112</td>
<td>22%</td>
</tr>
<tr>
<td>Fruits</td>
<td>108</td>
<td>260</td>
<td>148</td>
<td>29%</td>
</tr>
<tr>
<td>Eggs</td>
<td>172</td>
<td>240</td>
<td>104</td>
<td>20%</td>
</tr>
<tr>
<td>Oil / fats</td>
<td>174</td>
<td>226</td>
<td>116</td>
<td>22%</td>
</tr>
<tr>
<td>Sugar &amp; honey</td>
<td>106</td>
<td>310</td>
<td>100</td>
<td>19%</td>
</tr>
<tr>
<td><strong>Average</strong></td>
<td><strong>83</strong></td>
<td><strong>304</strong></td>
<td><strong>125</strong></td>
<td><strong>24%</strong></td>
</tr>
</tbody>
</table>

Table 20. Age of siblings of children with malnutrition- Mothers with other children (n) =387

<table>
<thead>
<tr>
<th>Age of other children</th>
<th>No.</th>
<th>%</th>
<th>Malnutrition</th>
<th>No malnutrition</th>
<th>Prevalence</th>
</tr>
</thead>
<tbody>
<tr>
<td>(0-5)</td>
<td>50</td>
<td>13%</td>
<td>16</td>
<td>34</td>
<td>32%</td>
</tr>
<tr>
<td>(6-11)</td>
<td>79</td>
<td>20%</td>
<td>30</td>
<td>49</td>
<td>38%</td>
</tr>
<tr>
<td>(12-23)</td>
<td>40</td>
<td>10%</td>
<td>20</td>
<td>20</td>
<td>50%</td>
</tr>
<tr>
<td>(24-35)</td>
<td>89</td>
<td>23%</td>
<td>12</td>
<td>77</td>
<td>13%</td>
</tr>
<tr>
<td>(36-47)</td>
<td>94</td>
<td>24%</td>
<td>9</td>
<td>85</td>
<td>10%</td>
</tr>
<tr>
<td>(48-60)</td>
<td>35</td>
<td>9%</td>
<td>5</td>
<td>30</td>
<td>14%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>387</strong></td>
<td><strong>100%</strong></td>
<td><strong>92</strong></td>
<td><strong>295</strong></td>
<td><strong>14%</strong></td>
</tr>
</tbody>
</table>

Table21. Main shock faced by the households in aweil center

<table>
<thead>
<tr>
<th>Shocks</th>
<th>No.</th>
<th>%</th>
<th>Malnutrition</th>
<th>No malnutrition</th>
</tr>
</thead>
<tbody>
<tr>
<td>No shocks</td>
<td>5</td>
<td>1%</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td>Insecurity</td>
<td>26</td>
<td>5%</td>
<td>5</td>
<td>21</td>
</tr>
<tr>
<td>Expensive food</td>
<td>187</td>
<td>36%</td>
<td>83</td>
<td>104</td>
</tr>
<tr>
<td>Limited access to basic services</td>
<td>13</td>
<td>3%</td>
<td>3</td>
<td>10</td>
</tr>
<tr>
<td>Diseases</td>
<td>252</td>
<td>49%</td>
<td>21</td>
<td>231</td>
</tr>
<tr>
<td>Floods</td>
<td>10</td>
<td>2%</td>
<td>2</td>
<td>8</td>
</tr>
<tr>
<td>Livestock diseases</td>
<td>3</td>
<td>1%</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Delay of rains</td>
<td>5</td>
<td>1%</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>Pest/crop disease</td>
<td>10</td>
<td>2%</td>
<td>1</td>
<td>9</td>
</tr>
<tr>
<td>Lack of water</td>
<td>5</td>
<td>1%</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>516</strong></td>
<td><strong>100%</strong></td>
<td><strong>119</strong></td>
<td><strong>397</strong></td>
</tr>
</tbody>
</table>

Aweil has overwhelming number of problems with varying gravity that affect the social economic wellbeing of the families and impact on the nutrition status of the children especially those 6-59 months with p-value of 0.0001 (95% C.I 0.1443-0.3025) which was significant. 99% (511) mothers reported at
least one of the following shocks: diseases 252(49%), high cost of food 187(36%), insecurity 26(5%), limited access to basic services 13(3%) and floods 10 (2%) among others (table10).

One of the findings is the relation between malnutrition and the age of the youngest sibling with p-value 0.001 at (95% C.I 0.1442-0.3167). 50 (13%) of the respondents reported that there was a younger child (1-5 months) and 79 (15%) reported younger child of 6-11 months and the rest reported siblings older to the one who was being enrolled into the study. Generally, the younger the youngest sibling, the greater the risk of malnutrition for the other child with the highest prevalence of malnutrition at 50% among children 12-23 months age group and followed by 38% among 6-11% age group. The list prevalence was 10% among the age group of 36-47% (table 11).

Table 22. Main sources of household income in Aweil

<table>
<thead>
<tr>
<th>Main sources of household income</th>
<th>No.</th>
<th>%</th>
<th>Malnutrition</th>
<th>No. of Malnutrition</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sale of crops</td>
<td>253</td>
<td>49</td>
<td>77</td>
<td>170</td>
<td>30%</td>
</tr>
<tr>
<td>Sale of livestock</td>
<td>10</td>
<td>2</td>
<td>3</td>
<td>7</td>
<td>1%</td>
</tr>
<tr>
<td>Sale of animal products</td>
<td>5</td>
<td>1</td>
<td>1</td>
<td>4</td>
<td>20%</td>
</tr>
<tr>
<td>Sale of natural resources like local building materials, honey, firewood</td>
<td>103</td>
<td>20</td>
<td>10</td>
<td>93</td>
<td>10%</td>
</tr>
<tr>
<td>Casual labor</td>
<td>31</td>
<td>6</td>
<td>3</td>
<td>28</td>
<td>10%</td>
</tr>
<tr>
<td>Salaried and skilled labor</td>
<td>41</td>
<td>8</td>
<td>2</td>
<td>38</td>
<td>6%</td>
</tr>
<tr>
<td>Small business</td>
<td>36</td>
<td>7</td>
<td>6</td>
<td>30</td>
<td>17%</td>
</tr>
<tr>
<td>Brewing</td>
<td>26</td>
<td>5</td>
<td>15</td>
<td>11</td>
<td>42%</td>
</tr>
<tr>
<td>Sale of fish</td>
<td>5</td>
<td>1</td>
<td>1</td>
<td>4</td>
<td>20%</td>
</tr>
<tr>
<td>Other</td>
<td>4</td>
<td>1</td>
<td>1</td>
<td>4</td>
<td>20%</td>
</tr>
<tr>
<td>Total</td>
<td>514</td>
<td>10</td>
<td>119</td>
<td>389</td>
<td>23%</td>
</tr>
</tbody>
</table>

15(3%) of the care takers sale livestock or their products like milk, majority 253(49%) sale of crops as their main source of income. 103 (20%) of them reported sale of natural resources like grass, poles, firewood and honey as their main source of household income. 41(8%) of the respondents had skilled labor with salary jobs. 31 (6%) worked as casual laborers, 36(7%) were small scale business women/men and 26(5%) reported local brewing as their source of household income (table12).

Table 23. Health seeking behavior among the caretakers in Aweil Center

<table>
<thead>
<tr>
<th>Health seeking behavior</th>
<th>No.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hospital</td>
<td>88</td>
<td>17</td>
</tr>
<tr>
<td>PHCC/U</td>
<td>108</td>
<td>20.9</td>
</tr>
<tr>
<td>CBD</td>
<td>156</td>
<td>30.2</td>
</tr>
<tr>
<td>Private Physician</td>
<td>23</td>
<td>4.4</td>
</tr>
<tr>
<td>Village health worker</td>
<td>6</td>
<td>1.1</td>
</tr>
<tr>
<td>Traditional healer</td>
<td>20</td>
<td>3.9</td>
</tr>
<tr>
<td>Drug shop</td>
<td>53</td>
<td>10.3</td>
</tr>
<tr>
<td>Other</td>
<td>63</td>
<td>12.2</td>
</tr>
<tr>
<td>Total</td>
<td>516</td>
<td>100</td>
</tr>
</tbody>
</table>
Discussion

The results achieved the 1st objective of assessing the prevalence of malnutrition among children 6-59 months in Aweil Center County. It showed that prevalence of global acute malnutrition - GAM rate at (<-2 z-score and/or edema) was [119] 23.2% (95% CI, 19.0- 27.9) which was above the WHO threshold of 15%. Similarly prevalence of moderately acute malnutrition (MAM) (<-2 z-score and >=-3 z-score, no edema) was 16.2 % (95% CI, 14.1-18.0) (table2). This was also above the threshold of 8% for MAM recommended by the global nutrition cluster (GNC). Prevalence of severe acute malnutrition (SAM) (% < -3SD) was 7% (95% CI, 4.9-9.9) in Aweil which was also higher than the WHO threshold of 2%.

This finding was consistent with the results of 2017 publication of another study done by WHO staff that showed that former northern Bahr el Ghazal state where Aweil Center is the capital had GAM rate above the emergence threshold and was staggering at catastrophic level of 33.3 % by 2015 (Adrianopoli M and Mpairwe A 2017). Neighboring Sudan state of North Darfur where Global Acute Malnutrition (GAM) prevalence is at 27.9 per cent has been in conflict for over decades like South Sudan leading to chronic underdevelopment which in turn resulted in to acute humanitarian needs (WHO 2017).

In relation to the second objective, 256(49%) of the respondents reported to have another younger sibling to the one enrolled in the study (table11). This is an indication of too close child spacing which gives little attention to the older child once the new baby is born hence he/she is likely to be weaned off breast milk too early with limited nutrition options; hence risk of becoming malnourished. This practice is however deeply rooted in the culture of South Sudanese leading to the high fertility rate of 7.1 children per woman (Hilde H. H. 2017).

The study revealed high burden of infectious diseases at 94.5% with p-value 0.00022 (95% C.I, 0.1667-0.291) and only 28(5.5%) of the children were reported not to have any illness in the past two weeks prior to the study as indicated in objective three of the study. 225 (43.7%) of the children were reported to have suffered from a febrile illness. These findings are consistent with that of WHO published in July 2018 which showed malaria (commonest cause of febrile illness) as the leading cause of morbidity accounting for 63% of the consultations.

The relationship between diarrhea and malnutrition is bidirectional: diarrhea leads to malnutrition and if chronic, can lead to stunting by 25-30% while malnutrition aggravates the diarrhea especially in children (Visser J, Blaauw R, and Labadarios D 2010).

Prevalence of stunting based on height/length-for-age z-scores was 8.7% (95% CI, 6.5- 11.6). Comparing the rate of stunting with the history of chronic malnutrition, the prevalence of stunting is much lower than expected most likely due to the associated genetic factors that the population of this pastoral community are genetically tall people.

163 (57.6%) of the children were fed once or twice in a day, 79 (15.4%) were fed thrice a day and the remaining 139 (27%) were fed four or more times a day with individual dietary diversity score of 16.3% with p-value of 0.001459 (C.I, 0.104461-0.212) which was significant (fig 10 and table 8). To provide food once or twice a day for young children with high metabolic rate can lead to malnutrition. This partly explains the chronic malnutrition in Aweil that has persisted in years. The community may not be aware that children need more frequent feeding than adults to prevent malnutrition.

Main sources of food for the 6-59 months old children were, the families own produce with estimate of 282(54.7%). This was followed by market or shop at 123 (23.9%) and work for food 67 (13%). Significant number of respondents 31 (6%) reported to have no food for the family hence resort to begging from relatives, friends and well-wishers both in town and villages; only 1(0.2%) reported to be relying on food aid from the humanitarian workers(table12). This partly reflects the inaccessibility of the remote areas by the aid workers for food aid. In South East Asia it is shown that the production of targeted nutrition-rich crops, homestead gardens, and diversification of the agricultural production system towards fruits and vegetables and aquaculture potentially improves nutrient intake and nutritional outcomes (Pandey L.V, Mahendra D. S, and Jayachandran U 2016).

Vitamin A supplementation for children 6-59 months was 273(53%) which is low coverage though
answers objective four of the study. Vitamin A deficiency (serum retinol 0.70 μmol/l or lower) is 20% in infants and children 6–59 months of age which need to be corrected through Vitamin A supplementation (WHO 2018) (fig9).

Measles vaccination with evidence from a vaccination card was only 284 (55%). This is poor measles coverage that cannot provide hard immunity to the children in the community. At least 95% coverage is needed to attain hard immunity.

273 (53%) of the children were reported to be sleeping under long lasting insecticide treated mosquito nets. With high prevalence of infectious diseases over 40% of which were fever, preventive measures like LLITN mass distribution and proper use need to be promoted (figure 9).

**Limitations of the study**

I. The study didn’t consider the residence status of the households or children whether some of them were IDPs from the neighboring states where there is conflict that could be more vulnerable to malnutrition than the host community.

II. This study was cross-sectional done in May; hence it does not reflect the seasonal variation of malnutrition during the pre-harvest, harvest and hanger gaps.

**Conclusion**

This study confirms the prevalence of malnutrition among children that remains chronically high above the WHO’s threshold of 15% in Aweil center and situation is worse by poor family planning, high burden of infectious diseases, dependency syndrome on inadequate food aid in the villages where the accessibility for basic services is hampered by flooding during the rainy season which calls for infrastructure development at the Payam level to increase accessibility to basic services.

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Evaluation of Indoor Residual Household Spraying (IRHS): Challenges-faced by Ndola Urban District

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Abstract

The study aimed at determining challenges associated with implementation of IRHS in Ndola urban district, Zambia.

Method: A cross section study conducted at Ndola city council over a period of six weeks, all 122 expert service providers were purposively selected, between October and November 2008. Semi-structured questionnaires and checklist used. Data analyzed by content analysis, Univariate and bivariate analysis, SPSS version 11.5. Chi-square determined association of variables; adherence, availability of logistic, acceptability of IRS and the outcome IRS challenges.

Results: Policy challenges: There was compliance n=7 with storage and disposal guidelines, while n=4 did not comply with use and environmental safeguards, as Spray operators spilled DDT on the ground.

Operational challenges: 81.3% of the respondents said experienced no problems while, 71.4% experienced itching, sneezing, and difficulty breathing, p value 0.005. 66% of Spray operators reported fewer problems implementing IRS while, 12% said had poor training and acquired less skill, p value 0.017. 75.2% revealed that Acceptability of IRS was low and 24.7% said IRS was not effective p value 0.036 validated by n=7 program officers. 28.1% reported repainting of walls, 44.7% reported variations in spraying due to late arrival of logistics 68.4%.

Institutional challenges; 43.9% reported inadequate shower and wash bay facilities and affected their operations much n=4. A checklist revealed serious inadequacies evident in poor transport, disposal bay, preparation bay, wash bay, and change rooms.

Conclusion: Poor institutional structure, insufficient logistics greatly impinged on daily operations of IRS and highly contributed to non-adherence to some policy guidelines.

Keywords: Indoor Residual Household spraying.

Introduction

Background information

The burden of malaria is unacceptably high globally. Today malaria remains a major cause of poverty and underdevelopment, and it is estimated that 3.2 billion people live at continuous risk of this disease. Each year, there are more than 350 million cases of malaria and more than a million deaths from the disease. More than two-thirds of malaria cases occur in Africa, as well as approximately 90% of deaths, which are mainly in children under five years of age (WHO 2006) and part of the answer rests with IRHS.

Its importance as a public health problem is reflected by the staggering toll malaria extracts in illness and suffering. In general, malaria epidemiology has the characteristics of a stable, endemic infectious disease. Consequently, at a macro-epidemiologic level, malaria is not as much an emerging disease as it is an established, intractable public health plague for fully one-third of the earth’s population (Olliaro, 1996: WHO, 1994).

WHO defines IRHS as the application of liquid insecticide with long-lasting residue properties which dries to form a crystalline deposit on the sprayed surface; the mosquitoes that come into contact with the surfaces absorb a lethal dose of the insecticide. Reducing the lifespan / longevity of the adult anopheles mosquito and reducing the density of adult anopheles mosquitoes (NMCC 2005). IRS can kill a mosquito any time it enters a house for a blood meal, which it typically does every 2-3 days, so that few will survive the approximately 12 days that are required for malaria parasites to complete part
of their life cycle in the vector mosquito, if all the houses they visit are properly sprayed. IRS is a method for community protection, and given its mode of action, the highest possible level of coverage is required to achieve the maximum impact on malaria transmission. Achieving this level of coverage and timing spraying correctly (in a short period of time before the onset of the transmission season) are crucial to realize the full potential of IRS (WHO 2006).

In the last 20 years Africa has witnessed a shift in strategic emphasis away from the unattainable eradication of malaria towards the reduction and effective management of disease outcome (Dobson 1999). Roll back malaria (RBM) was launched in 1998 and was built on the technical elements of the global strategy for malaria control (WHO 2000). Central to renewed efforts to Roll-Back Malaria (RBM) is the reduction of mortality through use of Indoor residual spraying (WHO 2000a). Scientific evidence of IRS efficacy in reducing or interrupting malaria transmission in different epidemiological settings has been available since the 1940s and 1950s (De Mellow 1936; Russell 1955). The first house spraying campaigns, just after World War II showed the capacity of this intervention to produce profound reduction in malaria transmission due to reduction in malaria vector longevity (Hanson K et al 2004). Numerous studies have shown that IRS has substantially reduced infant and child mortality. This evidence formed the rationale for introduction of IRS as a primary intervention for malaria control and eradication. Despite its initial widespread use and contribution to the success of malaria eradication and control efforts, in recent years, the use of IRS has declined. This is due in part to lack of government commitment and financing to sustain these efforts over the long term and to concerns about insecticide resistance and community acceptance (WHO 2006). However, another important factor has been general disapproval of DDT use, due to fears of its harmful effects on the environment and on human health, fears which are unjustified when DDT is used appropriately for IRS (Govere 2004).

While this seems to be an apparently simple strategy, the majority of the African continent has a number of distinguishing features which make this approach complex. Hence the need to explore the problems associated with IRS.

In Zambia, Malaria currently accounts for nearly four million clinically diagnosed cases per year, 36% of hospitalisations and outpatient department visits, and about 20% of maternal mortality (NMCC strategic plan 2006-2011). To address the disease burden of malaria, indoor residual household spraying (IRHS) is one of the primary malaria prevention strategies in Zambia and is carried out in 15 districts targeting urban and peri-urban areas in 2007. These include Kazungula, Livingstone and Mazabuka in southern province; Solwezi in north western province; Chongwe, Kabwe and Lusaka in Lusaka province; Chingola, Kalulushi, Chililabombwe, Kitwe, Luanshya, Mupuluira, and Ndola in copperbelt province; Kabwe in central province. It has expanded from two districts in 2000, to five districts in 2003, then to fifteen (15) districts in 2006/2007 and now to thirty-six districts in 2008/2009. The main objective of IRS work area for 2007 was to increase coverage among eligible populations from 75% to 85% by 2008 (approximately 700,000 households in 15 districts) and to be maintained to 100% by 2011. Planned activities among others included prioritizing adherence to environmental monitoring and safeguards, strengthening logistics and availability of transport, storage facilities to conform to environmental council of Zambia (ECZ), he rapid scale-up of IRS coverage from 75% to 85% in 2008 and to be maintained to 100% in 2011 can only prove successful if communities accept IRS. However, there are challenges that are inhibiting the country from meeting this target.

Statement of the problem

In Zambia malaria is still the number one cause of morbidity and mortality among the top 10 killer diseases, with an incidence of 412/1000 (MOH, HMIS 2006). It accounts for 45% of all out patient attendances and 50% of admission cases among children under-five years of age (MOH, HMIS 2004). It also contributes to about 20% of maternal mortality and 40% of infant and under-five child mortality (NMCC 2005). To reduce the disease burden integrated vector management has been introduced, of which IRHS is one of the interventions. Studies have shown that IRHS with DDT reduced annual malaria prevalence from 74% to less than 1% in 1979 over a 2year period in konkola copper mine in Zambia (Tren & Bate 2004). In Copperbelt province 180 villages were sprayed with insecticide in
1979 and parasite rate ranged from 2.4% to 6.2% mainly due to good control measures which were being practiced by the mining health authorities (NMCC 1999).

In 2000 -2002 the incidence of malaria in Ndola ranged between 354 in 2000 and 484/ 1000 in 2002. Ndola has shown some reduction in the malaria incidence since IRS was re-introduced in 2003 as shown below. The incidence was 482/ 1000 in 2003 and has further reduced to 434/ 1000 in 2006 and now 381/ 1000 in 2007 (Ndola DHMT HMIS 2008). This is still high as it is above the national incidence of 358/ 1000. WHO estimates IRHS with insecticide coverage at 42% which is extremely low despite its effectiveness (Park 2007). The IRS objective in 2008 was to ensure that at least 85% of the targeted households in the 36 districts are protected by the end of 2008 in Zambia. Statistics shows that the national coverage of IRS have improved from 87% in 2006 to 93% in 2007 (MOH 2008 national malaria action plan), of which Ndola had 89% IRS coverage in 2006 and 90% in 2007 (Ndola RBM report 2007). Despite the high coverage there are problems that IRS is not functioning properly as the incidence of malaria is still high, hence the need to identify implementation challenges associated with IRHS in Ndola urban district. If effectively done IRS is supposed to reduce malaria incidence by 75%, reason being that it reduces vector longevity, vector density and human contact in sprayed dwellings.

The other benefit of IRS is to contribute to the reduction of all causes of mortality by 20% in children under-five; High coverage of IRHS activities could reverse malaria trend and provide better economic growth as was evidenced in the past and currently in the konkola copper mines (Sipilanyambe and Nalishebo 2005). This study has been undertaken solely to find out the claims made by the NMCC and district councils that IRHS if successfully implemented will relatively reduce the prevalence of malaria in all the districts where this campaign is being carried out, with an estimated coverage of 90 - 100% by 2011. If this is not true, then what are the challenges of IRHS campaign, what could be impeding this program?

**Research questions**

1. What policy problems exist in the execution of IRHS?
2. What institutional problems are associated with implementation of IRHS?
3. What operational problems are associated with implementation of IRHS?
4. How can the problems be addressed?

**Justification**

IRHS has been chosen by the researcher among the other malaria intervention package (which include intermittent presumptive treatment (IPT), insecticide treated nets (ITN), prompt and effective case management) as it reduces vector longevity, vector density, and contact between the vector and human beings in sprayed dwellings thereby reducing morbidity and mortality associated with this disease burden. The investigator wishes to find out factors contributing to high incidence of malaria in Ndola despite high coverage of IRS. The investigation of implementation problems associated with IRHS from a public health evaluation perspective has great potential for improving service delivery and reducing morbidity and mortality rates for malaria. The study finding will be able to highlight program needs, provide strategic direction for future programs by ensuring that best approaches are explored and used to refine the implementation process. Also, the findings may be incorporated into policy process to ensure that interventions that are effective are implemented. At the same time this study will generate first hand data based on lived local experiences and this will strengthen planning and implementation of IRS. It is envisaged that from this project, policy makers like NMCC, service providers and the community at large will understand some of these problems, which must be explored, and solutions put in place to ensure that IRHS interventions are a success if malaria is to be reduced in Zambia.

**Definition of key concepts**

In academic writings, it is just prudent from the outset that key words, which form the building blocks of a subject matter, are identified and defined. Essentially it makes the reader appreciate
concepts when they reappear later in the text. Therefore, below are definitions of key concepts that have been used in this study.

Implementation is simply putting IRS strategies into action.
Challenges are simply difficulties or problems.
Indoor takes place inside the building.
Residual is small amount of insecticide that remains on the wall after spraying.
Household is a dwelling place.
Spraying consists of many drops of liquid insecticide applied on the wall.
Indoor residual household spraying is the procedure of applying liquid drops of insecticide which remain on the walls of the inside of the dwelling place for some time.

The magnitude of the problem

Malaria continues to be a major cause of preventable death. The annual burden includes 350 to 500 million clinical cases, more than 1 million deaths, and reduced economic growth (WHO & UNICEF 2005). Malaria is one of the biggest healthcare problems on the African continent. Sub-Saharan Africa accounted for 89% of the world total malaria deaths in 2005. An estimated 25 to 35% of all outpatient consultations and 20 to 45% of hospitalizations in this region are due to malaria (WHO & UNICEF 2005 in Marianela et al 2008).

Malaria incidence rates in Zambia tripled over the last three decades, from 121/1000 in 1976 to 428/1000 in 2003, 412/ 1000 in 2006 and a remarkable reduction was achieved in 2007 and now is at 358/ 1000 (MOH HMIS 2007). However, the trend in the incidence of malaria in Ndola has shown some reduction since IRS was re-introduced in 2003 as shown below. The incidence was 482/ 1000 in 2003 and has further reduced to 434/ 1000 in 2006 and now 381/ 1000 in 2007. This is still high as it is above the national target of 358/ 1000. Having looked at the magnitude of malaria, it is imperative that we should look at the history of IRS as an intervention in malaria control.

History of IRHS

In Zambia studies have shown that IRHS with DDT reduced annual malaria prevalence from 74% to less than 1% in 1979 over a 2year period in konkola copper mine in Zambia (Tren & Bate 2004). The study revealed that in Copperbelt province 180 villages were sprayed with insecticide in 1979 and parasite rate ranged from 2.4% to 6.2% mainly due to good control measures which were being practiced by the mining health authorities (NMCC 1999). The government of Zambia re-introduced IRS in 2003 in five pilot districts of which Ndola was one of them. Then it was increased to 15 districts in 2006/2007 spray season and now to 36 districts in the 2008/ 2009 spray season. The incidence of malaria by then was 482/1000in 2003 and five year after implementation of IRS the incidence is still high 385/ 1000 despite a high coverage of IRS. The coverage of IRS ranged from 83% in 2003, 86% in 2004, 90% in 2005, 89% in 2006 and 90% in 2007 (Simpungwe 2007). Five years have passed and IRS has been going on in Ndola. This study attempts to find out how IRS has been going on and what problems do the Ndola urban council experience in the implementation of this intervention in malaria control.

Challenges in IRS programs

Law challenges

Previously the malaria vector control programme in Zambia was largely governed by the mosquito extermination Act CAP. 557, 1944 which stipulated that the urban centers be covered 100% with two rounds of residual insecticide application every year. This led to success in eradication of malaria and by then it was a notifiable disease. This act needs review though it is supported by the public health Act cap 295. However, the current law focuses on Environmental safeguards. The main Act is the Environmental Protection and Pollution Control Act No. 12 of 1990 (CAP 204 of the Laws of Zambia). PART VII & Pesticide Toxic Substance (PTS) statutory instrument (SI) No. 20 of 1994 Covers: Importation, exportation, manufacture, storage, distribution, sale, use, packing, transportation, disposal and advertisement of pesticides and toxic substances.
Policy 1 challenges

In principle, DDT was banned due to its adverse effects on the environment, like the high persistence in different environmental compartments and bioaccumulation and biomagnifications in living organisms, including human beings. Also, there are reports that this practice is currently threatened by the emergence of DDT resistance. In line with the Stockholm convention, Environmental council of Zambia (ECZ) allowed the MOH to import and use DDT for malaria control. The Stockholm conversion is the International Instrument that regulates pesticides organic pollutant (POPs) e.g. DDT, Chlordane, PCBs. Zambia signed the instrument in 2001 and was ratified in 2006.

No studies have been done to collect baseline information on levels of DDT in different matrices and monitor adverse effects it might have on the environment and human health (ECZ 2006). However, there are factors that influence IRS intervention in malaria control. These factors have been classified as; Law and policy challenges, institutional and operational challenges.

Institutional 2 challenges

Institutional factors influencing indoor residual household spraying range from poor quality of care and service delivery, resistance of insecticide, sustainability of IRHS programme, poor timing and organization. These factors are valid as shown below:

Operational 3 challenges

Operational challenges include; community’s acceptance of IRS and inadequate logistics for IRS programme, replastering of houses. Human, technical and financial resources are often lacking to maintain a sustainable coverage (Coomsans and Canavale 2000).

Conclusion

IRS is a method for community protection, and given its mode of action, the highest possible level of coverage is required to achieve the maximum impact on malaria transmission. Achieving this level of coverage and timing IRS correctly are crucial to realize the full potential of IRS.

Objectives

General objectives

To determine challenges associated with IRHS in Ndola urban district, with the view to improve IRHS intervention in malaria control.

Specific objectives

1. To determine if acceptability of IRS by the community affect IRS implementation.
2. To assess whether IRS guidelines are being adhered to by service providers.
3. To establish the extent to which availability of IRS logistics affect operations.

Research questions

1. What policy problems exist in the execution of IRHS?
2. What operational problems are associated with implementation of IRHS?
3. What institutional problems are associated with implementation of IRHS?
4. How can the problems be addressed?

Conceptual definition of variables

5. Knowledge is the information required
6. Compliance is simply obedience to set standards or guidelines.
7. Service delivery is carrying out a task

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1 What policy challenges exist in the execution of IRHS?
2 What institutional challenges are associated with implementation of IRHS?
3 What operational challenges are associated with implementation of IRHS?
8. Quality care excellent service
9. Availability of logistics is ease of use
10. Acceptability of IRS is to accommodate
11. Indoor residual spraying challenges are difficulties experienced during spraying

Chapter three: research methodology

Introduction

This chapter describes the research methodology comprising the study design, study setting, study population, sample selection, data collection instruments, data collection techniques, ethical consideration, pre-testing, dissemination and utilization of results and limitation of the study. This study determined challenges associated with implementation of IRS in Ndola Urban District.

Variables

1. Dependent variable
   - Indoor residual household spraying challenges

2. Independent variables
   - Availability of logistics, Acceptability of IRS and Compliance with IRS guidelines.

Research design

This is a descriptive cross section study, which involves description and analysis of researchable objects with no intervention required. It is cross-sectional because the phenomena under study were captured during one data collection period. It also describes what exists about the phenomena and gives a clear picture of the situation. The study involved collection and presentation of data in a systematic manner, about evaluation of IRHS; challenges faced by service providers in Ndola urban district

Research setting

The research was conducted in Ndola urban district in Copperbelt province. Ndola city is 320 kilometers north of the capital city Lusaka, Zambia. The study was conducted at Ndola District council and public health offices along Broadway, where the service providers report before and after going into the field. Ndola district has a total population of 462,459 (Ndola DHMT HMIS 2008). The investigator chose Ndola urban district as a study site with the view of evaluating IRHS and challenges faced by service providers in Ndola urban district.

Study population

The sample consisted of all Program officers and spray operators (service providers) trained in IRS and participated in 2008 IRS spraying campaign, period October to November. The population has been selected because they include service providers of IRHS who are able to make decisions on this intervention and are more knowledgeable. Also, their attitude and practice towards IRHS may lead to effectiveness or ineffectiveness of this intervention in malaria control.

Sample selection and sample size

Purposeful Expert Sampling (For service providers)

All program officers were selected based on purposive expert sampling and all spray operators were purposively selected into the study. The spray operators were those specifically trained in IRS by Ndola district council and Ndola DHMT from the community. Expert purposive sampling was chosen despite its disadvantage of having unrepresentative sample. This is due to limited sample as there were only 129 trained service providers in IRS in Ndola urban district currently available, of these 120 were spray operators and 9 were program managers (1 project manager, 1 co-ordinator, and 7 supervisors). All service providers were recruited for the study. However, out of 9 program officers only 8 (98%) were interviewed as one declined to be interviewed or answer the questionnaire. Also, out of 120 spray
operators, only 114 (95%) were interviewed and 2 refused to be interviewed, while 4 of them stopped spraying before the exercise finished. A total of 122 respondents were accessed and there was 95% response rate.

**Inclusion criteria**
- All programme officers/ spray operators trained in IRS, residing in Ndola urban district and participated in 2008 spraying campaign.
- All those who were willing to participate.

**Exclusion criteria**
- All programme officers (supervisors) and spray operators who were trained in IRS but not residing in Ndola urban district and did not participate in 2008 spraying campaign.
- All those who were not willing to participate.

**Data collection tools**
For this project, the researcher used a semi-structured questionnaire with spray operators and program officers. Expert checklist was used on program officers to validate responses from the semi-structured interview schedule. The researcher used a semi-structured questionnaire (appendix IV and V) and an expert checklist (appendix VI).

**Validity**
This study employed two types of instruments, semi-structured interview schedule and a checklist. To ensure validity of data collection tool, pre-testing of the instrument was done in Luanshya to ensure clarity, precision and consistency of questions and where necessary adjustments were made on content and sequencing of questions. Expert checklist was used to validate responses from program officers. Triangulation method was used.

**Reliability**
The tool was modified from the national malaria indicator survey questionnaire. Reliability of the instrument was achieved by conducting a pre-test study in order to test the degree of accuracy with which the tools measured challenges in the implementation of IRS. After the evaluations of the pilot test to assess the extent to which the original questionnaire would grant us reliability, the researcher had an opportunity to perfect the questionnaire and checklist from the observed reactions of the respondents to the research instrument and their willingness to answer the questions. Deficiencies in the tool were overcome by making necessary changes where there were gaps. Also use of open-ended questions helped to bring out in-depth information so that all issues relating to challenges in IRS were discussed. In this study a Cronbach alpha coefficient of 0.70 was selected as a measure of reliability). If the item scores agree very closely with the universal score, then they should also be very closely related to one another as well. This way of assessing reliability is referred to as internal consistency, and is the approach presented in this study. Some questions that scored below 0.75 were dropped. In this way, reliability may be achieved.

**Data collection technique**
In this study two techniques (triangulation) were used to collect data. Face to face interview using semi-structured questionnaire, and observation using a checklist were conducted by the investigator. This enhanced collection of quality data and reduced information biases.

**Checklist**
A checklist containing policy, institutional and operational variables was used to obtain data from program officers. This tool was developed based on review of IRS guidelines and consultation from IRS experts. See appendix VII.
Semi-structured interview schedule

The tool was modified from the National malaria indicator survey questionnaire (MOH/CSO 2008). It was modified as the questionnaire items were different and only two questions were on IRS. The questionnaire items were identified and adapted from review of the literature, statements and findings from previous studies, such as Hanson et al 2004; Musawenkosi 2004; Tren & Bates 2004 to mention a few. The researcher will interview the experts in IRS (Program officers) and spray operators. This was taken care of through use of a checklist. Questionnaires consisted of both open and closed ended questions.

Data was collected from 4th week of October to 1st week of December 2008.

Pre-test

Pre-testing was done in Luanshya district at Thompson Hospital which was one of the IRS intervention areas, and had similar characteristics with those of the main study sites. The site was conveniently selected. Service providers were selected using expert purposive sampling and 12 participants were selected accounting 10% of the sample for the main study (1 program officer and 11 spray operators). Pre-test helped the investigator to determine whether the variables were realistic, measurable and attainable. It also helps to make revisions in order to strengthen methodology, detect errors in the tool, and assess duration of interview schedule and appropriateness and clarity of questions.

Ethical consideration

Ethical clearance was obtained from University of Zambia Biomedical Research Ethics Committee. Since this study involves human subjects, verbal and written consent was obtained from the participants and from Luanshya district Health management team (pre-test), Ndola district council, Ndola district health management team and Copperbelt provincial health office. The purpose and nature of the study was explained to study participants. Those who refused to participate were assured that no privilege was going to be taken away from them. Those who agree to participate were requested to sign a consent form. There were no risks and immediate benefits to those who participated in the study. Respondents were in a natural setting and hence were not exposed to emotional or physical harm. Confidentiality and anonymity were maintained to all respondents as their names were not appearing on the questionnaire.

Data process and analysis

Textual data that was derived from open ended questions was analyzed using qualitative content analysis. A basic issue when performing qualitative content analysis of textual data is to decide whether the analysis should focus on manifest (visible) or latent (hidden) content only or both (Downe, 1992). This study covered both forms of content analysis since the data was in textual form, the data was categorized into themes and analyzed on the computer using the Non-numerical Unstructured Data Indexing (NUD*IST) computer package.

Quantitative data

Numeric non-textual data that was derived from the Expert checklists and semi-structured questionnaires, each day, all interview schedules were sorted out and edited for internal consistency, completeness, legibility and accuracy. Variables were defined; pre-coded and analyzed on the computer using the Social Science Statistical Package version 11.5. This study was analyzed by Univariate analysis to make frequencies then bivariate analysis to make cross tabulations.

Chi-square was used to determine the association of the qualitative variables and the outcome (IRS challenges). The qualitative variables include availability of IRS logistics, and acceptability of IRS. Confidence interval was set at 95% which was provided together with estimates. Cut off point for significance was set at 5%, statistical significance was achieved if P value was 0.05 or less, thereby rejecting the null hypothesis.
Presentation of results

Introduction

A total of 122 respondents were interviewed and there was a 95% response rate. There were 9 program officers and only 8 were interviewed as one (1) declined to be interviewed. Spray operators were 120, however, only 114 were interviewed, two refused and four could not be traced as they stopped spraying before the exercise could finish. Data for 8 program officers has been presented in narrative form and frequencies have been used instead of percentages as the sample was very small.

Demographic characteristics

In this study, most of the program officers were relatively new to the IRS program as more than half served for less than three years (n=5). Environmental Health Technicians (n=7) and of these three quarters were males (n=6). Table 4.1.1 Majority (66) of the spray operators were males and most of them 85% (56) had 0-2 years of experience, compared to 42% (41) of the females (table 4.1.1). Sex was not associated with experience in IRS (p value = 1.000). Most of these spray operators were between 18- 30 years 84.2% (96) (table 4.1.2).

Policy guideline

Majority of them were the table shows that program officers complied with most guidelines, except for use guidelines and environmental safeguards where (n=4) said they complied, whereas 4 claimed they did not comply (table 4.2.1). The table shows that program officers complied with most guidelines, except for use guidelines and environmental safeguards where (n=4) said they complied, whereas 4 claimed they did not comply (table 4.2.1).

When interviewed concerning the use of DDT and the problems program officers faced, it was noted that even though the policy guidelines were followed, there were serious problems with environmental safeguards and use guidelines. The program officers cited the following: Spillage of DDT on the ground, mechanisms of disposing off of DDT not yet established, DDT was not disposed off correctly as it was being spilled by the spray operators, spray operators used to refuse to carry DDT and could spill it on the ground. The checklist showed that the concrete floor had cracks, ventilation was inadequate, and the store room had one door instead of two, while other requirements were available (Table 4.2.2). Spray operators used chemicals invariably and most of them used icon, DDT, Fedona, k-othrine 43% figure (4.2.1).

Operational problems that exist in the execution of IRS

When asked about how insecticides were carried from one household to another, more than half of the program officers revealed that spray men either carried the insecticides in plastic bags (n=6) or in their pockets (n=2). Three quarter of the program officers said the target was above 85% (n=6), while quarter did not know (n=2). Program officers ranked their spray operator’s level of knowledge to be above average (n=5). Majority of the program officers revealed that household members were less likely to be found in their homes in the rain season (n=6).

More than half of the program officers revealed that none of the insecticide is of much concern with resistance (n=5), while less than half said Icon (n=3). They also said that rate of acceptability in the community was average (n=4). Almost all Program officers revealed that residents in the townships refuse IRS (n=7). Program officers revealed that the reasons for the refusal of IRS by the community were that IRS made walls dirty, itching, not effective, excited bed bugs, affected recent plastering, warranted re painting of houses, spray operators are thieves and others just did not want. Three quarters of the program officers said they sometimes received IRS funds on time (n=5) and more than half said the timely reception of funds affected their operations very much (n=5). More than half of the program officers revealed that the procurement procedure was very short (n=6), and half of them said it affected their operations very little (n=4).

The checklist revealed that IRS guidelines were not available while spray pumps were inadequate (table 4.3.1). Table (4.3.2) shows that the spray men had almost all the protective clothes available.
Table 4.3.3 shows that majority 81.3% (87) of the respondents who said masks/ respirators were available experienced no problem while spraying compared to those who said they were not available 71% (5) experienced itching or rash, sneezing and difficulties in breathing. An association was done and (fishers exact test P value = 0.005 significant at p< 0.05 α) **.

Majority 64% (73) of the spray operators said that household members were less likely to be found in their homes in the rain season (graph 4.3.1). Table 4.3.4 shows that Majority 66% (35) of spray operators who rated their level of training as good acquired more skills and had little problems in implementing IRS, compared to 12 who said their level of training was average to poor, with less skill and had very much to average operational problems. (Chi-square = 8.10, df =2, p value = 0.017 significant at p< 0.05) **.

Table 4.3.9 shows that acceptability of IRS in the community ranged from average to low mainly because of bad smell, itching effect, dirtying walls and recent spray/ replastering of houses 75.2% (70), while 24.7% (23) said lack of information, not effective and don’t kill other insects. However, these proportions were significantly different. (Uncorrected chi-square 4.36 p= value 0.036 significant at p< 0.05 α) **. The highly recommended insecticide by the community was fedona 36.8% (42). Majority 57% (65) of Spray operators revealed that they experienced itching with regard to use of IRS chemicals, while 20.2% (23) said they had no problems (table 4.3.7). More than half 51.8% (59) of the spray operators revealed that reasons for refusal were due to bad smell, dirtens walls, and itching effects (table 4.3.8). Table 4.3.9 shows that acceptability of IRS in the community ranged from average to low mainly because of bad smell, itching effect, dirtying walls and recent spray/ replastering of houses 75.2% (70), while 24.7% (23) said lack of information, not effective and don’t kill other insects. However, these proportions were significantly different. (Uncorrected chi-square 4.36 p= value 0.036 significant at p< 0.05 α) **.

28.1% (32) of the Spray operators revealed that Repainting of walls was very much an operational problem (table 4.3.11). Almost half 44.7% (51) of the respondents disagreed that spraying was done at the same time every year (table 4.3.12). Majority 68.4% (78) of the respondents revealed that reasons for variation in spraying time were due to late arrival of funds and logistics (table 4.3.13).

Table 4.3.14 shows that more than half 76.3% (58) of the spray operators strongly disagreed/ disagreed that spraying was done at the same time every year and said reasons for variation were due to late arrival of funds/ logistics / poor timing/ planning, while 23.6% (18) said problems at national level. (Chi-square = 0.37, p value = 0.54).

**Institutional Problems Associated with Implementation of IRHS**

The program officers revealed that staffing levels were adequate (n=7) and the numbers fulfilled the establishment needs of the institution much (n=3). The program officers agreed that they provided good services (n=5). Almost all program officers said trained staffs were always available (n=7) during spray time and more than half said trained staff availability affected operations very little (n=5). Program officers said that Personnel attrition rates were very low n=5 and as such, operations were very little affected (n=4). When asked about adequacy of storage facilities, more than half of the respondents disagreed (n=5) that they had adequate storage facilities and half of them said it affected their operations much (n=4).

The program officers claimed that they supervised spray operators daily (n=7) and none had a spray schedule (n=8). The program officers claimed that they adequately sensitized the community (n=4), though none of them had a sensitization plan n=8. More than half of the program officers said that infrastructure resources were sometimes available (n=5).

Facility checklist revealed that, showers were present (+) but inadequate, whereas disposal bay, wash bay, change room and preparation bay were absent (-). All these were being constructed except for a change room (table 4.4.1). About half 54.4% (62) of the Spray operators revealed that they were adequate to undertake the sought activities (table 4.4.2).

Table 4.4.4 shows that 43.9% (50) of the spray operators disagreed that wash bay and shower clog existed while, 3.5% (4) strongly agreed that they existed.

Table 4.5.1 shows varied solutions on the area of improvement given by program officers and spray operators. Most respondents indicated that areas needing improvement were giving IEC on importance
of IRS and community sensitization 44.7% (51). The least suggested solution was the need for management and spray operators to work together and that supervisors needed to be involved in field work (table 4.5.1).

**Discussion of findings and conclusion**

**Introduction**

The main objective of the study was to determine implementation challenges associated with implementation of IRS in Ndola urban district.

This chapter discusses the findings in line with the research questions. The framework that is used to present the research findings is driven by de4 Vaus, (2001) advice to researchers doing cross sectional research. The sound advice is that, critical issues that are similar are easily organised under a research question and that in this way, critical issues are unlikely to be missed. In this study therefore the themes that represent the key research questions were used to show the findings and these are:

a. Theme I Policy Problems that Exist in the Execution of IRHS
b. Theme II Operational Problems that Are Associated with Implementation of IRHS
c. Theme III Institutional Problems that Are Associated with Implementation of IRHS
d. Theme IV Solutions to the Problems (Social Actors Accounts)

The chapter is composed of the discussion of the findings using extant data of previous research. This is done in order to illuminate the research problem, to elaborate and support facts with existing data. In this way, the study would grant convergent validation to the data. Limitations and strengths of the study are presented since these play an important role in making suggestions for future research. Then we wind up with the conclusion and recommendations. This leads us to the demographic characteristics of our respondents.

**Demographic characteristics of service providers and spray operators**

In this study, majority of program officers were Environmental Health Technicians n=7 and Most of them were relatively too new to the IRS program as more than half had served for less than three years n=5, noting that it has been in operation for six year. This could influence their supervisory skills to guide the spray operator. Just like program officers, most 85% (96) of the spray operators were males and were relatively new in the IRS program as three quarters of them had served less than three years, compared to 42% (41) of the females (table 4.1.1) and this could affect their skills negatively. The reason could be that exposure to insecticide limits the number of years one has to work as a spray operator which is 2-3 years and not beyond. However, sex was not associated with experience in IRS (p value 1.000). Majority 84.2% of the spray operators were in the age group 18-30 years (table 4.1.2) and most of them were males. The explanation could be that, this is the productive age group which is more energetic to move from one place to another in the field and could be unemployed. CSO (2003) documented that youth unemployment is still high with 21% of youths aged 20-24 years being unemployed. The reason for having more males could be that they are readily available and had to provide for their families, than females of the same age group who could be married.

**Policy challenges**

Our findings revealed that insecticides were not used and disposed of according to the dictates of the policy. The IRS program seems to fare well when it comes to complying with storage, disposal and transport guidelines (n=7). However, the IRS program managers have a serious problem in offering guidance in ensuring that the policy guidelines are adhered to. Program officers comply with most guidelines, except for use guidelines and environmental safeguards, n=4 said they complied, whereas n=4 claimed they did not comply (table 4.2.1). When asked why they were not able to comply with DDT guidelines they revealed that Spray operators used to spill DDT on the ground n=4. Basically, all the spray operators are trained during cascade training programme. This is carried out before the start of IRS campaign. The performance of the spray operators depends on the skills of the master trainers and supervision during training and field exercise during the campaign. There was spillage during

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chemical mix and washing of pumps after spray exercise because there was overcrowding at the wash bay because everyone was rushing and tired. In Ndola this could be attributed to inadequate infrastructure like absence of a wash bay where washing of spray pumps can be done, then the drums which were being used to clean and dispose of the left-over chemicals in the pumps. Chapin and Wasserstrom (1981) documented that spraying programs (especially using DDT) were curtailed due to concerns over safety and environmental effects, as well as problems in administrative, managerial and financial implementation.

A cursory look at their operational office using a checklist showed that most critical elements were adhered to whereas others were not adhered. The Concrete floor had cracks, ventilation was inadequate, and the store room had one door instead of two. A sign post, thermometer, insecticides and a stock record card were available (Table 4.2.2). We believe that construction of a wash bay and shower clog and refurbishment of store room will greatly reduce these policy challenges.

The findings revealed that Spray operators used chemicals invariably according to the type of structure and 43% used icon, Fedona, k-othrine and DDT, figure (4.2.1). Icon, Fedona and K-othrine were used for formal structures and DDT was used for informal mud houses. These chemicals were among the chemicals recommended for IRS by the WHO standard protocol (WHO 1998). When program officers were asked about resistance to chemicals used, more than half of the program officers revealed that none of the insecticide is of much concern with resistance n=5, while n=3 said Icon. This finding is in line with Chanda et al (2008) who documented that baseline insecticide susceptibility test conducted on the three malaria species to these chemicals in Zambia showed that there was 100% susceptibility. Therefore, insecticide resistance was not a factor in this study.

**Operational challenges**

Spray operators noted that IRS was punctuated with a lot of operational problems. The findings of this study revealed that availability of protective materials does influence operational problems as shown in table 4.3.3 majority 81.3% (87) of the respondents who said masks/ respirators were available experienced no problems while spraying compared to those who said they were not available 71% (5) experienced itching or rash, sneezing and difficulties in breathing. An association was done and the result was statistically significant (P value = 0.005). Therefore, we reject the null hypothesis which states that there was no association between availability of masks/ respirator and experienced problem with chemicals. Therefore, availability of protective clothing is significantly associated with operational problems. This implies that those who had protective clothing and used them correctly were less likely to experience operational problem associated with exposure to chemicals unlike those who did not have masks/ respirators. Some spray operators had their gum boats stolen and were using their own canvases, while others lost their respirators and were using pieces of clothes to cover their nose while spraying. Also, more emphasis should be placed on the importance of using protective clothing during spraying for the safety of the spray operators.

The findings of this study have revealed that level of training does influence operational problems of spray operators and the relationship was found to be statistically significant (p value = 0.017). 66% of Spray operators who rated their level of training as good acquired more skill and had less problems in implementing IRS than 12 who had average to poor training with less skills and had very much to average operational problems in implementing IRS (table 4.3.4). Therefore, we reject the null hypothesis which states that there is no association between level of training and operational problems. The findings are in line with Musawenkowski (2004) who reported that lack of proper supervision and/or skilled personnel is another mitigating factor because effective application of residual insecticides requires properly trained individuals. Therefore, there is need for NMCC to improve on supervision and training must be strengthened. The findings revealed that, fedona (Alphacyperthrin) was highly recommended by the community 36.8% (figure 4.3.2). These findings are in line with Rowland et al (2000) on use of Alphacyperthrin in IRS in Pakistan who revealed that, many people expressed appreciation for the spray campaign, since no persistent odour or residue was evident after spraying, and because both nuisance and vector mosquitoes were controlled. Also Curtis (1986) documented that Pyrethroids such as Deltamethrin and lambda-cyhalothrin are usually much more acceptable to householders because they leave no visible deposit on walls. We can infer that when IRS is effectively
done using the acceptable chemical by the community, IRS refusals are more likely to reduce thereby increase the coverage and reduce the disease burden.

The study discovered that there was a significant relationship between sex and insecticide highly acceptable by the community (p value 0.036). 44.6% (29) of the spray operators who said the most recommended chemical by the community was Fedona were males, compared to 26.5% (13) of the females (table 4.3.5). This result was statistically significant thereby rejecting the null hypothesis which states that there is no association between sex and insecticide highly recommended by the community.

While the spray operators were in the field, they experienced adverse effects related to contact with IRS chemicals. The study findings showed that Majority 57% of the Spray operators revealed that they experienced itching with regard to use of IRS, while 20.2% said they had no problems (table 4.3.7). This could be attributed to Exposure of the worker to the pesticides during preparation or IRS, however this can be greatly reduced if the worker follows best practices, Biscoe et al (2007) in RTI international (2007). Unlike the spray operators, complaint of itching effect of Icon from the community was reported as some of the challenges experience during the spray campaign (Ndola RBM report 2007). Therefore, lack of skill and knowledge may influence practice towards safety measures in handling the insecticides there by posing operational challenges

The study revealed that almost all (n=7) program officers said that residents in the townships refuse IRS. Also, more than half 51.8% of the spray operators revealed that reasons for refusal were varied and the most noted was due to bad smell, dirtens walls, and itching effects while 18.4% said lack of information (4.3.8). Lack of information on IRS implied that IEC messages were inadequate and poor and should be strengthened so that refusals are reduced and coverage increased to 100% in 2011. This finding was complimented by program officers who said that the reasons for the refusal of IRS by the community were that; IRS made walls dirty, itching, not effective, excited bed bugs, affected recent plastering, warranted re painting of houses, spray operators are thieves and others just did not want. This was in line with Simpungwe (2007) who documented that they faced resistance in some of the compounds during the 2007 spraying program. Similar findings were reported in other studies by Gunasekaran et al (2005) Mnzava et al (1998) and Musawenkosi (2004) that Wall decolourisation, bad smell, increase in bed bug nuisance, were some of the reasons attributed for the refusal. Curtis (1986) and Thurow (2001) also highlighted that Many residents resist spraying of DDT reasons being; the smell lingers, and DDT leaves stain on the walls and may need urgent attention.

In this study, majority 73.7% of the respondents said that acceptability of IRS in the community was average (graph 4.3.2). This was also revealed by program officers who said that rate of acceptability of IRS in the community was average n=4. The explanation could be attributed to refusals. Therefore, involvement of householders in collaboration with community representatives in IRS intervention is important Coomsans and Carnevale2 (2000). Resistance from residents prevents a high percentage of the homes being effectively sprayed; the effectiveness of the intervention is greatly reduced Curtis (1986) and Gladwell (2001). Also, Rowland et al (2000) revealed that use of Alphacyperthrin in IRS further revealed that, many people expressed appreciation for the spray campaign, since no persistent odour or residue was evident after spraying, and because both nuisance and vector mosquitoes were controlled.

The study also revealed that there was a significant association between acceptability of IRS and reasons for refusal of IRS by the community (P value 0.036). The findings showed that out of 93 spray operators who rated acceptability of IRS to be between average and low, more than half 75.2% (70) of them said reasons for refusal were mainly; bad smell, dirtying walls, itching effect and recent spray/ replastering of homes, while 24.7% (23) said it was due to lack of information, not effective and don’t kill other insects (table 4.3.9). This was in line with Simpungwe (2007) who reported that complaint of rat flea in informal structures was among the challenges experienced in 2007 spray season. This is supported by varied reasons given by spray operators. In view of this NMCC in conjunction with MOH need to consider using of chemicals which are highly acceptable in the community so that acceptability of IRS in the community can be improved thereby increasing IRS coverage to 100% by 2011 and reduce malaria incidence.
The findings of this study have revealed that there was no association between most recommended chemicals and acceptability of IRS (P value = 0.565). More than half 52.7% (48) of the respondents reported that the most recommended chemicals were fedona and k-othrine and said acceptability of IRS in the community was average compared to 42.9% (9) who said it was high (table 4.3.10). However, these proportions were not statistically different. Therefore, we fail to reject the null hypothesis which states that there was no association between recommended chemicals and acceptability of IRS. This implies that acceptability of IRS could not be accounted to highly recommended chemicals but there could be other factors related to operational problems. This is in line with Musawenkosi (2004) who reported that, the first spray is generally well accepted by the household, but if the comments of the population are not considered, doors will be closed the following spray rounds and spray coverage will be insufficient.

The study found that repainting / replastering of homes was a significant problem which could be occasioned by bad smell and wall staining and was not a new finding. 28.1% of the Spray operators revealed that Repainting of walls was very much an operational problem (figure 4.3.3). This finding supports that of Mnzava el al (1998) and Gladwell (2001) who reported that after spraying the houses, the community has a tendency of replastering the walls because of the presence of DDT stains. Other findings were those for Mabaso, et al (2004), Tren and Bates (2004) who documented that stains causes some villagers to avoid spraying of their homes or to resurface the wall, which eliminates the residual insecticidal effect of the spraying. A study by Gunasekaran (2005) further revealed that in replastered walls anophyles fluvatilis mortality were once or twice reduced to 27% and 13% respectively. At week 16, the mortality was only 19% on walls which had not been re-plaster ed and, during this period, re-plastering twice brought down the mortality to 5%. This practice compromises the effectiveness of IRS program and calls for evaluation of IRS messages targeted towards the community members. Therefore, the communities under this programme need to be educated not to plaster homes until after 6months of spraying exercise, because if they did so, mosquitoes won’t die and malaria will continue killing people especially pregnant women and children under -5 who are most vulnerable.

The study revealed that almost half 44.7% of the respondents disagreed that spraying was done at the same time every year table (4.3.12), and this was confirmed by both the program officers and spray operators. However, this is contrary to what the IRS guidelines stipulate. The IRS guidelines states that, spraying should be at regular intervals so as to ensure that an effective residue is in place during the whole transmission season. Smith et al (1995) and Deressa (2007) reported that effectiveness may be diminished if spray rounds are inappropriately timed in relation to the transmission season. There are various reasons why the situation is like this. Majority 68.4% of the spray operators said that reasons for variation in spray times were due to late arrival of funds and logistics (table 4.3.13). Program officers also confirmed that they sometimes received IRS funds on time n=5 and more than half said the timely reception of funds affected their operations very much n=5 and was significant. Similar findings were documented by MOH (2006) that there was delay in release of funds. WHO (2006), reported that full potential of IRS can be achieved through high coverage and good timing? Therefore, there is need for NMCC to ensure that IRS logistics and funds are released on time so that IRS campaigns starts on time according to the action plan before the malaria transmission season.

The findings further revealed that there is no association between spraying time and reasons for variation in spraying (p value = 0.54). The study showed that more than half 76.3% (58) of the spray operators strongly disagreed/ disagreed that spraying was done at the same time every year and said reasons for variation were due to late arrival of funds/ logistics / poor timing/ planning though were influenced by many factors, while 23.6% (18) said problems at national level. This shows that there could be other operational factors that influences spray time.

In general, the operational problems that we have seen are due to lack of clear link between the program activities and the organization’s key strategic priorities

**Institutional problems associated with implementation of IRIIS**

The findings revealed that staffing levels were adequate and this was confirmed by all respondents. 54.4% of the Spray operators revealed that they were adequate to undertake the sought activities (table
4.4.2) and the numbers fulfilled the establish needs of the institution for effective implementation of IRS activities. Also, program officers said trained staff were always available (n=7) and affected operations very little (n=5), while attrition of staff were low (n=5) and therefore staffing levels and attrition of trained staff were not a factor in this study.

Ndola has severe lack in infrastructural resources to support IRS. According to the findings of this study, almost half 43.9% of the respondents disagreed that shower and wash bay facilities were adequate, while 3.5% strongly agreed that they were adequate (table 4.4.4). Verification using a checklist confirmed that wash bay was not available and showers were present but inadequate causing institutional problems. The study also revealed that all (100%) of the spray operators revealed that transport was available through hired, however these transports used did not meet the transport regulations and were very expensive. The vehicles used, carried both chemicals and spray operators and did not have warning sign for chemicals. Also, majority 84.2% confirmed that they had no problems regarding transport (table 4.4.3). However, a few 2.6% reported knocking off late and 5.3% said it affected their work. A checklist showed that transport was not available for IRS but it was hired. Serious inadequacies were evident in transport, disposal bay, preparation bay, wash bay, and change rooms were not available and shower clog were not sufficient. As a result, the spray operators used to bath and wash their overalls at their homes which was a wrong practice, as all washing is supposed to be done in a washing bay. This finding was in line with challenges documented by MOH (2008) action plan that transport was inadequate in most IRS districts. Therefore, insufficient logistic highly impinged on daily operations of service providers in IRS and contributed to non-adherence to some of the policy guidelines. These findings were also highlighted by Simpungwe (2007) who said that transport was hired and there was need for a wash bay, shower and clogs for males and females. However, on the positive aspect the wash bay and shower clog were being constructed. Therefore, MOH in conjunction with NMCC should consider procuring vehicles for transportation of chemicals and IRS logistics as well as IRS service providers during the IRS campaign.

When asked about adequacy of storage facilities, more than half (n=5) of the program officers disagreed that they had adequate storage facilities and half (n=4) of them said it affected their operations much. These findings are in line with what was reported by the MOH in 2008 national malaria action plan that there were inadequate storage facilities in most IRS district. However, these findings contradict what was document by Simpungwe (2007) in the Ndola RBM report that Ndola had adequate storage facilities. However, both the program officers and spray operators were in agreement that storage facilities were inadequate as highlighted in their recommendations (table 4.5.2), this was also verified using a checklist. Checklist also verified that storage facilities were inadequate such that chemicals and equipments like spray pumps were stored in the same room and ventilation was inadequate. Among issues identified for global funding round 7 was improving storage facilities in 2007 action plan, however this issue has not yet been addressed in Ndola as such storage facilities does not meet the standard guideline as stipulated by WHO and ECZ. Also Spray pumps were inadequate 117 were available against 120 spray operators. This is mainly the problem of inadequate logistics which needs immediate attention to improve IRS coverage. Also, IRS guidelines were evidently missing and had negative impact on daily operations as they are guiding principles to effective implementation of IRS. In view of this there is need for NMCC to ensure that money for building and refurbishment of store room is released so that the existing infrastructure can be improved according to WHO and ECZ guidelines. Also, there is need to ensure that enough logistics are provided like spray pumps to the districts on time.

**Solutions to the problems (Social actors accounts)**

When program officers and spray operators were asked as to how the various problems could be solved, there proposals were targeted at improving operations and institutional structures (table 4.5.1). There was very little related to policy though policy measures have a direct bearing on operations and institutional structures. Spray operators gave varying reasons and most 44.7% (51) respondents indicated that areas needing improvement was giving IEC on importance of IRS and community sensitization. The least suggested solution was the need for management and spray operators to work together and that supervisors needed to be involved in field work 0.8% (1). This is very crucial and
shows that IEC messages on IRS are inadequate and need to be strengthened. However, one would note that some recommendations (table 4.5.2) are cross cutting and this is because of a relationship based on simultaneous occurrence or sequential occurrence. There is need for policy and decision makers to carefully analyze and see how best the solutions suggested by service providers can be incorporated at national level to solve some of the challenges in the implementation of IRS.

Limitations and strengths of the study

The study was conducted without the involvement of communities who happen to be consumers of the service and as such their views could have added impetus to the study. The limitations of community involvement were obvious in academic research on account of time and cost. But we have the views of the program officers and thus, we do not feel that these limitations would have caused major changes in our findings.

Notable strengths of the study are that it is the first known research to focus explicitly on IRS in Ndola from a public health perspective. This study is an initial step toward addressing the various problem areas that program officers and spray operators sighted that constrained service delivery. The study also contributes towards the scientific world knowledge on program evaluation and it is hoped that the results could be used by the program manager for purposes of program design improvements and operations. Population study has been done and findings can be generalized to Ndola urban district and other IRS districts in the country despite purposive sampling because they have similar characteristics like Ndola.

General conclusion

The study findings have policy, operational and institutional implications. Evaluation of IRS program in Ndola has shown that IRS can substantially reduce the incidence of malaria and its associated economic consequences, and should be promoted. The findings have shown that IRS target can be maintained from 85% to 100% through increased IEC in the community which can reduce the percentage of refusals so that IRS coverage goes up. It has clearly demonstrated that acceptability of IRS in the community was average because the percentage of refusals was very high and reasons included mainly; dirtens walls, Bad smell, itching effect and lack of information on IRS as the IEC was poor. This protocol found that there are logistic problems surrounding IRS program which may hamper reaching 100% target by 2011 these mainly include; inadequate spray pumps, and infrastructure, lack of transport and late arrival of funds/ logistics for IRS program at the District. The skills of spray operators were negatively associated with their level of training. The data in this review also demonstrate a striking pattern relating to the negative implications of non-adherence to policy and lack of program integrated monitoring and evaluation to address institutional and operational plans. It can be said that because of lack of strict adherence to policy guidelines and a poor institutional structure, have resulted into the serious operational problems that we have highlighted. The IRS program seems not to take account of the views of all stakeholders and this requires addressing through community participatory research action.

Tables and figures

Table 4.1.1. Sex in relation to experience in IRS of spray operators (n= 114)

<table>
<thead>
<tr>
<th>Sex</th>
<th>Experience in IRS</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0-2yrs</td>
<td>3-4yrs</td>
</tr>
<tr>
<td>Male</td>
<td>56 (85%)</td>
<td>10 (15%)</td>
</tr>
<tr>
<td>Female</td>
<td>41 (42%)</td>
<td>7 (41%)</td>
</tr>
<tr>
<td>Total</td>
<td>97 (85%)</td>
<td>17 (15%)</td>
</tr>
</tbody>
</table>

Table 4.1.2. Age (n= 114)

<table>
<thead>
<tr>
<th>Age of spray operators</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>18-30 years</td>
<td>96</td>
<td>84.2</td>
</tr>
<tr>
<td>31-40 years</td>
<td>18</td>
<td>15.8</td>
</tr>
</tbody>
</table>
Policy problems that exist in the execution of IRHS.

Table 4.2.1. Compliance to DDT guidelines

<table>
<thead>
<tr>
<th>Challenge</th>
<th>Problem area</th>
<th>Response Type</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>If you do use DDT, to what extent do you apply procedures in case of storage guidelines?</td>
<td>Policy challenge</td>
<td>7</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>If you do use DDT, to what extent do you apply procedures in case of use of guidelines?</td>
<td>Policy challenge</td>
<td>4</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>If you do use DDT, to what extent do you apply procedures in case of disposal guidelines?</td>
<td>Policy challenge</td>
<td>7</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>If you do use DDT, to what extent do you apply procedures in case of environmental safe guards?</td>
<td>Policy challenge</td>
<td>4</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>If you do use DDT, to what extent do you apply procedures in case of transportation guidelines?</td>
<td>Operational challenge</td>
<td>6</td>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>

Table 4.2.2. Store room checklist

<table>
<thead>
<tr>
<th>No</th>
<th>Item</th>
<th>Present (+)</th>
<th>Absent (-)</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Thermometer</td>
<td>(+)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Insecticide</td>
<td>(+)</td>
<td></td>
<td>All had expiry dates</td>
</tr>
<tr>
<td></td>
<td>• Name</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Expirely date</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Concrete floor</td>
<td>(+)</td>
<td></td>
<td>Had cracks</td>
</tr>
<tr>
<td></td>
<td>• Cracks</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• No cracks</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>2 Doors</td>
<td>(+)</td>
<td></td>
<td>Only one door</td>
</tr>
<tr>
<td>5.</td>
<td>Sign post</td>
<td>(+)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>Stock record</td>
<td>(+)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>Ventilation</td>
<td>(+)</td>
<td></td>
<td>but inadequate</td>
</tr>
<tr>
<td></td>
<td>• Overall</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Rubber gloves</td>
<td></td>
<td></td>
<td>Adequate</td>
</tr>
<tr>
<td></td>
<td>• Face shields/ goggles</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Masks</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Boots</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Operational problems that exist in the execution of IRS

Table 4.3.1. Facilities checklist

<table>
<thead>
<tr>
<th>No</th>
<th>Item</th>
<th>Present (+)</th>
<th>Absent (-)</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>IRS guidelines</td>
<td>(-)</td>
<td></td>
<td>Were not available</td>
</tr>
<tr>
<td>2.</td>
<td>Spray pumps</td>
<td>(+)</td>
<td></td>
<td>Not adequate only 117</td>
</tr>
</tbody>
</table>

Graph 4.3.1 Season when household members are less likely to be found in their homes for IRS (n=114)
Table 4.3.4. training by level of contribution to operational problems

<table>
<thead>
<tr>
<th>Rating of training</th>
<th>level of contribution to operational problems</th>
<th>Average to poor</th>
<th>Good</th>
<th>Very good</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Very much to average</td>
<td>12 (70.5%)</td>
<td>18 (33.9%)</td>
<td>15 (34%)</td>
<td>45 (39.4%)</td>
</tr>
<tr>
<td></td>
<td>Little to very little</td>
<td>5 (29.4%)</td>
<td>35 (66%)</td>
<td>29 (65.9%)</td>
<td>69 (60.5%)</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>*17 (100%)</td>
<td>53 (100%)</td>
<td>44 (100%)</td>
<td>114 (100%)</td>
</tr>
</tbody>
</table>

Table 4.3.8. Reasons for refusal of IRS by the community (n=114)

<table>
<thead>
<tr>
<th>Reasons for refusal</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>not effective, don’t kill insects</td>
<td>2</td>
<td>10.5</td>
</tr>
<tr>
<td>bad smell, dirtens walls, itching effects</td>
<td>59</td>
<td>51.8</td>
</tr>
<tr>
<td>recent spraying/ replastering of houses</td>
<td>1</td>
<td>.9</td>
</tr>
<tr>
<td>itching effects/ not effective</td>
<td>18</td>
<td>15.8</td>
</tr>
<tr>
<td>Lack of information</td>
<td>24</td>
<td>21.1</td>
</tr>
<tr>
<td>Total</td>
<td>114</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Table 4.3.9. Rating acceptability of IRS in the community by reasons for refusal (n=114)

<table>
<thead>
<tr>
<th>Rate of acceptability</th>
<th>Reasons for refusal</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>itching effect, bad smell, dirtens walls, recent spray/ replastering of houses</td>
<td>11 (52.3%)</td>
<td>10 (47.6%)</td>
</tr>
<tr>
<td></td>
<td>Lack of information, not effective, don’t kill insects</td>
<td>10 (47.6%)</td>
<td>10 (47.6%)</td>
</tr>
<tr>
<td>Very high- high</td>
<td>Total</td>
<td>*21 (100%)</td>
<td>*21 (100%)</td>
</tr>
<tr>
<td>Average – low</td>
<td></td>
<td>93 (100%)</td>
<td>93 (100%)</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>114 (100%)</td>
<td>114 (100%)</td>
</tr>
</tbody>
</table>
Table 4.3.10. Chemicals most recommended by level of acceptability of IRS in the community (n=112)

<table>
<thead>
<tr>
<th>Chemicals recommended</th>
<th>Level of acceptability of IRS</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>High (42.9%)</td>
<td>57 (50.9%)</td>
</tr>
<tr>
<td>Fedona &amp; K-othrine</td>
<td>9</td>
<td>48 (52.7%)</td>
</tr>
<tr>
<td>Icon &amp; DDT</td>
<td>12 (57.1%)</td>
<td>43 (47.3%)</td>
</tr>
<tr>
<td></td>
<td>21 (100%)</td>
<td>55 (49.1%)</td>
</tr>
<tr>
<td></td>
<td>91 (100%)</td>
<td>112 (100%)</td>
</tr>
</tbody>
</table>

Figure 4.3.3 Extent of agreement that replastering of walls is an operational problem (n=114).

Table 4.3.11. Level of agreement that repainting of walls as an operational problem (n=114)

<table>
<thead>
<tr>
<th>Level of agreement</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>very much</td>
<td>32</td>
<td>28.1</td>
</tr>
<tr>
<td>Much</td>
<td>27</td>
<td>23.7</td>
</tr>
<tr>
<td>Average</td>
<td>27</td>
<td>23.7</td>
</tr>
<tr>
<td>Little</td>
<td>9</td>
<td>7.9</td>
</tr>
<tr>
<td>very little</td>
<td>19</td>
<td>16.7</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>114</strong></td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>

Table 4.3.12. Extent of agreement that spraying is done at the same time every year (n=114).

<table>
<thead>
<tr>
<th>Level of agreement</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>strongly agree</td>
<td>15</td>
<td>13.2</td>
</tr>
<tr>
<td>Agree</td>
<td>41</td>
<td>36.0</td>
</tr>
<tr>
<td>Disagree</td>
<td>51</td>
<td>44.7</td>
</tr>
<tr>
<td>strongly disagree</td>
<td>7</td>
<td>6.1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>114</strong></td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>
Table 4.3.13. Reasons for variation in starting time of spraying (n=114)

<table>
<thead>
<tr>
<th>Reasons for variation</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>late arrival of funds/ logistics</td>
<td>78</td>
<td>68.4</td>
</tr>
<tr>
<td>poor timing/ planning</td>
<td>7</td>
<td>6.1</td>
</tr>
<tr>
<td>problems at national level</td>
<td>7</td>
<td>6.1</td>
</tr>
<tr>
<td>do not know</td>
<td>22</td>
<td>19.3</td>
</tr>
<tr>
<td>Total</td>
<td>114</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Table 4.3.14. Extent of agreement that spraying is done at the same time every year by reason for variation (n=114)

<table>
<thead>
<tr>
<th>Extent of agreement that spraying is done at the same interval</th>
<th>Reasons for variation in spraying</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly agree/ agree</td>
<td>Late arrival of funds/ logistics/ poor timing/ planning</td>
</tr>
<tr>
<td>Strongly disagree/ disagree</td>
<td>27 (71%)</td>
</tr>
<tr>
<td>Total</td>
<td>85 (74.5%)</td>
</tr>
</tbody>
</table>

Table 4.4.1. Facilities Checklist

<table>
<thead>
<tr>
<th>No.</th>
<th>Item</th>
<th>Present (+)</th>
<th>Absent (-)</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Disposal bay</td>
<td></td>
<td>(-)</td>
<td>Being constructed</td>
</tr>
<tr>
<td>2.</td>
<td>Wash bay</td>
<td>(-)</td>
<td></td>
<td>Being constructed</td>
</tr>
<tr>
<td>3.</td>
<td>Shower (+)</td>
<td></td>
<td>(-)</td>
<td>Not adequate</td>
</tr>
<tr>
<td>4.</td>
<td>Change room (-)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>Preparation bay (-)</td>
<td></td>
<td></td>
<td>Being constructed</td>
</tr>
</tbody>
</table>

Table 4.4.4. Adequacy of wash bay and shower clog (n=114)

<table>
<thead>
<tr>
<th>Level of agreement</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>strongly agree</td>
<td>4</td>
<td>3.5</td>
</tr>
<tr>
<td>Agree</td>
<td>29</td>
<td>25.4</td>
</tr>
<tr>
<td>Disagree</td>
<td>50</td>
<td>43.9</td>
</tr>
<tr>
<td>strongly disagree</td>
<td>31</td>
<td>27.2</td>
</tr>
<tr>
<td>Total</td>
<td>114</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Table 4.5.1. Areas of improvements (n = 114)

<table>
<thead>
<tr>
<th>Area of improvement</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Give IEC on importance of IRS and community sensitization</td>
<td>51 (44.7%)</td>
</tr>
<tr>
<td>2. IRS Program to start early around august to October before the rainy starts</td>
<td>24 (28.8%)</td>
</tr>
<tr>
<td>3. Need for adequate funding</td>
<td>18 (15.8%)</td>
</tr>
<tr>
<td>4. Government to distribute bed nets for those who agree to have their homes sprayed</td>
<td>7 (6.1%)</td>
</tr>
<tr>
<td>5. Government to put more effort in sensitizing the community such as involving the church leaders and traditional rulers, councilors and ward chairmen in IRS programs</td>
<td>4 (3.5%)</td>
</tr>
<tr>
<td>6. Government to improve in public partnership</td>
<td>1 (0.8%)</td>
</tr>
<tr>
<td>7. Supervision should improve to counter check with work done in the field</td>
<td>5 (4.3%)</td>
</tr>
</tbody>
</table>
8. To change chemicals like DDT as people complain that it dirtens homes, instead K-othrine & Fedona to be used as they kill other vectors. &ndash; 3 (2.6%)

9. To stop reducing spray days like this year they reduced to 44 days & most houses won’t be sprayed as time would not be enough &ndash; 4 (3.5%)

10. Need to build a shower, changing room & store room to be expanded &ndash; 3 (2.6%)

11. Also improve on payment of spray operators like K100, 000 per day &ndash; 5 (4.3%)

12. Also giving enough milk to neutralize the chemicals as the chemicals are very strong &ndash; 1 (0.8%)

13. No suggestion &ndash; 10 (6.7%)

14. Need for management & spray operators to work together, supervisors to be involved &ndash; 1 (0.8%)

<table>
<thead>
<tr>
<th>Table 4.5.2. Possible Solutions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Solution for the Challenge</strong></td>
</tr>
<tr>
<td>1. Construction of a wash bay to have a drain where pumps are stored, chemicals and pumps to be separated</td>
</tr>
<tr>
<td>2. Renovated available infrastructure</td>
</tr>
<tr>
<td>3. Proposed to council management to be given another room for IRS material storage and to improve ventilation as it is very hot</td>
</tr>
<tr>
<td>4. Partners have come in to improve the wash bay and showers</td>
</tr>
<tr>
<td>5. Extend the store room to cater for all requirements on IRS</td>
</tr>
<tr>
<td>6. Chemicals to be placed on the middle to leave room for air circulation in the store room</td>
</tr>
<tr>
<td>7. Separate ablution block to be built, build another store room for pumps, have transport for program officers to ease movements, and to have a separate account for IRS as it is put in DHMT account.</td>
</tr>
<tr>
<td>8. IEC to be continuous in the community even before IRS starts</td>
</tr>
<tr>
<td>9. Integrated vector management- Boam or Doom to be sprayed together with the chemicals</td>
</tr>
<tr>
<td>10. To provide transport for program officers to ease movements, and must have a separate account for IRS as it is put in DHMT account.</td>
</tr>
<tr>
<td>11. Funding should be done on time from stakeholders, NMCC &amp; MOH</td>
</tr>
<tr>
<td>12. Need to procure equipment like printers &amp; photocopiers in place</td>
</tr>
<tr>
<td>13. Tender procedures in Lusaka to be done early so that spraying starts early</td>
</tr>
<tr>
<td>14. Funding to be increased to enable them procure 2 light vehicles. 1 for the staff &amp; 1 for the water bulser since there is no horse</td>
</tr>
<tr>
<td>15. Increase community sensitization</td>
</tr>
<tr>
<td>16. Increase number of spray days from 44 days to 70 days</td>
</tr>
<tr>
<td>17. If our budget are given or respected the way we have planned</td>
</tr>
<tr>
<td>18. Procure more spray pumps</td>
</tr>
<tr>
<td>19. Need for adequate sensitization to start prior to spraying</td>
</tr>
<tr>
<td>20. Attitude of spray operators to be monitored – spray water instead of chemicals affecting success of IRS</td>
</tr>
<tr>
<td>21. Changing of supervisors as they over stay</td>
</tr>
<tr>
<td>22. Need for inventory of used &amp; unused chemicals to match with original supply after the exercise</td>
</tr>
<tr>
<td>23. Ventilation to be improved in the store room</td>
</tr>
<tr>
<td>24. Construction of a wash bay to have a drain where pumps are stored</td>
</tr>
<tr>
<td>25. chemicals and pumps to be separated</td>
</tr>
</tbody>
</table>

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Recommendations for improving IRS

- The study must be duplicated on a larger scale in other geographical areas to enable generalization of results. Also, a study should be done in the community to identify the gaps in IRS and how challenges can be addressed from the community point of view.
- There is need for the districts to have contingency funds from their own funds. Resources should be mobilized from stakeholders as a contribution to maintain continuity of the IRS programme, so that there is no delay in starting of IRS campaign.
- Institutional structures like store room for IRS must be refurbished and where they are not available must be constructed according to the ECZ and WHO standard guideline on Infrastructure for IRS.
- NMCC in conjunction with MOH and ECZ should ensure that the DDT is handled with care without environmental contamination by ensure that wash bay, preparation bay, and shower clog are available in all IRS district to prevent environmental pollution.
- There is need to invest in operational research resulting in malaria development of other types of insecticide and we are building up on this point which was stated in previous research by Korrick et al., (2001); Rogan and Chen (2005) and Fenster et al., (2006).

References


[50]. Sadasiviah, Shohba; Tozan, Yesim & Breman, Joel G. (2007)


[55]. The laws of Zambia (1964) CAP 557 mosquito extermination act.


Awareness, Knowledge and Practice of Self-Medication among Undergraduates in Adeleke University, Ede, Osun State, Nigeria

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Abstract

Self-medication is the treatment of common health problems with medicines without medical supervision. There is substantive literature on self-medication, however there has been limited focus on undergraduates. Hence, this study aimed to bridge gaps in information on awareness, knowledge and practice of self-medication among respondents. Using cross-sectional study design and stratified random sampling technique, 418 consenting respondents were recruited into this study. Quantitative data was collected using a semi-structured, self-administered questionnaire; analyzed using SPSS version 21 and summarized using proportions and Chi-square tests ($p \leq 5\%$). Mean age of respondents was 19.89\pm2.83 years, 52.4\% were males while 47.6\% were females. 97.8\% had awareness about self-medication, 66.0\% had good knowledge on harmful effects of self-medication while 76.8\% practiced self-medication. Analgesics was the most common drug used among respondents. Age and sex were statistically significantly associated with respondents’ knowledge on harmful effects of self-medication ($p<0.05$). Sex was statistically significantly associated with their practice of self-medication ($p=0.006$). There was a cognitive dissonance between respondents’ knowledge and practice because though results showed that respondents had good knowledge, it did not translate into good practice. The university authorities need to develop intervention strategies to engender behavioral change which can potentially improve their practices towards self-medication.

Keywords: Awareness, Knowledge, Practice, Self-medication, Undergraduates.

Introduction

It is a natural phenomenon of life for people to feel unwell, hence, take action (health-seeking behaviors) towards regaining an equilibrium in health. On a daily basis, irrespective of how knowledgeable people may be, many acts on their health without prior consultation with qualified health personnel due to the desire for a relatively lower-costing solution. This is known as “self-care”. Self-medication, as an element of self-care, is the selection and use of medicines by individuals to treat self-recognized illnesses or symptoms (World Health Organization, 2012). The World Self-Medication Industry (2010) further defines self-medication as, “the treatment of common health problems with medicines especially designed and labeled for use and approved as safe and effective for such use without medical supervision”. Once a person obtains and consumes medicinal products in a bid to treat self-recognized disorders or symptoms without the advice of a physician, he/she can be termed as practicing self-medication (William, Phalka, Phalka, and Durgawale, 2006). It involves acquiring medicines without a prescription, resubmitting old prescriptions to purchase medicines, sharing medicines with relatives or members of one’s circle or using leftover medicines stored at home (Loyola, Uchoa, Firme and Lima-Costa, 2005).

Drugs frequently used without prescription include antimalarial, analgesics, antipyretics, antibiotics and cough syrups. The sources of these drugs people use without prescription, sometimes are from pharmacies or left-over drugs from previous medications (Musa, Awosan, Ibrahim, Abdullahi, Jafaar, Peter, Anthony and Isah, 2016). Individuals obtain information about drugs through print media, pharmacy, medicine dealers, family and friends. Hence, they feel equipped to handle health issues by themselves, especially when faced with limitations such as difficulties in accessing medical care.
Increasing knowledge on how to deal with medications among populations, failures of health care systems in certain populations, availability of drugs in markets and poor drug regulatory practices are factors that contribute to self-medication. Other factors like demographic factors have been found to also influence self-medication. For instance, gender, age, sex and social role were discovered to have influence on self-medication (Girma, Diriba, Zerihun, Derbew, Abera, Mussie, Gebremedhin, Naod, Raghavendra and Abrham, 2011). It is a global public health issue of importance which is on a rapid rise/increase despite the dangers associated with it (Kumar, Kanchan, Unnikrishnan, Rekha, and Mithra, 2013; Osemene and Lamikanra, 2012). Many people trivialize ailments such as headache, fever, cough, throat infection, common cold and stomach ache while, some do perceive some ailments to be too mild to necessitate medical consultation.

A study carried out in Sokoto revealed that students indulged in self-medication to treat ailments such as fever, headache, body pain, cough/flu and diarrhea; the most frequently used drugs being pain killers, antimalarial, antibiotics, anti-flu and antidiarrheal (Musa et al., 2016). According to a study by Omolase, Adeleke and Afolabi (2012), the perceived simplicity of a health condition, financial constraints as well as non-availability of health care services were the main reasons for the practice of self-medication among respondents. People indulge in self-medication because while it helps them through their common health problems, it is time and cost saving especially for those who have few or no options as alternatives. The practice of self-medication must be based on authentic medical information otherwise irrational use of drugs can cause wastage of resources, increased resistance of pathogens, and can lead to serious health hazards. (Goldsworthy and Mayhorn, 2009). Though self-medication is a popular preference worldwide, little is still known about its appropriateness, hence the need for a certain level of knowledge and health orientation in order to produce responsible self-medication. In 2009, the World Self-Medication Industry reported that responsible self-medication can potentially reduce current burdens and challenges being faced by limited health care systems in various countries.

It is an acknowledged fact that the practice of self-medication (no matter the reason) is unacceptable (Sarahroodi, Arzi, Sawalha and Ashtarinezland, 2010). This requires giving heightened attention to the health-seeking behaviors people exhibit in our society in order to curb such unhealthy practices. There is a dearth of information on the awareness, knowledge and practices of self-medication among undergraduates in Adeleke University. It therefore became crucial to investigate these parameters to determine if they were aware of the dangers associated with self-medication and/or indulge in self-medication and bridge gaps in information by providing valuable insight which the university community will utilize to prevent indulgence in harmful self-medication practices among her undergraduates.

Materials and methods

Description of study area

This study was carried out in Adeleke University which is situated in an ambient and serene environment at Ede, Osun State, Nigeria. It is a higher institution of learning with six faculties and twenty-six Departments. The Faculties include the Faculty of Business and Social Sciences (FBSS), Faculty of Arts (FOA), Faculty of Science (FOS), Faculty of Law (FOL), Faculty of Engineering (FOE) and Faculty of Basic Medical Sciences (FBMS).

Study design

It was a descriptive cross-sectional study.

Study population

This comprised of undergraduate students in Adeleke University, Ede, Osun State.

Exclusion criteria

All administrative and non-administrative staff, post graduate students and off-campus students of Adeleke University were excluded. Students who did not give voluntary consent were also excluded from participating in the study.
Calculation of sample size

This was determined by adopting Leslie and Kish formula for single proportion. The desired minimum sample size was estimated at 380; 10% of the estimated sample size was added to make up for possible non-response, which brought the minimum sample size to 418.

Sampling technique

A stratified random sampling method was used to select respondents from various levels in Faculties.

Instrument of study and method of data collection

A 30-item semi-structured self-administered questionnaire was used by 3 trained research assistants (RAs) to collect information from the respondents. It included questions on their socio-demographic characteristics, knowledge on self-medication and its harmful effects and practice of self-medication. Distribution of questionnaires was mainly carried out during the day when students could be gotten in their classrooms.

Data analysis

Data was analyzed using the Statistical Product for Service Solution (SPSS) version 21. Socio-demographic variables and respondents’ responses were summarized and presented using frequency tables and charts. Bivariate analysis using Chi-square test statistics was employed to explore relationship between two categorical variables. Confidence limit was set at 95% and p-value of ≤0.05 as the significant level.

Scoring of outcome variable

A 5-point scale measured knowledge of self-medication. Respondents with scores greater than 2 were categorized as having good knowledge. A 3-point scale measured practice of self-medication with respondents who scored greater than 1 categorized as having poor practice (meaning the respondent indulged in self-medication).

Ethical considerations

Written informed consent was obtained from the respondents before administering the questionnaires and confidentiality was ensured.

Limitation of the study

Respondents’ recall bias, which we believe was limited to the barest minimum because they were assured of confidentiality and anonymity.

Results

A total of 418 questionnaires were distributed and retrieved, giving a response rate of 100%. Table 1 shows the socio-demographic characteristics of respondents. Mean age of respondents was 19.89±2.83 years. The age groups of 15-19 years and 20-24 years had 191(45.7%) and 195 (46.7%) respondents respectively. Two hundred and nineteen (52.4%) were male, 148 (35.7%) and 148 (35.7%) were students of the Faculty of Business and Social Sciences and the Faculty of Basic Medical Sciences respectively.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age (in years)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15-19</td>
<td>191</td>
<td>45.7</td>
</tr>
<tr>
<td>20-24</td>
<td>195</td>
<td>46.7</td>
</tr>
<tr>
<td>25-29</td>
<td>32</td>
<td>7.7</td>
</tr>
<tr>
<td>Mean age 19.89±2.83 years</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Sex</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>199</td>
<td>47.6</td>
</tr>
</tbody>
</table>
Male 219 52.4

<table>
<thead>
<tr>
<th>Faculty</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Business/Social Sciences</td>
<td>148</td>
<td>35.7</td>
</tr>
<tr>
<td>Basic Medical Sciences</td>
<td>95</td>
<td>22.7</td>
</tr>
<tr>
<td>Sciences</td>
<td>71</td>
<td>17.0</td>
</tr>
<tr>
<td>Arts</td>
<td>33</td>
<td>7.9</td>
</tr>
<tr>
<td>Engineering</td>
<td>14</td>
<td>3.3</td>
</tr>
<tr>
<td>Law</td>
<td>57</td>
<td>13.6</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Year</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>122</td>
<td>29.2</td>
</tr>
<tr>
<td>200</td>
<td>174</td>
<td>41.6</td>
</tr>
<tr>
<td>300</td>
<td>54</td>
<td>12.9</td>
</tr>
<tr>
<td>400</td>
<td>68</td>
<td>16.3</td>
</tr>
</tbody>
</table>

Most of the respondents, 409 (97.8%) had ever-heard about self-medication. The most common source of information were friends and family (83.5%). Other sources cited include the internet, television, radio and newspapers.

Two hundred and seventy-six respondents (66.0%) had good knowledge on self-medication though 71 respondents (17.0%) did not know the correct definition of self-medication. Possible side effects of self-medication cited by respondents included treatment failure 166 (39.7%), antibiotic resistance 152 (36.4%) and drug reactions 87 (20.8%) (Table 2).

Table 2. Knowledge on self-medication

<table>
<thead>
<tr>
<th>Variables</th>
<th>Frequency</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Definition of self-medication</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Taking drugs without medical consultation*</td>
<td>324</td>
<td>77.5</td>
</tr>
<tr>
<td>Consumption of drugs without a doctor’s prescription*</td>
<td>12</td>
<td>2.9</td>
</tr>
<tr>
<td>Is a human behaviour in which a substance is self-administered to treat physical or psychological ailments*</td>
<td>11</td>
<td>17.0</td>
</tr>
<tr>
<td>Don’t know</td>
<td>71</td>
<td></td>
</tr>
<tr>
<td><strong>Knowledge on harmful effects</strong>**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Treatment failure</td>
<td>166</td>
<td>39.7</td>
</tr>
<tr>
<td>Antibiotic resistance</td>
<td>152</td>
<td>36.4</td>
</tr>
<tr>
<td>Drug reaction</td>
<td>87</td>
<td>20.8</td>
</tr>
<tr>
<td>May lead to death</td>
<td>10</td>
<td>2.4</td>
</tr>
</tbody>
</table>

* Correct answer
**Multiple responses

Table 3 shows that 321 (76.8%) respondents practice self-medication. Common ailments which the respondents reportedly treated with self-medications included diarrhea (28.0%), fever (27.8%), cough (27.3%) and sore throat (20.1%).

Table 3. Practice of self-medication

<table>
<thead>
<tr>
<th>Practice in self-medication</th>
<th>Frequency</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indulgence</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>321</td>
<td>76.8</td>
</tr>
<tr>
<td>No</td>
<td>97</td>
<td>23.2</td>
</tr>
</tbody>
</table>
Health conditions treated with medication
Fever 116 27.8
Cough 114 27.3
Diarrhoea 117 28.0
Sore throat 84 20.1
Others e.g. body aches 196 46.9

Source of procurement of medications
Patent medicine store 238 56.9
Leftovers from previous prescription 132 31.6
Online stores/e-shopping 61 14.6

At the bivariate analysis level, age (p=0.028) and sex (p=0.001) were statistically significantly associated with knowledge on self-medication. Sex (p=0.006) was statistically significantly associated with practice on self-medication (Table 4 and 5).

Table 4. Relationship between selected socio-demographic characteristics of respondents and knowledge on self-medication

<table>
<thead>
<tr>
<th>Variables</th>
<th>Good knowledge</th>
<th>Poor knowledge</th>
<th>X²</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15-19</td>
<td>70.7</td>
<td>29.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20-24</td>
<td>65.1</td>
<td>34.9</td>
<td>7.161</td>
<td>0.028</td>
</tr>
<tr>
<td>25-29</td>
<td>46.9</td>
<td>53.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sex</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>74.4</td>
<td>25.6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>58.9</td>
<td>41.1</td>
<td>11.159</td>
<td>0.001</td>
</tr>
<tr>
<td>Level</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>100</td>
<td>68.9</td>
<td>31.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>200</td>
<td>67.2</td>
<td>32.8</td>
<td>1.361</td>
<td>0.715</td>
</tr>
<tr>
<td>300</td>
<td>61.1</td>
<td>38.9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>400</td>
<td>63.2</td>
<td>36.8</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 5. Relationship between socio-demographic characteristics of respondents and practice of self-medication

<table>
<thead>
<tr>
<th>Variables</th>
<th>Good practice</th>
<th>Poor practice</th>
<th>X²</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15-19</td>
<td>40.3</td>
<td>59.7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20-24</td>
<td>30.8</td>
<td>69.2</td>
<td>6.454</td>
<td>0.168</td>
</tr>
<tr>
<td>25-29</td>
<td>46.9</td>
<td>53.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sex</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>28.6</td>
<td>71.4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>43.4</td>
<td>56.6</td>
<td>10.351</td>
<td>0.006</td>
</tr>
<tr>
<td>Level</td>
<td></td>
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<tr>
<td>100</td>
<td>41.0</td>
<td>59.0</td>
<td></td>
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</tr>
<tr>
<td>200</td>
<td>32.8</td>
<td>67.2</td>
<td>5.540</td>
<td>0.477</td>
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<tr>
<td>300</td>
<td>31.5</td>
<td>68.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>400</td>
<td>41.2</td>
<td>58.8</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

In Figure 1, drugs that respondents reported as being frequently purchased for self-medication is diagrammatically presented as analgesics (55.5%), antimalarial (26.1%), antibiotics (10.8%) and cough syrups (9.1%).

Figure 2 shows that the low cost of self-treatment (23.0%), convenience (48.6%) and a lack of trust in health care provider (24.6%) were reasons offered by the respondents for indulging in self-medication.
Discussions

The patterns of sociodemographic characteristics among the respondents in this study was found to be unlike that observed in a study conducted in Northern Nigeria by Musa et al. (2016) where ages of respondents were mainly within the range of 20-29 years. Majority of the respondents in this study were within the age range of 15-24 years. However, this is a normal phenomenon for many undergraduates in the Southwestern parts of Nigeria where education is more readily pursued.

There was a very high level of awareness about self-medication (97.8%) amongst the undergraduates in this study. This is corroborated by studies by Oluwole, Joseph, Olujide, Kabir., Oladele, Paul and Olaniyan (2016) and Musa et al. (2016) where awareness among respondents was also very high (94.8%) and 95.0% respectively. The main source of information about self-medicating was cited as friends/ families (83.5%), akin to findings by Musa et al., (2016). Though undergraduates in Adeleke University are required to attend life seminars every semester where they are availed information on various issues including health-related ones, it was not mentioned as a source of information. This calls for the attention of the University’s management in modifying these seminars to include topics on self-medicating as being better informed will more readily enable students embrace positive health-seeking behaviors.

With respect to the respondents’ level of knowledge, more than half (66.0%) had good knowledge on self-medication. Majority (83%) gave correct definitions of self-medicating. This can be attributed to the fact that as students, they are believed to be exposed to a variety of communication channels and
also retain information obtained for long periods. A study conducted in Delta state, Nigeria among secondary school students also found out that 75% had good knowledge on the harmful effects of self-medication (Iyeke and Onoharigho, 2016).

This study found that a high proportion (76.8%) of the respondents practiced self-medication despite having knowledge on the harmful effects of self-medication. Findings from a study conducted in Nepal among medical students revealed similar situation (Raj and Sujiata, 2016). Reasons proferred for practicing self-medication included convenience (48.6%), lack of trust in prescribing doctors (24.6%), cost saving (23.0%) and fast & effective (0.2%). In an Ethiopian study, other reasons for practicing self-medication were cited as the respondents’ prior experience (39.10%) and mildness of the illness (37.50%) (Girma et al., 2011). Common health problems for which self-medication was practiced included aches and pains (46.9%), diarrhea (28.0%), fever (27.8%) and cough (27.3%) as corroborated by Musa et al. (2016). Notable amongst the drugs used for self-medication were analgesics (55.5%) and anti-malarial (26.1%). This is similar to situation in Iran where major drugs used for self-medication were cold and cough medications (94.5%) and analgesics (89.9%) (Marziyeh, Maryam, Farzaneh, Fatemeh, Ensiyeh, Abbas and Payam, 2016). An explanation for this may be the presence of medicine stores and vendors densely located within Ede, where drugs can be purchased quite easily over the counter. It is also believed that students resume school with pre-purchased medications stashed in their belongings for use once the feeling of ill health is suspected.

Furthermore, the study found that there was a statistically significant relationship between age and knowledge of harmful effects of self-medication (p=0.028). Those within the age group of 15-19 years had more knowledge on self-medication than those aged older. Also, there was a statistically significant relationship between sex and knowledge on self-medication (p=0.01) as female students were found to have more knowledge on self-medication than their male counterparts. There was a statistically significant relationship between the sex of the respondents and practices of self-medication (p=0.006). A higher proportion of male students had good practices in comparison with the females. Despite females having better knowledge on self-medication, this obviously did not translate into good practice. This is probably due to the potential for females to experience a greater burden of health issues for which medication might be needed on short notice such as dysmenorrhea.

Conclusion

This study concluded that there was a high level of awareness (97.8%), knowledge (66.0%) and indulgence in poor practice of self-medication (76.8%) among undergraduates of Adeleke University. There was a cognitive dissonance between the respondents’ knowledge and practice of self-medication as knowledge did not translate into good practice (the proportion of students who had poor practice was quite high).

Recommendations

Efforts should be intensified at the University level to develop interventions that would encourage positive behavior changes such as seeking medical consultation. Information, Education and Communication (IEC) materials should be employed in sharing information on the harmful effects of self-medication to aid better understanding of its consequences. At the community level, strict rules and penalties regarding unauthorized drug advertisement or sale should be enforced. The creation of health clubs/associations should be welcomed so as to create a more personal platform through which students can clarify issues on self-medication (and other health matters) and impact can be made.

Acknowledgements

Profound gratitude goes to Professor Esther Olufunmilayo Asekun-Olarinmoye for professional guidance.

References


Factors Influencing Adherence to Antiretroviral Drugs among HIV Positive Young Women and Adolescent Patients in North Central Nigeria

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Abstract

The impact of HIV in the world especially in sub-Saharan Africa has led to an extraordinary global effort to ensure adherence to antiretroviral (ARV) therapy to treat the disease in every country where HIV is a threat including Nigeria. However, starting patients on ARVs without ensuring full adherence through an adequate support system is likely to lead to treatment failure and the emergence of drug-resistant virus which can be transmitted to other. Factors influencing adherence to medication are both patients and service provider related. A descriptive, cross sectional study using a systematic sampling technique to select 473 young women and adolescent living with HIV in North central ART clinics in Nigeria. 77% of respondents have been on ARV regimen in the last 3 years. About 82% had good knowledge of medication adherence while 18% do not understand what adherence to medication means. Most (79%) of HIV patient’s adequate adherence to ART while others (13%) usually had stopped taking their medication when they feel better about their health. The commonest source of information about medication adherence to ARV was through the adherence counselor at during ART clinics (77%). Sixty percent of the respondents agreed that adherence to ARV medication helps in improving standard of living Factors that hindered effective adherence to treatment included poor providers’ attitude (28%) and forgetfulness to take their medication and pill burden (25%). Respondents who did not adhere to treatment were less likely to subsequently adhere to ARV medication (OR= 0.258, 95% CI = 0.1-0.5). Use of treatment supporters was the major determinant of medication adherence (OR = 4.2, 95% CI = 1.4-7.2). Majority of the respondents are knowledgeable about medication adherence.

Keywords: Adolescent, Antiretroviral therapy, HIV, Adherence, Young women.

Introduction

The human immunodeficiency virus (HIV) continues to take a tremendous toll on human health, with 37 million people infected and 1.2 million deaths worldwide in 2014. In sub-Saharan Africa, where the HIV epidemic has been most devastating, more than 25 million people are HIV-infected, about 70 percent of the global total (UNAIDS, 2015).

The overwhelming impact of HIV in the world especially in sub-Saharan Africa has led to an extraordinary global effort to ensure access to antiretroviral (ARV) therapy to treat the disease in every country where HIV is a threat including Nigeria. While the World Health Organization (WHO) goal of ensuring access to antiretroviral treatment (ART) for 3 million people by end of 2008 was not achieved, it continues to take a tremendous toll on human health, with 37 million people infected and 1.2 million deaths worldwide (UNAIDS, 2014). In sub-Saharan Africa, where the HIV epidemic has been most devastating, more than 25 million people are HIV-infected, about 70 percent of the global total(UNAIDS, 2015).
The roll-out of ARVs in many resource poor countries has been a remarkable expression of international solidarity. However, starting patients on ARVs without ensuring full adherence through an adequate support system is likely to lead to treatment failure and the emergence of drug-resistant virus which can be transmitted to others. Drug-resistance is a potentially major threat to achieving universal access as it could mean that more and more people have to switch to second-line ARVs, which are more expensive and more difficult to use thereby increasing programme costs which will reduce the total number of people with access to treatment.

With the high number of deaths, AIDS is likely to pose significant human resources challenge to the country. With the epidemic picture, which shows urban and young population having higher sero-prevalence, it is likely that the disease will disproportionately affect young professionals. It is of utmost concern to know that its impact will be felt in every area of human endeavour, including the educational, health, faith-based organizations, agricultural and defense sectors, among others (National policy for HIV and AIDS, 2009).

Anti-Retroviral Therapy (ART) has improved the quality of life of Human immunodeficiency virus (HIV) patients worldwide. A reduction in HIV-related morbidity and mortality has been recognized in countries where ART has been made widely available. Acquired immune deficiency syndrome (AIDS) is now a manageable chronic illness. To achieve optimal results from ART, high levels of patient adherence to ART is essential. High levels of adherence to ART (at least 95%) is needed to ensure optimal benefits.

Adherence is defined as a patient's ability to follow a treatment plan, take medications at prescribed times and frequencies, and follow restrictions regarding food and other medications. Adherence is a problem in any chronic disease and an average non-adherence rate of 24.8% have been reported. Suboptimal adherence to ART may ultimately lead to failure of primary regimen. The national guidelines in India stipulates >95% adherence to ART.

There are many barriers to adherence in both developed and developing countries. It is important to identify factors that lead to non-adherence and develop strategies to improve long-term adherence. Anti-Retroviral Therapy (ART) has improved the quality of life of Human immunodeficiency virus (HIV) patients worldwide. A reduction in HIV-related morbidity and mortality has been recognized in countries where ART has been made widely available. Acquired immune deficiency syndrome (AIDS) is now a manageable chronic illness. To achieve optimal results from ART, high levels of patient adherence to ART is essential. High levels of adherence to ART (at least 95%) is needed to ensure optimal benefits.

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Poor adherence to antiretroviral drugs during pregnancy can lead to suboptimal viral suppression, development of viral resistance, higher risk of mother-to-child transmission, and mother-to-child transmission of resistant HIV strains (Hayman et al, 2009).

Interrupting medication permits the virus to resume rapid replication and as many as 1010 viral particles will be produced per day, this allows resistant mutant strains to be generated which are no longer responsive to available antiretroviral drugs, posing a public health danger (Murphy et al, 2002). Adherence to antiretroviral drugs poses unique challenges to HIV infected persons particularly in pregnant women. Improving adherence among pregnant women therefore requires knowledge of the factors that influence adherence.

Several methods have been used to measure adherence, but no gold standard has been established (Nachega et al, 2016). Each of these methods has its respective strengths and weaknesses. Available methods include pill counts, self-report, prescription refills, medication event monitoring system (MEMS), biological markers, and assays (Holzemer et al, 2005).
Though several studies in Nigeria have evaluated the factors associated with nonadherence to antiretroviral therapy among HIV-positive adults, only one from literature search studied antiretroviral adherence issues in HIV-positive pregnant women (Igwegbe, 2010).

They deduced from their study that the determinants of nonadherence to antiretroviral drugs in HIV-positive pregnant women were low level of education, nondisclosure of HIV status, and longer duration of therapy (Igwegbe, 2010).

Adherence to medication is influenced, among other factors by the knowledge of and attitude towards the drugs. Medication adherence, particularly for complex regimens such as highly active antiretroviral therapy (HAART), is a complex behavior, requiring patients to remember multiple medications and dosing schedules (Whitley, 2009). A theoretical framework encompassing cognitive factors has been suggested by researchers who assert that health behavior modification like ARV adherence requires knowledge, skills, and self-efficacy (Cervone, 2004). Knowledge has been defined variously as awareness of personal health status as well as general knowledge of the afflicting condition. Studies have also reported that understanding of medication effectiveness is associated with better adherence (Bennet et al, 2005), while inadequate knowledge and confusion have been associated with lower adherence (Au J, 2006). In Nigeria and other African countries, several studies have reported the relationship of knowledge with adherence to medications in patients with chronic diseases such as hypertension and diabetes mellitus. However, there is a paucity of data on knowledge and attitude of PLWHA on ARV.

Despite several interventions, non-adherence to antiretroviral therapy (ART) remains a barrier to achieving its maximum benefits of HIV treatments. High-levels of sustained adherence have been demonstrated to be directly associated with a decline in the babies’ HIV acquisition risk and viral load suppression and increased life expectancy in the mother. In contrast, poor adherence to ART has been associated with poor treatment outcomes, emergence of resistance, patients’ dissatisfaction, increased healthcare expenditure, and avoidable deaths.

Previously reported barriers to antiretroviral (ARV) medication adherence include: ART side-effects, social stigma, depression, non-disclosure of HIV status, unemployment, food insecurity, alcohol/substance abuse, alternative forms of therapy, inadequate follow-ups, stock outs, work and family responsibilities, low self-efficacy, low treatment satisfaction and distance to clinics. The factors associated with non-adherence also vary contextually. For instance, knowledge can be linked to non-adherence. Lack of emotional and financial support from husband, inadequate counselling and internal migration could also be reasons for non-adherence to ART.

**Methods**

Description of the study area North Central Nigeria (also known as the Middle-Belt region) consists of the seven states situated geographically spanning from the west, around the confluence of the River Niger and the River Benue. The region itself is rich in natural land features and boasts some of Nigeria’s most exciting scenery. The region is also home to many historical and colonial relics. The facilities providing ART services includes the Secondary and private healthcare facilities across FCT. ARVs are obtained through the support of PEPFAR and all site providing ART services are all linked to the drug pool system.

**Study design**

This study is a descriptive cross sectional study design.

**Study population**

The study population consists of young women and adolescents living with HIV (PLHIV) who have been enrolled into care and commenced antiretroviral therapy within the last 2-3 years.

**Inclusion criteria**

People Living with HIV from the age of 10 – 24 years who have attended clinic for more than 5 times at any of the ART centers for more than two years. This will validate that the patients have 3 or 4 mandatory adherence sessions.
Exclusion criteria

People living with HIV from the age of 10-24 years who are not clinically stable or are not within the enumerated area will not considered. PLHIV below 10 years and above 24 years of age as at this time of the study were not considered.

Sample size

The sample size was 473 young women and girls living with HIV

Results

473 respondents were voluntary sampled for the study. The commonly occurring age group of respondents who participated in the study were patients aged 14-24 years

Most (56%) of respondents were married while (44%) were never married as at the time of the survey. (58.5%) respondents completed primary level of education and 39% had up to secondary education while 5.6% did not have formal education.

However, a large proportion (87.4%) of respondents have been on ARVs regimen for years compared with 12.6% who claimed they were just enrolled on the regimen about a month prior this study.

Table 1. Socio-economic characteristics of respondents

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Frequency (N=473)</th>
<th>Percentage (%)</th>
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<tr>
<td>Age (in Years)</td>
<td></td>
<td></td>
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<tr>
<td>10-14</td>
<td>26</td>
<td>5.4</td>
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<tr>
<td>15-19</td>
<td>196</td>
<td>41.4</td>
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<tr>
<td>20-24</td>
<td>251</td>
<td>53.1</td>
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Medication Adherence Practices among People Living with HIV respondents’ medication adherence practices among people living with HIV in the study location. Over one-third (35.2%) of people living with HIV sampled for this study have been on ARV therapy above five years and over one-tenth (12.1%) of them were on the therapy for about 2-3 years, while those who were on it less than three months were the least participants of this study (9.8%). Obviously, a large proportion (80.3%) of respondents were on the first line regimen as at the time of the study compared with second line and third line regime (19.2% & 0.5%) respectively.

Considering the adherence practices of respondents, it was observed that respondents who didn’t usually forget to take their regimen were more than those who usually forget to take the regime (62.8% vs. 37.2%). But majority (86.8%) were opined that they had never been careless to take the ARV medicine compared with 13.2% who said so. More than half (51.3%) claimed that they never skipped their medications, but 19.5% said within the past week prior this survey they had missed taking their ARV regimen. A large proportion of respondents exclaimed that they never stopped their ARVs drugs whenever they feel better about their health compared with 6.3% who claimed they had stopped taking the regimen when they felt they were feeling okay with their health. Also, majority (95.5%) of the respondents claimed sometimes if they feel worse, they never stopped taking the regimen.

 Majority (97.5%) of respondents claimed adherence counselling is mandatory before commencing ARVs compared with 1.4% who didn’t know about adherence counselling. Two-third (67.0%) of respondents who participated in the study claimed that whenever they missed my drugs for a day, they will take it the next day while one-quarter (25.5%) said they never take it next day they missed the regimen. Also, a large proportion (96.8%) of respondents were of the fact that 100% adherence is desired for people living with HIV and 94.0% agreed that they have been adhering to their drugs, and would like to continue in such way compared with 4.1% who were not sure of continuing in such pattern.
| Statement                                                                 | Strongly Disagree (%) | Disagree (%) | Neither Agree or Disagree (%) | Agree (%) | Strongly Agree (%) | n   | ∑X | Mean Rating  
  \( \frac{\sum X}{n} \) |
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</tr>
</thead>
<tbody>
<tr>
<td>If you do not take this medication exactly as instructed, the HIV in your body will become resistant to HIV medications</td>
<td>10.3</td>
<td>1.7</td>
<td>6.3</td>
<td>31.9</td>
<td>49.7</td>
<td>746</td>
<td>3051</td>
<td>4.09</td>
</tr>
<tr>
<td>ARVs have positive effect on your health</td>
<td>8.5</td>
<td>2.8</td>
<td>6.1</td>
<td>39.8</td>
<td>42.8</td>
<td>739</td>
<td>2996</td>
<td>4.05</td>
</tr>
<tr>
<td>I fully understand what my doctor, nurse or the people at my pharmacy have explained to me so far</td>
<td>2.4</td>
<td>1.2</td>
<td>4.3</td>
<td>41.9</td>
<td>50.2</td>
<td>745</td>
<td>3250</td>
<td>4.36</td>
</tr>
<tr>
<td>I can mention the names of my medicines and their scope without hesitation</td>
<td>31.2</td>
<td>20.0</td>
<td>13.9</td>
<td>22.4</td>
<td>12.6</td>
<td>706</td>
<td>1873</td>
<td>2.65</td>
</tr>
<tr>
<td>I trust my doctor and agree to my therapy plan together with him</td>
<td>2.9</td>
<td>0.8</td>
<td>4.4</td>
<td>45.9</td>
<td>46.0</td>
<td>730</td>
<td>3149</td>
<td>4.31</td>
</tr>
<tr>
<td>My medications help me only if I take them absolutely regularly as recommended</td>
<td>3.9</td>
<td>0.4</td>
<td>4.6</td>
<td>42.1</td>
<td>49.0</td>
<td>745</td>
<td>3218</td>
<td>4.32</td>
</tr>
<tr>
<td>Medicines are all poisonous. You should avoid taking medicines at all if possible</td>
<td>70.1</td>
<td>17.4</td>
<td>5.8</td>
<td>2.4</td>
<td>4.3</td>
<td>747</td>
<td>1145</td>
<td>1.53</td>
</tr>
<tr>
<td>I feel basically healthy. Therefore, I am sometimes unsure whether I really have to take my medicines daily</td>
<td>54.7</td>
<td>23.1</td>
<td>6.7</td>
<td>9.2</td>
<td>6.3</td>
<td>746</td>
<td>1413</td>
<td>1.89</td>
</tr>
<tr>
<td>I take my medicines every day automatically at a fixed time or on fixed occasions</td>
<td>8.0</td>
<td>5.6</td>
<td>8.3</td>
<td>38.9</td>
<td>39.3</td>
<td>738</td>
<td>2922</td>
<td>3.96</td>
</tr>
<tr>
<td>I frequently forget things on an everyday basis</td>
<td>56.4</td>
<td>28.1</td>
<td>5.0</td>
<td>8.4</td>
<td>2.0</td>
<td>737</td>
<td>1264</td>
<td>1.72</td>
</tr>
<tr>
<td>Generally, I often feel bad, and sometimes I feel discouraged and depressed.</td>
<td>50.2</td>
<td>14.7</td>
<td>7.4</td>
<td>12.7</td>
<td>14.9</td>
<td>739</td>
<td>1680</td>
<td>2.27</td>
</tr>
<tr>
<td>I frequently have problems taking my medications or it is difficult for me to keep me on the accompanying conditions of the medication intake</td>
<td>57.1</td>
<td>33.6</td>
<td>5.4</td>
<td>2.7</td>
<td>1.2</td>
<td>739</td>
<td>1163</td>
<td>1.57</td>
</tr>
<tr>
<td>I really would need help on an everyday basis (and particularly related to my treatment with medicines). But I do not get any help</td>
<td>56.7</td>
<td>29.2</td>
<td>2.7</td>
<td>5.5</td>
<td>5.8</td>
<td>739</td>
<td>1290</td>
<td>1.75</td>
</tr>
</tbody>
</table>
I am really frightened of the side effects of my medicines.  

<table>
<thead>
<tr>
<th></th>
<th>59.4</th>
<th>21.7</th>
<th>4.3</th>
<th>9.2</th>
<th>5.3</th>
<th>737</th>
<th>1321</th>
<th>1.79</th>
</tr>
</thead>
<tbody>
<tr>
<td>In case I already noticed or in case I would notice side effects related to my medicines: I have talked or would talk to my doctor about them as soon as possible</td>
<td>5.0</td>
<td>2.3</td>
<td>2.7</td>
<td>30.1</td>
<td>59.9</td>
<td>744</td>
<td>3257</td>
<td>4.38</td>
</tr>
<tr>
<td>In case I already noticed or in case I would notice side effects related to my medicines: I have stopped/would stop my medications or took/would take less of them</td>
<td>69.1</td>
<td>17.8</td>
<td>3.7</td>
<td>4.5</td>
<td>5.0</td>
<td>737</td>
<td>1169</td>
<td>1.59</td>
</tr>
</tbody>
</table>

Strongly Agree –5, Agree – 4, Undecided – 3, Disagree – 2, Strongly Disagree – 1

Logistics Regression Model of Factors Influencing Medication Adherences of Patients to Antiretroviral Therapy.

Logistic regression was used to test associations between various factors and medication adherence in the study locations. Multivariate analysis was therefore used to test the degree of associations between independent and dependent variables which were assessed using odds ratios. The overall model in table 8 shows that factors identified were good predictors of dependent variable – carelessness in taking ARVs in the study locations ($\beta = 1.866, df = 1, p < 0.05$). The model was based on dichotomous response variable – poor adherence (0) and good adherence (1) and/or categorical explanatory variable(s), which are various factors affecting medication adherence to treatments. Thus, for every patient adherence,

$\beta = 0$ ⇒ P (adherence) is the same at each level of x

$\beta > 0$ ⇒ P(adherence) increases as x increases

$\beta < 0$ ⇒ P(adherence) decreases as x increases

Therefore, the Odd Ratio (OR) is determined in the same model explaining how more likely factors are able to influence ARVs medication adherences.

Majority (87.9%) of respondents however, agreed that they won’t allow any obstacle to prevent me from holistically taking my ARVs, about one in ten (12.4%) of respondents still don’t mind missing ARVs on some days. Close to one-fifth (17.3%) of respondents agreed that there would be no consequences if they missed ARVs on some days but disagreed by majority (73.3%). Respondents who wish to soon discontinue ARVs was 9.1% and those who were not sure accounted for 8.4%.

Respondents who want to start to combine herbal and alternative therapy with ARVs were very small compared with those who disagreed with such attitude (4.1% Vs. 90.1%). While 69.3% of respondents claimed they would not like to skip my drug collection appointment days and 98.0% said they would keep to their appointment’s days related to drugs taking and adherence. A large proportion (99.1%) of respondents agreed to keep to the ARVs dosing, frequency and time.

Table 5 shows respondents’ perception towards medication adherence in the study location. Obviously considering the mean rating of respondents, majority of them averagely agreed that if they didn’t take this medication exactly as instructed, the HIV in their body will become resistant to HIV medications (4.09) while they averagely perceived that ARVs have positive effect on their health (4.05).

Also, majority of respondents averagely agreed that they fully understood what doctor, nurse or the people at my pharmacy had explained to them so far (4.36). Majority of respondents averagely neither agreed nor disagreed that they could either mention the names of the medicines and their scope without hesitation (2.65).

Meanwhile, majority of respondents averagely agreed that they trusted their doctor and also agreed to their therapy plan together with the doctor (4.31), and respondents also agreed that their medications helped them only if they took them absolutely regularly as recommended (4.32).
Respondents averagely disagreed that medicines are all poisonous and should avoid taking medicines at all if possible (1.53). In the similar vein, respondents averagely disagreed to the statement that they when feel basically healthy, they therefore sometimes unsure whether they would really have to take my medicines daily (1.89).

Respondents averagely agreed that they took their medicines every day automatically at a fixed time or on fixed occasions (3.96), while majority disagreed to the fact that they frequently forget things on an everyday basis (1.72) and disagreed that generally they often feel bad, and sometimes feel discouraged and depressed (2.27).

Considering problems regarding medications, respondents averagely disagreed that they frequently have problems taking their medications or it’s difficult to keep on the accompanying conditions of the medication intake (1.57) and also disagreed that they would need help on an everyday basis - particularly related to treatment with medicines. It was averagely disagreed that respondents were really frightened of the side effects of my medicines (1.79)

Respondents averagely agreed that in case they noticed or would notice side effects related to the medicines; they would talk to their doctors about any side effects as soon as possible (4.38) and strongly disagreed that they would stop taking medications or taking less if they had notice of any side effects related to their medicine (1.59).

### Table 4. Variables in the equation

<table>
<thead>
<tr>
<th>Beta Coefficient</th>
<th>Standard Error</th>
<th>Wald Statistics</th>
<th>Degree of Freedom</th>
<th>P-value</th>
<th>Odd Ratio (OR)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>1.866</td>
<td>0.117</td>
<td>253.379</td>
<td>1</td>
<td>6.464</td>
</tr>
</tbody>
</table>

*P<0.05

Considering the factors affecting medication adherence, the logistics regression model shows that there was significant association between proximity/ closeness of ART centres to patients’ house and medication adherence. Thus, proximity of patients’ house or nearest to the ART centres is 0.180 times more likely to influence medication adherence ($\beta = -1.716, \text{Odd Ratio } [OR] = 0.180, p < 0.05$). As distance to ART centres decreases, then medication adherences increases.

Also, there was a significant relationship between refusal of service at patients’ ATR clinics during working hours in the past for any reason and their medication adherence. Prompt service to people living with HIV without hesitation is 28.577 times more likely to influence adherence medication ($\beta = 3.353, \text{Odd Ratio } [OR] = 28.577, p < 0.05$). This implies that, the more the prompt ART services increases the more the adherence of the medications.

In the same vein, there was a significant association between financial constraints for patients in seeking medical services with respect to the use of ARVs and good medication adherence. Financial constraints of patients living with HIV in seeking medical services is 6.543 times more likely to influence medication adherences in the study location ($\beta = 1.878, \text{Odd Ratio } [OR] = 6.543, p < 0.05$). This means that an increase in financial resources of the patients will increase their medication adherences.

The religious belief system of people living with HIV is significant associated with their medication adherences. The decrease in the religious belief system will increase medication adherences of ART. The religion of patients is 0.167 times more likely to influence medication adherences ($\beta = -1.793, \text{Odd Ratio } [OR] = 0.167, p < 0.05$).

In light of these, only proximity/ closeness of ART centres to patients’ house, refusal of service at patients ATR clinic during working hours for any reason, financial constraints for patients in seeking medical services and religious belief system of patients become strong influencing factors that influence mediation adherences to treatment of people living with HIV.
Table 5. Logistics regression model of factors influencing medication adherences

<table>
<thead>
<tr>
<th>Dependent Variable: Respondents ever careless in taking ARVs in the past</th>
<th>Beta Coefficient</th>
<th>Standard Error</th>
<th>Wald Statistics</th>
<th>Degree of Freedom</th>
<th>P-value</th>
<th>Odd Ratio (OR)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>-2.182</td>
<td>3.046</td>
<td>0.513</td>
<td>1</td>
<td>0.474</td>
<td>0.113</td>
</tr>
<tr>
<td>Existences of barriers in seeking medical services regarding ART</td>
<td>0.619</td>
<td>0.365</td>
<td>2.871</td>
<td>1</td>
<td>0.090</td>
<td>1.857</td>
</tr>
<tr>
<td>Preference locations of ART medical services</td>
<td>0.008</td>
<td>0.198</td>
<td>0.001</td>
<td>1</td>
<td>0.969</td>
<td>1.008</td>
</tr>
<tr>
<td>Proximity/ closeness of ART centres to patients house</td>
<td>-1.716</td>
<td>0.439</td>
<td>15.276</td>
<td>1</td>
<td>0.000*</td>
<td>0.180</td>
</tr>
<tr>
<td>Nearest centre to patients house</td>
<td>0.158</td>
<td>0.203</td>
<td>0.608</td>
<td>1</td>
<td>0.435</td>
<td>1.171</td>
</tr>
<tr>
<td>Denial to receiving ARVs drugs from clinic before</td>
<td>-0.835</td>
<td>0.907</td>
<td>0.849</td>
<td>1</td>
<td>0.357</td>
<td>0.434</td>
</tr>
<tr>
<td>Refusal of service at patients ATR clinic during working hours before for any reason</td>
<td>3.353</td>
<td>0.889</td>
<td>14.234</td>
<td>1</td>
<td>0.000*</td>
<td>28.577</td>
</tr>
<tr>
<td>Convenience hours the facility open for patients</td>
<td>0.871</td>
<td>1.028</td>
<td>0.717</td>
<td>1</td>
<td>0.397</td>
<td>2.389</td>
</tr>
<tr>
<td>Money constraints for patients in seeking medical services</td>
<td>1.878</td>
<td>0.320</td>
<td>34.418</td>
<td>1</td>
<td>0.000*</td>
<td>6.543</td>
</tr>
<tr>
<td>Buying ARVs in the past</td>
<td>0.001</td>
<td>1.014</td>
<td>0.000</td>
<td>1</td>
<td>0.999</td>
<td>1.001</td>
</tr>
<tr>
<td>Religious belief system of patients</td>
<td>-1.793</td>
<td>0.701</td>
<td>6.540</td>
<td>1</td>
<td>0.011*</td>
<td>0.167</td>
</tr>
</tbody>
</table>

*P<0.05

Conclusion

Majority are aware of the benefits of adhering to treatment. One of the major influencer of medication adherence is treatment supporter who have significantly helped participants to stick to their medication. However, it is important to take the young women and girls into consideration when designing programs that can scale up adherence to treatment in HIV programs. An organized comprehensive education on medication adherence that is responsive to the need of young women and adolescent girls is important and may become a necessity for these challenges associated to living healthy.

Citations

Folajimini Oluwasina et al, 2018: Factors influencing adherence to antiretroviral drugs among HIV positive young women and adolescent patients in north central Nigeria

Acknowledgements

I acknowledge the 473 young women and adolescent patients (respondents) who participated in this study for their time and patience.

References


[28]. WHO. (2013). Number of people receiving antiviral therapy (ART) and percentage of all people living with HIV receiving ART in low- and middle-income countries overall and by WHO region, 2013.

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Abstract

Background: In most communities, the first level of healthcare visit is usually the community pharmacies hence, has the chance to detect HIV for the provision of early intervention for HIV services. Consequently, if access to HIV care, treatment and prevention services is enhanced at the level of community pharmacies, the burden of HIV/AIDS in Nigeria will be reduced significantly.

Purpose: The study assessed the knowledge of community pharmacists regarding HIV/AIDS and its management and their level of standard precautions practice.

Methods: Out of 242 community pharmacists in Abuja Municipal Area Council (AMAC), Federal Capital Territory, a total of 155 registered community pharmacists who had valid practicing license were randomly selected. A questionnaire specifically designed for this study was self-administered to these participants. SPSS was used for the analysis, a P-value of less than 0.05 was regarded as significant and Chi-square tests were applied for inferential analysis.

Results: Within the 155 community pharmacists sampled, complete response were obtained from 104 (67%) community pharmacists. The mean age of the participants was 44.3 years (SD ± 2.47). There were 72.1% males. 80.8% of the participants had only Bachelor of Pharmacy degree, 79.8% of participants reported correctly that HIV can be transmitted through with blood and semen and this was significantly associated with level of education (p = 0.002). Most of the participants (92.3%) did not know the HIV transmission rate from mother to child in the deficiency of antiretroviral drugs in developing countries and only 37.8% of community pharmacists keep stock of antiretroviral drugs for post exposure prophylaxis. Many of the participants (83.0%) had good knowledge of the concept of standard precaution and 76.0% knew the conditions of which standard precautions should be practiced. 57.5% of the participants wash their hands with soap and water always after any direct contact with patients, 63.2% recap used needles after giving injections or drawing blood from the patients. Only 26.9% had been vaccinated against Hepatitis B.

Conclusion: The finding of this study revealed that the knowledge and practice of community pharmacists in HIV/AIDS is relatively poor especially mother–child transmission. In as much as the knowledge of community pharmacists on standard precaution was good, there were paucities in their practice of standard precaution especially in the area of handling and disposal of used needles, poor availability of HIV post exposure prophylaxis drugs and vaccination against Hepatitis B. Management of HIV/AIDS should be integrated into the curriculum for continuing professional development for pharmacists. The implementation of adherence to the principles of standard precaution through consistent monitoring and supervision is highly recommended.

Keywords: Community pharmacists, knowledge and practices, HIV/AIDS & standard precautions.

Literature review

Approximately about 36.9 million people were living with HIV globally as at 2017 (WHO 2018) and when compared with about 27.4 million in 2000, it can be deduced that there has been an incessant transmission of the virus despite a recorded improved access to antiretroviral drugs which have aided to
reduce the mortality rate of the disease. HIV/AIDS has caused many deaths in Africa and is one of the main public health concerns in many African countries for example, Sub-Saharan Africa accounts for about two-thirds globally of people living with HIV. HIV spread made a quantum leap in Africa during the 20th century due to urbanization, poverty, prostitution, education and health care (Van Niekerk A., Loretta MK., 2005). Nigeria being the second largest epidemic globally had about 3.2 million people living with HIV in 2016 (UNAIDS 2017) which affects all geographic areas and virtually all the population groups. Due to the healthcare providers to fight HIV epidemic both at the public health facilities and private health care facilities including the community pharmacies. Care and support are insufficient due to inadequate staff in terms of manpower and capacity.

Many healthcare providers have not had the necessary and satisfactory training on HIV prevention and treatment, and many healthcare facilities lack working materials, medications and equipment (Physicians for Human rights, 2006). Not all healthcare workers are knowledgeable of how HIV is transmitted (Aisien AO, 20 05). There are gaps in the knowledge of HIV by healthcare workers especially in their attitude and counselling practice and it is recommended very necessary that additional training be provided to them (Hentgen et al; 2002). Private Medical doctors owned up to having deficient knowledge, attitude and practice to PMTCT and 90.1 % were willing to attend a capacity building course to update their knowledge (Okike et al; 2011). The knowledge, attitudes and practices of healthcare workers in HIV post exposure prophylaxis is high and the practice of wearing gloves during work activities was also high (Saoud et al;2013). The knowledge and practice of healthcare workers generally influence the quality of care provided to people living with HIV and their ability and willingness to access care (Dorothy Oqua et al 2011). Lack of proper training affect healthcare workers negatively on their work, stigma and shared confidentiality affect them emotionally. The need for speeded up training on HIV/AIDS of the rural nurses, a broader application of universal precautions and provision of post exposure prophylaxis in the public health facilities in South Africa were advocated for (Delobelle et al; 2009). Community pharmacies are possible outlet for improved access to HIV services since the community pharmacists dwell in the community among the people, interact with them daily and respected in the community (Micheal Thompson, 1999). Patients who are being provided medication therapy management by community pharmacists who have received intensive training on the management of HIV/AIDS such as adherence monitoring, adverse drug reaction identification and management, refill reminder services, rational use of drugs and referral when necessary for other medical services; have been found to be more adherent to their medication and better use of their medication (Hirsch et al; 2009).

Healthcare workers are often at risk of exposure to blood and other body fluids such as hepatitis B virus, hepatitis C virus and human immunodeficiency virus (HIV) during the course of their job (Shiao J. et al; 2002), therefore it is very crucial to prevent such exposure. Health workers ought to be vaccinated against hepatitis B to protect them and also their patients. Many healthcare workers fail to adhere to the practice of standard precaution (Garbus L, 2003, Mbanya DN. Et al 2001, Talashek ML. et al 2007). How much HIV transmission due to unsafe healthcare practices in Africa is debatable hence, eradicating every unsafe practice in health facilities ought to be a primacy for HIV prevention and for other infection control (Gisselquist D, Poterat JJ 2004, Schmid GP, et al; 2004). Occupational exposure can be due to needle stick, splash of blood into the eyes or blood contact with non-intact skin (Worker Health Chart book, 2004) seen as a serious problem and is a common cause of many disease transmission and mortality. All community pharmacy staff should be immunized against hepatitis B so that they do not get infected due to needle stick injury when accepting returned patient medicines due to returned lancets inside the bags of returned medicines (Pharmaceutical Journal, 2011).In some community pharmacies, clinical services such as immunization, blood glucose testing etc. are provided, thus staff can be exposed to accidental spillage of blood and body fluids when carrying out their activities e.g. provision of first aid (Pharmaceutical Journal, 2011). Some pathogens transmitted from one person to other cause nosocomial infections through health workers who do not practice control measures such as hand disinfection, use of gloves etc. between
patients (Horn WA. et al; 1988). A reduction of exposure risk to blood and body fluids has been demonstrated by compliance to principles of standard precaution (Chan R. et al; 2002). It is recommended that capacity building through continuing educational modules on hospital infection produces positive effect on adherence to infection control procedures and compliance to barrier techniques (Angelillo et al; 1999). Regular hand wash is a good way to prevent spread of common viruses and infections such as influenza and therefore should be encouraged. The knowledge and practice of standard precautions of healthcare workers in Federal Medical Center Asaba, Delta state Nigeria was found fair, however the need for further improvement through intensive healthcare training on various aspects of standard precautions and infection control programs was seriously recommended (Isara AR1, Ofili AN; 2010).

Adinma ED et al; 2009 examined the knowledge and practice, as well as factors influencing universal precautions practices amongst Nigerian House officers and nurses in tertiary health institutions in Southeast Nigeria and found that knowledge of universal precautions measures was high for both categories of respondents; 97.0% for doctors and 92.0% for nurses, although practice was better for nurses, 75.0%, compared to the doctors, 15.2%, p < 0.05. The study concluded that the effective knowledge and practice of universal precautions amongst hospital workers are very important to prevent infections from blood and body fluid pathogens. Hamid et al in their study of the knowledge of blood-borne infectious diseases and the practice of universal precautions amongst health workers in a tertiary hospital in Malaysia observed that there was a small positive correlation between knowledge and actual practice of universal precautions (r = 0.3000, n = 206, p < 0.001) amongst the cohort studied. Factors such as age and years of experience did not contribute towards acquiring knowledge of blood-borne diseases or the practice of universal precautions. Compliance with non-recapping of usual needles was highest among trained nurses and worst with doctors (Sadoh WE. et al; 2006). A high percentage (94.6%) of healthcare workers performed hand washing after handling patients while less than two-thirds of respondents (63.8%) always used protective equipment.

Education has a positive impact on retention of knowledge, attitudes and practices among various categories of healthcare workers, compliance with interventions should be mandatory in order to reduce the incidence of nosocomial infections and there is a need to develop a system of continuous education for all level of healthcare workers (Suchitra and Lakshmi Devi, 2007).

**Mythology**

**Setting**

Abuja Municipal Area Councils was created on the 1st October, 1984 and comprises of the following ethnic groups: Gbagyi, Gwanda, Koro, Gade, and Nigers Spread across other ethnic groups. The Main Gbagyi settlement in AMAC includes: Karu, Nyanya, DurumiGarki, Ketti, Kabusa, Mabushi, Jabu, Lugbe, IdoToge, Hulumi, Pyakasa, Jikwoyi, Kurudu, OrozoMaitama and Asokoro areas. The Gwandaras are commonly found in Karshi, Nyanya, Sheretti, Gwagwa and Karmo areas. The rest of the population are distributed among these communities in pockets of settlements (Federal Capital Territory Area Councils Services Secretariat web portal, 2013).

The Community Pharmacy is usually the first point of call for those in need of healthcare services, thus presenting opportunity for early intervention services such as referrals, treatment, counselling and palliative care. They are readily accessible & render affordable services. They have functional operational systems and a client base who have confidence in their person/practice & hence willing to confide in them. The Community Pharmacists are respected community members of the communities located within the communities. They Are professional and competent and have long service hours (Usually open 8am-9pm). The goals of this research are to ascertain the knowledge and practice of community pharmacists’ in HIV/AIDS and standard precaution.
Map of Abuja municipal council

Selection criteria

Eligibility criteria to be included in the study are:

- Superintendent pharmacists in a community pharmacist located in AMAC.
- A valid practicing license
- You must be a registered community pharmacist
- Only pharmacists that consented to participate were included in the study.

Any patient who did not meet each of these criteria was excluded from the study.

Study design

This study is an analytical, cross-sectional study. The information was collected from the community pharmacists working in Abuja Municipal Area Council in FCT, Nigeria.

Study population

The study population included 242 registered community pharmacists in Abuja Municipal Area Council (AMAC) out of which 155 met the selection/inclusion criteria.

Sample size calculation and sampling

The sample size (n) was calculated as follows (Yamane, 1967):

\[ n = \frac{N}{1 + N(e)^2} \]

Where \( n \) = the sample size; \( N \) = the study population = 242; \( e \) = the level of precision (± 5%). Therefore,

\[ n = \frac{242}{1 + 242(0.05)^2} = 150.8 \approx 151 \text{ community pharmacists} \]

The calculated sample size (n) was a total of 151 community pharmacists; however, the sample included 155 community pharmacists to accommodate for losses due to incomplete or missing data on
important variables of interest. Out of the study population, 155 community pharmacists were selected using simple random technique.

**Ethical consideration**

Ethical approval for this study was obtained from FCT Health Research Ethics Committee (FHREC), Abuja Nigeria. Informed consent was obtained from the participants and confidentiality was assured by excluding identifiers during analysis.

**Reliability and validity**

Questionnaires were given to the experts in the field for content validity and were also pretested before they were administered.

**Data collection**

The pre-tested questionnaire was distributed to 155 community pharmacists. These pharmacists were randomly selected from a population of 242 community pharmacists located in AMAC. The questionnaires were self-administered and distributed to the pharmacies and also at the Association of Community Pharmacists in Nigeria, Abuja chapter forum, the pharmacists were given a deadline by which the completed questionnaires will be collected. The questionnaire consisted of 49 questions divided into 3 sections. Section 1 addressed demographic issues, section 2 addressed their knowledge and management practice of HIV/AIDS of which they were to choose A-E, while section three addressed their knowledge and practice of standard precaution of which they were to choose 1-5 and in some Yes or No.

**Data analysis**

To describe patient characteristics, proportions and medians were calculated. We compared proportions using chi-square tests. Chi-square was used to determine association between categorical variables and a P-value of less than 0.05 was considered significant. Data was presented in tabular and graphical forms.

**Results**

**Characteristics of participants**

A total of 104 community pharmacists were sampled in this study, 75 (72.1%) were males and 29 (27.9%) were females. Majority 80 (76.9%) of the participants were aged 25-44 years, and only 6 (5.8%) and 18 (17.3%) were less than 25 years and greater than 44 years, respectively. The mean age of the participants studied was 32.88 years (standard deviation (SD) = 8.12) and the mean year of experience at work was 4.43 years (SD = 2.47). 26.9% have been working for less than 1 year, 45.2% for 1 – 5 years, 14.4% for 6-10 years, 4.8% for 16-20 years and 2.9% for 21- 25 years. Majority 84 (80.8%) of the participants had only Bachelor of Pharmacy in their level of education, 7 (6.7%) had Pharm D while 11 (10.6%) had Master’s degree. Of the participants, 74 (71.2%) were fully employed and 27(26%) were part time workers. The socio-demographic characteristics of the participants are summarized in [Table 1].

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sex</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>75</td>
<td>72.1</td>
</tr>
<tr>
<td>Female</td>
<td>29</td>
<td>27.9</td>
</tr>
<tr>
<td><strong>Age group (years)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15 – 24</td>
<td>6</td>
<td>5.8</td>
</tr>
<tr>
<td>25 – 44</td>
<td>80</td>
<td>76.9</td>
</tr>
<tr>
<td>45 – 64</td>
<td>18</td>
<td>17.3</td>
</tr>
</tbody>
</table>
Knowledge of community pharmacists regarding HIV/AIDS

All participants reported correctly that HIV/AIDS is a contagious disease caused by virus. The knowledge of the causative agent of HIV was not associated with educational status and years of professional experience of the participants (p > 0.05).

Of the participants, 83 (79.8%) of them reported correctly that HIV can be transmitted through direct contact with blood and semen. The participants’ knowledge of HIV transmission through contact with blood and semen was significantly associated with level of education (p = 0.002). Of the participants, 68 (81.9%) of them with only B. Pharm degree reported correctly that HIV is transmitted through direct contact with blood and semen compared to 4 (57.1%) of those with PharmD degree and 11 (100%) of those with Master’s degree.

The years of professional experience of the participants was not significantly associated with knowledge of HIV transmission through contact with blood and semen (p = 0.299). Of the participants who had < 1-year professional experience, 23 (82.1%) were correct about HIV transmission through contact with blood and semen compared to 34 (72.3%) for 1 – 5 years, 15 (100.0%) for 6 – 10 years, 5 (100.0%) for 16 – 20 years and 3 (100.0%) for 21 – 25 years.

Majority of the participants indicated correctly that HIV can be transmitted through sharing of razor blades [Figure 1]. The differences in knowledge of this mode of transmission by participants’ level of education was not statistically significant (p = 0.299) unlike the participants’ years of professional experience (p = 0.016). All participants who had 6-10 and 21-25 years of professional experience indicated correctly that HIV can be transmitted through sharing of razor blades compared to 93.6% for 1 – 5 years of experience and 60.0% for 16 – 20 years of experience.
Figure 1. Frequency distribution of participants responses to routes of HIV transmission disaggregated by level of education, N = 104

Of the participants 93(89%) reported correctly that staying healthy by eating nutritious food is not a preventive measure to HIV infection [Figure 2].

Figure 2. Frequency distribution of non-preventive measures for HIV infection as indicated by the participants; N = 104

Majority of participants (92.3%) did not know that the HIV transmission rate from mother to child in the absence of antiretroviral drugs in developing countries was 25-35%. The lack of knowledge about this was associated with participants’ level of education (p = 0.001) and years of experience (p = 0.000). Of the participants who had B. Pharm, 92.9% did not know HIV transmission rate from mother to child in the absence of antiretroviral drugs in developing countries, compared to 57.1% for Pharm D and 100% for participants who had Master’s degree. Of the participants who had <1 year of professional experience, 80.8% did not know HIV transmission rate from mother to child in the absence of antiretroviral drugs in developing countries, compared to 100% for 1-5 years, 75% for 6-10 years, 100% for 16-20 years and 100% for participants who had 21-25 years of professional experience. Majority of the participants (91.5%) indicated correctly that Tuberculosis is the most common opportunistic infection in HIV-infected patients [Figure 3].
Majority of participants (79.8%) did not know that the chief predictor of heterosexual transmission of HIV is plasma viremia. Of the participants who had B. Pharm, 78.9% did not know that the chief predictor of heterosexual transmission of HIV is plasma viremia, compared to 85.7% for Pharm D and 63.6% for participants who had Master’s degree. Of the participants who had <1 year of professional experience, 80.9% did not know that the chief predictor of heterosexual transmission of HIV is plasma viremia, compared to 80% for 1-5 years, 66.7% for 6-10 years, 100% for 16-20 years and 100% for participants who had 21-25 years of professional experience.

HIV Related Services Practiced at Community Pharmacies

All CPs sampled had visibly placed valid practicing license issued by the Pharmacists Council of Nigeria and a pharmacist to supervise the dispensing of drugs as required by law. Of the CPs, only 77.7% had patient counseling area with audio and visual privacy; and 49.0% reported that they provide services to HIV infected clients. Only 37.8% of CPs in this study reported stocking antiretroviral drugs; and 47.9% of them had records of the patient medication profile. Of the community pharmacists, only 63.2% were trained in Pharmaceutical Care in HIV/AIDS, TB and STI.

The common HIV related services provided at the community pharmacies were HIV risk assessment and counseling for clients (43.6%) and palliative care services (72.1%) - Table 2. Other common services provided at the community pharmacies included malaria prevention (91.7%), STI treatment (93.8%), provision of condoms (92.5%) and referral services (94.9%). The HIV related Services provided at Community Pharmacies are summarized in [Table 2].

**Table 2.** Frequency distribution of HIV related Services provided at Community Pharmacies

<table>
<thead>
<tr>
<th>Question Items</th>
<th>Yes (%)</th>
<th>No (%)</th>
<th>Total, N (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>HTC SERVICES</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Does the pharmacist do HIV Risk Assessment &amp; counseling for his clients?</td>
<td>41 (43.6)</td>
<td>53 (56.4)</td>
<td>94 (90.4)</td>
</tr>
<tr>
<td>Does the pharmacist provide HIV testing &amp; counseling services?</td>
<td>11 (15.1)</td>
<td>62 (84.9)</td>
<td>73 (70.2)</td>
</tr>
<tr>
<td><strong>TB SERVICES</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Does the pharmacist provide TB services?</td>
<td>29 (34.5)</td>
<td>55 (65.5)</td>
<td>84 (80.8)</td>
</tr>
<tr>
<td>Does the pharmacist provide TB Screening?</td>
<td>7 (13.7)</td>
<td>44 (86.3)</td>
<td>51 (49.0)</td>
</tr>
<tr>
<td>Does the pharmacist provide TB Adherence Support?</td>
<td>7 (13.7)</td>
<td>44 (86.3)</td>
<td>51 (49.0)</td>
</tr>
<tr>
<td>Does the pharmacist provide TB Drugs Refills?</td>
<td>19 (32.8)</td>
<td>39 (67.2)</td>
<td>58 (55.8)</td>
</tr>
<tr>
<td>Does the pharmacist provide DOTs/Community</td>
<td>7 (14.3)</td>
<td>42 (85.7)</td>
<td>49 (47.1)</td>
</tr>
<tr>
<td>TB Care?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-------------------------------</td>
<td>-------</td>
<td>-------</td>
<td>-------</td>
</tr>
<tr>
<td><strong>PALLIATIVE CARE SERVICES</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Does the pharmacist provide palliative care services to PLHIV?</td>
<td>62 (72.1)</td>
<td>24 (27.9)</td>
<td>86 (82.7)</td>
</tr>
<tr>
<td>Does the pharmacist provide Adherence Counseling to PLHIV?</td>
<td>45 (71.4)</td>
<td>18 (28.6)</td>
<td>63 (60.6)</td>
</tr>
<tr>
<td>Does the pharmacist provide OI management to PLHIV?</td>
<td>34 (52.3)</td>
<td>31 (47.7)</td>
<td>65 (62.5)</td>
</tr>
<tr>
<td>Does the pharmacist provide Palliative care to PLHIV?</td>
<td>62 (72.1)</td>
<td>24 (27.9)</td>
<td>86 (82.7)</td>
</tr>
<tr>
<td>Does the pharmacist provide Pain Management to PLHIV?</td>
<td>43 (69.4)</td>
<td>19 (30.6)</td>
<td>62 (59.6)</td>
</tr>
<tr>
<td>Does the pharmacist provide Psychosocial support to PLHIV?</td>
<td>43 (69.4)</td>
<td>21 (32.8)</td>
<td>64 (61.5)</td>
</tr>
<tr>
<td>Does the pharmacist provide OI management to PLHIV?</td>
<td>34 (52.3)</td>
<td>31 (47.7)</td>
<td>65 (62.5)</td>
</tr>
<tr>
<td>Does the pharmacist provide Nutritional Support and Counseling to PLHIV?</td>
<td>43 (69.4)</td>
<td>19 (30.6)</td>
<td>62 (59.6)</td>
</tr>
<tr>
<td><strong>MALARIA SERVICES</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Does the pharmacist provide Malaria Prevention to PLHIV?</td>
<td>50 (91.7)</td>
<td>16 (8.3)</td>
<td>66 (63.5)</td>
</tr>
<tr>
<td>Does the pharmacist provide Malaria Treatment to PLHIV?</td>
<td>53 (76.8)</td>
<td>16 (23.2)</td>
<td>69 (66.4)</td>
</tr>
<tr>
<td><strong>STI SERVICES</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Does the pharmacist provide STI services?</td>
<td>77 (84.6)</td>
<td>14 (15.4)</td>
<td>91 (87.5)</td>
</tr>
<tr>
<td>Does the pharmacist provide STI Screening?</td>
<td>19 (30.6)</td>
<td>43 (69.4)</td>
<td>62 (59.6)</td>
</tr>
<tr>
<td>Does the pharmacist provide STI Treatment?</td>
<td>76 (93.8)</td>
<td>5 (6.2)</td>
<td>81 (77.9)</td>
</tr>
<tr>
<td>Does the pharmacist provide STI Counseling?</td>
<td>79 (91.9)</td>
<td>7 (8.1)</td>
<td>86 (82.7)</td>
</tr>
<tr>
<td><strong>RH/FP SERVICES</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Does the pharmacist provide RH/FP services?</td>
<td>77 (89.5)</td>
<td>9 (10.5)</td>
<td>86 (82.7)</td>
</tr>
<tr>
<td>Does the pharmacist provide Condoms?</td>
<td>74 (92.5)</td>
<td>6 (7.5)</td>
<td>80 (76.9)</td>
</tr>
<tr>
<td>Does the pharmacist provide Emergency Contraceptive?</td>
<td>65 (86.7)</td>
<td>10 (13.3)</td>
<td>75 (72.1)</td>
</tr>
<tr>
<td>Does the pharmacist provide Injectable Contraceptives?</td>
<td>67 (82.7)</td>
<td>14 (17.3)</td>
<td>81 (77.9)</td>
</tr>
<tr>
<td>Does the pharmacist provide Oral Contraceptives Provided?</td>
<td>69 (89.6)</td>
<td>8 (10.4)</td>
<td>77 (74.0)</td>
</tr>
<tr>
<td>Does the pharmacist provide RH/FP Counseling services?</td>
<td>55 (78.6)</td>
<td>15 (21.4)</td>
<td>70 (67.3)</td>
</tr>
<tr>
<td><strong>REFERRAL SERVICES</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Does the Pharmacist provide Referral Services?</td>
<td>75 (94.9)</td>
<td>4 (5.1)</td>
<td>79 (76.0)</td>
</tr>
<tr>
<td>Do you call on or refer client to a pharmacy for HIV drugs?</td>
<td>12 (28.6)</td>
<td>30 (71.4)</td>
<td>42 (40.4)</td>
</tr>
<tr>
<td>Do you refer clients to a nearby Primary health care for HIV services?</td>
<td>14 (66.6)</td>
<td>8 (36.4)</td>
<td>22 (21.2)</td>
</tr>
<tr>
<td>Do you refer clients to a tertiary hospital for HIV services?</td>
<td>37 (94.9)</td>
<td>2 (5.1)</td>
<td>39 (37.5)</td>
</tr>
</tbody>
</table>

The knowledge of standard precaution by community pharmacists

Majority of participants (83.0%) had good knowledge of the concept of standard precaution. There was significant differences in knowledge by level of education (P = 0.000) and years of professional
experience (p = 0.000). Of the participants who had B. Pharm, 88.2% had very good knowledge of standard precaution concept, compared to 57.1% for Pharm D and 77.8% for participants who had Master’s degree. Of the participants who had <1 year of professional experience, 76.2% had very good knowledge of standard precaution concept, compared to 95.7% for 1-5years, 66.7% for 6-10 years and 60% for 16-20 years.

**What are potential ways of occupational exposure?**

Of the participants 56(59.0%) indicated correctly all the potential ways of occupational exposure [Figure 4]. The knowledge of potential ways of occupational exposure was associated with participants’ level of education (p = 0.000) and years of experience (p = 0.000). Of the participants who had B. Pharm, 49 (63.6%) %) indicated correctly all the potential ways of occupational exposure, compared to 0(0.0%) for Pharm D and 7(77.8%) for participants who had Master’s degree. Of the participants who had <1 year of professional experience, 38.5% %) indicated correctly all the potential ways of occupational exposure, compared to 33(70.2%) for 1-5years, 5(50%) for 6-10 years, 5(100%) for 16-20 years and 0% for participants who had 21-25 years of professional experience.

![Figure 4. Frequency distribution of potential ways of occupational exposure, N = 104](image)

**According to the standards precautions, hand washing is performed?**

Knowledge of Standard precaution of when hand washing is performed was significantly associated with the level of education (p = 0.016) and years of professional experience of the participants (p = 0.000). Of the participants, 54 (73.0%) of them with only B. Pharm degree reported correctly when hand washing is performed compared to 1 (25.0%) of those with PharmD degree and 4 (44.4%) of those with Master’s degree.

Of the participants who had < 1-year professional experience, 14 (60.9%) were correct about when hand washing is perfomed compared to 36 (80.0%) for 1 – 5 years, 6 (46.2%) for 6 – 10 years, 5 (100.0%) for 16 – 20 years and 0 (0.0%) for 21 – 25 years.

**For which of these conditions should standard precautions be followed?**
Majority of participants 73 (76.0%) reported correctly the conditions of which standard precautions should be practiced (Figure 5). The knowledge of the conditions of which standard precautions should be practiced was statistically associated with educational status (p = 0.031) and years of professional experience of the participants (p = 0.002).

Of the participants, 63 (79.7%) of them with only B. Pharm degree reported correctly the conditions of which standard precautions should be practiced compared to 1 (25.0%) of those with PharmD degree and 7 (63.6%) of those with Master’s degree.

Of the participants who had < 1-year professional experience, 16 (64.0%) were correct about conditions of which standard precautions should be practiced compared to 38 (80.6%) for 1 – 5 years, 13 (61.5%) for 6 – 10 years, 5 (100.0%) for 16 – 20 years and 3 (100.0%) for 21 – 25 years.

**Which of the following body fluids require standard precautions?**

Of the participants 90(95.7%) reported correctly that blood, vaginal fluid, blood tinged body fluids and Saliva in dental procedures require standard precautions – Figure 5.

![Which of the following body fluids require standard precautions?](image)

**Figure 5.** Frequency distribution of participants’ responses to body fluids that require standard precautions disaggregated by level of education, N = 104

**For HIV post exposure prophylaxis (PEP), HIV counseling & testing is done immediately after the exposure and PEP is given only to HIV negative test result**

The differences in the knowledge of standard precaution is not statistically significant in their level of education (p = 0.392) but was significant in their length of professional experience (p = 0.000). Of the participants, 31 (45.6%) of them with only B. Pharm degree reported correctly that for HIV post exposure prophylaxis (PEP), HIV counseling & testing is done immediately after the exposure and PEP is given only to HIV negative test result conditions of which standard precautions should be practiced compared to 3 (75.0%) of those with Pharm D degree and 5 (55.6%) of those with Master’s degree.

Of the participants who had < 1 year professional experience, 12 (52.2%) were correct about HIV post exposure prophylaxis (PEP), HIV counseling & testing is done immediately after the exposure and PEP is given only to HIV negative test result compared to 18 (41.9%) for 1 – 5 years, 6 (54.6%) for 6 – 10 years, 0 (0.0%) for 16 – 20 years and 3 (100.0%) for 21 – 25 years.

**Two or three antiretroviral drugs are given immediately after the exposure but within 72 hours**
Majority of participants 71 (88.8%) reported correctly that two or three antiretroviral drugs are given immediately after the exposure to HIV but within 72 hours (Figure 6). The knowledge of when post exposure prophylaxis should be given was statistically associated with educational status (p = 0.050) and years of professional experience of the participants (p = 0.000).

Of the participants, 58 (89.2%) of them with only B. Pharm degree reported correctly the conditions of which standard precautions should be practiced compared to 4 (57.1%) of those with PharmD degree and 9 (81.8%) of those with Master’s degree.

Of the participants who had < 1-year professional experience, 16 (76.2%) were correct about conditions of which standard precautions should be practiced compared to 41 (95.3%) for 1 – 5 years, 11 (100.0%) for 6 – 10 years, 0 (0.0%) for 16 – 20 years and 3 (100.0%) for 21 – 25 years.

**Figure 6.** Frequency distribution of participants correct responses to standard precaution practices to HIV post exposure disaggregated by level of education, N = 104

**Antiretroviral drug is taken for 4 weeks**

Majority of participants 59 (83.1%) reported correctly that antiretroviral drug is taken for 4 weeks - Figure 7. The differences in knowledge of precaution by participants’ level of education was statistically significant (p = 0.014) unlike the participants’ years of professional experience (p = 0.000). All participants who had 16 -20 years and 21-25 years of professional experience indicated correctly that antiretroviral drug is taken for 4 weeks for post exposure prophylaxis to HIV compared to 68.8% for 1 – 5 years of experience and 66.7% for 6 – 10 years of experience.

**Figure 7.** Frequency distribution of participants’ responses to whether antiretroviral drug is taken for 4 weeks disaggregated by level of education, N = 104
The practice of standard precaution by community pharmacists

Majority of the participants wash their hands with soap and water *always* after any direct contact with patients 50 (57.5%), while 26 (29.9%) *often* wash their hands with soap and water after any direct contact with patients, and 11 (12.6%) *seldom* wash their hands with soap and water after any direct contact with patients.

Majority of the participants recap used needles after giving injections or drawing blood from the patients 48 (63.2%), while 20 (26.3%) do not recap used needles after giving injections or drawing blood from the patients and 8 (10.5%) remove needles from the disposal syringes after giving injections or drawing blood from the patients.

Majority of the participants use a puncture proof container when discarding used needles and sharps 36 (50%) compared to 19 (25.0%) use a closed dust bin when discarding used needles and sharps, 8 (10.5%) use any available container while 9 (11.8%) use a dust bin covered with plastic.

Majority of the participants *always* wear gloves for contact with body fluids, non-intact skin and mucous membrane 65 (81.3%) compared to 10 (12.5%) that *often* wear gloves for contact with body fluids, non-intact skin and mucous membrane and 5 (6.3%) that *seldom* wear gloves for contact with body fluids, non-intact skin and mucous membrane.

Majority of participants always cover all cuts and abrasions with a water proof dressing when coming in contact with clients 59 (75.6%) compared to 10 (12.8%) that *often* cover all cuts and abrasions with a water proof dressing when coming in contact with clients 2 (2.6%) that *seldom* cover all cuts and abrasions with a water proof dressing when coming in contact with clients and 7 (9.0%) that *never* cover all cuts and abrasions with a water proof dressing when coming in contact with clients.

Other standard precaution practices evaluated include whether sharps disposal containers are located as close as practical to the use area 64 (83.1%), if they had needle stick injury in the last three month 7 (8.4%), if post exposure prophylaxis (PEP) is available 22 (33.8%), awareness of guideline for PEP management 42 (55.3%) and if they have been vaccinated against Hepatitis B 21(26.9%) – Table 3.

### Table 3. Frequency distribution of standard precaution practices by community pharmacists

<table>
<thead>
<tr>
<th>Question Items</th>
<th>Yes (%)</th>
<th>No (%)</th>
<th>Total, N (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>The sharps disposal containers are located as close as practical to the use area</td>
<td>64 (83.1)</td>
<td>13 (16.9)</td>
<td>77 (74.0)</td>
</tr>
<tr>
<td>I have had needle stick injury in the last three month</td>
<td>7 (8.4)</td>
<td>76 (91.6)</td>
<td>83 (79.8)</td>
</tr>
<tr>
<td>Is post exposure prophylaxis (PEP) available</td>
<td>22 (33.8)</td>
<td>43 (66.2)</td>
<td>65 (62.5)</td>
</tr>
<tr>
<td>Are you aware of guideline for PEP management?</td>
<td>42 (55.3)</td>
<td>34 (44.7)</td>
<td>76 (73.1)</td>
</tr>
<tr>
<td>Have you been vaccinated against Hepatitis B?</td>
<td>21 (26.9)</td>
<td>57 (73.1)</td>
<td>78 (75)</td>
</tr>
</tbody>
</table>

**Discussion**

The results obtained from this study are interesting and provide an insight into community pharmacists’ knowledge of HIV/AIDS and standard precautions and their practices. There are a number of trends which are evident, some of which are not surprising, while others are rather worthy of note.

Majority of pharmacists in community practice are male and majority have only Bachelor of Pharmacy degree. Respondents have excellent knowledge of the causative agent of HIV and assigned relatively high scores to non-preventive measure of HIV/AIDS, the transmission routes of HIV and also Tuberculosis as the most common opportunistic infection in HIV-infected patients. This is expected because they are basic information about HIV/AIDS. However, majority did not know the transmission rate from mother
to child in the absence of antiretroviral drugs in developing countries and also did not know that the chief predictor of heterosexual transmission of HIV is plasma viremia. The lack of knowledge about the transmission rate was associated with participants’ level of education and years of experience and could be attributed to participants not updating their knowledge with current issues.

All the participants had valid practicing license and majority had audio-visual privacy to enable them counsel clients privately on one-on one. Most of these pharmacies do not stock antiretroviral drugs and only some of them provide services to HIV clients. This can be attributed to the fact that HIV drugs are given free to clients in the hospitals therefore are hardly bought and may expire on them causing loss. It is worthy to note that many of them have been trained on pharmaceutical care in HIV/AIDS, TB and STI.

All the pharmacies provide one or more HIV related services although not very strongly, such as HIV risk assessment and counseling, palliative care services, HTC services, TB services, and some common services that are very much provided in these pharmacies are malaria prevention, reproductive health services, malaria screening and treatment, STI treatment, provision of condoms and referral services. This is not unexpected since these activities are associated with the traditional functions of community pharmacists and since some community pharmacies in Nigeria are now used as palliative care and referral points to increase demand for HIV services in the community (Dorothy Oqua, 2011). Effective management of HIV/AIDS by community pharmacists is not dependent on their knowledge and practice of standard precaution. In general, this study has shown that the knowledge and practice of community pharmacists in HIV/AIDS management is not intense and hence agrees with the alternate hypothesis which says that effective management of HIV/AIDS by community pharmacists is dependent on their knowledge and practice of standard precaution.

The study shows that many of the community pharmacists have good knowledge of standard precaution concept and when hand washing is supposed to be performed; the level of these knowledge declines as the years of experience increased and as their level of education rose. Studies by Angelillo et al (1999) recommended that attending continuing educational modules about hospital infection had a positive effect on infection control procedures and compliance with barrier techniques (Angelillo et al; 1999). Many of the participants indicated correctly all the potential ways of occupational exposure and becomes more significant as their years of experience and level of education increased. The knowledge of the conditions of which standard precautions should be practiced declined as the level of education rose. Education has a positive impact on retention of knowledge, attitudes and practices in all the categories of health professionals hence, there is a need to develop a system of continuous education for all the categories of health professionals (Suchitra J B and Lakshmi Devi N; 2007). Few of the respondents reported correctly that for HIV post exposure prophylaxis (PEP), HIV counseling & testing is done immediately after the exposure and PEP is given only to HIV negative test result conditions.

In answering questions relating to the practice of standard precaution, only 50% use a puncture proof container when discarding used needles and sharps and 63.2% recap used needles after giving injections or drawing blood from the patients and when compared with their level of education and their years of experience, the practice of standard precaution declined as the years of experience increased and as level of education rose which may be that the respondents in the course of their practice became careless in their practice regarding standard precaution. This therefore, agrees with the hypothesis that ‘Effective management of HIV/AIDS by community pharmacists is not dependent on their knowledge and practice of standard precaution’. Although there has been controversy about how much HIV transmission in Africa is due to healthcare practices (Gisselquist D, Potterat JJ. 2004, Schmid GP et al; 2004), eliminating all unsafe practices in health facilities should be an urgent priority for HIV prevention and for overall infection control.

The fact that a significant proportion practice standard precaution by always wearing gloves for contact with body fluids, non-intact skin and mucous membrane shows that wearing gloves is an important line of defense. Majority of participants always cover all cuts and abrasions with a water proof dressing when coming in contact with clients and have their sharps disposal containers are located as close as practical to
the use area; however majority of the respondents do not have post exposure prophylaxis available and have not been vaccinated against Hepatitis B. Inadequate knowledge and unawareness of guideline for PEP management as well as unavailability of Hepatitis B vaccine may have contributed to these unsafe practices. Only 8.6 % have had needle stick injury in the last three months.

**Conclusion**

This study findings showed that the knowledge and practice of community pharmacists in HIV/AIDS is somewhat poor. Although the knowledge of community pharmacists on standard precaution was good, there were deficiencies in their practice of standard precaution especially in the area of handling and disposal of used needles, availability of post exposure prophylaxis and vaccination against Hepatitis B. Therefore, the null hypothesis which says that effective management of HIV/AIDS by community pharmacists is independent on their knowledge and practice of standard precaution is sustained. HIV/AIDS should be integrated into the curriculum for continuing professional development of pharmacists. The enforcement of adherence to the principles of standard precaution through regular monitoring and supervision is highly advocated.

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An Assessment of Referral System Effectiveness among Health Facilities in Enugu State, Nigeria. (Tertiary, Secondary and Primary Health Facilities)

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Abstract

Background: A good referral system serves as a link between the three levels of health care practiced in Nigeria and ensures the continuity of proper health care service delivery. The effectiveness of referral system is an important determinant of the strength of health care service delivery. This study assesses referral system effectiveness among health facilities (primary, secondary and tertiary) in the urban and rural areas using two local government areas in Enugu State. Objective: To assess referral system effectiveness among health facilities in Enugu State Nigeria. Methodology: A cross-sectional epidemiological study of the analytical type was carried out among health workers in the various levels of health facilities within two local governments in the urban and rural areas in Enugu State. Stratified sampling technique was used to select the study participants. A pretested self-administered questionnaire was used to collect data from the respondents and was analysed using SPSS version 23. Results: The mean age of the respondents was $36.26 \pm 8.73$ (SD) years. There was a good overall knowledge and practice of referral given as 392 (95.6%) and 235 (57.3%) respectively. Majority 74(47.3%) of the respondents had a relatively good knowledge of feedback but do not practice the feedback system of referral. Conclusion and Recommendations: The level of awareness of the referral system was impressive. However, the actual referral practice was not very satisfactory due to the lack of proper feedback and poor follow up. Efforts should be made by the agencies involved towards an improvement of the referral system.

Keywords: Referral system, Effectiveness, Health facilities, Enugu State.

Introduction

The referral system is an important tool to ensure effective health care delivery. The Nigerian Health System operates three levels of health care namely, the primary, secondary and tertiary levels which interact through a referral System. This is a two-way relationship between health facilities ensuring continuity and complementation of health services. The referral system requires cooperation, coordination and exchange of information between the primary health facility and the first referral hospital during the referral and discharge of patient from the hospital. Referral system is needed in the health system to maximize limited resources, avoid duplication of services, promote cooperation and complementation between primary, secondary and tertiary health facilities. Referral can be either external or internal. External referral is a referral done between one health care facility and another. External referral can be vertical or horizontal. A vertical referral is a referral from a lower to higher facility, or from a higher to lower facility. While a horizontal referral is a referral from one facility to another within the same level but different catchment. For instance, a horizontal referral could be when a patient is referred from one tuberculosis treatment centre to another at the same level but probably due to proximity to patient for easier access to medication. On the other hand, an internal referral is a referral done within the same health care level and facility. For instance, in the same tertiary hospital, a patient being managed for cardiac disease by a cardiology unit could be referred to an ophthalmology unit for the index patient’s eyes to be checked. Also, referral can be from public or private sectors through the physician or other health workers. Some patients present directly to the hospital (higher centres) on self-referral by-passing the lower level facilities sometimes based on perceived inadequacies on the lower level facility. The hospital is usually overwhelmed with patients which makes adequate attention difficult to achieve. The tertiary health facilities provide extensive primary and first referral care to clients’ mainly in urban settlements. The primary level of care is the entry point to health care.
system and should be able to provide majority of the essential and basic health care services. The secondary level hospitals are to provide general outpatient and inpatient services accepting referrals from urban and rural PHC, while tertiary hospitals are to provide specialized services to referrals from secondary hospitals \(^4\). In Nigeria, many secondary and tertiary facilities are crowded with people with simple ailments that can be managed at primary health centres while health workers in many of the latter are idle\(^5\).

There are still no adequate trainings and guidelines to carry out proper referral practice, therefore a study that assesses the effectiveness of referral system and practice by the health workers in the different levels of health care facilities in Nigeria should be carried out. Hence this study was designed to assess the referral system effectiveness among health facilities (primary, secondary and tertiary health facilities) in both urban and rural local governments in Enugu state.

### Methodology

#### Study area

The study area is Enugu State. Enugu state was carved out of the old Anambra state in Nigeria and has a population of about 3,267,837. It covers an approximately 12,727 square kilometres. It shares boundaries with six states, boarded by Abia and Imo states in the south, flanked in the east and west by Ebonyi and Anambra states respectively and in the north by Kogi and Benue states. The state lies partly within the tropical rainforest belt to the south, its physical features and vegetation change gradually in the north eastern direction from the tropical rain forest belt to the open woodland and savannah land as it approaches its northern boundary. The native population is entirely Igbo with a sprinkling of Igala near her borders with Kogi state, other ethnic groups are however well represented in the state with a predominance of Hausa and Yoruba communities. The state is well known for its industrial centres and markets with 75% of the state agrarian. It has about 87 federal establishment. However most of the federal establishment are located at the urban or semi urban centres. Virtually no federal establishment could be found in the rural area\(^6\).

#### Study design

A cross-sectional study of the analytical type was carried out among health workers in the various levels of health facilities within two local governments in the urban and rural areas in Enugu state.

#### Study population

The study population are health workers at different levels in the various health facilities in Enugu state. This include health workers from the primary health care facility, secondary health care facility and tertiary health care facility.

#### Sample size determination

The sample size was calculated using the Cochrane’s formula for cross sectional measurement of proportions which states that

\[
n = \frac{Z^2pq}{d^2}
\]

where

- \(n\) = minimum sample size,
- \(Z\) = standard normal deviate that corresponds to 95% confidence interval = 1.96
- \(p\) = 0.595
- \(q\) = 1 - \(p\) = 1 - 0.595 = 0.405
- \(d\) = minimum tolerable error =0.05

Thus, \(n = \frac{1.96^2 \times 0.595 \times 0.405}{0.05^2}\) = 370.291

\(n = 370\)

Also adding the 10% non-response rate, the sample size to be used will be:

- 10% of 370 = 0.1 \(\times\) 370 = 37
- 370 + 37 = 407

Therefore, the sample size for the study is 407.
Sampling method

The target population for this study were health workers in the primary, secondary, and tertiary health facilities in Nkanu West and Enugu North local government areas of Enugu state. In Nkanu West local government area, there are 24 primary health centres, 1 district hospital, 1 cottage hospital, about 10 private clinics and one tertiary hospital. In Enugu North local government area, there are 14 health centres, 1 secondary health facility, about 20 private clinics and one tertiary hospital. A sample of 407 workers was selected.

Data collection

The data collection tool was a semi-structured self-administered questionnaire which was designed using the standard referral guidelines of the Nigerian Federal Ministry of Health. It was divided into 5 sections.

Statistical analysis

Data generated from this study was entered into the computer for analysis and analysed using the Statistical Package for Social Sciences (SPSS) version 23 (Chicago, Ill) Data was analysed quantitatively and presented in the form of frequency tables.

Knowledge was assessed using a scoring system which was computed using 3 knowledge questions for which yes was scored 1 and no was scored 2. The possible range of scores was 3-6. Scores between 3 and 4 were categorised as Good and those above 4 as Poor.

Attitude was assessed using a scoring system which was computed using 4 attitude questions each with a 5-point Likert scale with scores ranging from 1 to 5. The possible range of scores was 4-20. Scores between 4 and 11 were categorised as Good and those between 12 and 20 as Poor.

Practice was assessed using a scoring system which was computed using 8 practice questions for which Yes was scored 1 and No was scored 2. In other questions which had options of Frequently, Occasionally and Never, a possible range of scores of 1 to 4 was used. The total possible range of scores was 8 to 24. Scores between 8 and 15 were categorised as Good and those between 16 and 24 were categorised as Poor.

Association between categorical variables and the Knowledge, attitude and practice of respondents were assessed using Chi square test with statistical significance assumed at p<0.05.

Results

A total of 407 copies of questionnaires were distributed and retrieved. This gives a response rate of 100%.

Table 4.1 shows the socio-demographic variables of the respondents. The mean age of the respondents was 36.26 ± 8.73 (SD) years. About half of each of the respondents were male (202/407) or female (208/407) respectively, majority 63.4% (260/407) were married. Those who attained educational achievement up to tertiary and secondary level 48.5% (198) had the same and the highest educational strata. The mean year of service of the respondents was 9.89 ± 7.48 while the majority of the respondents were doctors 53.9% (219). The teaching hospital has the highest proportion 42.3% (170) as work place of the respondents.

There was no statistically significant relationship between knowledge category and age (p= 0.943). However there was a statistically significant association between age category and practice (p = 19.119)

Table 4.2 shows the knowledge level of the respondents. Most of the respondents had a good knowledge of referral, 95.6% (392). Almost all the respondents 99.8% (406) of the respondents have heard about referral. The most common source of information was health education 84.9%, followed by colleagues 23.7%, radio 14.1%, television 9.3%, and friends/family being the least being 8.0%.

Table 4.3 shows the attitude to referral practice among the respondents. Most of the respondents 91.5% had a positive attitude towards referral practice. Almost all the respondents 97.1% (398) agreed that referral was done to patient’s good, as well as majority 94.4% (387) agreed that they referred patient when necessary. On the other hand, more than half of the respondents 86.4% (354) agreed that referral made them look like they do not know their work.
Tables 4.4 and 4.5 show the level of referral practice among the respondents. Most of the respondents 73.7% (302) refer patients from their centre to other health facilities, with the highest number 86.1% of reason for referral being to ensure that patients receive advanced treatment and lowest number 3.6% of reason for referral being that they do not want patient to die in their facility. About half of the respondents (50.2%) were noted to receive feedback occasionally from the referral centres that they refer their patients to while 47.3% were noted to also occasionally provide feedback to the centres that refer patients to them. 41.2 % of the respondents were noted to record the details of the patients in the referral register sometimes. While 68% of the respondents collect the details of patients such as phone numbers or address, 33.9% actually do home visitation to the patients. Majority of the respondents 65.4% do not have an ambulance at their health care facility. Meanwhile amongst the 34.6% respondents that have an ambulance, only 87.9% of the ambulances are functional and being used.

Table 4.6 shows the factors that influence referral practice among the respondents. From the table, 50.8% of the respondents were noted not have referral forms at their centres and majority 59.8% of the respondents have never received a training on referral. Most of the respondents occasionally had available at their centres, the referral slip, the referral form, the referral registers and the phone registers as was seen in their response of 36.1%, 33.4%, 31.7% and 30.2% respectively.

Discussion of findings

Majority of the respondents in this study were married and within the age group of 30-39, with the mean standard deviation being 36.26 ± 8.73(SD) years. This is in conformity with the average working age group and also comparable with a study carried out in Gombe state Nigeria while it contrasts with a study done at Benin Edo state Nigeria. The reason for the differences may be due to a smaller sample size used in the study. The majority of professional cadre of the respondents was mostly doctors whom were mainly from the teaching hospitals and being followed by the CHEWs who formed that of the PHC workers. This is in line with a study done in Kaduna state Nigeria but however differs in terms of the cadre at the PHC level in a study done in the United State. The similarity may be because in the PHC centres in Nigeria and most African countries, there is still lack of adequate professional health work force, therefore most of the health workers found there are these CHEWs with some being volunteer workers as well.

There was a good overall knowledge on referral system among the respondents. Again, majority were noted to have their main source of information as health education followed by their colleagues. This corresponds with a similar study done in South Eastern Nigeria but differs from a study done in North-Western Nigeria and another done in Iran where there was a poor knowledge of referral among the health workers. The reason for the generally good knowledge of referral may be owing to the fact that most of the PHC and secondary health care facilities lack adequate professional health care workers and the infrastructure to handle most of the cases that presents to them, thus they are trained to refer these cases for appropriate health care services. On the other hand, there may be insufficient awareness and provisions for referral in these study areas with poor knowledge.

The overall attitude towards referral was positive as majority of the respondents had a good reason for referring the patients that needed to be referred, even though a great number of respondents which was mostly among the health workers at the PHCs still think that they will be seen as being incompetent. Proper knowledge is one factor that influences the attitude of the health care workers especially those at the lower levels of health care. A study done in the northern area of Nigeria showed a poor attitude towards referral.

It was noted from the study, that there was a good overall referral practice (57.3%) though just slightly above half of the respondents. Most of them had good reasons to refer and claim to refer patients to the other higher levels of health care centres, the tertiary and the secondary levels. While even among the tertiary level, they also practice the horizontal referral within the same level or facility from one specialty to another. Most of the respondents were noted to refer and also have patients being referred to them only occasionally. Similar results were obtained from a study done at Gombe state Northern Nigeria and Benin state Nigeria where the most of the respondents were noted to refer their patients and most of them affirmed that they do occasionally. On other hand, another study done in Kaduna state Nigeria showed a poor referral practice among health workers.
There is no proper feedback or practice of the two-way referral system which would have benefited both the referring health worker, the referred health worker and even the patient alike.

A proper knowledge of the referral system and availability of the necessary elements to carry out the practice will in turn lead to a good referral practice. From this study, most of the respondents were noted not to have access to an ambulance and even amongst those that had, some were not functional. This would further impede the actualization of a good referral practice because a patient may have been referred but does not have a means of getting to the referred facility as urgently as may be necessary.

A study done in Kenya showed that the availability of necessary infrastructure and transport facilities for the transportation of patients, specimens and other parameters were not sufficient. From the study, most of the respondents have never received any form of training regarding referral practice. Also, some of the factors which influence the referral practice and thereby determine its proper application or not include the referral slips, referral form, referral register, phone register was accessed and it was noted that most of the respondents do not really have proper access to these tools that will facilitate their practice of referral. This is in line with and comparable to the study done in Kenya which noted the unavailability of these factors at the facilities where they are needed.

A study done in the United Kingdom also noted lack of proper communication as part of the hindrances to appropriate referral practice.

**Conclusion**

This study on referral system was carried out among health workers at the tertiary, secondary and primary levels of health care in both the urban and rural areas selected in Enugu state Nigeria to assess the effectiveness of the system. Findings have shown that while the level of awareness was impressive, the actual practice of the referral system (two-way referral system) however was not satisfactory as most of the health workers especially at primary health care level. The lack of proper feedback and poor follow up hinders effectiveness of the referral system at the various levels of health care in Nigeria. Therefore, efforts should be made by the agencies and policy makers to improve the communication and synergy of the various levels of health care.

**Table 1. Socio-demographic variables**

<table>
<thead>
<tr>
<th>Socio-demographic variables</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age in years</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20 – 29</td>
<td>91</td>
<td>23.0</td>
</tr>
<tr>
<td>30 – 39</td>
<td>177</td>
<td>44.7</td>
</tr>
<tr>
<td>40 - 49</td>
<td>100</td>
<td>24.4</td>
</tr>
<tr>
<td>50 – 59</td>
<td>36</td>
<td>9.1</td>
</tr>
<tr>
<td>60 – 69</td>
<td>6</td>
<td>1.5</td>
</tr>
<tr>
<td><strong>Mean ± SD</strong></td>
<td><strong>36.26 ± 8.731</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Years of service</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 -5</td>
<td>135</td>
<td>34.7</td>
</tr>
<tr>
<td>6 – 10</td>
<td>128</td>
<td>32.9</td>
</tr>
<tr>
<td>11 -20</td>
<td>81</td>
<td>20.8</td>
</tr>
<tr>
<td>21 – 30</td>
<td>41</td>
<td>10.5</td>
</tr>
<tr>
<td>31 – 40</td>
<td>4</td>
<td>1.0</td>
</tr>
<tr>
<td><strong>Mean ± SD</strong></td>
<td><strong>9.89 ± 7.487</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Sex</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>202</td>
<td>49.6</td>
</tr>
<tr>
<td>Female</td>
<td>208</td>
<td>50.4</td>
</tr>
<tr>
<td><strong>Educational level</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No formal</td>
<td>2</td>
<td>0.5</td>
</tr>
<tr>
<td>Primary</td>
<td>10</td>
<td>2.5</td>
</tr>
<tr>
<td>Secondary</td>
<td>198</td>
<td>48.5</td>
</tr>
<tr>
<td>Tertiary</td>
<td>198</td>
<td>48.5</td>
</tr>
<tr>
<td><strong>Marital status</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 2. Knowledge of referral system

<table>
<thead>
<tr>
<th>Heard about referrals</th>
<th>Yes Freq (%)</th>
<th>No Freq (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>406 (99.8)</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>1 (0.2)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sources of information</th>
<th>Freq (%)</th>
<th>Freq (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>TV</td>
<td>38 (9.3)</td>
<td>372 (90.7)</td>
</tr>
<tr>
<td>Radio</td>
<td>58 (14.1)</td>
<td>352 (85.9)</td>
</tr>
<tr>
<td>Health education</td>
<td>348 (84.9)</td>
<td>62 (15.1)</td>
</tr>
<tr>
<td>Colleagues</td>
<td>97 (23.7)</td>
<td>313 (76.3)</td>
</tr>
<tr>
<td>Family/friends</td>
<td>33 (8.0)</td>
<td>377 (92.0)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Level of the referral system</th>
<th>Freq</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary</td>
<td>28</td>
<td>6.9</td>
</tr>
<tr>
<td>Secondary</td>
<td>49</td>
<td>12.0</td>
</tr>
<tr>
<td>Tertiary</td>
<td>331</td>
<td>81.1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Yes F (%)</th>
<th>No F (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>386 (94.1)</td>
<td>24 (5.9)</td>
</tr>
<tr>
<td>302 (73.7)</td>
<td>108 (26.3)</td>
</tr>
<tr>
<td>286 (69.8)</td>
<td>124 (30.2)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Overall Knowledge</th>
<th>Good</th>
<th>Poor</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>392 (95.6%)</td>
<td>17 (4.1%)</td>
</tr>
</tbody>
</table>

Table 3. Attitude to referral practices

<table>
<thead>
<tr>
<th>Variables</th>
<th>Positive f (%)</th>
<th>Negative f (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Referral done to patients good</td>
<td>398 (97.1)</td>
<td>13 (2.9)</td>
</tr>
<tr>
<td>Referral is beneficial to health worker</td>
<td>361 (88.0)</td>
<td>48 (12.0)</td>
</tr>
<tr>
<td>Like referring when necessary</td>
<td>387 (94.4)</td>
<td>22 (5.6)</td>
</tr>
</tbody>
</table>
Referral made me look like I don’t know my work

Overall attitude
Positive 91.5%
Negative 8.5%

<table>
<thead>
<tr>
<th>Variables</th>
<th>Yes (%)</th>
<th>No (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Refer patients from centre</td>
<td>302(73.7)</td>
<td>108(26.3)</td>
</tr>
<tr>
<td>Reasons for referrals</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ensure patients gets advanced treatment</td>
<td>353(86.1)</td>
<td>57(13.9)</td>
</tr>
<tr>
<td>There are investigations we can’t do</td>
<td>158(38.5)</td>
<td>252(61.5)</td>
</tr>
<tr>
<td>Don’t want patient to die in my facility</td>
<td>15(3.6)</td>
<td>395(96.4)</td>
</tr>
<tr>
<td>How often do you refer to other centres</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Frequently</td>
<td>56</td>
<td>13.7</td>
</tr>
<tr>
<td>Sometimes</td>
<td>234</td>
<td>57.1</td>
</tr>
<tr>
<td>Occasionally</td>
<td>99</td>
<td>24.1</td>
</tr>
<tr>
<td>Never</td>
<td>21</td>
<td>5.1</td>
</tr>
<tr>
<td>How often are patients referred to your centre</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Frequently</td>
<td>145</td>
<td>35.4</td>
</tr>
<tr>
<td>Sometimes</td>
<td>87</td>
<td>21.2</td>
</tr>
<tr>
<td>Occasionally</td>
<td>157</td>
<td>38.5</td>
</tr>
<tr>
<td>Never</td>
<td>21</td>
<td>5.1</td>
</tr>
<tr>
<td>How often do you get feedback after you refer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Frequently</td>
<td>32</td>
<td>7.8</td>
</tr>
<tr>
<td>Sometimes</td>
<td>82</td>
<td>20.0</td>
</tr>
<tr>
<td>Occasionally</td>
<td>206</td>
<td>50.2</td>
</tr>
<tr>
<td>Never</td>
<td>88</td>
<td>21.5</td>
</tr>
<tr>
<td>How often do you provide feedback</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Frequently</td>
<td>40</td>
<td>9.8</td>
</tr>
<tr>
<td>Sometimes</td>
<td>78</td>
<td>19.0</td>
</tr>
<tr>
<td>Occasionally</td>
<td>194</td>
<td>47.3</td>
</tr>
<tr>
<td>Never</td>
<td>98</td>
<td>23.9</td>
</tr>
</tbody>
</table>

Table 4. Referral practices

<table>
<thead>
<tr>
<th>How often do you record details in the referral register</th>
<th>Freq</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequently</td>
<td>63</td>
<td>15.4</td>
</tr>
<tr>
<td>Sometimes</td>
<td>169</td>
<td>41.2</td>
</tr>
<tr>
<td>Occasionally</td>
<td>46</td>
<td>11.2</td>
</tr>
<tr>
<td>Never</td>
<td>132</td>
<td>32.2</td>
</tr>
<tr>
<td>Yes (%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No (%)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Do you collect details</th>
<th>282</th>
<th>68.8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do you refer on request</td>
<td>241</td>
<td>58.8</td>
</tr>
<tr>
<td>Doing home visits</td>
<td>139</td>
<td>33.9</td>
</tr>
</tbody>
</table>

Table 5. Referral practices (2)
### Table 6. Factors that influence referral practice

<table>
<thead>
<tr>
<th>Has ambulance</th>
<th>Frequency (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>124 (87.9)</td>
</tr>
<tr>
<td>No</td>
<td>18 (12.1)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Functional ambulance</th>
<th>Frequency (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>256 (65.4)</td>
</tr>
<tr>
<td>No</td>
<td>18 (12.1)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Overall Practice</th>
<th>Frequency (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Good</td>
<td>235 (57.3)</td>
</tr>
<tr>
<td>Poor</td>
<td>175 (42.7)</td>
</tr>
</tbody>
</table>

### References


[7]. Federal Ministry of Health Revised National Policy 2004; 5-17
A Study to Determine Knowledge, Attitude and Practices of Women of Child Bearing Age on Obesity and Its Impact on Fertility at Mbuyanehanda Maternity Hospital

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Abstract

Background: Shortage of obesity awareness campaigns at antenatal clinics; women who were severely obese were 43% less likely to achieve pregnancy than normal-weight women or women who were considered overweight but not obese during the study. The study is among the first to examine the relationship between body weight and infertility in women who ovulate in Harare Zimbabwe. In Harare only five out of twenty-two antenatal clinics had obesity health education talks and measured BMI for ovulating women. In 2018 this prompted an investigation to determine knowledge, attitude and practices of women of child bearing age on obesity and its impact on fertility at Mbuyanehanda Maternity Hospital.

Methods: Analytical cross-sectional study was carried out. Three hundred and eighty-four (384) participants were selected by proportional sampling from Mbuyanehanda antenatal clinic. Questionnaires adapted from the World Health Organization Stepwise approach to Surveillance non-communicable disease instrument and the Health Belief model was used to collect data on knowledge, attitude and risk factors of obesity on fertility in women of childbearing age. BMI measurements were taken. Obesity was defined as BMI above 25.

Results: The proportion of patients who were obese and had their BMI measured was 70%. Only females were enrolled in the study. The statistically significant factors associated with obesity were having heard about the risk obesity (AOR 3.1, 95% C.I 1.7-5.4), knowing that weight check and control was important whilst on childbearing age (AOR 1.8, 95% C.I 1.1-2.9) and health education on dangers of obesity or high BMI (AOR 1.6 95% C.I 1.0-2.7).

Summary: There was a high proportion of elevated BMI amongst patients who were ignorant of the dangers of obesity on fertility. Despite lack of knowledge on BMI monitoring equipment and shortage of staff, majority of patients at Mbuyanehanda maternity hospital of childbearing age were at risk of developing infertility or childbearing complications because of inadequate knowledge on obesity prevention and control. Health promotion and education on dangers of obesity and body weight monitoring and the upgrading of health services factors to improve the monitoring of BMI at maternal health clinics is necessary. Further studies on factors associated with poor control of body weight amongst female patients during child bearing age are needed.

Keywords: Body Mass Index (BMI), fertility, Health Belief Model, Obesity.

Abbreviations

WOCBA : Women of child bearing Age
BMI : Body Mass Index
WHO : World Health Organization
MNMH : Mbuyanehanda Maternity Hospital
HBM : Health Belief Model
Introduction

The prevalence of overweight and obesity is higher among urban women than their rural counterparts in Zimbabwe. More than 33% of women in the urban area are either overweight or obese compared to only 11% of women in rural areas according to the Maternal reproductive health survey conducted by Ministry of health and Child care in 2012. Obesity is a global issue. Despite efforts to confront it, the worldwide incidence of obesity continues to escalate. The WHO estimates that approximately one billion people throughout the world are overweight and that over 300 million of these are obese. If current trends continue, the number of overweight persons will increase to 1.5 billion by the year 2015. The number of obese adults in Australia is estimated to have risen from 2 million in 1992 to 3.1 million in 2005 [2]. What contributes to the problem of obesity mainly stems from the imbalance between reduced exercise, overindulgence in energy-dense dietary intake, changing lifestyle and dietary composition. It has been known that obesity is related to systemic diseases such as diabetes mellitus, cardiovascular diseases, hyperlipidemia, sleep apnea, cancers and osteoarthritis. Female obesity has a great impact on reproductive function and the hormonal milieu. As far back as 1934, the association between obesity and infertility was recognized when Irving Stein and Micheal Leventhal described a triad consisting of obesity, hirsutism and infertility: the ‘Stein–Leventhal Syndrome’. Overweight and obese women have more problems of menstrual irregularities, chronic or intermittent anovulation, infertility, signs of androgen excess, increased risk of miscarriages and hormone-sensitive carcinomas. In the Million Women Study, it was noted that increasing BMI was associated with an increased incidence of endometrial carcinoma (relative risk [RR] = 2.89; 95% CI: 2.62–3.18). Obesity also has important implications for the delivery of obstetric care. It is well recognized that maternal obesity is associated with an increased risk of maternal, peripartum and neonatal complications.

It is not clear how obesity affects fertility in women who ovulate normally. Van der Steeg suggests that disruptions in the hormone leptin, which regulates appetite and energy expenditure, may prevent successful fertilization.

Reproductive endocrinologist William Dodson, MD, tells WebMD that it is increasingly clear that the role of obesity in reproduction is more complex than was once thought. "What we once held as dogma is now starting to fall apart," he says. "We thought that if a woman's obesity was not affecting her ovulatory function, her fertility would be similar to a normal-weight woman's. But this does not appear to be true."

Dodson's own recent research at the Penn State Hershey College of Medicine confirmed that obese women undergoing infertility treatments needed higher doses of infertility drugs than normal-weight or overweight women.

Like the newly published study, all the women in the Penn State study had normal ovarian function.

"The issue of obesity and reproduction is complex, and we are only beginning to understand it," he says. Obesity contributes significantly to menstrual irregularities, absence of ovulation, difficulty in conception, reduced response to fertility treatments, increased chances of miscarriage and perinatal complications. Obesity causes increased production of insulin as well as insulin resistance, which, in women, may lead to erratic ovulation. There is also a link between obesity, excess insulin production and infertility which is referred to as polycystic ovarian syndrome (PCOS). PCOS is a specific medical condition represented with irregular menstrual cycles, decreased or absence of ovulation, obesity and elevated levels of male hormones. PCOS is a risk factor for infertility, and it has been established that 35-65% of PCOS patients are obese. Increased BMI negatively affects the achievement and maintenance of pregnancy. Obese females have a lower chance of pregnancy and a higher risk of miscarriage. Even after conception, they have higher risk of pregnancy complications such as miscarriage, developing diabetes and chances of premature birth. The likelihood of LSCS (Lower segment Caesarian section) also increases which puts the mother and baby at high risk. The prevalence of obesity among women of child-bearing age has increased from about 24.2% in 2005 to 28.3% in 2015, and the number of females having weight-loss surgery is rising, which increases their chances of conception due to weight loss.

Problem statement

An observation has been made that women of child bearing age seem not to be aware that being obese has bearing on fertility. Nationally representative surveys show recent increases in the prevalence of
overweight and obesity among women of reproductive age in Zimbabwe, and Zambia from 15.8 to 28.8% from 2006 to 2010.

**Purpose of the study**

The purpose of the study is to determine knowledge, attitude and practices of women of child bearing age on obesity and its impact on health at Mbuyanehanda Maternity Hospital.

**Objectives**

The study seeks to:

- Determine knowledge of women of child bearing on obesity and its impact on fertility.
- Find out about the women’s attitude and practices
- Identify challenges these women face regarding obesity and its impact on fertility.

**Inclusion and exclusion criteria into the study**

As measured by the BMI, a 5-foot 6-inch woman who weighs 52kgs to 70kilograms is considered normal weight (BMI of 18.5 to 24.9). If she weighs between 70 to 84 kilograms, she is considered overweight (BMI of 25 to 29.9), and she would be considered obese at a weight of 84kilograms or more (BMI of 30+).

**Questions of the study**

What knowledge and practices do these women have on obesity and its effects on fertility?

**Significance of the study**

The researcher hopes that:

- Knowledge on obesity and its impact on fertility will be determined.
- Recommendations made will be handed over to the Ministry of Health and Child Care for intervention purposes.
- Challenges identified by the women will be identified.
- More information will be given to women regarding obesity and its effects on fertility.

**Scope of the study**

The study will be conducted between November and December 2018 at MNMH in Harare Zimbabwe. A total of over 300 women will be interviewed. These will be from all over Zimbabwe since MNMH is a national referral centre for maternal specialty.

**Literature review**

According to the World Health Organization (WHO 2018) Overweight and obesity are defined as abnormal or excessive fat accumulation that presents a risk to health. A crude population measure of obesity is the body mass index (BMI), a person’s weight (in kilograms) divided by the square of his or her height (in metres). A person with a BMI of 30 or more is generally considered obese. A person with a BMI equal to or more than 25 is considered overweight.

Obesity and overweight prevalence are increasing and it has become an epidemic and a public health issue of concern worldwide. Obesity has damaging effects on all systems, including reproductive health. There is a high prevalence of infertility in women with obesity. It is now well known that there is a strong association between obesity and infertility among women of child bearing age worldwide. However, studies are still ongoing on the relationship between obesity and reproductive functions. Obesity is associated with early onset of puberty, abnormal menstrual pattern, decreased efficacy of contraceptives, ovulation disorders, and increased miscarriage rate. The women tend to have poor reproductive outcomes as much as they will also have assisted conception.

**Research methodology**

**Introduction**

The chapter will describe the methods which are going to be used in carrying out the research study. It includes the research design, study population, study sample, data collection, sample procedure,
instrument design, data analysis, and ethical considerations.

Research design

A descriptive research design is going to be used. It is appropriate for this study because it gives the researcher first-hand information regarding knowledge, attitude and practices of WOCBA at Mbuyanehanda Maternity Hospital (MNMH)

Study population

At total of 150 (WOCBA) Women of Child Bearing Age with a body mass index of 30 and above will be randomly selected. Another 150 WOCBA with a body mass index of less than 30 will also be randomly selected.

Study sample

As it is not possible to study every woman, simple random sampling method is going to be used. Simple random sampling is going to be used so that each individual is chosen entirely by chance and each member of the target population has an equal chance of being included in the sample.

Data collection instrument

Data will be collected from 300 WOCBA on their knowledge, attitude and practices towards obesity and its effects on fertility.

Sample procedure

This is going to be done on 300 WOCBA of which 150 will be overweight and 150 who are not. Probability sampling will be used so that every possible sample of a given size will have the chance of being selected.

Instrument design

An interview schedule is going to be used to collect data.

Conceptual framework

Risk factors for BMI monitoring in childbearing mothers can be associated with demographic factors, socio-cultural factors, health service factors, economic and cultural factors (see figure 1 below).
The health care environment should be having low barriers and high perceived benefits according to the health belief model these are important in order for there to be recommended behaviours. Incorporating the perceived benefits of action i.e. BMI monitoring and the barriers to action which may be health service factors or linked to obese patients’ attitude towards BMI check, the study also assessed whether health care factors promoted prevention of infertility to patients with high BMI above 30 through monitoring and information dissemination.

Self-efficacy the need for patients with high BMI to feel competent to prevent obesity as an adverse effect of life saving low BMI is also another aspect of the HBM that the study explored. The study from the conceptual framework mainly looked at the health service factors that contributed to poor BP monitoring and detection of high BMI in patients’ women of childbearing age. Predisposing factors linked to the Health belief model were assessed as well as socio economic factors and demographic factors to

Figure 1. Conceptual framework
try and understand and come up with reasons why most high morbidly obese patients did not have their BMI monitored at antenatal clinics. These were included in the framework bearing in mind that in most countries BMI monitoring is now being done at home if the patients can calculate correctly their BMI as taught. At the end of the interviewer administered questioning the patients had a health talk session about risks of high body mass index and how to control or prevent its rapid effects. In addition, the study also assessed low barriers to BMI monitoring both socially economically and health related, perceived benefits and the level of knowledge of childbearing female patients with high BMI on the importance of BMI regular check.

**Data presentation and analysis**

The association between obesity and menstrual irregularities has been recognized. Obesity was present at a fourfold higher rate in women with menstrual irregularities compared with normally menstruating females. Historical data from 26,638 women, aged 20–40 years, were used to study the association between obesity and menstrual abnormalities, including evidence of infertility. It was found that women with evidence of anovulatory cycles, in other words, irregular cycles greater than 36 days and hirsutism, were more than 30 lb (13.6 kg) heavier than women with no menstrual abnormalities after adjusting for height and age. In adolescents and young women, the age of onset of obesity and that of menstrual irregularities are significantly correlated. In the 1958 British birth cohort, Lake et al. tracked 5799 females at the ages 7, 11, 16, 23 and 33 years and noted that obesity in childhood and early twenties increased the risk of menstrual problems. Obesity at 23 years and obesity at 7 years both independently increased the risk of menstrual problems by age 33 years (odds ratio [OR] = 1.75; OR = 1.59, respectively) after adjusting for other confounding factors. Women who were overweight and obese at 23 years of age were less likely to conceive within 12 months of unprotected intercourse after adjustment for confounders (RR = 0.69). Overweight and obesity in early adulthood appears to increase the risk of menstrual problems and sub fertility. There are also several epidemiological studies that suggest changes in bodyweight are critical factors regulating pubertal development in young women. A few studies have reported that obese girls had their menarche earlier than normal-weight girls. Similarly, the onset of ovarian failure and menopause occurs several years earlier in obese women than in normal-weight women [21]. The link between obesity and infertility is complex. The available knowledge supports the concept that androgen alterations and their balance with estrogen represent the most important mechanism responsible for the development of subfertility or infertility in obese women. Sex hormone binding globulin (SHBG) is a protein carrier that binds testosterone and dihydrotestosterone with high affinity and estrogens with a lower affinity. The degree of obesity is inversely related to SHBG levels. In addition, body fat distribution further influences SHBG concentrations. Females with central adiposity have lower SHBG concentrations in comparison with peripheral obesity [22]; therefore, the percentage of free testosterone fraction tends to be higher in women with central obesity. In addition, the adipose tissue is a site of active androgen production, converting androgens into estrogens, and of androgen and estrogen interconversion, which largely depends on the amount of fat [22]. Increased androgen production and reduced binding of androgens to SHBG contribute to hyperandrogenism, resulting in anovulation through inhibition of follicular maturation. Hormones regulating energy metabolism have been shown to exert different effects on several reproductive events. The roles of insulin and insulin-like growth factors have been studied extensively and are well known for their effects on reproductive events, such as ovarian steroidogenesis, folliculogenesis and ovulation physiology. Insulin resistance plays a key metabolic role in PCOS, and insulin-sensitizing drugs are now widely used to induce ovulation and improve fertility in these women [23]. In addition to insulin, novel hormones, such as leptin, ghrelin, adiponectin, resistin and peptide YY3–36 have been discovered as important regulators of appetite and energy homeostasis [24, 25]. The close relationship between energy metabolism, nutritional state and reproductive physiology suggests that disorders or alterations in nutritional state (obesity, malnutrition, anorexia nervosa and so on) and metabolic disturbances can disrupt the complex interplay of gonadotropins and gonadal hormones, which are essential for fertility. Recent research has demonstrated that leptin plays an integral role in the normal physiology of the reproductive system with complex interactions at all levels of the hypothalamic–pituitary–gonadal axis. Observational studies have demonstrated that levels of leptin excess, deficiency or resistance can be associated with abnormal reproductive function [26]. Increased body weight and fat
tissue substantially disrupt menstrual pattern and fertility potential. In obese women, weight loss alone improves insulin resistance and promotes fertility. In addition, expression of leptin, ghrelin and their receptors in various reproductive organs, such as the ovary, testis, endometrium, embryo and placenta, have been demonstrated to have important roles in different stages of embryo development and implantation [26,27]. The Nurses’ Health Study in 1994 compared 2527 married nulliparous nurses unable to become pregnant for at least 1 year owing to ovulatory disorder with controls comprising of 46,718 married parous nurses with no history of infertility [28]. The risk of ovulatory infertility for women at different BMI levels at age 18 years was compared with that for women at 18 years whose BMI was 20–21.9 (median for the cohort). Logistic regression was used to adjust for other confounding variables. Multivariate relative risks for infertility were: 1.2 (BMI: <16), 1.1 (BMI: 16–17.9), 1.0 (BMI: 18–19.9), 1.0 (BMI: 20–21.9), 1.1 (BMI: 22–23.9), 1.3 (BMI: 24–25.9), 1.7 (BMI: 26–27.9), 2.4 (BMI: 28–29.9), 2.7 (BMI: 30–31.9) and 2.7 (BMI: ≥ 32).

These findings suggested that an elevated BMI at age 18 years, even at levels lower than those considered to be obese, is a risk factor for subsequent ovulatory infertility. More recent data from this group show that ovulatory infertility can be largely attributed to overweight and sedentary lifestyle. Recent data by Gesink Law et al. from their study on more than 7327 pregnant women enrolled in the Collaborative Perinatal Project at 12 study centers in the USA showed that fecundity was reduced for overweight (OR: 0.92; 95% CI: 0.84, 1.01) and obese (OR: 0.82; 95% CI: 0.72, 0.95) women compared with optimal-weight women and was more evident for obese primiparous women (OR = 0.66; 95% CI: 0.49, 0.89).

### Obesity and infertility treatment

Most studies demonstrate conclusive evidence that increasing BMI is associated with an increased requirement of drugs to induce ovulation. Large doses of clomiphene of up to 200 mg per day were required to ensure ovulation in the heaviest women. Similar trends were also observed in doses of gonadotrophins required to induce ovulation. In a study of 335 women with WHO group II anovulatory infertility, it was noted that with increasing BMI, a higher threshold dose of gonadotrophins was required (odds for needing a higher dose more than 75 IU was 1.47 [95% CI: 0.84–2.55] and 2.15 [95% CI: 1.17–3.94] for overweight and obese women, respectively) and there were more days of stimulation (OR: 1.8; 95% CI: 0.32–3.27 and OR: 2.91; 95% CI: 1.21–4.6) for overweight and obese women, respectively. In another study by Fedorcsak et al. involving 2660 IVF/intracytoplasmic sperm injection (ICSI) cycles, there was a positive correlation between BMI and the total follicle-stimulating hormone (FSH) required. The higher the BMI, the more FSH is required for ovarian stimulation. Although the starting dose of FSH was not fixed in this report, the correlation between BMI and the length of stimulation suggests that the differences in FSH requirement were not caused solely by a deliberate subscription of higher FSH doses in obese women. Therefore, obesity represents a condition of resistance to agents used to stimulate ovulation. Linear association was observed between higher BMI and longer stimulation with FSH (p < 0.001), requirement for increased total doses of FSH (p < 0.001), increased frequency of cycle cancellations owing to insufficient follicular development (p < 0.001) and a lower number of collected oocytes (p < 0.001). The value of obesity as a predictor of infertility treatment outcome is controversial. While some studies reported a decrease in pregnancy and implantation rates in obese women, others reported no effects of extreme body weights. Conflicting results may be related to the type of treatment, inconsistent definitions of obesity and smaller size of cohorts observed. In a study by Wang et al. on a large cohort of women seeking infertility treatment (n = 3586), it was noted that weight had a significant correlation on the outcome of assisted reproductive technique, with a significant linear reduction in fecundity from the moderate group to the very obese group (p < 0.001). The fecundity of the moderate group was almost 60% higher than that of the very obese group. Not only that, it was observed that bodyweight has an ‘inverted U’ effect on reproduction, which means that being either underweight or overweight has a deleterious effect on assisted reproductive techniques (ART) outcome. There is evidence for an increased risk of miscarriage in obese women. Lashen et al. conducted a nested case–control study in which obese (BMI: > 30kg/m2) women were compared with an age-matched control group with normal
BMI (19–24.9 kg/m2) [39]. A total of 1644 obese and 3288 age-matched normal-weight controls with a mean age of 26.6 years (95% CI: 26.5–26.7) were included in the study. The risk of early miscarriage was significantly higher among the obese patients (OR: 1.2; 95% CI: 1.01–1.46; p = 0.04). These data confirm that increasing obesity significantly reduces the chance of successful pregnancy. Obesity is also a risk factor for early miscarriage after assisted reproduction. Fedorcsak et al. noted that obesity was associated with an increased risk of early pregnancy loss occurring before 6 weeks gestation. In another retrospective study on a large cohort of women (n = 2349) who were pregnant following ART, the overall incidence of spontaneous abortion was 20%. Compared with women with normal BMI, there was progressive increase in risk of spontaneous abortion in overweight, obese and very obese groups (OR: 1.29, [95% CI: 1.00–1.66]; OR: 1.71; [95% CI: 1.20–2.43] and OR: 2.19; [95% CI: 1.27–3.78] in the overweight, obese and very obese, respectively). The poor reproductive performance in obese women, both in natural and assisted conception cycles, may be a result of a combination of lower implantation and pregnancy rates, higher preclinical and clinical miscarriage rates, and increased complications in pregnancy for both mother and fetus. These have been related to various endocrine and metabolic disturbances, such as effects on steroid metabolism and alterations in the secretion and action of insulin and other hormones, such as leptin, resistin, ghrelin and adiponectin, which may affect follicle growth, corpus luteum function, early embryo development, trophoblast function and endometrial receptivity. The question remains as to the mechanism by which obesity may affect fecundity in women. Is it exclusively an ovarian effect, endometrial effect or a combined effect? The oocyte donation model is unique. By restricting study to oocytes donated by normal-weight women, the effect of obesity on oocyte development was eliminated, thus permitting an assessment of the extraovarian effect of excess bodyweight on successful pregnancy outcomes. However, data regarding the effects of BMI on the oocyte donation model are conflicting. While two authors observed no association between BMI, pregnancy rate and loss rate in oocyte donation cycles [42,43], others noted obesity to be an independent risk factor for miscarriage in women receiving donated oocytes [44,45]. Bellver et al., in his recent publication, studied 2656 first IVF cycles of ovum donation using good-quality embryos [36]. The recipients were divided into groups according to BMI: less than 20 kg/m2 (n = 471), 20–24.9 kg/m2 (n = 1613), 25–29.9 kg/m2 (n = 450), and greater than or equal to 30 kg/m2 (n = 122). The rates of implantation, pregnancy and miscarriage were similar among the BMI groups, although there was a negative trend when BMI increased. However, the ongoing pregnancy rates per cycle were poorer in the overweight and obese groups than in the underweight and normal groups. When the cut-off point of 25kg/m2 was taken into account, the ongoing pregnancy rate per cycle initiated was significantly reduced in the overweight and obese groups (from 45.5% with 25kg/m2, p = 0.002). The OR of ongoing pregnancy per started cycle among BMI groups was 0.85 (95% CI: 0.76–0.95, p = 0.003), showing a significant trend to decrease as BMI increased.

Table 1. Adjusted odds ratio for maternal, peripartum and neonatal outcomes, according to BMI. Normal

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<tbody>
<tr>
<td>Hypertensive disease of pregnancy</td>
<td>1.00</td>
<td>1.74</td>
<td>3.00</td>
<td>4.87</td>
</tr>
<tr>
<td>Gestational diabetes</td>
<td>1.00</td>
<td>1.78</td>
<td>2.95</td>
<td>7.44</td>
</tr>
<tr>
<td>Caesarean section</td>
<td>1.00</td>
<td>1.50</td>
<td>2.02</td>
<td>2.54</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Neonatal outcomes</th>
<th>Stillborn</th>
<th>Birth defect</th>
<th>Hypoglycaemia</th>
<th>Admission to intensive care</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal (BMI 20.01–25)</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>Overweight (BMI 25.01–30)</td>
<td>1.16</td>
<td>1.26</td>
<td>0.78</td>
<td>0.92</td>
</tr>
<tr>
<td>Obese (BMI 30.01–40)</td>
<td>1.19</td>
<td>1.58</td>
<td>2.57</td>
<td>1.25</td>
</tr>
<tr>
<td>MorbidlyObese (BMI &gt;40)</td>
<td>0.89</td>
<td>3.41</td>
<td>7.14</td>
<td>2.77</td>
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</tbody>
</table>

The findings that were found at the study that we conducted at Mbuyanehanda had findings that were similar to another large review, involving women who were booked for antenatal care in Queensland, Australia, it was noted that as BMI increases, cesarean section rates, maternal morbidity, neonatal
morbidity, neonatal intensive care utilization and length of hospital stay all increase. There was also a doubling of birth defects from 1.9% in women with a BMI of 30–40kg/m2 to 4% in women with a BMI above 40kg/m2 (Table 3). Data from the Atlanta Birth Defects Risk Factor Surveillance Study from January 1993 until August 1997, noted that obese women were more likely than average-weight women to have an infant with spina bifida (unadjusted OR: 3.5; 95% CI: 1.2–10.3), omphalocele (OR: 3.3; 95% CI: 1.0–10.3), heart defects (OR: 2.0; 95% CI: 1.2–3.4), and multiple anomalies (OR: 2.0; 95% CI: 1.0–3.8) [50]. Overweight women were more likely than average-weight women to have infants with heart defects (OR: 2.0; 95% CI: 1.2–3.1) and multiple anomalies (OR: 1.9; 95% CI: 1.1–3.4). Several epidemiologic studies have suggested that being overweight before pregnancy is a risk factor for neural tube defects (NTDs) [51,52]. BMI of more than 29kg/m2 doubles the risk of NTDs (OR 1.9; 95% CI: 1.1–3.4) [52]. Werler et al. compared 604 fetuses or infants with a NTD with 1658 fetuses or infants with other major malformations, all diagnosed within 6 months of delivery [53]. Compared with mothers weighing 50–59 kg, the RR of NTDs increased to 1.9 (95% CI: 1.2–2.9) for women weighing 80–89 kg and to 4.0 (95% CI: 1.6–9.9) for women weighing 110 kg or more. When women were classified according to daily intake above or below the recommended level of 400 µg of folate, an approximately threefold increase in risk was estimated for the heaviest weights in both groups. Intake of 400 µg or more of folate reduced the risk of NTDs by 40% among women weighing less than 70 kg, but no risk reduction was observed among heavier women [53]. The supposed mechanisms that increase the congenital anomaly rates include insulin resistance and its consequence, incipient hyperglycemia. In addition, the increased risk of congenital malformations, in particular NTDs, in children of obese women can be explained by difficulties in visualization when making the ultrasound scan and missing adjustment for weight when measuring biochemical markers [54]. Thus, preventive measures should be taken with overweight teenagers before their first pregnancy, and delivery wards should have an essential role in identifying women at high risk in their next pregnancy as a result of obesity. Modest weight loss would bring substantial advantages to the obstetric outcomes of these women.

**Summary, discussion and conclusion**

Treatment of obesity itself should be the initial aim in obese infertile women before embarking on ovulation-induction drugs or ART. Reduction of fat and abdominal fat should result in improved menstrual function and fertility and a reduction of metabolic risks. A reduction of 2–5% in body weight was associated with restoration of ovulation, an 11% reduction in abdominal fat, a 4 cm reduction in WC and a 71% increase in insulin sensitivity. Weight loss results in an increase in SHBG, reduction in testosterone, improved menstrual function, improvement in conception rate and reduction in miscarriage rate. As central adiposity is associated with menstrual disorders and infertility, abdominal fat loss is critical in restoring ovulation. Various strategies have been suggested to overcome the problem of obesity. Amongst these are dietary management, physical activity, behaviour modification, pharmacologic treatment and surgery. The issues are the long-term compliance to these strategies and maintaining the weight loss. The NIH recommends a multifaceted approach to treating obesity. It emphasizes the importance of achievable and sustainable goals, notably a combination of diet, physical activity and behavior therapy. This is where aspects of the health belief model came into play in terms of focusing on the perceived benefits.

**Obesity in women**

Obesity is related to many systemic diseases and abnormalities in hormonal and reproductive function. Obesity can be measured clinically by body mass index (BMI), waist circumference and waist–hip ratio. Waist–hip ratio greater than 0.8 defines an increased risk of cardiovascular disease and reduce cumulative pregnancy rate.

**Obesity and PCOS**

30–50% of PCOS women are overweight or obese. Obesity, particularly abdominal obesity amplifies hyperinsulinemia.
Obesity and reproduction

Obesity is related to menstrual abnormalities; amenorrhea, oligomenorrhea and menorrhagia are fourfold higher in obese women.

Obesity also contributes to anovulatory and ovulatory infertility via altered imbalance between estrogen, androgen and SHBG.

Hyperandrogenism and hyperleptinemia are also related to anovulatory and ovulatory infertility in obese women.

Obesity and assisted reproduction

Obesity is associated with a lower chance of live birth after IVF/intracytoplasmic sperm injection and with an impaired response to ovarian stimulation.

Obesity reduces the likelihood that a woman will be accepted for assisted reproductive techniques (ART) treatment, particularly in a nationally funded situation.

Obesity and obstetric care

Overweight and obesity increases obstetric risks in a BMI-dependent manner. The risk of perinatal death and congenital abnormalities double in the obese mother.

Managing obesity

Weight loss improves menstrual regularity, ovulation and fertility, and should be promoted as an initial treatment option for obese women with infertility. Only 3–5% weight loss is required.

Lifestyle modifications are the best way to achieve and sustain weight loss. These include sensible dieting, regular exercise, cognitive behavior therapy and a supportive group environment.

Pharmacological & surgical intervention

Pharmacologic intervention with metformin is not superior to clomiphene to induce ovulation and pregnancy/live birth rate in obese PCOS women.

Surgical intervention should be reserved if other measures of weight reduction fail. Although effective, it must be used together with dietary modifications and behavioral changes.

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Predictors of Sexual-Risk behaviours among Youth in Ibadan North-West Local Government Area, Oyo state, Nigeria

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Abstract

**Background:** Sexual-Risk behaviours contribute to the leading causes of morbidity, mortality and social problems among youths. Although there are many studies conducted on this subject, the predictors of sexual-risk behaviours among youths have not been well explored. This study was therefore, designed to contribute to existing knowledge and enhance the development of strategies that will positively influence the perception and attitude of youths regarding sexual health risk related matters.

**Methods:** A descriptive cross-sectional study design using multistage sampling methods was conducted among randomly selected 360 youths (15-24 years) using data collected via pre-tested interviewer administered semi-structured questionnaire, which measured the following variables: socio-demographic characteristics; sexual-risk behavior and predictors of sexual-risk. Data was analyzed using Chi-square test and binary logistics regression at p=0.05. Social learning theory was adopted in the development of the instrument.

**Results:** Almost half (49.7%) of the respondents reported to have ever had sex, 57.5% and 71.2% of them had sexual intercourse with casual partners and multiple partners respectively, also 68.7% of them did not use condom during their last sexual activity. Age and gender were the most significant predictors of sexual-risk behavior. Youths aged between 15-17 and 18-20 years are about 5.7 and 3.1 times respectively more likely than those older than 21 years to have an early sexual debut (OR = 5.693, CI = 1.205-26.901; 3.067, CI = 1.260-7.465) while male youths were about 2.6 times more likely than females to use condoms (OR = 2.563, CI = 1.171-5.607).

**Conclusion:** Dearth of information available to youths about sexual health and the dangers associated with risky sexual behaviours can be held responsible for increased levels in participation in sexual-risk behaviours among youths. There is need for concerted effort of all to promote healthy behaviour, via youth-centered programmes and youth targeted behavioural change interventions.

**Keywords:** Youths, Sexual health, Sexual-risk behaviour, Predictors, Ibadan.

Introduction

Young people generally constitute a very important segment of the population of any nation because of their number and characteristics. They are the nation’s most valued human resource due to the role they can play in socio-economic and political situation of the country if appropriately trained and encouraged. They are characterized by Nigerian government as ambitious, enthusiastic, energetic and promising. They are also considered vulnerable in society due to the rapid pace of change they experience at this stage of their lives (Nigeria National Youth Policy, 2009).

Studies in Nigeria has established that young people are vulnerable to sexual risk behaviours, which include early sexual debut, having multiple sexual partners, indulging in unprotected sex, low and inconsistent use of condoms etc. (Echendu, Joseph, Nkemakolam, Chima, Akinsewua, Ejike, 2011).

The youth risk surveillance system monitors six types of health risk behaviours that contribute to the leading causes of death, disability and social problems among youth and adults; one of which is sexual
health risks. (Centre for Disease Control and Prevention, 2010). Most young people are healthy, however more than 1.8 million young people aged 15 to 24 die each year (World Health Organization, 2008a) due to sexual related problem and other health risks. Worldwide, a very larger number of young people suffer from illnesses which prevent them to grow and develop to their full potential.

It was posited that adolescents in Nigeria have a high burden of reproductive health problems (Ahonsi, 2013). This assertion is supported by earlier surveys conducted on sexual behaviours of Nigerian Adolescents (National Demographic Health Survey, 2008; Federal Ministry of Health, 2011) which indicated that Nigerian adolescent (15-19) almost half of the females (46.2%) and about a quarter of males (22.1%) have engaged in sexual intercourse.

It had been documented that sexually transmitted infections (STIs) are commonly found in young people aged 15-24 years. WHO stated that young people between the ages of 25 years have experienced over 100 million new cases of sexually transmitted infections (STIs) annually. And in Nigeria this same aged group had been found with the highest rate of HIV infection. HIV/AIDS prevalence among all youths is 5.2% compared to national prevalence at 4.4% (National Demographic Health Survey, 2013). Prevalence of female youth STD contraction is 17.2% (Adebowale, Titiloye, Fagbamigbe, Akinyemi, 2013). Studies have also revealed that early sexual debut is another sexual risky practice among young people that contribute to reproductive health problems and diseases. Twenty four percent (24%) of women had sexual intercourse by age 15 and 54% by age 18 (NDHS, 2013). In the national HIV survey of 2010, HIV infection rate among the aged 15-19 years old and the 20-24 years old group are 3% and 4.6% respectively (Federal Ministry of Health, 2011). 2% of females aged between 15-24 years and 4% of males of aged between 15-24 years had two or more sexual partners (NDHS, 2013).

Several studies had been done generally on risky behaviours among in-school and out-school adolescents; most especially on sexual risk behaviours. However, few studies had been carried out on sexual-risk behaviour indulged by young people in Nigeria using a community setting, unlike most studies which were conducted in school settings.

Goal

The goal of this study was to investigate predictors of sexual-risk behaviours among youths in Ibadan North-West Local Government Area (LGA), Oyo State.

Specific objectives

1. Identify various sexual-risk behaviours among youths in Ibadan North-West LGA, Oyo State.
2. Identify the predictors of sexual-risk sexual behaviours among youths in Ibadan North-West LGA, Oyo State.

Theoretical frame-work

The social learning theory was adopted in the course of this research to determine methods by which risky health behaviours can be discouraged. The chart below showcases the relationship between various factors that play significant roles to discourage the involvement of youth in risky sexual health behaviours.
Materials and methods

Study design

A community-based, descriptive cross-sectional study design was used for this research which was limited in scope to the investigation of the risky sexual health behaviours among youths in Ibadan North-West LGA, Oyo State.

Target population

The Sample population consisted of youths in Ibadan North-West LGA, Oyo State that consented to participate in the study, who were between the ages of 15-24 years old and had resided for at least 6 months in Ibadan North-West LGA, Oyo State.

Sample size and sampling techniques

A sample size of 321 was derived using the Leslie-Fischer formula, with a prevalence of 56.5% from a previous study about sexual behaviours and perception of HIV/AIDS in Nigeria (Fawole, Ogunkan and Adegoke, 2011). To increase representativeness and to make allowance for non-response, the sample size was summed up to 360.

A multi-stage sampling technique was used in selecting the respondents for this study. Stratified sampling method was used to group the 11 wards present in Ibadan North West local government into three categories: inner core (urban-slum), transitory and peripheral for proper representation of the entire population. Proportionate sampling method was used to select five wards out of the 11 wards present in
the local government area. Three communities were selected from each of the wards using simple random sampling via balloting system. At each of the selected communities, 24 youths were randomly selected. Respondents that consented were then selected using simple random sampling via balloting system where more than one eligible respondent was present in a house.

**Instrument for data collection**

Quantitative method was used to obtain data for this study. The instrument was a semi-structured interviewer administered questionnaire which included both open-ended and close-ended questions. The questionnaire consisted of two main sections and each section of the questionnaire focused on the following:

- Socio-demographic characteristics of the respondents.
- Sexual risky health behaviours practiced by the respondents and reasons for youth engagement in risky health behaviours.

Sexual risky health behaviours were measured on a 26-point scale. Generally, the higher the score, the higher the respondent’s participation in risky sexual health behaviours. Scores of 20 points and above were said to have a high level of participation in risky sexual behaviour, scores between 10 and 19 were said to moderately participate in sexual risky health behaviours while scores of 9 and below were said to be have a low participation in risky sexual health behaviours.

**Data collection process, management and analysis**

The instrument used was a pretested semi-structured interviewer-administered questionnaire, the questionnaire elicited information about respondents’ socio-demographic characteristics, sexual behaviours and factors responsible for such behaviours. Content validity of the instrument was also ensured. To ensure reliability the questionnaire was translated into Yoruba, the language widely spoken in the communities. Also, the draft instrument was pre-tested among in Ibadan-North LGA to ascertain comprehension, acceptability and revision of the instrument. A Cronbach’s Alpha correlation coefficient of 0.981 was used to determine the reliability of the instrument.

Three research assistants who were fluent in English and Yoruba languages were recruited and trained for the study. Proper explanations were given to ensure clarity to ensure documentation of valid information. Non-verbal cues were observed which helped to elicit the appropriate responses to the questions. Each copy of the questionnaire was reviewed by research assistants and principal researcher for completion.

Data collected were analyzed with IBM’s SPSS version 21, using both descriptive and inferential statistics (Chi-square and Binary logistic regression), which was used to test for significant associations between variables as well as the strength of the associations. Level of significance was considered at p-value of less than 0.05 for all inferential statistics.

The outcome measures analyzed in the study were sexual behaviour of respondents, some of which were also the risk indicators. Sexual behavior (risk indicators) included sexual activity in the preceding 12 months, previous sexual exposure, early sexual debut, multiple sexual partners, casual sex and unprotected sex (non-use of condom). Likewise, their reasons for engaging in such behaviours was explored, among which included peer pressure, civilization/social and media pressure, curiosity, pleasure/fun, loneliness and many more. Predictors of sexual-risky behaviours was assessed by the investigators using chi square test and binary logistic regression analysis set at p-value ≤ 0.05 to ascertain their association. The respondent’s socio-demographic variables used include age, gender, level of education, level of income, religious, marital status, family type (Monogamy/Polygamy), Living arrangement (“Who do you live with most of the times”), Ethnicity and Current status (“What are you doing presently”)
Ethical considerations

Ethical approval for the study was obtained from Oyo State Ministry of Health Ethics Review Committee prior to commencement of the study. Permission was also obtained from community heads of the study sites. Respondents were assured of confidentiality, privacy and anonymity of information given. Their consent was also obtained before they were recruited into the study.

Results

The demographic characteristics of the respondents showed that 61.1% of the respondents were males while 38.9% were females. Their ages ranged from 15 – 24 years with a mean age of 19.15 ±2.978. Majority (72.2%) of the respondents were Christians. Another 76.1% are of Yoruba descent, 89.4% were single and 2.5% were respondents who were co-habiting.

The highest level of education attained by respondents was senior secondary level. More respondents had estimated weekly income of 500 naira or below with only 4.4% earning above 1000 – 20000 naira. A majority also (68.9%) were from a monogamous family while 31.1% were from a polygamous family.

Sexual experience

Majority (71.7%) of the respondents reported to have boy/girlfriend, among whom almost half (49.7%) reported to have ever had sex. The age at first sexual intercourse range from five to twenty-four (5-24) years with almost half (46.4%) who had first intercourse at age 13–16 years. A few (5.6%) had their first intercourse quite early within the age range of 5–8 years and the least. The mean age at first intercourse was 14.66 ± 5.865.

Most recent sexual activity showed that majority (40.8%) of the respondents had sexual intercourse with someone the same month of the study. Also, findings from this study showed that majority of the respondents were sexually active.

Sexual-risk behaviour

To verify if the respondents have ever had sex with a casual friend/acquaintance, three questions were raised. The first question was “who was your most recent sex partner?”. While addressing the question, majority (56.4%) of the respondents reported that their boy/girlfriend was their recent sex partner, and the least (21.3%) reported that their most recent sex partner was a casual friend/acquaintance.

The second and third questions to probe this issue were “Ever had sex with a casual friend/acquaintance?” and “Have you had sex with a casual friend in the past 12months?”. From the percentage who have ever had sex, more than half (57.5%) reported to have ever had sex with a casual friend while 72.8% said their sexual intercourse with casual friends occurred in the past 12 months.

Number of sex partners

A majority (31.2%) of the respondents who had had sex, had at most five sexual partners and at least two sexual partners. The mean number of sexual partners respondents claimed to have had in the last 6–12 months to the study was 4.

Contraception and contraceptive use

It was discovered that of the population of respondents that have ever had sexual intercourse, 20.7% of them reported not to have ever used any form of protection. 64.8% reported condom as a form of protection they have ever used while 2.8% reported the use of local herbs. Also, only 39.1% of the respondents that stated that they used condoms were occasional users, 68.7% reported that they did not use condom at their last sexual encounter.
Predictors of sexual-risk behaviours

Sexual experience

Findings on the association between respondents’ socio-demographic variables and ever had sex revealed significant association with all socio demographic variables except level of education and family type. Regression analysis revealed that there is a moderately positive association between gender and sexual experience; males are about 1.5 times more likely than their female counterparts to have had sexual intercourse.

Respondents aged between 15-17 and 18-20 years are 3.8 and 2.1 times respectively less likely than age 21-24 years to have ever had sexual intercourse (OR = 0.266, CI = 0.126-0.564; OR = 0.487, CI = 0.255-0.931 respectively). Also, students are 2.7 times less likely than those that are employed to have ever had sexual intercourse. (OR = 0.368, CI = 0.160-0.844), while respondents whose weekly income was 500 naira and below are about 3.2 times less likely to have ever had sexual intercourse than those whose income was above 5000 naira (OR = 0.309, CI = 0.113-0.845).

Early sexual debut

Findings on the association between respondents’ socio-demographic variables and age at first sexual initiation revealed significant association with age, marital status and level of education; which indicates that they are predictors to early sexual initiation.

There is also a very strong positive correlation between current age and age at sexual debut of respondents, as respondents within age groups of 15-17 and 18-20 years are about 5.7 and 3.1 times respectively more likely than those older than 21 years to have an early sexual debut (OR = 5.693, CI = 1.205-26.901; 3.067, CI = 1.260-7.465).

Moreover, there is a moderate positive association between level of education and early sexual initiation. Respondents who had no formal education and those with junior secondary education and below are about 2.9 times more likely than those in/with tertiary education to initiate sexual intercourse earlier.

Use of condom

There is an association between gender and condom use as male respondents were about 2.6 times more likely than their female counterparts to use condoms (OR = 2.563, CI = 1.171-5.607). While respondents within the age group of 15-17 years are 3.6 times less likely than those within age 21-24 years to use condoms (OR = 0.277, CI = 0.092-0.830). Also, respondents living with their parents are 3.5 times more likely to consistently use condoms (OR = 3.479, CI = 1.675-7.225). However, respondents within the ages of 15-17 years are 7.6 times less likely than those within age 21-24 years to use condom at last sexual intercourse (OR = 0.132, CI = 0.036-0.488).

Sexual intercourse with casual partners

Male respondents were discovered to be about 2.3 times more likely than their female counterparts to have sex with casual partners (OR = 2.341, CI = 1.183-4.633) while students and apprentice are about 3.5 times less likely than those employed to have sex with casual partners (OR = 0.286, CI = 0.140 - 0.787).

With regards to their current status, those who were both students and apprentice are about 3.5 times less likely than those that were employed to have sex with casual partner.

Multiple sexual partners

Findings from the study revealed that respondents with at least junior secondary school education and senior secondary education are about 6.2 and 3.5 times respectively more likely than those with tertiary education to have multiple sexual partners (OR = 6.158, CI = 1.501-25.269; OR = 3.970, CI = 1.678-9.395 respectively).
Also, male respondents are 2.5 times more likely than their female counterparts to have multiple sexual partners. Regarding their age, respondents aged between 15-17 and 17-20 years are 3.9 and 1.7 times less likely than those within age 21-24 years to have multiple sexual partners. (OR = 0.257, CI = 0.085 - 0.777; OR = 0.592, CI = 0.525 - 0.397).

**Discussion, conclusion and recommendations**

The duration of continued education has created a big gap between age at puberty and age at marriage, which therefore increases the likelihood of sexual initiation and unprotected premarital sex, thus creating a situation whereby most students are sexually active and have early sexual debuts (Imaledo, Peter-Kio and Asuquo, 2012).

Respondents within the age group 21-24 years were found to engage more in sexual-risky behaviours and are more vulnerable. This agrees with a study carried out among university students of Ilorin, South-West of Nigeria, where respondents aged between 20-24 years were sexually active and vulnerable (Fawole, Ogunkan and Adegoke, 2011). It was also reported that more than half of all new cases of HIV infections in the world occur among young people under the age 25 (Onyene, Uzoka, Ikonta and Bakare, 2010). Tendency to engage in sexual-risk behaviour increases with age among youths. This implies that older youths are at most risk of engaging in sexual-risky practices.

**Sexual-risk behavior**

Findings from this study also confirmed the occurrence and increase in premarital sex, which could be attributed to delayed marriage while trying to acquire both formal and informal education.

In this study, more males than females are documented to be engaged in sexual intercourse, this may be because males have higher tendency to engage in riskier behaviours than their female counterparts. Similar findings were obtained among undergraduate students of University of Port Harcourt in Nigeria where 52.0% of the respondents have ever had sex intercourse (Imaledo, Peter-Kio and Asuquo, 2012).

The findings of this survey further agrees with earlier studies that young people in Nigeria are becoming more sexually active, and many of them have poor reproductive health knowledge to practice safe sexual practices. These high sexual activities among young ones have implication for sexual and reproductive health including exposure to the dangers of contracting STIs, including HIV/AIDS, unwanted pregnancies and poorly managed abortion.

The high level of sexual activities can also be attributed to the increasing loss of moral values in many societies. For instance, Nigerian societies are becoming less restrictive towards premarital sex, coupled with peer pressure to experiment, poor access to quality reproductive health information including family life health education (FLHE) and greater permissiveness towards males than females; often girls are more supervised than boys, and because of these male youths are more likely to engage in risky behaviours than females.

The age of sexual debut is low as found in this study. This finding agrees with a study conducted among undergraduate students of University of Port Harcourt where almost half of their respondents had their sexual debut between the ages of 5-24 years (Imaledo, Peter-Kio and Asuquo, 2012). Other possible reasons for early debuts may be the increasing rate of children molestation and paedophilia.

Most respondents in this study who were sexually active had multiple partners. Similar findings were found in a study carried out among undergraduate students of University of Ilorin, Nigeria (Fawole, Ogunkan and Adegoke, 2011). Having multiple sexual partners also has considerable implications for sexual and reproductive health, including HIV and other STIs transmission and it is one of the factors driving the HIV scourge among youths (Baba-Djara, Brennan, Corneliess, Agyarko-Poku, Akuoko, Opoku., et al). Multiple sexual partnerships have been noted to be a high-risk sexual behaviour because of their tendency to increase the risk of HIV transmission through sexual networks (Berry and Hall 2009).

More than half (57.5%) of the respondents who were sexually active had ever have sex with casual friends or acquaintance before, while 72.8% claimed to have sex with casual friends or acquaintance in the last 12 months preceding the study. A similar study carried out among youths in national youth
service camp Osogbo, Nigeria also identified boy/girlfriend (81.8%) as the highest reported sexual partners, followed by casual friends (25.2%), live in partners (24.3%) and sex workers (7.0%) (Eyitope, 2014).

A cross-sectional study titled gender-based differences in the high-risk sexual behaviours of young people aged 15-29 in Melilla (Spain) found that concerning the motives for having sexual relations with casual partners, male participants considered opportunity and interest in knowing the other person to be more important than the female participants; whereas more females regarded physical excitement as an important reason for having sexual relations with casual partners (Romero-Estudillo, Gonzalez-Jiménez, Mesa-Franco and Garcia-Garcia, 2014).

Economic hardship has been found to encourage young women to initiate sexual activity at early ages for economic reasons and to sustain the practice in older ages (Oshi, Ezugwu, Oshi, Dimkpa, Korie and Okperi, 2007; Aderibigbe and Araoye, 2008). The use of condom during last sexual exposure in this study is lower when compared with the percentage 58.1% reported in the study conducted at South western, Nigeria among youth service corps members (Eyitope, 2014).

Prostitution among females as well as males for financial benefits can also be attributed to the increase in sexual activities and early debuts among youths. Wide spread incidences of such sexual activities may increase the risk of reproductive and health problems such as STIs, including HIV/AIDS, it may also put younger women at increased risk of unwanted pregnancy and abortion.

Predictors of sexual-risk behaviour

The gender of respondents as found in this study, was a predictor to involvement in risky sexual behaviour. This agrees with a study conducted among rural school-going adolescents, where it was observed that gender was a predictor to differences in sexual behaviour; this study stated that more males engaged in risky sexual behaviour than females, partly because of the high level of testosterone in boys, which increases early disposition to sexual activities (Adedapo, Julie and Willy, 2014). Males were reported in a study to be more likely to have multiple partners and experience early sexual initiation than females, and thus they are at an increased risk of contracting and transmitting STDS from partner to partner (Dekeke and Sandy, 2014). This predominance among males could be because less attention is given to males compared to females by parents, as female adolescents and youths are much more restricted socially by their parents and the society than males. Also, given that females bear the grunt of unwanted or unplanned pregnancies, it can be said to be the reasons why most males are reported to be more active sexually than females while a higher use of condoms by males may be as a result societal norm which discourages females from possessing condoms.

Age is another predictor for youth engagement in risky sexual behaviour as younger respondents are more likely than older ones to initiate sexual intercourse early. However, younger respondents are less likely than older ones to ever use condom. This shows that adolescents are more prone to unsafe sexual practices than older youths which could be attributed to peer pressure, curiosity, experimentation, poor access to reproductive health services and lack of some life building skills at this stage of their life. Kanku in 2010 reported that adolescence is characterized by upsurge of such hormones as they begin puberty. On the other hand, older youths are more likely to have multiple sexual partners than younger ones which could be attributed to a high level of self-independence and low parental restriction.

Other predictors are the educational levels of respondents as youth or young persons with only secondary education are more likely to have early sexual debuts and have multiple sexual partners than those who have attained tertiary education. This could be linked to poor access to correct reproductive health information and parental level of education. Parental educational level is also said to be an important predictor of youths’ educational and behavioural outcomes (Davis, 2005). Youths of literate parents are reported to be less likely to engage in early sexual risk behaviour, such as early sexual initiation before marriage (Dessalegn, 2006).
In general, social pressure is another factor influencing risky sexual behaviour among young people and youths; premarital sexual activities are now more socially acceptable in Nigeria than they were several years ago.

**Conclusion**

A large number of the youths engage in several sexual-risk health behaviours. These behaviours range from having early sexual debuts to having unprotected sexual intercourse with multiple sexual partners including casual friends. Being youths, they are prone to experimenting sexually, these increases their chances of exposure to sexually transmitted diseases and the trauma associated with teenage pregnancy and poorly managed abortions. The research thus established that demographic variables are significant predictors of sexual-risk behavior among youths.

Despite the strong predictors for sexual-risk behaviours engaged in by youths, it is believed that their behaviour can be positively modified through age appropriate, youth-friendly behavioural change interventions that would serve to educate them on sexual and reproductive health and the consequences of indulging in sexual-risk behaviours.

![Figure 1. Report of casual sex among respondents](image_url)
Figure 2. Report of number of sexual partner(s) in the last 6-12 months

References

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