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Assessing The Awareness And Prevalence Level Of Obesity Among Adolescents And Adults In Ajara– Badagry, Lagos State, Nigeria.

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Abstract

This project focused on the awareness and prevalence level of obesity among adolescent and adults in Ajara community, Badagry local government area of Lagos State Nigeria. The project was carried out employing a simple survey method and random sampling technique as sampling and data collection tools. Height and weight of study participants were measured to calculate their Body Mass Index (BMI). The World Health Organization (WHO) classification of obesity using BMI was then used to determine the obesity status. A simple pre tested questionnaire was also used to collate information on the awareness of obesity from the respondent. The result shows that about one tenth (13.5%) of the study population were obese, more than half (53.9%) were aware that obesity can lead to death however majorities (90.8%) have not done any test to check their obesity status. The prevalence level (13.5%) from this study is in agreement with the 12% prevalence rate reported by Nkwoka I.J, Eguu M.O, et al (2014) as well as within the range of 8.1% - 22.2% defined by Chukwuonye I.I, ChukuA.et al in 2013.

Keywords: Obesity, Prevalence, Nigeria.

Introduction

Obesity impacts negatively on individual and national resources. Although no record was found from the researched literatures concerning the cost estimate for obesity in Nigeria; the costs may run into several billions of naira a year. There is a need for urgent intervention to prevent future implications on health care expenditure as well as overall development of the nation. This capstone project was conducted to in order to assess the awareness and prevalence level of obesity and use the study as an educational tool to provide information on the epidemiology, risk factor and prevention of obesity.

Methodology

This project work was carried out using simple random sampling technique. The participants were selected during their attendance at the clinic and the venue for the religious activity. A simple questionnaire was developed to collate information on the subject from the respondent. The questionnaire comprises of three major segments; social demography, awareness of obesity and risk factors of obesity. All volunteered men and women in this category, were sampled with their weight and height measured using a stadiometer, they were also asked to complete the developed questionnaires with assistance provided by the trained research assistants. The body mass index was used to define obesity and this was calculated by dividing the weight of individual participants (in Kilogram) by the square of their heights in centimeters. The WHO cutoff for BMI was then used to classify them into underweight, normal range, overweight and obese. The participants were also provided with WHO fact sheet on obesity as educational material. Each interviewer/research assistant and the principal investigator, making 4, worked as a team (in pairs) and carry out the measurement and interview for 4 days : 1 day for the community gathering and 3 days at the clinic setting until a total of 152 sample size was obtained.

Results

Table 1. Socio demographic characteristics of respondents

QUESTIONNAIRE ITEMS	FREQUENCY	PERCENTAGE (%)
AGE GROUP		
13-19	14	9.2
20-30	32	21.1
31-40	42	27.6
41-50	26	17.1
51-60	20	13.2
60-70	10	6.6
NR	8	5.2
TOTAL	152	100
OCCUPATION		
Trading	48	31.6
Civil servant	30	19.7
Self employed	50	32.9
Student	14	9.2
Clergy	10	6.6
TOTAL	152	100
MARITAL STATUS		
Single	32	21.1
Married	120	78.9
TOTAL	152	100
GENDER		
Male	68	44.7
Female	70	46.1
NR	14	9.2
TOTAL	152	100
LEVEL OF EDUCATION		
NONE	6	3.9
PRIMARY	32	21.1
SECONDARY	50	32.9
UNIVERSITY	38	25
POST GRADUATE	4	2.6
NR	22	14.5
TOTAL	152	100

Only about one tenth (9.2%) of the respondents were teenagers while the rest were adults in the following age brackets: 20-30 (21.1%), 31-40 (27.6%), 41 – 50 (17.1%), 51-60 (13.2%) and 61 – 70 (6.6%). Eight respondents (5.2%) did not indicate their age. A larger percentage of the respondents were either self-employed (32.9%) or traders (31.6%) while the rest were civil servants (19.7%), students (9.2%) or clergy (6.6%). Majorities (78.9%) were married while the remaining 21.1% were singles; 46.1% were females, 44.7% male and 9.2 % did not indicate their gender.

Table 2. Awareness of obesity as a public health disorder

QUESTIONNAIRE ITEMS	FREQUENCY	PERCENTAGE (%)
Have you heard the word obesity before?		
YES	88	57.9
NO	64	42.1
TOTAL	152	100
Have you received any public lecture on obesity?		
YES	70	46.1
NO	82	53.9
TOTAL	152	100
Do you know the meaning, causes and prevention of obesity?		
YES		
NO	52	34.2
TOTAL	100	65.8
	152	100
Do you have any family history of obesity?		
YES	40	26.3
NO	112	73.7
TOTAL	152	100
Are you aware that obesity can lead to death?		
YES	82	53.9
NO	70	46.1
TOTAL	152	100
Do you know how obesity can be diagnosed?		
YES	36	23.7
NO	116	76.3
TOTAL	152	100
Have you done any test to check your obesity status?		
YES	14	9.2
NO	138	90.8
TOTAL	152	100

Only 57.9% of the respondents claimed to have heard about Obesity while 42.1% have not heard about it before. Almost half of the respondent (46.1%) had received public lecture on Obesity, 53.9% have not. 34.2% claimed to know the meaning, causes and prevention of Obesity while 65.8% claimed not to know. Only about a quarter (26.3%) of the respondents have family history and more than half (53.9%) are aware that Obesity can lead to death. Majority (76.3%) of the respondents know how Obesity can be diagnosed while the remaining 23.7% do not know how it is diagnosed. A larger proportion of the respondents (90.8%) have not done any test to check their Obesity status while about One tenth (9.2%) have done test to check their Obesity status.

Table 3. Respondents' association with risk factors of obesity

QUESTIONNAIRE ITEMS	FREQUENCY	PERCENTAGE (%)
Does your routine work restrict you to a sitting position		
YES	56	36.8
NO	96	63.2
TOTAL	152	100
Do you have at least 30 minutes for daily exercise?		
YES	84	55.3
NO	68	44.7
TOTAL	152	100
Mode of transport for routine movement		
Personal car	18	11.8
Buses	12	7.9
Motorcycle/tricycle/bicycle	48	31.6
Walking	74	48.7
Total	152	100
Time of dinner		
Before 7pm	90	59.2
After 7pm	62	40.8
Total	152	100
Consumption of pastries/fast food		
Daily	16	10.5
Weekly	12	7.9
Occasionally	106	69.7
Never	18	11.9
Total	152	100
Does income determine regular consumption of pastries/fast food?		
YES	22	14.5
NO	130	85.5
TOTAL	152	100

About 63.2% of the respondents claimed that their routine work does not restrict them to a sitting position while 36.8% claimed to be restricted to a sitting position by their routine work. More than half (55.3%) claimed to have at least 30 minutes of daily exercise, 44.7% claimed not to. Almost half of the respondents (48.7%) walk on feet as a mode of routine movement, 31.6% use either motorcycle, tricycle or bicycle. 11.8% use their personal car while 7.9% use buses. More than half (59.2%) claimed to have dinner before 7pm while 40.8% have their dinner after 7pm. Majority of the respondents (69.7%) claimed to consume pastries/fast food occasionally, 10.5% consume pastries/fast food daily, 7.9% consume pastries/fast food weekly while the remaining 11.9% never consume pastries/fast food at all.

Table 4. Body mass index (BMI) result of respondents. (WHO classification²⁸)

BMI CLASSIFICATION	FREQUENCY	PERCENTAGE (%)
Underweight (BMI <18.5)	16	10.8
Normal Range (BMI = 18.5 – 24.9)	38	51.4
Overweight/Pre Obese (BMI = 25 – 29.2)	18	24.3
Obese (BMI ≥30)	10	13.5

About one tenth (13.5%) of the study population were obese; almost half (51.4%) have their BMI within the normal range, 24.3% were overweight and the remaining 10.8% were underweight according to WHO classification of obesity using BMI values.

Discussion and Conclusion

This study assessed the awareness and prevalence level of obesity among adolescent and adults in Ajara community, Badagry local government area of Lagos State Nigeria.

About one tenth (13.5%) of the study population were found to be obese in the following categories; class I (50%), class II (30%) and class III (20%). This particular finding is in agreement with previous studies conducted on the prevalence level of obesity where it was reported that the prevalence of obesity among adult population was estimated at 10% in West Africa²⁰ and 8.1% – 22.2% in Nigeria²².

Only about a quarter (26.3%) of the respondents claimed to have family history of obesity, however 70% of the number found to be obese in the study do not have any family history of obesity. This may be interpreted (though insufficient data) that family history only have about 30% association with development of obesity in an individual.

Though more than half (53.9%) were aware (based on this study) of the health implication of obesity, a greater percentage (90.8%) have not done any test to check their obesity status, it is believed therefore that projects like this will increase the awareness level on obesity and with the distribution of the fact sheet, respondents will be able to tell more people about obesity. The overall health benefit expected is reduction in mortality rate due to obesity.

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Analysis Of Anthropometric Risk Factor Profile Correlates Of Hypertension

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Abstract

BACKGROUND: Hypertension is an important risk factor for cardiovascular disease (CVD) and has become a major global burden on public health. Obesity and weight gain has been reported in previous studies as the most important determinants of hypertension. Close link between obesity and hypertension forms part of a broader relationship between body weight and blood pressure (BP) among others.

OBJECTIVES OF THE STUDY: This call for a study to analyse the anthropometric risk factor profile correlates of blood pressure (BP) levels in a representative sample of market women in Juaben.

MATERIALS AND METHODS: The study was carried out using questionnaire as well as direct measurement within the period of March/April, 2015.

RESULTS: The study recorded high levels of prevalence of all the selected anthropometric risk factor profiles of high blood pressure (hypertension). A prevalence rate of 74% was noted for obesity. Among other variables, the following prevalence rates were recorded: 85.1% for excess WHR, 56% for excess abdominal circumference/girth, 84% for sum of various classes of hypertension for systolic and 48% for diastolic. An analysis of correlations of anthropometric profiles of height and BMI on systolic blood pressure were significantly correlated respectively ($r=.417$ and $r=.366$, p -value at 0.01). Contrary to this, statistically insignificant correlations were observed on both systolic and diastolic blood pressures respectively for weight $r=.140$ and $r=.183$; waist circumference $r=.152$ and $r=.096$; hip circumference $r=.244$ and $r=.105$; abdominal circumference/girth $r=.082$ and $r=-.042$; heart rate $r=.187$ and $r=.141$, **p -value at 0.01**). Among anthropometric variables, waist to hip ratio showed statistically insignificant correlation on BMI ($r=.083$, **p -value at 0.01**) whereas weight $r=.792$; height $r=-.405$; waist circumference $r=.469$; abdominal circumference/girth $r=.446$ were statistically significant on BMI (**p -value at 0.01**) and hip circumference ($r=.371$, **p -value at 0.05**)

RECOMMENDATIONS: Against this, this study proposed the following recommendations for consideration; organisation of health talk on weight management practices among market women. There should be an awareness creation on hypertension prevention as well as increased advocacy on vegetable and fruits intake.

1. Introduction

1.1 Background of the study

Capstone project on analysis of anthropometric risk factor profile correlates of hypertension, a study among market women in Juaben, community of Ghana was to study an in depth relationship of the three discipline studied in a semester and its bearing or practicability on the topic. Three major areas or subjects of consideration in this project are epidemiology, social and behavioural sciences and biostatistics. Epidemiology will focus on prevalence and distribution of major risk factors of hypertension among market women, perhaps social and behavioural sciences will look into the social characteristics of market women such as their age, income level, level of education, occupation and their social lifestyle and its relation to the topic under study. Biostatistics will be applied during collection, analysis and interpretation of project outcome with appropriate statistical techniques to help draw a conclusion that would be a true reflection of the entire population.

Hypertension being the focal point of this project is a disease of complex origin, affecting 972 million people worldwide as reported by Kearney et al., 2005 in his study. He further noted that by 2025, worldwide hypertension will rise from the present 26.4% to 29.2%. Obesity and weight gain have been identified by numerous authors as being critical determinants of hypertension. (Ferguson et al., 2008; Dalton et al., 2003; Kannel et al., 2000). Body mass index (BMI), as an indicator of obesity, has been found by Field et al., 2001 in his study to be consistently associated with an increased risk of hypertension. Excess intra-abdominal fat is associated with greater risk of obesity related morbidity than is overall adiposity (Chen et al., 2001).

Waist circumference has been reported in previous studies by Han et al., 1997 as one of the best and simple measure of total fat mass and cutaneous abdominal fat

Against these background, this project seek to study an anthropometric risk factor profile correlates of blood pressure (BP) levels among a representative market women in a Ghanaian community to justify the global picture of the problem documented by previous authors and to help framing of appropriate intervention.

1.2 Problem statement

“Hypertension is a non-communicable disease and is a leading cause of death worldwide, which is attributable to 60% of the global deaths and responsible for 46% of the global burden of disease (WHO 2001, Murray et al., 1996)”. The biggest single killer is coronary heart diseases, followed by other CVDs, cancer and chronic lung disease in that order. Diabetes is a major contributor to deaths from CVDs, but also causes its own unique complications. Common risk factors of these NCDs include smoking, physical inactivity, obesity and diets high in saturated fat and sodium and low in fruit and vegetables intake (Nigel, 2001a). Many developing countries are affected by a double burden of disease; the combination of long established infectious diseases with a rapidly growing new epidemic of chronic NCDs (WHO 2000).

Until recently, risk factors associated with NCDs and the diseases linked to them were basically common among developed countries. Studies from some African countries suggest that in predominantly urban settings, the prevalence of diabetes and hypertension increased markedly over the last ten years to the year 2000 (Nigel, 2001b).

1.3 Rationale of the study

High blood pressure (hypertension) remains an area of high concern to public as well as health services providers. Until recently, High blood pressure (hypertension) was not given much attention as the diseases were noted to be confined to wealthy people. With the increase in trend of the disease among all different social categories of people, attention has begun to rise about major risk factors of the diseases.

In Ghana, particularly Juaben where this project was carried out, available reports indicate that there in an increased rise of hypertension and its related risk factors. There is therefore the need for a critical insight into the situation with particular reference to market women who stand a higher chance of being at risk due to the nature of their work.

1.4. Research questions

- What factors account for development of hypertension
- What is the present levels of risk factors for hypertension
- What can be done to solve the problem of hypertension prevalence

1.5 Objective of the study

The main objective of this study was to analyse the anthropometric risk factors profile correlates on blood pressure among market women in Juaben, a community in Ghana.

Specifically, the study was meant to;

- Identify prevalence of anthropometric risk factor profiles of high blood pressure among market women
- Assess relationship of anthropometric profiles correlates of blood pressure
- Compare levels of risk of hypertension among resident and mobile market women

2. Literature review

2.1 Anthropometric indexes

BMI is an important correlate of blood pressure and hypertension prevalence. By the current World Health Organization (WHO,2000) criteria, a BMI $<18.5\text{kg/m}^2$ is considered underweight, $18.5\text{--}24.9\text{kg/m}^2$ ideal weight and $25\text{--}29.9\text{kg/m}^2$ overweight or pre-obese and obese with various category as I ($30\text{--}34.9\text{kg/m}^2$), class II ($35\text{--}39.9\text{kg/m}^2$) and class III ($\geq 40\text{kg/m}^2$). A BMI greater than 28kg/m^2 in adults is associated with a three to four-fold greater risk of morbidity due to T2DM and CVDs than in the general population (Van Itallie, 1985). The recent increase in overweight and obesity in the United States (Flegal et al., 2002) both in adults and children may explain, in part, the associated increase in hypertension prevalence over the past decade. In the NHANES-III data, obese men and women had a hypertension prevalence ranging from 49% to 64% with increasing degrees of obesity in men and from 39% to 63% with increasing obesity in women versus 27% in normal-weight men and 23% in normal-weight women (Must et al., 1999). According to Paffenbarger et al., 1983, weight gain is also associated with an increase in hypertension incidence and age-related rise in systolic blood pressure. In an analysis of four Chicago epidemiological studies, weight gain was associated with an increase in pulse pressure. Framingham Heart study reported a 5% weight gain to be associated with a 20% to 30% increase in hypertension incidence as documented by Vasani et al., 2001. A study by Winkvist et al., 1997 in Indonesia indicated 11.6% and 14.3% in their studies in the years 1996 and 1997 respectively as being a rate of overweight or obese among their study subjects.

A central distribution of body fat is associated with a higher risk of morbidity and mortality than a more peripheral distribution (Kissebah et al., 1994)

Measurement of waist circumference, (Han et al., 1997; Lean et al., 1995), or waist: hip ratio (WHR) (Han et al., 1997) provide useful indices of abdominal fat accumulation and a better correlation with an increased risk of ill health and mortality. An abdominal girth in excess of 108 cm (40 inches) for men and 98 cm (35 inches) for women or a WHR > 1.0 and 0.85 in men and women, respectively, are the present indicators accepted for being having an excessive abdominal fat accumulation which correlate with a substantially increased risk of metabolic complications (WHO, 2000; Han et al., 1997)

Obesity among Ghanaian adults is very common among elderly as well as females and people living in urban areas. A study involving two urban and one rural community in Greater Accra region showed an overall crude prevalence of obesity (BMI $\geq 30\text{kg/m}^2$) of 20.2% and 4.6% for females and males, respectively. Obesity increased with age, peaking in the 55 to 64-year age group (Amoah, 2003)

From a large body of evidence, global epidemic of obesity has resulted mainly from societal factors that promote sedentary lifestyles and consumption of high-fat, energy-dense diets (WHO, 2000).

The Ghana Demographic and Health Surveys (DHS) demonstrate that prevalence of obesity or overweight among adult (non-pregnant) women across the country increased 2.5 fold in ten years from 10% in 1993 to 25.3% in 2003(Ghana Statistical Service, 2004). Crucially, the 2003 DHS data shows that there are more obese women (25.3%) than malnourished women (9%).

2.2 High blood pressure

Blood pressure is considerably lower in children than in adults and increases steadily throughout the first two decades of life. In adults, cross-sectional and longitudinal surveys have shown that systolic and

diastolic blood pressure increase progressively with age. For example, in the WHO MONICA survey, systolic blood pressure increased by about 0.29 to 0.91 mm Hg per year in men and 0.6–1.31 per year in women (Wolf et al., 1997). This increase remains stable and possibly declines after age 50 for diastolic but not for systolic blood pressure, leading to a steep increase in pulse pressure; a key risk factor for cardiovascular outcome (Franklin et al., 1999). These trends have been demonstrated in both genders and most ethnic groups (Hajjar et al., 2003).

Similarly, many studies document an increase in hypertension prevalence with age (Cent 2005). According to a study in Ghana by Charles and Ellis (2006), on pre-hypertension in Ashanti Region, West Africa: An opportunity for early prevention of Clinical Hypertension, documented 40% and 29% as a prevalence of both pre-hypertensive and hypertensive respectively with pre-hypertension being more in non-hypertensive males than non-hypertensive females particularly people aged around 35 years. In population-based sample studies of United States, mean systolic blood pressure is higher for men than for women during early adulthood, although among older individuals age-related rate of rise is steeper for women. Consequently, among individuals aged 60 or older, mean systolic blood pressure of women is higher than that of men (Hajjar et al., 2006).

2.3 Physical inactivity

Physical inactivity is known to be a major public health problem of concern in 2000 as physical activity levels of people of all ages tended to decrease (CDC 2001). The Centres for Disease and Control (CDC 2001) reported that, among the youth in America aged 12 and 13 years, 69% were regularly active. However, the number dropped to 38% for young people between the ages of 18-21 years. A physically inactive child is more likely to become a physically inactive adult, which could lead to chronic diseases of lifestyle (Frantz et al., 2003). Patterns of inactivity, also known as sedentism, begin early in life, making the promotion of physical activity among children imperative (Summerfield 1998).

The prevalence of physical inactivity among youth worldwide has increased. In the international level, 67% of young children in Canada did not meet the average physical activity guidelines to achieve optimal growth and development (Canadian Fitness and Lifestyle Research Institute 1998). In the United States of America, Guo et al (1994) reported that nearly 50% of American young people aged between 12 and 21 years did not engage in vigorous physically active lifestyles on a daily basis. Among the United Kingdom, London Health Observatory reported that both adults and children in Britain are less active and less fit than previously.

The Allied Dunbar National Fitness Survey (1992) identified UK adult population groups who were sedentary as women aged 16-24 years, middle-aged men and people aged 50 years and over.

In the Health Survey in England 1997, 22% boys and 30% girls were reported as being physically inactive between - 22 - age 10 and 15. In the 16-24 year age group, 39% of the males were reported as inactive and 62% of the females were reported as inactive. In some Sub-Saharan countries, prevalence of physical inactivity has been recorded.

A study in South Africa report from Birth to Twenty (BTT) 2002, indicates that more than 40% of young people do not participate in regular physical activity. The BTT study found that physical activity was less common among girls than boys and among those with lower income and less education

2.4 Sedentary lifestyle

Sedentary life style and low educational attainment have each been linked to the rise in blood pressure with age, low socio-economic status, low occupational class, psycho-social factors such as hostility and time urgency/impatience, job strain, depression (Davidson et al., 2000).

3. Materials and methods

3.1 Study type and design

A cross-sectional study design was adapted to analyse the effect of anthropometric risk factors profile of hypertension among a representative sample of market women in Juaben, a community in Ghana with the use of structured questionnaire on formal interview basis as well as direct physical measurements.

3.2 Sampling techniques and sample size

Purposive sampling techniques was employed to enrolled 50 market women resident in Juaben for more than three months as at the time of the study.

3.3 Study variable

Variables of interest to this study included dependent and independent variables. The dependent variables were: High Blood pressure (hypertension) while the independent variable was: age, height, weight, BMI, WHR, abdominal circumference etc.

3.4 Pre-testing

A pilot test of survey questionnaire was carried out on a sample of 5 respondents to ensure control, skills and rate of questionnaire administering for effective correspondence and to help in restructuring of questionnaire. Few corrections were made on the questionnaire after pre-testing exercise.

3.5 Ethical consideration of the study

Verbal Informed consent was also obtained from participants before carrying out the exercise. The aims and processes of the research were fully explained to participants and only consenting individuals were chosen to be interviewed and other measurements taken. Although data was handled by the researcher, confidentiality was guaranteed as respondents were dealt with individually.

3.6 Data collection techniques and tools

Participants were interviewed through a structured questionnaire on formal interview basis. Information obtained included anthropometric measurements of importance including weight of the participants, height, waist and hip circumference and as well as blood pressure measurements using standardized procedures and calculated various indices of obesity including BMI, WHR, and abdominal circumference. Data collection took place on March 2015 and the project report was finalised on April 2015.

3.7 Measurement procedures

3.7.1 Pulse rate and blood pressure measurements: The pulse rate and resting blood pressure were recorded using a Standard Aneroid Sphygmomanometer and a stethoscope (Model : MC-20.EXANOVO[®] 2008. China)

Procedure

- The participant was made to sit for at least five minutes prior to testing.
- His/her right arm was bare and resting on a table.
- A cuff of appropriate size was wrapped firmly around the upper arm

- The cuff was then inflated.
- On reaching the maximum inflation level, the cuff was deflated gradually and resting blood pressure and resting pulse rate were recorded accordingly.
- Both pulse readings and resting blood pressure was taken three times within about 5 minutes.

3.7.2 Weight: Weight was measured using a scale (Electronic weighing scale).

Procedure

- The participant was asked to remove all excess clothing and made to stand upright on the scale on bare footed
- The participant weight was recorded in kilograms to the nearest whole number.

3.7.3 Height: A tape measure was used to measure the overall height of subjects.

Procedure

- Tape measure was taped against a wall with tape measure 20 cm above ground level.
- The participant was also made to remove his/her shoes, stand feet together and arms at the sides and made to stand with heels, buttocks and upper back against the wall in a complete upright position.
- The measurement from the 20th cm level to highest point on head was measured.
- The overall height was recorder/obtained by adding 20 cm to the remaining height obtained above the bench mark level, all in centimetres.
- The height was then expressed in metres.
- The height in metres was then squared. BMI was then calculated from this expression using the following formula: Body weight (kg)/height (m)².

3.7.4 WHR /abdominal girth/circumference measurement: With abdomen relaxed, a horizontal measurement was taken at the level of the narrowest part of the torso, just below the twelfth rib using tape measure. Participant was made to stand upright following taking measurement of waist. While participant stood erect and in upright position, a horizontal measurement was taken at the level of maximum circumference of the hips/buttocks.

Procedure

- The participant was made to stand with feet together and arms at the sides.
- Both the waist ,hip and abdominal girth or circumference were measured in centimetres
- The tape measure was horizontally wrapped around the full circumference of the waist and on hip of participant at different times
- Measurement was repeated for three times in each case for consistency.
- Scores were recorded to the nearest centimetres
- The waist-hip ratio was determined.

3.8 Data analysis and presentation

Data was analyzed with SPSS Version 15 and Microsoft Excel 2003 compatible with Microsoft Windows Vista version 2007. Data was analysed for frequency of distribution as well as means and correlations. The results were then presented in the form of tables with interpretations of findings made as possible.

3.9 Limitation of study

The study encountered the following limitations, though their effect on accuracy and reliability of study results was quite minimal:

- Financial constraints
- Limited time for the study

3.10 Delimitations of the study

The study covered only Juaben community but not Ghana as a whole. Additionally, results of the study were basically confined to only the market women. Limited sample size of the study, as study did not cover the majority of the market women

4. Results and discussion

4.1 Background information

Table 4.1 below presents information on background information of respondents enrolled in the study.

Table 4.1. Background information

Variable	Frequency	Percentage
Age of Respondents		
52-68>	14	28
35-51	25	50
18-34	11	22
Marital Status		
Single	3	6
Married	34	68
Divorced	8	16
Widowed	4	8
Separation	1	2
Religious affiliation		
Christian	50	100
Muslim	--	--
Traditionalist	--	--
Highest Level of education		
No Education	34	68
J.S.S	16	32
Employment Category		
Mobile	38	76
Resident	12	24
Income Status		
Minimum(10 GH ¢)	5	10.6
Average (100 ¢)	8	17

Maximum(500 GH¢)	1	2
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It is observed from the table that most (50%) of the respondents were within age range of 35-51 whilst few (22%) were within age range of 17-34. With marital status, majority (68%) were classed as married with only 2% being considered separated.

On the basis of religious background, all (100%) the respondents were christians, with no muslim nor traditionalist.

The study also realised that, majority (68%) of respondents had no formal education with 32% having Junior High School as their highest level of education. This high illiteracy level among the respondents will go a long way in negatively influencing their business success, as education plays a significant role in an efficient management of business activities. Due to the nature of the study, all (100%) the respondents were market women, with 78% being involved in mobile type of marketing whereas 24% were engaged in resident type of marketing activities. Correlation analysis showed no association in terms of category of business, be of resident or mobile on anthropometric profiles. On the average, 17% of the respondents received as amount of 60 Ghana cedi per month whilst 10.6% received as low as 10 Ghana cedi per month. This implies that the socio-economic status of the respondents is likely to fall below the average. This intern will mean inability to meet the social and other obligations of the respondents if extra activities are not carried out in addition to the main marketing business.

4.2 Anthropometric profile of respondents.

Table 4.2 below details the anthropometric profiles of respondents.

Table 4.2. Anthropometric profile of respondents

Variables	Minimum	Maximum	Mean	SD
Weight (kg)	45.0	145	76	19.8
Height (cm)	127	195	159	0.13
Body mass Index (kg/m ²)	18.1	65.8	30.5	8.84
Waist circumference (cm)	73.0	145	101	8.84
Hip circumference (cm)	62.0	174	111	16.6
Waist to hip ratio	0.65	1.17	0.9	0.08
Abdominal circumference/girth(cm)	78.0	143	102	16.9
Heart Rate(bpm)	55.0	94	74	9.21
Systolic blood pressure (mm Hg)	76.0	180	134	18.6
Diastolic blood pressure (mm Hg)	56.0	94	78	8.83

It is observed from the table above that, on the average, all the respondents (100%) were within Obesity stage I category as well as excess waist and abdominal adiposity. This makes the entire respondents being at risk of complications associated with being obese which may include high blood pressure and to some extent liver infections.

4.3 Prevalence of body mass index (BMI) categories

By WHO standards, body mass index was calculated as weight divided by height squared (kg/m²), and categorized as: Under weight (<18.5); Normal (18.5–24.9); Overweight (25.0–29.9); Obesity I (30.0–34.9); Obesity II (35.0–39.9) and Obesity III (\geq 40.0). The table below presents information on the prevalence of various categories of BMI of the respondents.

Table 4.3. Prevalence of BMI weight categories

BMI Category	Frequency	Percentage
Under weight	2	4
Normal	11	22
Overweight	12	24
Obesity I	15	30
Obesity II	5	10
Obesity III	5	10
Total	50	100

From the table above, most (30%) of the respondents were within obesity stage I category, with few (4%) being underweight. This implies that there is the need to intensify lifestyle behaviour modification strategies that target weight reduction, so as to reduce the likelihood future burden among the population.

4.3 Prevalence of waist – hip – ratio (WHR) categories

With reference to WHO standards, the cut off points used to categories waist/ hip ratio as an indicator of excess fat accumulation are; WHR (>0.85) for normal; and WHR (>0.85) for abnormal. This is only applicable to women conditions.

Table 4.4 below depicts information on various prevalence levels of WHR of respondents.

Table 4.4. Prevalence of waist – hip – ratio (WHR) categories

WHR Category	Frequency	Percentage
Normal	7	14.9
Abnormal	40	85.1
Total	47	100

Waist-to- hip ratio in excess of 0.85 in women is an indication of excess fat accumulation. This will go long way to interfere with some processes of the body, which may include menstruation. Excess fat promotes some hormones release that may interfere with pregnancy, thus the greater proportion of the respondents stand a chance of having pregnancy related abnormalities.

4.3 Prevalence of abdominal circumference/girth (AC/G) categories

By current WHO classification, an abdominal circumference or girth in excess 98 cm (35 inches) for women is currently accepted indicators of excessive abdominal fat accumulation. Table 4.5 below details information on prevalence of abdominal circumference /girth categories of respondents.

Table 4.5. Prevalence of abdominal circumference/girth (AC/G) categories

AC/G Category	Frequency	Percentage
Normal(</=98cm)	22	44
Abnormal(>98cm)	28	56
Total	50	100

It is observed from the table that most (56%) of the respondents stand at risk of abdominal adiposity.

4.4 Prevalence of hypertension

By adopting World Health Organization (WHO) criteria for classifying blood pressure, the following categories of hypertension both systolic and diastolic are being considered by this study:

Category	SBP	DBP
Optimal	<120	<80
Pre-hypertension	120- <140	80 - <90
Hypertension stage I	140 - <160	90 - <100
Hypertension stage II	≥ 160	≥ 100

Table 4.6 below details information on prevalence of various categories of hypertension for both systolic and diastolic pressure.

Table 4.6. Prevalence of hypertension

Systolic Hypertension			Diastolic Hypertension	
Category	Frequency	Percentage	Frequency	Percentage
Optimal	8	16	26	52
Pre-hypertension	23	46	19	38
Hypertension stage I	15	30	5	10
Hypertension stage II	4	8	0	0
Total	50	100	50	100

It can be deduced from the table that most (46%) of respondents were pre-hypertensive on systolic pressure with (38%) on diastolic pressure. It is also observed that systolic hypertension was quite higher among the respondents than diastolic hypertension. Targeted strategies towards reduction in systolic hypertension among the population will be beneficial, though diastolic pressure also requires same attention in order to prevent chronic hypertensive conditions.

4.5 Correlation between anthropometric indices on blood pressure

Table 4.7. Correlations between anthropometric indices on blood pressure

Variables	SBP	DBP
Weight	.140	.183
Height	.271	.417**
Body mass index	-.029	.366**
Waist circumference	.152	.096
Hip circumference	.244	.105
Waist to hip ratio	-.088	-.080
Abdominal circumference/girth	.082	-.042
Heart Rate	.187	.141

****Correlation is significant at the 0.01 level**

Table 4.7 above details information on the correlations analysis of various anthropometric indices on systolic and diastolic pressure. It is observed that no significant association was observed among indices on blood pressure, except height and BMI which significantly showed an association with diastolic blood pressure. Though practically, the selected indices do exert an association on blood pressure, there was no significant difference observed with regards to this study.

4.6 Correlation among anthropometric indices

Table 4.8. Correlation among anthropometric indices

Variables	Body mass index
Weight	.792**
Height	-.405**
Waist circumference	.469**
Hip circumference	.371*
Waist to hip ratio	.083
Abdominal circumference/girth	.446**

****Correlation is significant at the 0.01 level**

***Correlation is significant at the 0.05 level**

From the table, almost all the selected indices showed an association with BMI with significant difference except WHR which showed no association with BMI. The association of these indices with BMI implies that, changes in one or more of the indices will present a corresponding effect on the BMI status of the body. For prevention of obesity among the population, management and control of these variables will help reduce incidence of obesity among the population.

5. Conclusion and recommendation

5.1 Conclusion

This study recorded high levels of prevalence of all the selected anthropometric risk factor profiles of high blood pressure (hypertension). A prevalence rate of 74% was recorded for sum of various levels of obesity among market women in Juaben, thus only 4% and 22 % were underweight and normal weight respectively.

Among other variables, the following prevalence rates were recorded: 85.1% for excess WHR, 56% for excess abdominal circumference/girth, 84% for sum of various classes of hypertension for systolic and 48% for diastolic.

An analysis of correlations of anthropometric profiles with hypertension was weakly correlated as observed by this study except height and BMI which significantly showed a strong association with diastolic blood pressure. Among variables, almost all the selected indices showed an association with BMI with significant difference except WHR which showed no association with BMI.

5. Recommendation

Based on the key findings of this study, the following recommendations are proposed for consideration:

- Organisation of health talk on weight management practices among the market women
- There should be an awareness creation on the hypertension prevention.
- Vegetable and fruits intake should be advocated among market women

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**QUESTIONNAIRE ON ANALYSIS OF ANTHROPOMETRIC RISK FACTOR PROFILE
CORRELATES OF HYPERTENSION.**

‘A Case Study Among The Market Women In Juaben’.

Paper Code.....

DEMOGRAPHIC CHARACTERISTICS	
1. Sex of Respondent	1. Male <input type="checkbox"/> 2. Female <input type="checkbox"/>
2. Age of Respondents	
3. What is your marital status	1. Single 2. Married <input type="checkbox"/> 3. Divorced 4. Widow 5. Separation
4. Highest level of education	1. Never <input type="checkbox"/> 2. JSS 3. SSS
5. Occupation/Business	
6. Category of Occupation	Mobile <input type="checkbox"/> Resident
7. Average estimated monthly Income?	
8. Religious affiliation	1. Christian <input type="checkbox"/> 2. Muslim 3. Traditional
PHYSICAL/ANTHROPOMETRIC MEASUREMENTS	
Weight and Height	
9. Weight measurement	Kilogram(Kg) <input type="checkbox"/>
10. Height measurement	Centimeters (cm) <input type="checkbox"/>
11. Are you pregnant? (<i>For women only</i>)	1. Yes (<i>Don't measure waist and HIP circumference</i>) <input type="checkbox"/> 2. No
Waist, Hip and Abdomen	
12. Waist circumference (to nearest 0.1 cm)	<input type="checkbox"/>
13. Hip circumference (to nearest 0.1 cm)	<input type="checkbox"/>
14. Abdominal circumference/girth (to nearest 0.1 cm)	<input type="checkbox"/>
Heart Rate (Pulse)	
14. a. Reading 1	Beat per minute <input type="checkbox"/>
b. Reading 2	Beat per minute <input type="checkbox"/>

c. Reading	3	Beat per minute	<input type="text"/>
Blood Pressure			
15. a. Reading	1	Systolic (mmHg)	<input type="text"/>
		Diastolic (mmHg)	<input type="text"/>
b. Reading	2	Systolic (mmHg)	<input type="text"/>
		Diastolic (mmHg)	<input type="text"/>
c. Reading	3	Systolic (mmHg)	<input type="text"/>
		Diastolic (mmHg)	<input type="text"/>

A Study Of The Predisposing Factors To Vesico-Vaginal Fistula In Women Of Ebonyi Local Government Area Of Ebonyi State

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Abstract

Vesico-vaginal fistula is an abnormal hole between the urinary bladder and the vagina leading to involuntary discharge of urine into the vagina. Vesico-vaginal fistula still remains one of the main morbidities of childbirth in developing world and Ebonyi Local Government Area of Ebonyi State is a typical example.

The study was aimed at identifying those predisposing factors to VVF in women of Ebonyi local government area of Ebonyi State. It is a cross-sectional descriptive community based study and a total of 386 women of child bearing age were assessed using interviewer administered questionnaires.

The study revealed that 80% (309) of the studied population were aware of VVF. The study also revealed that the predisposing factors to VVF were influenced by one's level of education and employment status as both variables were statistically significant. Level of education and employment status were directly proportional to one's knowledge and inversely proportional to those predisposing factors to the development of VVF.

In conclusion, major breakthrough is still needed in order to get the women of Ebonyi Local Government Area of Ebonyi State to actually know about VVF and those predisposing factors for the development of VVF. To decrease those predisposing factors that can lead to VVF; the study suggested advocacy, health education, economic empowerment of women, girl child education and improving the socio-economic status of women as tools to bringing the desired change.

1. Introduction

In the year 2000, Nigeria and other members of the United Nations agreed on a number of Millennium Development Goals (MDGs) to improve the welfare of the people in their countries in the 21st century. The first goal of MDGs was dedicated to the reduction of poverty and extreme hunger and one of the health related goals concern reducing maternal deaths by three-quarters (75%) by the year 2015 (MDG 5).

Less than a year to the date set for attaining the MDGs many women still die or get disabled because of pregnancy, labour and child delivery. These ailments and disabilities such as anaemia, obstetric fistula, chronic pelvic inflammatory disease and post-partum psychosis (women losing their minds after childbirth) afflict the victims for periods ranging from days to life.

One of the most serious injuries of childbearing is obstetric fistula, a hole in the vagina or rectum caused by labour that is prolonged – often for days – without treatment. Usually the baby dies. Because the fistula leaves women leaking urine or faeces, or both, it typically results in social isolation, depression and deepening poverty. Left untreated, fistula can lead to chronic medical problems.

1.1. Vesico-vaginal fistula

Vesicovaginal fistula (VVF) is a subtype of female urogenital fistula (UGF). Vesicovaginal fistula is an abnormal fistulous tract extending between the bladder and the vagina that allows the continuous involuntary discharge of urine into the vaginal vault. In developing countries, the predominant cause of VVF is prolonged obstructed labor (97%).

Other causes of VVF include urologic or gynecologic instrumentation, pelvic malignancy (cervical cancer, etc.), inflammatory diseases, radiation therapy, and trauma.

The most common complaint is constant urinary drainage per vagina although small fistulas can present with intermittent wetness that is positional in nature.

Vesico-vagina fistula occurs when emergency obstetric care is not available to women who develop complications during childbirth. This is why women living in remote rural areas with little access to medical care are at risk.

1.2. Geographical distribution

Fistula used to be present in the U.S. and Europe, but was largely eliminated in the latter part of the 19th century and early 20th century with improved obstetric care in general and the use of caesarean sections in particular to relieve obstructed labor. In 1991, the World Health Organization identified the following geographic areas where vesico-vaginal fistula prevalence is high: virtually all of Africa and south Asia, the less-developed parts of Oceania, Latin America, the Middle East, remote regions of Central Asia, and isolated areas of the former Soviet Union and Soviet-dominated eastern Europe.

In Nigeria alone, Harrison (1985) reported a Vesico-vaginal fistula rate of 350 cases per 100,000 deliveries at a university teaching hospital ¹.

1.3. Rational for the study

Over seventy percent of the Nigerian population lives in the rural area and the urban suburbs. These greater bulks of the Nigerian population in the rural area and suburbs are mainly constituted by the vulnerable groups (women and children). These vulnerable groups are saddled with limited expenditure on priority social sectors that benefit them, absence of governance structures that bring the voices of the marginalized people into public setting, lack of transparency in the use of public funds for basic services, and the exclusion of women and girls from family and community decision making.

The major factors associated with vesico-vaginal Fistula are deeply embedded in political, economic and social determinants that underlie poverty and vulnerability.

Ebonyi State, the youngest in the South-East geopolitical zone of Nigeria is a typical example of the manifestation of this canker worm in the fabrics of our society some years back.

1.4. Objective of the study

1.4.1. Main objective

- ❖ To identify the predisposing factors to VVF in women of Ebonyi local government area of Ebonyi State

1.4.2. Specific objectives

1. To identify the level of awareness and knowledge of the women about Vesico-vaginal fistula.
2. To identify the predisposing factors to VVF in the women.
3. To determine whether any of the socio-demographic variables have effect on the predisposition to VVF.

2. Literature review

Millions of girls and young women in resource-poor countries are living in shame and isolation, often abandoned by their husbands and excluded by their families and communities. They usually live in abject poverty, shunned or blamed by society and, unable to earn money, many fall deeper into poverty and further despair. The reason for this suffering is that these young girls or women are living with vesico-

vaginal fistula (VVF) due to complications which arose during childbirth. Their babies are also probably dead, which adds to their depression, pain and suffering.

Actual incidence/prevalence rates from community-based studies are difficult to come by because the condition is under reported due to stigma associated with it. However, in many parts of Africa especially in the more remote rural areas, it is one of the commonest pregnancy related morbidities.

Vesico-vaginal fistula is a health condition caused by the interplay of numerous physical factors and the social, cultural, political, and economic situation of women. This interplay determines the status of women, their health, nutrition, fertility, behaviour, and susceptibility to VVF².

2.1. Lack of access to maternity care

In developed countries, both obstructed labour and VVF are medical problems which are largely in the past. This is because problems with labour may be anticipated during antenatal care and a difficult labour that may become obstructed can be identified by the use of the partograph, and a caesarean section can be performed.

In resource-poor countries, the reality is different. In these countries the vast majority of the women who die, or who develop fistula during childbirth, do so because they did not receive the health care that they needed. This may be due to a lack of basic health-care provision or through, for whatever reason, an inability to access the local health-care services.

Improving access to timely obstetric care is the most important first step that can be taken to prevent fistula from occurring in the first place. The problems in accessing maternity care that can lead to maternal death or complications are commonly referred to as the “three-delays”³. Fistula can develop because of any one of these:

- 1) Delay in deciding to seek care.
- 2) Delay in reaching a health-care facility.
- 3) Delay in receiving adequate care at the facility.

2.2. Socio-cultural factors

The World Health Organization (WHO) argues that poor socioeconomic development is the basic underlying factor responsible for maternal ill-health, including the prevalence of obstetric fistulae. It further argues that the standards of health in developing countries are low and those natural hazards such as malnutrition and infections remain largely unchecked. The situation worsens where health services are deficient or absent, particularly in isolated rural areas. Logistic problems compound the problem, including the failure of existing health systems to provide appropriate health care that is accessible, acceptable, and adaptable; the sole development of urban areas to the marginalization or total exclusion of rural areas; unequal distribution of government resources; and the lack of appropriate basic infrastructure such as roads, water, health centres, schools, and electricity².

Most fistula occur among women living in poverty in traditional cultures, where a women’s status and self-esteem may depend almost entirely on her marriage and ability to bear children.

2.2.1. Malnutrition: In areas where malnutrition is an indicator of a community's nutritional status, women have been noted to be more acutely malnourished than men due to differential feeding practices for boys and girls from birth. This reflects a fundamental undervaluing of girls and women which leads to discrimination and their neglect. The effects of malnutrition contribute greatly to the underdevelopment of women's physiology, and eventually to some of the physical problems. In developing countries, the poverty and malnutrition in children contributes to the condition of stunting, where the girl skeleton, and therefore pelvis as well, do not fully mature. This stunted condition can contribute to obstructed labor, and therefore fistula. Evidence to support this is found in Murphy and Baba Tukur's 1981 study⁴

2.2.2. Early marriage and childbirth: The traditional practice of early marriage contributes to a risk of obstructed labour and fistula. In parts of sub-Saharan Africa and South Asia, where VVF is most

common, women often marry as adolescents, sometimes as young as ten years of age, and many become pregnant immediately thereafter, before their pelvises are fully developed for childbearing. This helps to explain why VVF sufferers are often very young girls.

Study results on VVF vary geographically. In Africa, where the problem appears to be most prevalent, studies have shown that at least 70% of women with fistulae are aged 30 years and under.

In Asia, the same trend holds true, except that a greater concentration of women with VVF fell within the 20 to 24 year age group (except in Bangladesh, where almost half were under 20⁵

The case is different in Latin America, in that VVF has only been reported in Ecuador. A study by Calle⁶ indicated that 75% of the women with fistulae were primiparous, but the numbers were reported to be so small as to make the findings inconclusive.

In Ethiopia and Nigeria, for example, over 25% of fistula patients had become pregnant before the age of 15, and over 50% had become pregnant before the age of 18⁷. Fistula formation is also more likely to follow a first labour⁸ and often these girls and women may have been the victims of forced marriages. In a study by M. Kabir, Z. Iliyasu, I. S. Abubakar and U. I. Umar at Kano, Kano State Nigeria, the patient's age ranged between 10 and 36 years with a median age of 16 years. A majority of the patients 87 (72.5%) were between 10-20 years of age. 98(81.6%) of the patients had their first marriage between the ages of 10-15 years. A majority of these patients 94(78.3%) were illiterate.

Obstructed labour is directly related to the custom of early marriage in Nigeria (frequently below the age of 18 and sometimes before the onset of menstruation, as early as 11 years old). Early marriage invariably leads to early sexual contact and subsequent pregnancy at a time when a young girl is not adequately physically developed to permit the passage of a baby with relative ease. This can lead to a prolonged and obstructed labour and damage leading to the misery of fistula. The same phenomenon also occurs in women whose growth has been stunted as a result of poor nutrition or malnourishment.

In many traditional communities early marriage and childbearing, and large families, are the norm. There is little awareness of the need to delay the first pregnancy, or to space pregnancies well apart to enable the mother to recover and gain strength before a subsequent pregnancy. However, health services alone are unable to respond to these problems. Deeply embedded cultural and social values, and systems of beliefs, continue to form barriers which prevent young women from being able to manage their own lives and bodies. Changes in social and cultural attitudes, and enabling legislation to protect the rights of the health of adolescent girls, are also needed to help women delay their first pregnancy until they are physically able to deliver safely.

2.2.3. The role and status of women in a typical africa society: The low status of women, particularly young women just after marriage, plays a fundamental part in fistula development. Some women are denied access to care, or actually harmed, due to cultural beliefs and traditional practices. Some women may live in seclusion and, for many, the responsibility to decide to seek health care in pregnancy, or even after prolonged labour, falls to the husband or other family members, including the mother-in-law. When these women fail in their perceived duty to bear live children and, still worse, develop the stigmatizing condition of VVF, they are often rejected by their husband's family and have no means of subsistence. They are usually immediately divorced and left to fend for themselves.

Another social contributor to VVF is the lack of decision-making power available to women, even in decisions pertaining to their own health. This situation has been found to be particularly true for women in seclusion or "purdah"⁹. The existence of this problem is a major determinant in the health seeking behaviour of women. For example, if labour becomes obstructed and all local methods fail, a woman may be taken to hospital only if consent is given by her husband, the village chief, or sometimes her mother-in-law. Most times the decision comes too late. Depending on the distance to the nearest hospital, such women and/or their babies may not make it alive; if they do, permanent damage to the internal organs would have occurred. This situation is reported in Margaret Murphy's research in Zaria (1981), where it is characteristic for VVF patients to come from rural areas⁹

2.2.4. Harmful traditional practices on women: Harmful traditional practices, such as female genital cutting or mutilation (FGC or FGM), also contribute to the risk. Such cutting is usually carried out under unsanitary conditions, often by removing large amounts of vaginal or vulval tissue, thus causing the vaginal outlet and birth canal to become constricted by thick scar tissue. These practices increase the likelihood of gynaecological and obstetric complications, including prolonged labour and fistula. Although there are few reliable statistics available, these practices may increase the likelihood of such complications by up to seven times.

Harmful cutting before or during labour by unskilled birth attendants also contributes to fistula formation. In some countries, a traditional midwife or barber uses a sharp instrument, such as a knife, a razor blade or a piece of broken glass, to make a series of random cuts in the vagina in an attempt to either prepare the vagina for delivery or, during labour, to remove the obstruction and make way for the baby. These practices may explain as many as 15% of fistula cases in some parts of Africa¹⁰.

2.3. Socio-economic factors

2.3.1. Poverty: The single most important economic factor contributing to the prevalence of VVF is poverty, especially poverty in rural areas. According to the WHO 1991 Report on Obstetric Fistulae, women with fistulae come almost exclusively from poor families and communities¹¹. In her 1981 Zaria study, Murphy indicated that her data pointed to the fact that fistula patients usually come from poor subsistence farming backgrounds^{9,12}. While the immediate causes of vesico-vagina fistula are obstructed labour and a lack of emergency obstetric care, pervasive poverty is an important underlying cause. Women who suffer from vesico-vagina fistula tend to be impoverished, malnourished, lack basic education and live in remote or rural areas. Two epidemiologic studies of fistula have found that over 99% of women undergoing repair were illiterate¹³.

In sub-Saharan Africa the incidence of vesico-vaginal fistula has been estimated to be about 124 cases per 100,000 deliveries in rural areas, compared with virtually no cases in major cities¹⁴. Like many other women in remote areas of poor countries, most women who develop untreated fistula give birth at home, without assistance from skilled birth attendants.

Poverty also serves as a disincentive or deprives fistulae patients from using modern health facilities due to personal costs incurred as a result of attending these facilities. Examples of this type of cost include costs of transportation to the hospitals, costs of medication, hospital fees, costs of bandages and sutures, and costs associated with feeding both the patient and those who accompany her.

2.3.2. Illiteracy: With respect to education, Murphy and Baba Tukur's study⁴ also demonstrated that only boys attend school in Zaria (this research coincided with Universal Primary Education in Nigeria). Girls were seen hawking foodstuffs and other goods prepared by the women, who were confined to their compounds. Adult education for women was not fully accepted. In three villages, home economics was the only course offered to girls, while in six villages, adult literacy classes were for men only.

In many instances, a lack of health education hinders VVF prevention. Most rural dwellers see obstetric complications either as a result of the pregnant woman's sin, the anger of the gods, a curse, evil spirits, or heredity. For example, studies conducted across West Africa by the Prevention of Maternal Mortality Network (1992) demonstrated that certain behaviour, including infidelity and disregarding the authority of one's husband or elders, is believed to lead to obstructed labour and hemorrhage¹⁵. According to the study, women in Accra (Ghana), Benin, Calabar (Nigeria), and Freetown (Sierra Leone) reported that when complications arose, oracles were consulted. If the oracle confirmed insubordination, the pregnant woman was forced to apologize and to perform cleansing rites before she was taken for treatment. Similarly, in Bo, Sierra Leone, complications determined to have arisen from infidelity led to forced confessions of sin and the husband spitting water on the woman's abdomen to appease the gods. Only then was further help sought in hospitals, and only if the complication was thought to be serious enough¹⁵.

Illiteracy is also a factor which determines what kind of medical help is sought^{13, 16, &17}. Illiteracy deters people from attending hospitals, particularly when they are made to feel stupid and when hospital staff come from an alien culture with differing traditions, customs, and language^{4, 17& 18}.

According to Edström¹² and Royston and Armstrong,¹⁹ education gives young women better access to profitable employment alternatives. It also reduces the incidence of high-risk pregnancies, unwanted pregnancies, and abortions by increasing contraceptive use and reducing fertility. As girls stay in school longer, the average age at marriage tends to rise, as does the average age at first birth, especially when family planning services are promoted, readily available, and accepted by the women^{15,5}.

3. Methodology

3.1. Study area

Ebonyi State, the youngest in the South-East geopolitical zone was created in the year 1996 by the then Head of State – Late General Sani Abacha.

3.2. The people

Going by the official gazette of Federal Government of Nigeria of 2nd February 2009, the population of Ebonyi State is put at about two million, two hundred people. These people live in the thirteen (13) local government areas of the state.

Ebonyians are mainly agrarians, hardworking and industrious. Similarly, endowed with rich heritage, the people have peacefully and harmoniously co-existed for ages, justifying their socio-cultural congruency and ancestral commonality.

Its people have suffered years of neglect with the result that backwardness, poverty, illiteracy, ignorance, poor health service delivery and lack of basic amenities characterized its people at inception. These factors have impacted adversely on the health and social status of the people especially women and children. Maternal morbidities like Vesico-Vaginal Fistula (VVF) have incapacitated some of their women, improvising them and condemning them to perpetual poverty.

3.3. Geography

Ebonyi State lies between 7°31'N longitudes, 5°N'E with a land mass approximated at 5,932 square kilometers. The State is bounded in the North by Benue State, East by Crossriver State, South by Abia State and West by Enugu State.

With its savanna and semi-tropical vegetations, humid, sandy and dotted marshy soils, Ebonyi State is blessed with moisture land for growing not only variety of both cash and food crops but also animal husbandry.

There is the additional endowment of river which surround and criss-cross the state, which if effectively and systematically harnessed will distinctly place Ebonyi on the forefront of all season agricultural production in the country.

3.4. Study site

Ebonyi local government area is one of the thirteen (13) local government areas in Ebonyi State. It is bound in the north by Ado local government areas of Benue State and in the south by Abakaliki local government area. The eastern and western boundaries are Izzi and Ohaukwu local government areas respectively.

Ebonyi local government area has one of the worst road network in the State and has been one of the main source of negative health indices in the State. The people are mostly peasant farmers with relatively low socio-economic status compared to most part of Ebonyi State.

The local government area was carved out from Izzi local government area in October 1996 by the General Sani Abacha military administration. The local government is made up of 13 wards with a total population of 126,679 (66,679 are women and 27,878 are women of child bearing age). The local government has a total of 11 secondary schools, only one is government owned while the rest is community owned. A total of 6 health facilities including one State general hospital, mission and privately owned health facilities exist in the local government area. Most of the referral cases go to Sudan United Mission Hospitals in Izzi and Ohaukwu local government areas, Mile four hospital, Federal medical centre and the State teaching hospital in the state capital Abakaliki.

As a result of low level of education and other socio-economic factors, the health status of the people is very poor as indicated by Ebonyi local government being one of the local governments in Nigeria where wild polio virus was found in 2010

3.5. Study design

The design is cross-sectional descriptive community-based study.

3.6. Study population

Inclusion Criteria:

- Women of child bearing age.

Exclusion Criteria:

- Women below child bearing age
- Women above child bearing age

3.6.1. Sample size: The above inclusion criteria.

Women of child bearing age: The minimum sample size is determined by using

the formula: $n = \frac{z^2(pq)}{e^2}$ (where the population is more than 10,000) ----- 1 -

where n is the minimum sample size required

p = proportion of women that is knowledgeable about VVF

q = proportion of women that is not knowledgeable about VVF

z = value corresponding to the level of confidence

e = margin of error required

Since there is no documented study so far on the knowledge of the people on VVF and its associated factors;

$$p = 50\% = 0.5$$

$$q = 1-p = 0.5$$

$$z = 1.96 \text{ which is } 95\% \text{ level of confidence}$$

$$e = 0.05$$

The population of the women of child bearing age in Ebonyi local government area is 27,878

$$\begin{aligned} \text{Therefore } n &= 1.96^2(0.5^2)/0.05^2 \\ &= 384 \end{aligned}$$

3.7. Sample method

Multistage sampling technique was employed in the study. In stage 1: Ebonyi local government area was selected by random sampling from the sampling frame of the thirteen (13) local government areas in Ebonyi State.

In stage 2: Onuenyim Agalegu ward was selected by simple random sampling from a frame of 13 wards in the local government area

Stage 3 was the selection of the three hundred and eighty four (386) women of child bearing age (WCBA) from the eleven (11) villages making up Onuenyim Agalegu ward.

The 4th stage was the selection of the number of women within the women of child bearing age in all the villages in Agalegu ward using the systematic sampling technique.

$$n = 386$$

N = estimated number of women of child bearing age in Onuenyim Agalegu ward is 2633.

$$\text{Therefore the sampling interval} = \frac{2633}{386} \\ = 7$$

To collect the simple systematic sampling of every seventh (7th) person was after the random start was selected from a table of random numbers. The women were identified by the preliminary household listing in the villages and a house to house survey conducted to recruit and search out the eligible respondents.

3.8. Data collection

Data was collected using an interviewer-administered semi-structured questionnaire. The questionnaire was divided into 2 sections: The socio-demographic status of the respondents and the socio-demographic characteristics of the studied population were used to identify the predisposing factor to VVF in the women. Several measures were taken to ensure confidentiality. The questionnaire was interviewer administered and there was no column for self identification. The questionnaire covered several aspects of the knowledge and awareness of VVF with respect to socio-demographic variables. Two doctors and four nurse midwives were recruited to help those that could not read nor write to respond to their questionnaire.

3.8.1. Data analysis: The data from the questionnaires were entered into a Microsoft excel sheet and analysis was done with SPSS version 16. Social demographic features of the study participants were presented in frequency tables. Cross tabulations were done and Pearson's Chi square was used to test for statistical significance. The level of significance was set at ≤ 0.05 while confidence level was set at 95%.

3.9. Ethical concern

- Express permission was secured from the local government authority and the ward counselor.
- All the participants in the study were politely asked to give verbal consent before giving a questionnaire
- The information was collected confidentially with complete respect to the respondent's wish and without any force or coerce.

4. Results

The study was carefully designed and carried out in two sections- The socio-demographic status of the respondents and the socio-demographic characteristics of the studied population were used to identify the predisposing factor to VVF in the women. The results of the study were summarized in the following seven (7) tables.

Table 1. Socio-demographic characteristics of respondents

Socio-demographic variable	Frequency N = 386	Percent
Age group (years)		
15-24	87	22.5
25-34	265	68.8
35-44	27	6.9
≥45	7	1.8
Highest level of education		
Diploma and above	63	16.3
WASC/SSCE	92	23.8
FSLC	143	37.1
None	88	22.8
Marital status		
Single	53	13.7
Married	310	80.4
Separated	9	2.3
Divorced	14	3.6
Employment		
Employed	83	21.5
Unemployed	303	78.5

Majority of the respondents 265 (68.8%) were in the age group 25-34 years while 231 (59.9%) have less than senior secondary school certificate or its equivalent. About 310 (80.4%) respondents were married and as high as 303 (78.5%) were unemployed.

Table 2: Awareness of VVF in relation to socio demographic characteristics of respondents

Socio-demographic variable	Frequency (N = 386)	Awareness of VVF		X ²	P value
		Yes Freq. (%)	No Freq. (%)		
Age:					
15 -24	87	67 (77.0)	20 (23)		
25 -34	265	202 (76.2)	63 (23.8)	0.694	0.875
35 -44	27	22 (81.5)	5 (18.5)		
≥45	7	6 (85.7)	1 (14.3)		
Marital status:					
Married	310	232 (74.8)	78 (25.2)		
Single	53	45 (84.9)	8 (15.1)	3.999	0.262
Divorced	14	12 (85.7)	2 (14.3)		
Separated	9	8 (88.9)	1 (11.1)		
Highest educational qualification:					
Nil	88	60 (68.2)	28 (31.8)		
FSLC	143	103 (72.0)	40 (28.0)	14.009	0.003***

WASC/SSC	92	78 (84.8)	14 (15.2)		
Diploma & Above	63	56 (88.9)	7 (11.1)		
Employment status					
Employed	83	79 (95.2)	4 (4.8)	19.824	0.000***
Unemployed	303	218 (71.9)	85 (28.1)		

*** Statistically significant

Awareness of VVF is directly proportional to one's level of education. Employed people also had more awareness of this morbidity than their unemployed counterpart. The awareness of VVF had no strong link with the age and marital status of the respondents. Respondents' awareness of VVF was statistically significant for level of education and employment status as P is equal to 0.003 and 0.000 for highest level of education and employment status respectively.

Table 3. ANC attendance of respondents in relation to their socio-demographic characteristics

Socio-demographic variable	Frequency (N = 386)	ANC Attendance		X ²	P value
		Yes Freq. (%)	No Freq. (%)		
Age:					
15 -24	87	68 (78.2)	9 (21.8)		
25 -34	265	199 (75.1)	66 (24.9)	6.475	0.091
35 -44	27	22 (81.5)	5 (18.5)		
≥45	7	5 (71.4)	2 (28.6)		
Marital status:					
Married	310	238 (76.8)	72 (23.2)		
Single	53	37 (69.9)	16 (30.1)	3.838	0.279
Divorced	14	13 (92.8)	1 (7.2)		
Separated	9	6 (66.7)	3 (33.3)		
Highest educational qualification:					
Nil	88	67 (76.1)	21 (23.9)		
FSLC	143	116 (81.2)	27 (18.8)	10.556	0.014***
WASC/SSC	92	84 (91.3)	8 (8.7)		
Diploma & Above	63	63 (100)	0 (0.00)		
Employment status					
Employed	83	82 (98.8)	1 (1.2)	30.754	0.000***
Unemployed	303	210 (70)	93 (30)		

Antenatal attendance had a strong link with one's level of education. The more one's level of education is the more one's tendency to attend ANC. This reflected conspicuously in the data where 63 (100%) of those that had diploma certificate and above attended ANC. Also 92 (98.8%) of those who were employed also attended ANC. ANC attendance was therefore statistically significant for both highest level of education and employment status. P is 0.014 and 0.000 for highest level of education and employment status respectively.

Table 4. Means of transport of respondents to hospital during labour in relation to their socio-demographic characteristics.

Socio-demographic variable	Frequency (N = 386)	Means of transport during labour		X ²	P value
		Trekking Freq. (%)	Other means Freq. (%)		
Age:					
15 -24	87	52 (59.9)	35 (40.1)		
25 -34	265	144 (54.4)	121 (45.6)	0.922	0.820
35 -44	27	16 (59.2)	11 (40.8)		
≥45	7	4 (57.2)	3 (42.8)		
Marital status:					
Married	310	146 (47.2)	164 (52.8)		
Single	53	30 (56.7)	23 (43.3)	6.934	0.074
Divorced	14	11 (77.8)	3 (22.2)		
Separated	9	5 (57.2)	4 (42.8)		
Highest educational qualification:					
Nil	88	58 (66.0)	30 (34)		
FSLC	143	81 (56.7)	62 (43.3)	49.536	0.000***
WASC/SSC	92	46 (50.0)	46 (50.0)		
Diploma & Above	63	7 (11.1)	56 (88.9)		
Employment status					
Employed	83	4 (4.8)	79 (95.2)	117.436	0.000***
Unemployed	303	216 (71.3)	87 (28.7)		

As one's level of education increases one's means of transport to hospital during labour improves from trekking to other better means of transportation. This changes are evident in educated people 56 (88.9%) for those that had diploma and above; and employed people 79 (95.2%). Means of transportation to hospital during labour was statistically significant for level of education and employment status.

Table 5. Circumcision of girl child in relation to the socio-demographic characteristics of respondents

Socio-demographic variable	Frequency (N = 386)	Circumcision of VVF patients		X ²	P value
		Yes Freq. (%)	No Freq. (%)		
Age:					
15 -24	87	24 (27.6)	63 (72.4)		
25 -34	265	68 (25.7)	197 (74.3)	1.463	0.691
35 -44	27	5 (18.5)	22 (81.5)		
≥45	7	1 (14.3)	6 (85.7)		
Marital status:					
Married	310	85 (27.4)	225 (72.6)		
Single	53	10 (18.9)	43 (81.1)	4.110	0.250
Divorced	14	2 (14.3)	12 (85.7)		
Separated	9	1 (11.1)	8 (88.9)		
Highest educational qualification:					
Nil	88	26 (33.0)	59 (67.0)		

FSLC	143	46 (32.2)	97 (67.8)	14.726	0.002***
WASC/SSC	92	16 (17.4)	76 (82.6)		
Diploma & Above	63	7 (11.1)	56 (88.9)		
Employment status					
Employed	83	6 (7.2)	77 (92.8)	18.408	0.000***
Unemployed	303	92 (30.4)	211 (69.9)		

The assertion to the question whether one is going to circumcise her female child was more amongst the uneducated and unemployed ones. Non-circumcision of one's girl child was statistically significant for the level of education and employment status as P is equal to 0.002 and 0.000 respectively.

Table 6. Age at marriage of respondents in relation to their socio-demographic characteristics

Socio-demographic variable	Frequency (N = 386)	Age at marriage			X ²	P value
		<25 Freq. (%)	>25 Freq. (%)	Don't know Freq. (%)		
Age:						
15 -24	87	56 (64.3)	2 (2.3)	29 (33.4)		
25 -34	265	167 (63.1)	9 (3.4)	89 (33.5)	3.214	0.782
35 -44	27	18 (66.7)	2 (7.4)	7 (25.9)		
≥45	7	4 (57.5)	1 (14.0)	2 (28.5)		
Marital status:						
Married	310	190 (61.3)	12 (3.8)	108 (34.9)		
Single	53	38 (71.7)	1 (1.9)	14 (26.4)	6.112	0.411
Divorced	14	9 (64.3)	1 (7.1)	4 (28.6)		
Separated	9	8 (88.9)	- -	1 (11.1)		
Highest educational qualification:						
Nil	88	51 (58)	4 (4.5)	33 (37.5)		
FSLC	143	86 (60.2)	3 (2.1)	54 (37.7)	8.059	0.234
WASC/SSC	92	65 (70.7)	5 (5.4)	22 (23.9)		
Diploma & Above	63	43 (68.3)	2 (3.2)	18 (28.5)		
Employment status						
Employed	83	62 (74.7)	4 (4.8)	17 (20.5)	4.535	0.104
Unemployed	303	183 (60.4)	10 (3.3)	93 (36.3)		

Unlike the other factors we have taken into consideration previously. Age at marriage of the respondents was not influenced by respondents' level of education or employment status. Age at marriage of the respondents was not statistically significant for any of the socio-demographic variables used in this study.

Table 7. Respondents' view about early marriage in relation to their socio-demographic characteristics

Socio-demographic variable	Frequency (N = 386)	View about early marriage			X ²	P value
		Good Freq. (%)	Bad Freq. (%)	Undecided Freq. (%)		
Age:						
15 -24	87	10 (11.5)	32 (36.8)	45 (51.7)		
25 -34	265	16 (6.0)	122 (46.0)	127 (48.0)	5.500	0.481

35 -44	27	1 (3.7)	13 (48.1)	13 (48.2)		
≥45	7	1 (14.3)	2 (28.6)	4 (57.1)		
Marital status:						
Married	310	18 (5.8)	132 (42.6)	160 (51.6)		
Single	53	8 (15.1)	25 (47.2)	20 (37.7)	9.278	0.159
Divorced	14	1 (7.1)	6 (42.9)	7 (50.0)		
Separated	9	1 (11.1)	6 (66.7)	2 (22.2)		
Highest educational qualification:						
Nil	88	6 (6.8)	28 (31.8)	54 (61.4)		
FSLC	143	9 (6.3)	61 (42.7)	73 (51.0)	11.854	0.065
WASC/SSC	92	7 (7.6)	50 (54.3)	35 (38.1)		
Diploma & Above	63	6 (9.5)	30 (47.6)	27 (42.9)		
Employment status						
Employed	83	10 (12.0)	46 (55.4)	27 (32.6)	12.545	0.002***
Unemployed	303	18 (5.9)	123 (40.6)	162 (53.5)		

Respondents' view about early marriage was only influenced by respondents' employment status and nothing more. Respondents view about early marriage was only statistically significant for respondents' employment status. P is 0.002 for view about early marriage in relation to employment status of the respondents. How bad one views early marriage is dependent on ones employment status as employed people see it as a bad practice.

5. Discussions

Over 80% of the study population is aware of VVF as seen in Table 2. In as much as awareness cut across their various social demographic variables, the level of awareness of VVF differs. Awareness of VVF is statistically significant for level of education and employment status. This implies that awareness of VVF is directly proportional to one level of education and economic status. This is in agreement with studies done in other places which said that VVF is more among the illiterates and people with low economic status. According to Edström¹² and; Royston and Armstrong,¹⁹ education gives young women better access to profitable employment alternatives. It also reduces the incidence of high-risk pregnancies, unwanted pregnancies, and abortions by increasing contraceptive use and reducing fertility.

In table 3 there is really an improvement in antenatal attendance which could be because of the free maternal and child health services of the Ebonyi State Government. However ANC attendance is more with educated and employed women than their uneducated and unemployed counterpart. Antenatal attendance therefore has a strong relationship with one's level of education as well as economic status. As "P" is statistically significant for level of education and employment. Just like the Nigeria Demographic and Health Survey (NHDS) 2008 which showed that about 75.7% of Ebonyi State women within child bearing age attend ANC²⁰. Our study showed that about 76.2% of the studied population attends ANC. ANC attendance increased with increasing education level and employment. The slight deviation and increase could be accounted for by the free maternal health services of the present administration in Ebonyi State.

This study also tried to access the means through which these women go to hospital when they are in labour. The study discovered in table 4 that majority of the women trek to the hospital when they are in labour irrespective of the distance. However this does not apply for those who are educated and employed as many of them go hospital during labour through other better means other than trekking. The means with which a woman in labour goes to the hospital is a function of one's level of education and

employment status. This particular item which is one of the causes of second delay in seeking for care is statistically significant for education and good economic standing. This simply means that the ease which a pregnant woman gets to the hospital is function of her education and economic status.

One of the predisposing factors to VVF is female circumcision. This study shows that greater than 75% of the respondent wouldn't circumcise their girl child but the statistical difference amongst other socio-demographic variables under study is not significant except for level of education and economic status. From table 5 even though other socio-demographic variables wouldn't circumcise their female child but it is assuredly most unlikely amongst the educated people and people who are employed compared to their uneducated and unemployed counterparts. Educated and working class people are more prone to not circumcising their female child as "p" is statistically significant for level of education and employment status.

The age at which our respondents married was not in any way statistically significant for any of the socio-demographic variables as can be seen in table 6. Over 60% of the respondents married before the age of 25 years and one would have been wondering why their level education could not stop them from marrying early. This could be that those educated respondent has married before going to school or they were married off by their poor parents who couldn't train them and they are now trained by their husbands. This is agrees with what is obtainable here where a girl is given in marriage early by their poor parents to a capable man who now train the girl. This particular item implicates custom of the people as well as economic status of parents and would be husbands.

Most of the respondents were undecided as touching their view about early marriage as is seen in table 7. This could be shying away from the truth as many would like to train their girl child before giving her to marriage but for the financial burden involved. It was only the employed ones that 55% were saying that it is bad to marry out a girl child so early. This shows that poverty is the major reason why people marry out their girl child early. Marrying out a girl child does not only provide a relief by reducing the number of dependent ones but also boost the economy of the family through bride price and other incentives from the in-law. Education alone or employment without good financial base is not enough to stop this predisposing factor to VVF. This show the role reduction and eradication of poverty will have in reduction of the predisposing factors to VVF. P is only significant for employment status i.e. socio-economic status. This goes a long way to show that early marriage is caused by poverty and that is the more reason the data shows that marrying out a girl child before 18 decreases with employment. The attitude of the population to marrying out girls early was a function of their financial state alone irrespective of one's level of education. Even with many certificates and inability to afford for the comfort of one's family, such a person will opt to marrying out the girl child prematurely or early which serves as a relief and source of income to the family. The study in Murtala Mohammed Specialist Hospital in Kano showed most VVF patients married early²¹.

6. Conclusion

The root cause of Vesico-vaginal fistula is deeply embedded in political, economic and social determinants that underline poverty. The whole work in this study revolves around education and poverty. These two socio-economic variables have strong connotations as the absence of one leads to the other. Both of them according to our findings in this study have a strong effect on the development of VVF. This study was also able to establish two social classes among the studied population:

Class 1: the educated and employed

Class 2: the uneducated and unemployed

One of the most striking revelations from this study is that about 80% of the participant in the study are aware of VVF yet those predisposing factors to the development of VVF are still indisputably existing. The big question now is why this discrepancy?

This study was able to pin down the reason for this incongruence to:

Poverty: Education and employment status are the two socio-demographic characteristics that influence one's predisposition to VVF according to the study. Notwithstanding, there are still some practices like early marriage which people still indulge in despite their education. This goes a long way to show that the root cause of VVF according to our studies is illiteracy which leads to unemployment. Unemployment in turn leads to poverty. Poverty as the main social risk factor leads to early marriage which is seen as a relief and also a source of income for the impoverished family. Poverty debases a woman and because of their low status in the communities, they lack the power to choose when to start giving birth to children and also when to seek for obstetric care. All these webbed up factors drag the poor rural uneducated woman to VVF.

Come what may, major breakthrough is still needed in order to get the women of Ebonyi local government area of Ebonyi State to actually stamp out these predisposing factors to VVF. Like what the scripture said "you shall know the truth and the truth shall set you free". The identification of these predisposing factors to VVF can only be complete when it reflects in the attitude of the people which in all entreties culminate in the reduction and eradication of VVF.

7. Recommendations

The study therefore makes the following submissions as the way forward based on the revelations from this study.

- I. **Advocacy:** Advocacy at the level of the community and the different tiers of the government about VVF, its associated factors, the control, prevention and cure is very important. Acceptability and accessibility to modern health facilities should be enhanced, by bringing it within the reach of the communities and to the women especially. Advocacy for the establishment and use of emergency obstetric care centres in the community.
- II. **Health education:** This enables the community to be better informed about reproductive health issues and the dos and don'ts pertaining to maternal morbidity and mortality. Awareness campaign should be organized in schools, clubs and other organizations. Traditional and religious leaders should be involved and ex-VVF patients should be recruited to participate in the campaigns. The campaigns should focus on those basic truths about VVF and its associated factors. The campaign should also encourage those who already have VVF to seek for help. Existing health facilities should also tailor their teachings in their health talks during antenatal visits to include those basic truths about VVF.
- III. **Economic emancipation:** It is the primary responsibility of the government to provide adequate infrastructure especially in the rural areas. Good all season roads are essential to improve geographical access to health institutions. It is also primarily the responsibility of government to establish modern health institutions and facilities but communities and religious organizations can also play a role. The government of this country should be more proactive in poverty eradication by creating jobs to the Nigerian populace and enacting those laws that will make it favourable for investors to come in. Economic empowerment of women through organization of women's cooperatives and establishing small income generating projects are to be encouraged in order to give them some economic independence.
- IV. **Girl child education:** Illiteracy and ignorance are among the most potent root causes of maternal mortality and morbidity including VVF. The more people are educated and informed the less likely they are to embark on risky behaviours and lifestyle which predisposes them to VVF. Formal education and religious teaching should be actively encouraged. In this regard the communities as well as all the tiers of government and NGOs have roles to play. Government should establish more schools and these should be either free or subsidized, especially for girls, depending on local conditions. Withdrawal of girls from school for marriage should be discouraged. Family life education should be taught in schools. Formal education enables recipients to better appreciate the value and benefits of qualitative healthcare.

- V. **Improving the status of women in the society:** At the background of many of those morbid occurrences is the traditional low status of women in the society. Culturally women take the back seat in most things and are only to be seen and not to be heard or be in control of their reproductive life. In some cultures when they are in labour and problems arise which endangers their life or health they cannot even take decision to go to hospital for help if the husband is away. As a strategy male over dominance should be the focus of action not dominance. Hence, male involvement in all awareness and community mobilization is very important.

Micro-credit scheme should be put in place to empower the women economically. This will enable them to have access to medical care and control the issues of non patronage resulting from the high level of poverty, as well as the dependency of the women on their husbands and other relations for almost everything.

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8.1. Appendix

8.1.1. Questionnaire: Kindly tick the option(s) that most apply to you. All information will be treated confidentially.

Socio-demographic characteristics:

1. How old are you?
2. What is your marital status? (i) Single (ii) married (iii) separated (iv) divorced.
3. What is your highest level of education? (i) Nil (ii) FSLC (iii) WASC/SSCE (iv) Diploma/above
4. Which of the following applies to you? (i) employed (ii) unemployed

Awareness of VVF

5. Do you know about VVF? (i) yes (ii) no (iii) don't know
6. What do you think are the causes of VVF? (i) evil spirit (ii) adultery (iii) obstructed labour (iv) early marriage (v) female circumcision (vi) inadequate health facility (vii) ignorance (viii) poverty (ix) poor nutrition (x) curse (xi) don't know
7. Do you think VVF is curable? (i) yes (ii) no (iii) don't know

Predisposing factors to VVF

8. At what age did you marry? (i) 18yrs (ii) 18-25yrs (iii) 25-40yrs (iv) >40yrs (v) don't know
9. At what age did you have their first pregnancy? (i) <18yrs (ii) 18-24yrs (iii) 25-40yrs (iv) >40yrs (v) don't know
10. Will you circumcise female child? (i) yes (ii) no (iii) don't know
11. Do you attend ANC? (i) yes (ii) no
12. What is the commonest means of transport to the hospital during labour? (i) trekking (ii) wheel barrow (iii) bicycle (iv) motorcycle (v) motor car
13. Who do you think takes the decision of when to go for treatment? (i) father (ii) mother (iii) husband (iv) wife (v) both partners (vi) others (vii) don't know
14. Do you like your girl child to marry and get pregnant before the age of 18? (i) yes (ii) no (iii) undecided
15. What in your mind do you perceive as the commonest cause of VVF in this village? (i) obstructed labour (ii) female circumcision (iii) illegal abortion (iv) sexual assault (v) none of the above.

Diarrhoea In The Under-Fives: Constraints Encountered By Care Providers In Its Management

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Abstract

Diarrhoea continues to be one of the major causes of dehydration in the under-five population especially in the developing countries; resulting in high infant mortality rate, particularly in sub-Saharan Africa. Diarrhoea resulting to dehydration kills more children under five years of age than malaria, AIDS, measles and tuberculosis. It is actually the second leading cause of death in children under five in the world and responsible for 1.9 million deaths per year, following pneumonia, which kills 2 million per year. As such deaths via diarrhea represent 17% of deaths among children under-five; out of a total of 11 million deaths annually. This mostly results from the consumption of contaminated food and drinking of water from doubted sources. World-wide, around 1 billion people lack access to improve water and 2.5 billion have no access to basic sanitation. The objectives of the study were:

- ✓ *To assess the knowledge of care providers in identifying cases with dehydration in the under-fives.*
- ✓ *To assess their practices toward the adequate management of dehydration in the under-fives.*
- ✓ *To find out the difficulties encountered in its proper management.*
- ✓ *To propose practical solutions in order to curb its occurrence.*

A descriptive cross-sectional design was employed, in which primary data was collected from a sample in the study population in order to collect baseline data to be a representative of the study population during the study period, in order to assess the knowledge of care providers of Mankon Medicalized Health Centre and Nkwen Medicalized Health Centre in the assessment and management of dehydration in the under-fives.

Data was collected from care-providers of both Mankon and Nkwen Medicalised Health Centres who had served in these health facilities for at least six months and who are versed with the causes of dehydration in the under-fives, its clinical manifestations and the adequate implementation of proper management.

The convenient sampling technique for this study in which all the eight (8) care providers managing clinical cases in the medical ward and the twelve (12) care providers managing clinical cases in the paediatric ward of both Mankon and Nkwen Medicalised Centres were involved in the study and questionnaire administered to them.

A structured questionnaire was designed to collect primary data from respondents. This instrument was structured as such to tailor the specific objectives of the study:

Results show that; out of the 22 respondents, 11 (50%) were Nursing Assistants (NA), 2.0 (9.09%) were State Enrolled Nurses (SEN), then 8.0 (36.36%) were State Registered Nurses (SRN) and 1.0 (4.54%) a Bachelor in Nursing Science degree (BNSc).

Six nurses have worked for between 6-12 months, 7 nurses for between 1-5 years, 3 nurses for between 5-10 years and 4 nurses for between 20 years and above. Out of the 22 Care-providers, 13 (59.09%) suggested that dehydration is excessive loss of fluid from the body, while 9.0 (40.90%) of the respondents thought that dehydration is loss of body fluids and electrolytes. However, all the 22 respondents presented similar causes and clinical pictures and state that dehydration is classified into 3 types in terms of severity.

All the 22 respondents identified 3 types of dehydration and offered specific solutions as to each of them. They equally attribute specific length of time required to manage each type of dehydration. The 22 participations also thought that to properly manage this condition, appropriate tools (urinary bag or any calibrated bowl) should be used to estimate the amount of fluid lost.

On the clinical manifestations of dehydration, 49 responses were gotten as follows, 11 (23.40%) could not distinguish signs and symptoms as to mild, moderate and severe dehydration, 12 (25.53%) stated difficulties as regard to management approaches, while 24 (51.06%) related their difficulties to mother's compliancy.

All the respondents suggested similar causes and clinical pictures and classified it into three types. All of them above implies that with the knowledge on dehydration, nursing staff can easily reverse this condition with less fatality using specific management approach corresponding to the degree of dehydration, and prevent complications.

Health advice offered to mothers by nurses on the management approaches at home fall under four items viz: O.R.S., water and fluid, nutrition and hygiene. 18 (33.96%) provided health talks on hygiene. If faeco-oral infections should be avoided, hygienic measures must be implemented, 14 (26.41%) nurses advocated on the use of O.R.S which should be taken at home.

Keywords: Sanitation, Diarrhoea, Dehydration, Under-fives, Oral Rehydration solution, Hypervolemia, Fluid Replacement Therapy

Introduction

Diarrhoea continues to be one of the major causes of dehydration in the under-five population especially in the developing countries; resulting in high infant mortality rate, particularly in sub-Saharan Africa (UNICEF, 2009). Diarrhoea resulting to dehydration kills more children under five years of age than malaria, AIDS, measles and tuberculosis. It is actually the second leading cause of death in children under five in the world and responsible for 1.9 million deaths per year, following pneumonia, which kills 2 million per year (UNICEF, 2009). As such deaths via diarrhea represent 17% of deaths among children under-five; out of a total of 11 million deaths annually. This mostly results from the consumption of contaminated food and drinking of water from doubted sources. World-wide, around 1 billion people lack access to improve water and 2.5 billion have no access to basic sanitation (Sarah Cumberland, 2009).

In a healthy person, total body water constitutes about 60% of the 75% of the body's weight. Because fluid is the main constituent of the body, the importance of body's fluid balance is readily apparent.

Hypo-hydration or dehydration is an excessive loss of body fluid from diverse compartments. However, in physiological terms, it entails a deficiency of fluid within an organism and occurs whenever the total output of fluid exceeds the total intake regardless of the underlying cause.

Dehydration can be caused by a wide range of diseases causing impairment of water homeostasis in the body through the skin, respiratory tract, gastro intestinal tract and the urinary system. Among these diseases, diarrhoea diseases seem to be the first leading cause of dehydration. Diarrhoea is defined as the passage of three or more loose or liquid stools per day, it is usually a symptom of an infection in the intestinal tract which can be caused by a variety of bacterial, viruses and parasites. Infection is spread through eating contaminated food or drinking contaminated water or even from person-to-person as a result of poor hygiene practices.

Paediatric dehydration is frequently the result of gastro-enteritis characterized by vomiting and diarrhea, however, other causes may include poor oral intake due to disease such as stomatitis, or osmotic diuresis from uncontrolled diabetes mellitus.

Hypotonic dehydration is the primary loss of electrolytes, sodium in particular in extra-cellular fluid, osmotic pressure changes resulting in extra cellular fluid moving into the intra cellular compartment. This then lead to a decrease of sodium from its normal range (136 – 144 mm d/l). It may be due to water over load or too much 5% dextrose. Volume depletion can be concurrent with hypo-natremia characterized by

plasma volume contraction with free water excess. An example is a child with diarrhea who has been given tap water to replace diarrhea losses, free water is replenished, but sodium and other solutes are not. Treatment here entails replacement using sodium chloride (Normal saline) infusion to re-instate the status-quo to normal.

Hypertonic (hypernatremic) dehydration refers to the surplus of sodium in intracellular fluid that can result from excess water loss or an overall excess of sodium. This condition could arise from excessive saline or Ringer's lactate infusion with true dehydration (different from volume depletion). Plasma volume contracts with disproportionate free water loss. An example is a child with diarrhea whose fluid losses have been replenished with hypertonic solution – Baking soda or improper dilute infant formula. Volume depletion has been restored, but free water has not. Treatment deals with administration of 5% dextrose infusion.

Symptoms of mild dehydration are noticeable after 3% to 5% of one's normal water volume has been lost. Initially, one experiences dry mouth, thirst, loss of appetite and dry skin which can be followed by constipation; decrease urine output (oliguria); unexplained tiredness, discomfort and irritability of the neuromuscular system and headache associated with dizziness when standing up.

Symptoms of moderate dehydration become apparent when 5% to 10% of normal water volume has been lost. There may be no urine output (anuria) ; Slightly sunken fontanelles and eyes; decrease tears; loss of elasticity or stretchiness of the skin; sudden weight loss; depressed respiration; decreased oxygenation; symptoms of lethargy; convulsion, spasms; lethargy (hypoactive reflex) drowsiness and extreme insomnia.

Symptoms of severe dehydration are apparent when the cardiac and respiratory rates increase to compensate for decrease plasma volume and blood plasma. These manifests through tachycardia, weak and rapid pulse, tachypnea and hyperpnea. At about 10% to 15% fluid loss or above, muscles are plastic; vision may dim, tangling of limbs (paresthesia); anuria is evident; deeply sunken fontanelles and eyes. Because of the complicating nature of this stage, the following can result: delirium, disorientation, unconsciousness, pulmonary oedema, hallucination, seizure and coma (Angelucci D. *et al.*, 1993).

The cholera outbreak in Cameroon and Zimbabwe highlights failure in the global fight against an old enemy. This is not only symptomatic of the breakdown of water and sanitation infrastructures, but also the restricted availability of simple life-saving treatment-Oral Rehydration Salts (ORS) solution. While a little can be done in short term to improve access to safe water and appropriate sanitation treatment with ORS solution for cholera – an acute intestinal infection that causes severe diarrhea has become more widely available to those afflicted (Sarah Cumberland, 2009).

Cholera outbreaks occurred in Africa in November 2010, killing more than 600 people in Cameroon and neighboring Nigeria. This issue of clean water in Africa remains unresolved in many areas. Cameroon's extreme North and North Regions are characterized by limited access to portable water and absence of latrines – these are the strong contributing factors to the cholera outbreak. According to Mirabell Akwei, a nurse treating cholera victims, around two-thirds of the people treated with cholera in Mokolo (Extreme North Cameroon) have been children (Jeremy Sprigge, 2010).

According to the Center for Disease Control and Prevention (CDC) Atlanta (2010), for children younger than 5 years, the annual incidence of diarrhea illness is approximately 1.5 billion, while deaths are estimated between 1.5 and 2.5 million. Though these numbers are staggering, they represent an improvement from the early 1980s when death rate was approximately 5 million per year.

In the United States of America, pediatric dehydration, particularly that due to gastro-enteritis is a common emergency in department complaints. Approximately 200,000 hospitalization and 300 deaths per year are attributed to gastro-enteritis each year.

According to Dr Chaignat from the WHO's Global Task Force on Cholera Control, a possible 80% of those afflicted could have been treated successfully with ORT. She says, severe cases may need intravenous fluid, but most people can be saved by ORS.

In 2009, diarrhea disease was the third leading cause of death in low income countries causing 6.9% of death overall. In children under-fives, it is the second leading cause of death following pneumonia. Out of 1.9 million children killed by diarrhea disease in 2009, 80% were under two years of age.

The Nigeria's Health Ministry reported that over 6.000 cases have been reported since June 2010 and more than 350 people have died and the infection threatens to spread. In Cameroon, the outbreak has killed more than 200 people and another 2500 cases of cholera have been diagnosed in June 2010 (Sprigge, 2010).

Information gotten from the Cameroon Ministry of Public Health was that, throughout the year 2010, 10.759 cases of cholera have been identified, 10,112 treated cases and 657 deaths. The following eight regions were affected: Centre, Far North, Littoral, North, North West, West, South West and South. The Far North Region registered 88% of the total cases.

At the Bamenda Regional Hospital, a second level referral health facility for the region, dehydration occurs secondary either to malnutrition (kwashiorkor, marasmus) or infectious diseases (gastro- enteritis, meningitis, tuberculosis). Out of the various degrees of dehydration, the commonest ones (mild to moderate) are successfully managed with no deaths registered. However, the severe type that common in outbreaks such as cholera occurs mostly seasonally when floods occur or when the water table gets high; as the prognosis is very dramatic. The following represents the gravity in the under-five age group from January 2006 to December 2010 as concern severe dehydration.

In 2008, out of 26 children who presented with dehydration in the pediatric unit, 6 cases died.

In 2009, out of 35 cases, 1 death occurred; in 2008, no severe case was presented; in 2010, 10 patients presented with no death registered. In 2011 and 2012, 59 cases and 44 cases were admitted with 4 and 3 deaths respectively (Hospital Records, 2012).

As a result, mothers seem not to detect mild and moderate dehydration and management approaches towards it. Furthermore, during the management of various types, the investigator could not accurately distinguish mild dehydration from moderate one, nor from severe dehydration, as the treatment approaches were focused on intra venous administration of either isotonic solutions-5% dextrose, normal saline or Ringer's lactate, or hypertonic solution -10% dextrose, 5% dextrose in normal saline (Hastings *et al.*, 1994)

Study objectives

General objective

To ascertain the knowledge of care providers in the prompt recognition and adequate management of dehydration in the under-five age group.

Specific objectives

- ✓ To assess the knowledge of care providers in identifying cases with dehydration in the under-fives.
- ✓ To assess their practices toward the adequate management of dehydration in the under-fives.
- ✓ To find out the difficulties encountered in its proper management.
- ✓ To propose practical solutions in order to curb its occurrence.

Study hypothesis

Health care providers, who are knowledgeable on the causes of dehydration in the under-fives, its clinical manifestation and are provided with adequate resources for the implementation of proper management, would successfully treat such cases with less mortality than those who are not.

Methodology

Study design

It was a descriptive cross-sectional design, in which primary data was collected from a sample in the study population in order to collect baseline data to be a representative of the study population during the study period, in order to assess the knowledge of care providers of Mankon Medicalized Health Centre and Nkwen Medicalized Health Centre in the assessment and management of dehydration in the under-fives.

Study population

The study was carried out in the care providers of both Mankon and Nkwen Medicalised Health Centres who had served in these health facilities for at least six months and who are versed with the causes of dehydration in the under-fives, its clinical manifestations and the adequate implementation of proper management.

Sample size and sampling procedure

The convenient sampling technique for this study in which all the eight (8) care providers managing clinical cases in the medical ward and the twelve (12) care providers managing clinical cases in the paediatric ward of both Mankon and Nkwen Medicalised Centres were involved in the study and questionnaire administered to them.

Primary data collection tool

A structured questionnaire was designed to collect primary data from respondents. This instrument was structured as such to tailor the specific objectives of the study as follows:

- Knowledge on dehydration.
- Management of dehydration.
- Health education, advice given to mothers on discharge.
- Proposed solutions to salvage the situation.

Method for data analysis

Data was coded using a coding guide developed for the study and entered in CsPro, cleaned and exported to SPSS windows version 16.0 for analysis. Descriptive statistics was employed to analyze the households' perceptions and practices. Bivariate analysis was used to evaluate the association between explanatory and outcome variables.

Method for data presentation

Data collected was analyzed using the SPSS software and presented in graphics and frequency tables.

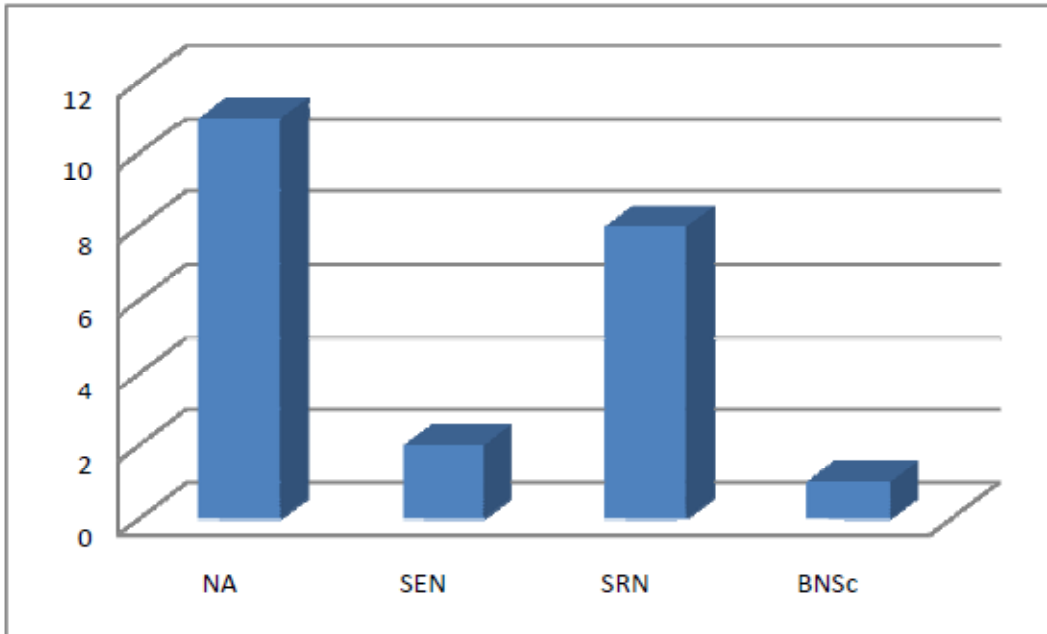


Figure 1. Distribution of Respondents according to professional grade

From figure 1, out of the 22 respondents, 11 (50%) were Nursing Assistants (NA), 2.0 (9.09%) were State Enrolled Nurses (SEN), then 8.0 (36.36%) were State Registered Nurses (SRN) and 1.0 (4.54%) a Bachelor in Nursing Science degree (BNSc).

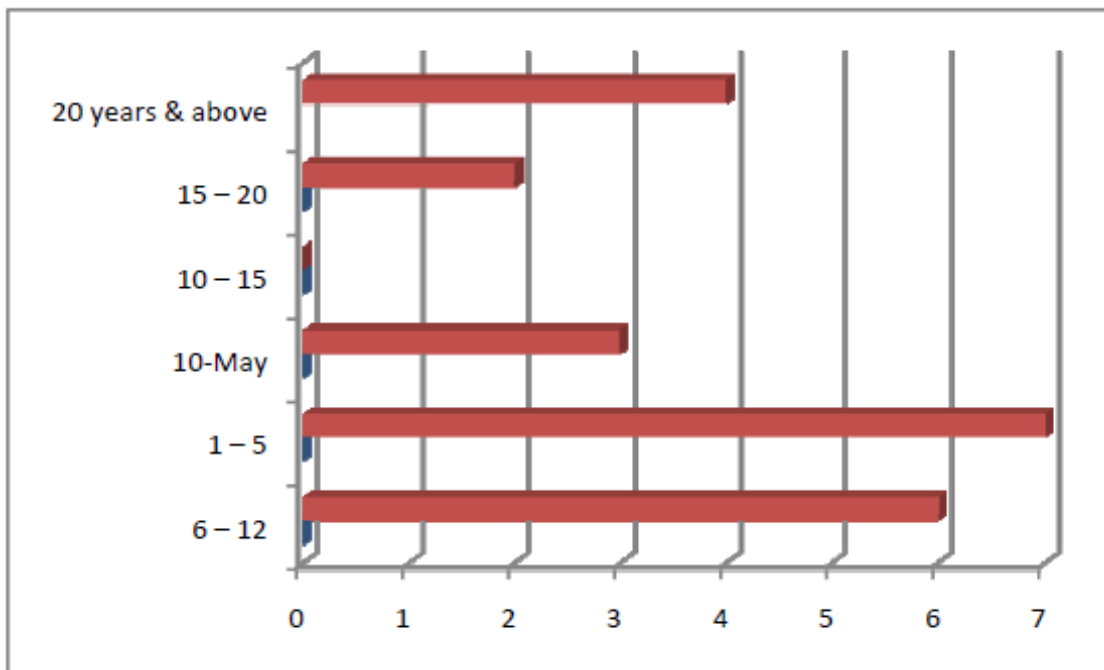


Figure 2. Distribution of participants according to duration in service

In Figure 2, 6 nurses have worked for between 6-12 months, 7 nurses for between 1-5 years, 3 nurses for between 5-10 years and 4 nurses for between 20 years and above.

Knowledge on Dehydration

Table 1. Distribution of Respondents for Knowledge on Dehydration

Definition of Dehydration	Clinical pictures of dehydration	Types of dehydration	Frequency	Percentage
Excessive loss of body fluids caused by vomiting, diarrhea, burns, hyperperspiration, poor in-take of fluids, gastro-enteritis and renal failure.	Thirsty, dry skin, weakness, sunken eyes and fontanelle decrease in skin turgor, irritability, confusion and coma	3	13	59.09
Excessive loss of body fluids and electrolytes caused by vomiting, diarrhea, electrolytes imbalance, infection gastro-enteritis and food poisoning.	Sunken eyes and fontanelle, restlessness, weight loss, flabby abdominal muscles, no urine, no tears, unconsciousness, irritability, dry gum and lips, confusion and coma.	3	9	40.90
Total			22	100

The table above shows that out of the 22 respondents, 13 (59.09%) suggested that dehydration is excessive loss of fluid from the body, while 9.0 (40.90%) of the respondents thought that dehydration is loss of body fluids and electrolytes. However, all the 22 respondents presented similar causes and clinical pictures and state that dehydration is classified into 3 types in terms of severity.

Management of Dehydration in Under-Fives.

Table 2. Respondents Knowledge of the Management According to Severity

Type of dehydration	Type of solution	Duration of treatment	Tools used to estimate amount of fluid lost	N°. of participants.
Mild dehydration	ORS	4 – 6 hours	Fluids & electrolytes	22
Moderate dehydration	Normal Saline	8 – 12 hours	Chart or urinary bag	22
Severe dehydration	Ringer Lactate	24 – 48 hours	Or any calibrated bowl	22

From table IV, all the 22 respondents identified 3 types of dehydration and offered specific solutions as to each of them. They equally attribute specific length of time required to manage each type of dehydration. The 22 participations also thought that to properly manage this condition, appropriate tools (urinary bag or any calibrated bowl) should be used to estimate the amount of fluid lost.

Health advice to mothers on discharge.

Table 3. Distribution of Respondents' Proportion of Management Approach per Variable.

Variables	Management approach at home	Frequency of Respondents	%
O.R.S	- Keep O.R.S. at home - Prepare O.R.S. - Freely drink O.R.S. - Continue rehydration with O.R.S.	14	26.41
Water & fluids	- Give enough fluids - Give good variety of fluids & rich food. - Boil water before drinking	12	22.65
Nutrition	- Continue breast feeding. - Proper handling of food before consumption. - Avoid food poisoning. - Provide balance diet.	9	16.98
Hygiene	- Wash feeding utensils. - Hand washing before feeding and after toileting. - Keep environment clean. - Frequent change of linen	18	33.96
Total		53	100

The table portrays that, health advice on management approach was offered on the following items: O.R.S. water and fluids, nutrition and hygiene in the following proportions: 18 (33.96%) of the respondents provided health talks on hygiene, followed by 14 (26.41%) of the respondents who offered health talks on O.R.S., then 12 (22.65%) of the respondents highlighted on water and fluid and 9 (16.98%) of the respondents offered health talks on nutrition.

Difficulties encountered in the management of dehydration in the under-fives.

Table 4. Respondents' difficulties encountered with regard to the various practices.

Items	Difficulties	Frequency	%
Signs and symptoms	Not distinguished as to mild, moderate and severe dehydration	11	23.40
Management approaches	- In-availability of fluid measuring tools. - Use of bed pan, plastic bag and bucket to collect output. - Amount of IV fluid per body weight and per duration not defined. - Mode of preparation and storage condition of ORS not stated.	12	25.53
Mother's compliancy	- Knowledge deficit. - Emptying of urine container without evaluation. - Mothers allow infants to vomit or urinate on the linen.	24	51.06
Total		49	100

From the table, it shows that out of the 22 respondents 49 responses were gotten as follows, 11 (23.40%) could not distinguish signs and symptoms as to mild, moderate and severe dehydration, 12

(25.53%) stated difficulties as regard to management approaches, while 24 (51.06%) related their difficulties to mother's compliancy.

Discussion of results

Looking at their duration in the service, 6.0 (27.27%) have worked for between 6-12 months, 7.0 (31.82%) have worked for between 1-5 years, 4.0 (18.18%) have worked from 20 years and above. This inequality distribution of the duration in the service signifies that those who are present in high frequency (high percentage) have worked for 1-5 years, and must have developed more skills and knowledge in the recognition and management of dehydration. Moreover, they could manage this condition with less fatality if they are provided with adequate resources. For those that have worked for 20 years and above, though the percentage is low, the number is however still significant, reason being that, throughout their professional career, they had also acquired more in the identification and management of dehydration in this age group.

Knowledge on dehydration

The distribution of respondents on knowledge of dehydration enunciated their definitions as follows: 13 (59.09%) nurses defined it as excessive loss of body fluids caused by vomiting, diarrhea, poor intake and renal failure, while 9.0 (40.90%) nurses defined it as excessive loss of body fluids and electrolytes caused by vomiting diarrhea, electrolytes imbalance and gastro enteritis. These definitions imply that, for dehydration to occur, they must be alteration in the functioning of one organ responsible for fluid homeostasis. Examples here include gastro enteritis which is infection of the gastro-intestinal tract characterized by vomiting and diarrhea, renal failure stands to be the inability of the kidneys to selectively retain water and electrolytes. Moreover, poor intake can be related to any abnormality of the oral cavity such as stomatitis. These organs are responsible for fluid and electrolytes balance ((Methen., 2000). All the respondents suggested similar causes and clinical pictures and classified it into three types. All of them implied that with the knowledge on dehydration, nursing staff can easily reverse this condition with less fatality using specific management approach corresponding to the degree of dehydration, and prevent complications (Bresee J.S. *et al.*, 2003) or reverse acute dehydration (Angelucci D. *et al*, 1993).

Management of dehydration in the under fives

Presenting data according to severity, all the 22 respondents identified three types of dehydration and offered specific solutions to each of them. They equally specified the length of time required to manage each type that varies from 4 hours to 6 hours for mild dehydration, using ORS; often managed at home, from 8 hours to 12 hours for moderate dehydration using Normal Saline, and from 24 hours to 48 hours for severe dehydration using Ringer's Lactate. These two forms are mainly managed in health facilities. Normal Saline and Ringer's Lactate usually given intravenously are used only for severe dehydration. However, the ORS may be administered by Naso-gastric tube if necessary. The aim of this treatment according to Angelecci D et al., (1993) is to reverse acute dehydration. The differences in duration imply that the management depends on how severe the condition is. Regardless of the severity, each child presenting with dehydration should be treated in less than 48 hours (2 days) (Glass. R. et al., 2003).

Tools used to evaluate input and output are also a valuable elements in managing this condition as they help to attain the expected outcome (results), that is to maintain fluid and electrolyte balance ((Metheny. 2000).

Health advice to mothers on discharge.

Health advice offered to mothers by nurses on the management approaches at home fall under four items viz: O.R.S., water and fluid, nutrition and hygiene. 18 (33.96%) provided health talks on hygiene. If faeco-oral infections should be avoided, hygienic measures must be implemented, 14 (26.41%) nurses

advocated on the use of O.R.S which should be taken at home. This solution had shown to be very effective in treating dehydration (WHO, 2006). 12.0 (22.65%) highlighted on water and fluid replacement. This is to enhance fluid and electrolytes balance ((Metheny. N.M.,2000) thereby not only rehydrate the child, but also in decreasing the duration of the diarrhea (Pediatric Update, 1994).

9.0 (16.98%) laid emphases on nutrition that should be well conserved, well cooked and given at short intervals basis, this goes in line with the BRAT routine meal advocated by Pillitteri (1995) as a protocol for providing a balanced diet while replacing fluid and electrolytes during acute episode of diarrhea in children. This shows that when all these variables are put together, the management of this condition will be very effective and will induce no fatality.

Difficulties encountered in the management of dehydration in the under-fives

Difficulties encountered by nurses in the management of dehydration in the under-fives fall within 3 items namely: difficulties to distinguish the manifestations of each type 11 nurses (23.40%), difficulties in management approaches 12 nurses (25.53%) and difficulties related to mothers compliancy 24 nurses (51.06%). These difficulties are linked and may have negative impact in the health status of the child. The inability to differentiate signs and symptoms and the mother's compliance would influence the management approaches.

Guidelines for nursing care is disrupted because measuring of fluid intake and output is inadequate. The clients' fluid intake may not be effective because the client and relatives are not knowledgeable on the fact that the nurse needs a record of all fluid entering the body and all fluids output so they may not know the quantity (fluid based food) and amount of fluid to take in further more. They often discard the output without the knowledge of the care provider who is as the role model (Dorthea Orem) and needs to offer total or partial care delivery to the patient. As a nutritional assessment (dietary plant) is not carried out to identify imbalances and food preferences. The nurse cannot initiate teaching. It is in this light that Metheny N.M, (2000) advocated that nurse should pay attention to certain parameters when assessing a client's fluid and electrolytes status (intake and output of fluid, urine concentration, skin turgor and degree of moisture in oral cavity, etc).

Recommendations

The recommendations go to three (3) resource areas viz: the nursing staff, the health facilities and the Ministry of Public Health.

The nursing staff.

- The nurses should regularly undergo refresher courses so as to be upgraded on the norms and standards of management of childhood dehydration.
- They should be drilled on the newly developed skills in IMCI.
- They should teach carers on how to identify signs of dehydration in children and provide them with first line treatment.

To the health facilities.

* Should provide appropriate case detection instruments to the health care providers to enhance the proper identification and prompt management of cases of dehydration the under-five population.

* They should endeavour to implement policy guidelines as laid down by the Ministry of Public Health for implementation at the operational level.

* They should encourage critical thinking among, capacitate the junior staff with tangible practical measures and provide capacity building opportunities via the regular organization of Seminars workshops.

To the ministry of public health.

- The Ministry of Public Health should provide WHO with official figures on devastating effects of the dehydration in the under-fives more especially when it is associated with outbreaks such as cholera ; for logistical and financial assistance to be provided when need arises.
- The Ministry of Public Health should draw more attention on dehydration in under-fives as is the case with other diseases notably tuberculosis, malaria, HIV/AIDS etc)

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The Acquisition And Proper Usage Of LLINs As A Primary Preventive Measure Against Malaria In The Batibo Health Area In North West Cameroon

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Abstract

Each year, there is an estimated 220 million deaths caused by malaria leading to approximately one million deaths mostly among children under five years of age. There is a growing international agreement to use prevention and treatments methods that are available against malaria. The most effective method include; the use of mosquito bed nets treated with long lasting insecticide (LLINs) to avoid mosquito and to kill mosquito and spraying the inside wall of the houses with similar to kill malaria carrying mosquitoes. In 2013 an estimated 136million LLINs were delivered in endemic countries, a major increase over the 70million bed nets were funded for delivery in 2014 and suggesting an even stronger pipeline for 2015. Population access to LLINs remain below the target universal coverage and has not appreciably improved.

Malaria being a fatal disease is becoming difficult to prevent and control because of the habit of increasing resistance to the insecticides of the female anopheles mosquito.

In Cameroon, malaria remains a public health problem and responsible for 31% of consultations and 44% of hospitalization in health facilities. It is responsible for 18% of deaths occurring in Cameroon .In children less than 5 years 31% of deaths are due to malaria.

The use of LLINs in Cameroon is still a problem, that is why in world malaria days from 2013-2015 the theme has been “invest in the future, defeat malaria to call attention to the effort to finish the job this 2015 calling for high level commitment to the vision of a world free of malaria”.

The general objective was to find out the factors affecting the acquisition and proper usage of LLINs as a primary preventive measure against malaria and to propose possible solutions to identified problems.

The specific objectives of the study were:

1. To assess the community's knowledge on malaria prevention.
2. To assess their practical measures used in preventing malaria through the use of LLINs.
3. To find out the proportion of the community with LLINs properly installed and utilized.
4. To ascertain the constraints encountered by the community in its proper usage and propose possible solution to any identified problems.

A descriptive cross-sectional study was employed in which data was collected on the acquisition and proper use of LLINs in the Batibo health area.

The study population constituted of the inhabitants of Batibo health area community.

A sample of 100 respondents were randomly selected using the systematic random sampling method to represent the entire population of Batibo Health Area). Results show that on the distribution of respondents relative to whether they have LLINs; it was observed that out of the 100 respondents 62% had LLINs while 38% did not have, 12 (19.35%) of the respondents said they have never had LLINs , 28(45.26%) said LLINs are not enough while 22(35.48%) said the one they had is bad. The reason why LLINs may not be enough maybe because of increase in household members as 46 % of the respondents have more than four members per household.

It was equally observed that out of the 38 respondents who had LLINs they were not properly used as only 10(26.5%) said they sleep under LLIN every night, 8(21.0%) said when they feel cold and 20(52.6%) said they like.

Conversely, out of the 38 respondents who had LLINs 16(42.1%) said everybody in the household sleep under LLINs while 22(57.9%) said not everybody sleep under LLINs. It was observed that not everybody sleep under LLINs because 13(34.3%) of the respondents said they were old, 2(5.2%) said they do not know why and 2(5.2%) said it is because of negligence.

In conclusion, from the results obtained it was found out that; most people do not use nets because the nets are insufficient and may be because of increasing number of per household compared to the number of LLINs given per household. In the community the relationship between mosquito and malaria well known but many people are not aware of the night-biting female anopheles mosquito that transmit the malaria parasite may be contributing to the fact that many people still reluctant to use the net properly as a primary preventive measure against malaria.

The peripheral level has a great task in the implementation of the proper use of LLINs and to let the net users understand that heat production and not breathing well are minor effects to some people at the beginning of the use of LLIN but after sometime these effects will disappear.

Key words: Long lasting Insecticidal Bednets, Female anopheles mosquitoes, Malaria, Installation, Residual spraying, Prevention, Vulnerable, Under-fives

Introduction

According to World Vision, malaria though eliminated in some parts of the world years ago, remains a significant public health problem threatening half of the world's population (Atkinson JA, Bobagare, *et al*, 2009). Each year, there is an estimated two-hundred and fifty million deaths caused by malaria leading to approximately one million deaths mostly in children under five years of age.

There is a growing international agreement on how to use prevention and treatment methods that are available against malaria. The most effective preventive measures include the use of mosquito bed-nets treated with long lasting insecticides to avoid mosquito bites and to kill mosquito and spraying the inside wall of the houses with similar insecticides to kill malaria-carrying mosquitoes. The most effective treatment for malaria consists of using a combination of several anti-malaria drugs, one of which is the derivatives of artemisinin (WHO, 2005).

Several International Organizations have set up ambitious objectives for large scale malaria control. The target set by WHO in 2005 was to provide malaria prevention and treatment services by 2010 to at least 80% of the people who need them (WHO, 2009). By so doing it aims to reduce malaria by half the proportions of the people who become ill or died from malaria by 2010 and at least by three-quarter by 2015 compared to 2005. It is vital to monitor malaria trends to see if malaria control campaigns are being effective and to make improvements (WHO, 2008).

Malaria is one of the most severe public health problems worldwide. It is the leading cause of death and disease in many developing countries where young people and pregnant women are the groups mostly affected groups (WHO, 2010). Moreover because of the severity of this disease, malaria was included in the Millennium Development goals which were established by the UN in 2000 with the intention of tracking global poverty and health inequality. Goal six included the target to "halt and begin to reverse the incidence of malaria and other major diseases." Unfortunately, a report published in July 2008 in Plos Medicine states that this goal is unlikely to be met (UN, 2000).

More than 1700 people die every day from the effects of a simple mosquito bite. The provision of insecticides treated nets along with training on how to use them are proven ways of stopping the spread of this deadly disease (World Vision 2009).

Malaria is an entirely preventable and treatable mosquito borne illness. In 2013, 97 countries had an ongoing malaria transmission. An estimated 3.4 billion people are at risk of malaria of whom 1.2 billion

are at high risk. In high risk areas, more than one malaria case occurs per 1000 population. There were estimated 207 million cases of malaria in 2012 (WHO, 2012). Ninety percent of all malaria death occurs in sub-Saharan Africa. In 2012, malaria killed an estimated 482 000 children under five years of age, i.e. 1300 children die every day or one child almost every minute. Between 2000 and 2012, the scale up of interventions helped to reduce malaria incidence rate by 25% globally and 31% in the WHO African region (WHO, 2012).

About 52 countries are on track to reduce the malaria case incidence rate by 75% in line with WHO assembly and roll back malaria targets for 2015. These 52 countries only account for 4% (8million) of total estimated malaria cases. Fifty-two countries are on track to meet Millennium Development Goal targets of reversing the incidence of malaria between 2000 and 2015 (WHO, 2009).

In 2013, an estimated 136 million long last-lasting insecticides nets were delivered to endemic countries, a major increase over the 70million bed nets that were delivered in 2012. About 200million long-lasting insecticides nets (LLINs) were been funded for delivery in 2014, suggesting an even stronger pipe line for 2015. Population access to LLINs remains below the target of universal coverage and has not appreciably improved.

Malaria being a fatal disease is becoming difficult to prevent and control because of the habit of increasing resistance to the insecticides of the female anopheline species. It is highly endemic in nature and is characterized by severe illness episodes and complications. It is turning into a grown hazard in the developing countries. Being a common disease increasing morbidity and mortality, it is the focus of concern (UNICEF, 2014).

Internationally, malaria is a major health problem in Africa, Asia, Central America, and South America. About 40% of the world's population lives in areas where malaria is common. Three-hundred to five-hundred million of cases of malaria occur every year, and 1-2million deaths occur, most of which are young children (UNICEF, 2014).

Malaria affects males and females alike, children of all ages are susceptible to malaria. In counties where malaria is endemic, children less than five years have repeated, and often serious attacks. The survivors develop partial immunity thus older children and adults often have asymptomatic parasitemia, (i.e. presence of plasmodium in the blood-stream without clinical manifestations of malaria) most deaths resulting in children younger than five years (UNICEF, 2014).

In the African region, malaria death rates decreased by 49% across adult age groups and by 54% in children under five years of age. UNICEF is a funding partner with WHO, United Nations Development Program (UNDP) and World Bank's Roll Back Malaria (RBM) initiative a global partnership established in 1998 to catalyze support for malaria control and elimination, and to rally partners around a common plan of action to fight the disease. One of the key goals of 2011 revision of the Global Malaria Action Plan (GMAP) was to reduce global malaria deaths to near zero by the end of 2015 (UNICEF,2014).

From 2008-2012 UNICEF procured over 120 million nets and provided support to over thirty countries. Major recent efforts to scale-up the availability of Insecticide Treated Nets (ITN) in Africa are yielding impressive results. By 2011, seventy-eight countries worldwide had adopted the policy to provide nets to all persons at risk of malaria universal coverage of which eighty-nine countries have policy of distributing the nets free of charge to the end user.

Unfortunately, many children especially in Africa continue to die from malaria as they do not sleep under insecticide-treated nets. The proportion of the population sleeping under an ITN which represents the population directly protected was estimated to be 36% in 2013 (UNICEF, 2014).

In Cameroon, malaria remains a public health problem; the disease is responsible for 31% of consultations and 44% of hospitalization in health facilities. It is responsible for 18% of deaths occurring in the country. In children less than five years 41% of deaths are due to malaria (Science and Education, 2013).

The researchers carried out this study in the Batibo Health Area after having observed that the rate of malaria from the health centre record statistics was the most prevalent with 54.6 % of monthly consultations.

Research question

Why has malaria prevalence still remain considerably high even with the distribution of LLINs as a primary preventive measure?

Study objectives

General objective

To find out the factors affecting the acquisition and proper usage of long lasting insecticide nets (LLINs) as primary preventive measure against malaria and to propose possible solutions to any identified problems.

Specific objectives

- To assess the community's knowledge on malaria prevention in Batibo Health Area;
- To assess their practical measures used in preventing malaria through the use of LLINs in Batibo Health Area;
- To find out the proportion of the community with LLINs properly installed and utilized in Batibo Health Area;
- To ascertain the constraints encountered by the community in its proper usage and propose possible solutions to any identified problems.

Hypothesis

Households that are knowledgeable on the proper installation and daily use of LLINs as a primary preventive measure against malaria would have lesser or no cases of malaria incidence than those that are not.

Methodology

Study design

A descriptive cross-sectional design was used in which the investigator collected primary data from sample respondents, where people's knowledge and practical measures were assessed and the findings described as such.

The investigator collected data from a sample of respondents in the zones to assess the acquisition and effective use of LLINs as a primary preventive measure against malaria.

Sample size

The sample size was calculated using the formula below:

$$N = \frac{(z)^2 \times p(1 - p)}{(e)^2}$$

Where,

N=the required sample size

Z=confidence interval of 95% (z=1.96)

p=the population of households (15%)

e=random error of 5% (type 1 value of 0.05)

N=100 respondents.

The target population consisted all households in Batibo urban health area. A sample size of 100 respondents was selected to be a representative of the entire population of Batibo Health Area. Using a simple random sampling method, five selected zones were balloted via simple random sampling; the zones picked were selected for this study where houses were numbered in fours and every fifth house was selected for administration of questionnaires. Twenty houses were selected in each zone making a total of 100 households.

Instrument for primary data collection

A structured questionnaire of close and open ended questions was used in the collection of primary data.

Method used for data analysis

The data collected was analyzed using manual tallying and scientific calculator, presented using tables, bar charts, pie charts and histograms

Presentation and analysis of results

Sex distribution of respondents

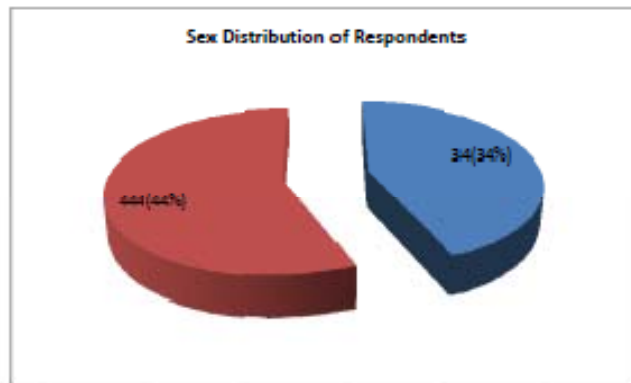


Figure 1. Distribution of respondents according to sex

From Figure 1, out of 100 people who were given questionnaires to answer, 34% were males, while 66 out of the 100 respondents were females.

Distribution of respondents' according to marital status.

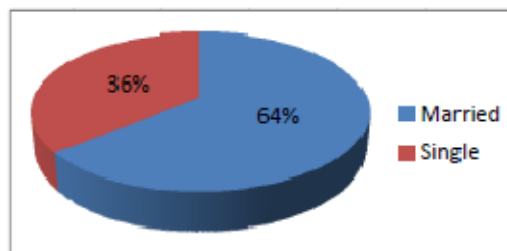


Figure 2. Distribution of respondents according to marital status.

From figure 2, out of 100 respondents, 64 were married while 36 were not married.

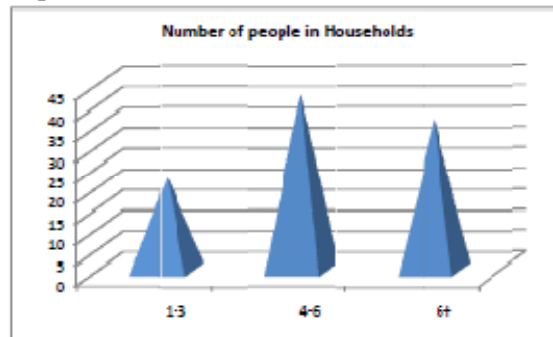


Figure 3: Distribution of respondents according to the number of persons per household.

From figure 3, out of 100 respondents, 22% were having between 1-3 members in the house, and 42% were having between 4-6 members in the household, while 36% of the respondents were those who had at least six and above people in the house.

Community's knowledge on malaria prevention

Knowledge on malaria.

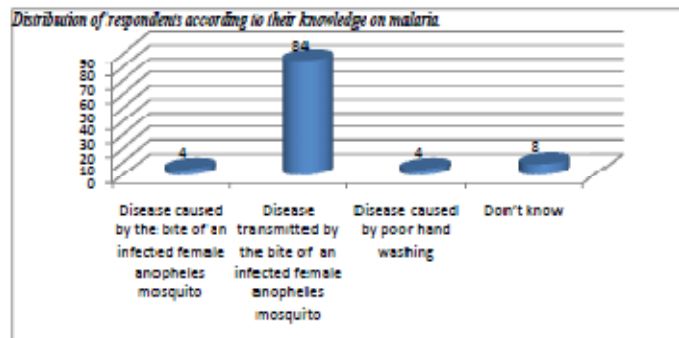


Figure 4: Distribution of respondents according to their knowledge on malaria.

From figure 4 above, it can be observed that 84% of the respondents said a disease transmitted by the bite of an infected female anopheles mosquito, 4% said a disease caused by the bite of an infected female anopheles mosquito, 4% said a disease caused by poor hand washing and 8% said they don't know.

Knowledge on malaria prevention

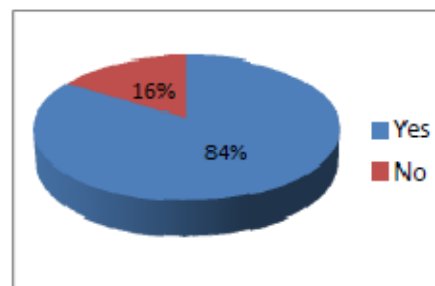


Figure 5. Distribution of respondents according to their knowledge on the prevention of malaria.

From figure 5 above, out of 100 respondents, 84 percent the respondents said malaria can be prevented while 16% of the respondents said malaria cannot be prevented.

Knowledge on the consequences of malaria

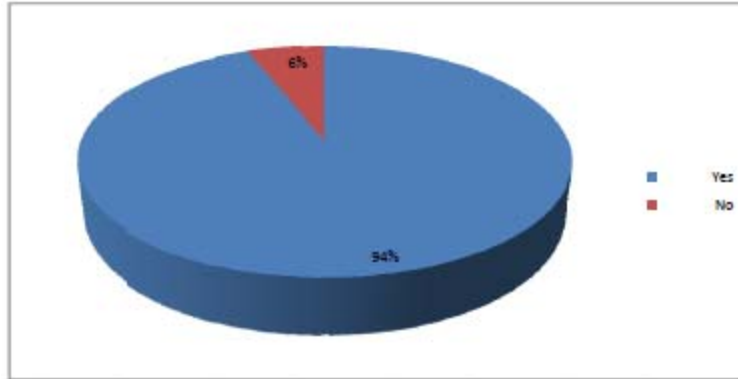


Figure 6. Distribution of respondents according to the consequences of malaria

From figure 6, 94% said malaria can kill following infection while 6% said malaria does not kill.

Malaria preventive measures used

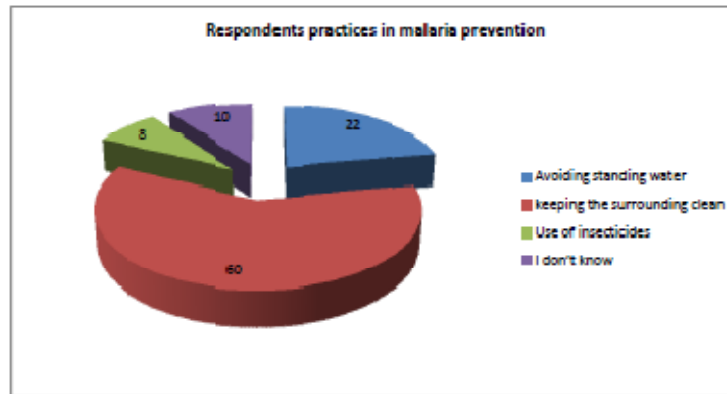


Figure 7: Distribution of respondents according to their practical measures on malaria prevention

From the result on figure 7, it can be observed that 60% of the respondents said by keeping the surrounding clean, 22% said by avoiding standing water, 10% said they did not know, and 8% said with the use of insecticide.

Practical measures on the proper use of LLINs

Community's practical measures via the proper use of LLINs.

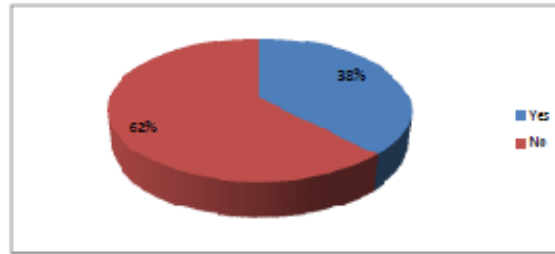


Figure 8. Distribution of respondents according to whether they have LLINs.

From figure 8 above 38 % of the respondents had LLINs while 62 % of the respondents did not have LLINs.

Knowledge on proper use of LLINs

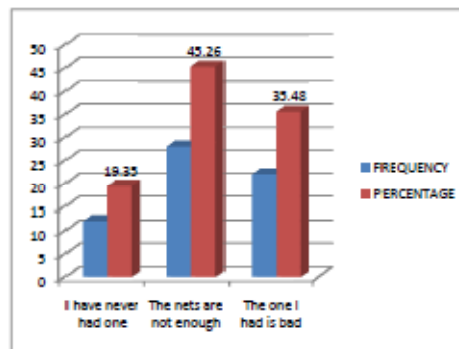


Figure 9. Distribution of respondents according to the reasons why they don't have a mosquito net

From figure 9, 12 (19.35%) of the respondents have never had nets, 28(45.26%) of the respondents said the nets were not enough, and 22 (35.48%) said the one they had was bad.

Practical use of LLINs

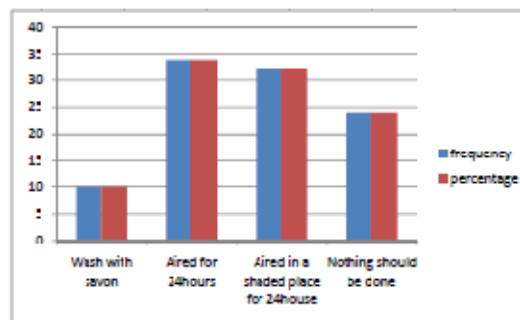


Figure 10. Distribution of respondent according to what is to be done to a new net before using it.

From figure 10, out of 100 responses on what is to be done before using new LLINs, 34% of the respondents enunciated the fact that the LLINs should be aired for 24 hours, 10% of the respondents said it should be washed with a detergent, 24% said nothing should be done and 32% of the respondents said it should be aired in a shaded place for 24hours.

Frequency in the utilization of LLINs.

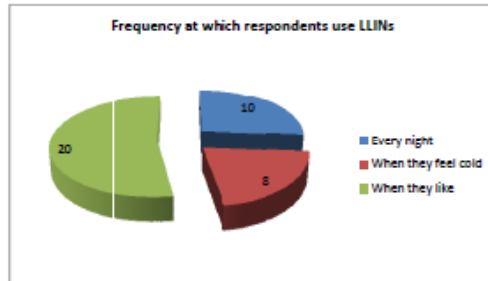


Figure 11. Distribution of respondents according to how often they use LLINs.

From figure 11 above 26.5% of the respondents said they slept under LLINs every night, 21% said they used LLINs when they feel cold and 52.6% said they sleep under LLINs only when they like.

Minor side effects encountered during the use of LLINS.

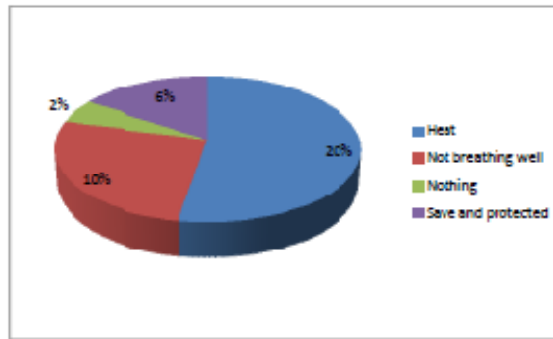


Figure 12. Distribution of respondents according to how they feel sleeping under a mosquito net.

From figure 12 above it can observe that out of the 38% had nets, 52.63 percent said they feel heat when they sleep under the net, 26.32% of the respondents said they feel as if they are not breathing well, 5.26 percent of the respondents said they don't feel anything and 15.59 percent said they feel safe and protected.

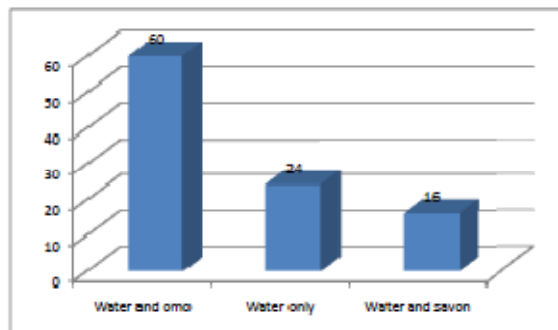


Figure 13. Distribution of respondents according to what can be used to wash the net.

From figure 13, 60% of the respondents said water and powdered detergent can be used to wash the net, 24% of the respondents said only water should be used and 16% said water and detergent soap can be used.

Constraints encountered by the community in the proper use of LLINs.

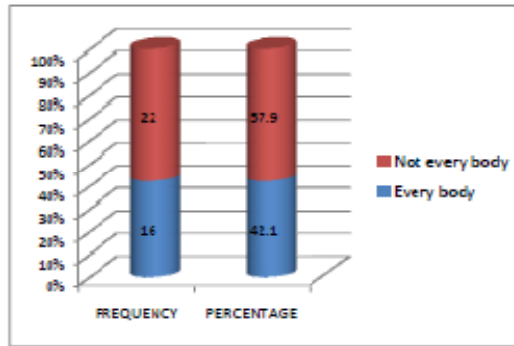


Figure 14. Distribution of respondents according to the actual number of people that sleep under mosquito nets

From figure 14 above, out of the 38% of the respondents who have nets 57.9% of the respondents do not sleep under LLINs and 42.1% of the respondents said everybody sleep under the net.

Reasons LLINs are not used

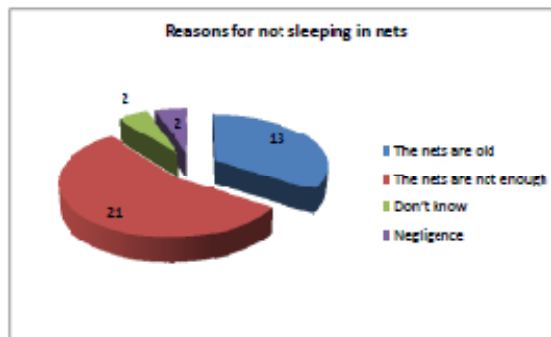


Figure 15. Distribution of respondents according to reasons why everybody do not sleep under the mosquito net.

From figure 15 above, out of the 38% of respondents who have LLINs, 34.3% of the respondents said not everybody sleep under LLINs because the nets are old, 55.3% said the nets are not enough; 2% said it's because of negligence.

Obstacles encountered in the use of nets

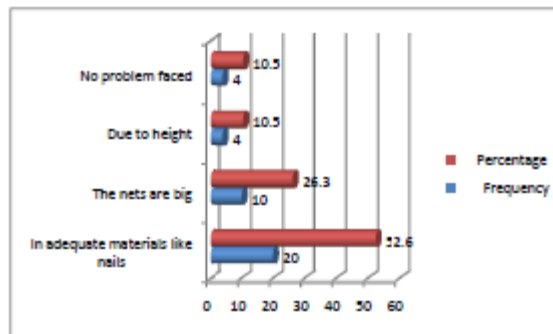


Figure 16. Distribution of respondents according to the difficulties faced in hanging the nets.

From figure 16 , out of the 38 respondents who had nets 52.6% of the respondents faced problems of inadequate materials like nails, pins, 26.3% of the respondent said the nets are too big, 10.5% said the height of their ceiling was a problem and 10.5% said there had no problems.

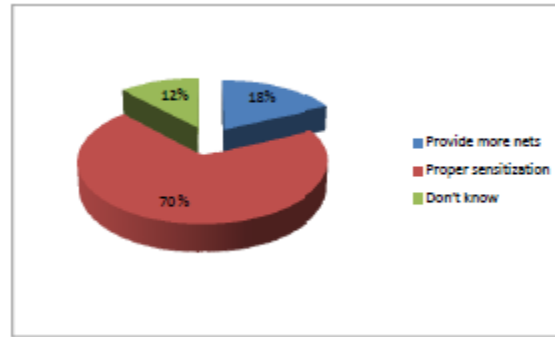


Figure 17. Distribution of respondents according to what the health unit can do in order to convince the community on the proper use of mosquito net.

From figure 17, 18% of the respondents said the health units should provide more nets, 70% said proper consistent sensitization and 12% said they don't know.

Discussion of findings

Respondent's knowledge on the use of LLINs

It was observed that 66% of the respondents were females and 34% were males ; this is probably because many women were met at home than the men and probably because when the women go for their ANC the nets are given to them even when they are married or not. Also, 64% compared to 36% of the respondents were married as seen on figure1 page-, it implies that those that are married and have children have a greater probability of having more than one net than those that are not . It was also observed that 78% of the respondents had household members of 4 and above as seen on table 2 page- which implies that nets are limited to an extent due to overcrowding in some homes. The issue of insufficient nets goes in line with a study that was conducted in Banadi where each household received one or two nets depending on the composition of the household (Wardi Distribution Report 2013) .It was observed that the proportion of 1:38 persons in a room will be 95% bed net use, implying that overcrowding will reduce the average net per household. According to Adjei *et al*, 2011, each addition of bed nets in the house increase its use by 58%.

It was observed that even though malaria is endemic in Cameroon 16% of the respondents as seen on table 3 page- did not really know what malaria was all about which implies that they cannot be preventing what they do not know. So, some effort should be put in this area so as to educate the population on basic knowledge about malaria so that adequate measures can be taken to prevent it. It was also observed that 84% of the respondents know that malaria can be prevented while 16% still said malaria cannot be prevented as seen on figure 3 page-, this may be due to the fact that most of the respondents are ignorant of the fact that female anopheles mosquito bite mostly at night, so the use of LLINs can adequately prevent malaria if properly used at night to prevent the bite of this mosquito thereby preventing malaria. Even though 16% of the respondents did not know if malaria can be prevented, they were aware of the fact that malaria kills as seen on figure 4 page- that 94% of the respondents had the knowledge that malaria kills, 6% are still ignorant of malaria outcome which is a problem because malaria is an endemic disease though can be treated the population has to be sensitized on every detailed about it.

Practical measures on the use of mosquito nets

The use of LLINs is just one of the methods of preventing malaria; a good number of the respondents were aware of other methods of preventing malaria as seen on figure 5 page- that 90% of the respondents said by keeping the environment clean, avoid standing water and the use of insecticide while 8% of the

respondents did know other preventive method other than the use of LLINs which is still positive for the health area to prevent malaria if adequately used.

During this study it was observed that 62% of the respondents did not have LLINs while 38% had as seen on figure 7 pages- that out of the 38 respondents that had nets, 19.35% have never had nets, 45.26% said the nets are not enough may be because of increased number of persons per household while 35.48% of the respondents said the one they had is bad and have been discarded probably because of limited knowledge on the fact that the nets can be washed and use again. Also 68% of the respondents what can be used to wash the net; this may be because they did not even have the nets and secondly it might be because in the past the nets were always taken to the health units where they were washed and treated but today the nets used are long lasting insecticide nets so many people might still be having limited knowledge on its management. The nets can be washed with water and savon or omo that has little or no detergent.

Sixty-eight percent of the respondents said the nets can be washed but did not know what can be used may be because they did not have nets. Still from the 38% that have LLINs it was observed that only 10% of the respondents sleep under at night while 28% sleep under the LLIN only when there is cold or when they like as seen on figure 9 page-.Although 38% of the respondents had nets it was not a an assurance that 38% of the respondents were protected because 28% of the 38% were not using the nets properly thereby still increasing the chances of malaria prevalence.

Proportion of respondents with properly installed nets

It was again observed that out of the 38% respondents who have nets, 57.3% do not sleep under as seen on figure 12 page-probably because the nets have been discarded saying they are old 43.3%, some said the nets were not enough, 55.3% and 4% said it was because of negligence all these responses might be indicating that there is limited knowledge on the management of LLINs. Emphasis should be really be laid on the proper use of these nets so that we can reduce while not eradicate malaria in our country Cameroon.

Constraints encountered and possible solutions

Despite the minor side effects like feeling heat and not breathing well as seen on table 4 page- the respondents before receiving the nets should be made to understand that these are minor side effects that they may experience but will disappear over a very short time. As seen on table 7 page-52.6 % of the 38% respondents who had nets said they had inadequate materials like nails for hanging up nets compared to their ceiling, 26.3% said the nets were too big compared to the size of their beds making them to see the nets as a burden to them and 10.5% of the respondents complained of the height and the nature of their houses and 10.5% said they had no problems. This implies that many people have limited knowledge on other methods like the frame and tent methods in the Batibo health area.

Finally, the health units have to put more efforts to ensure that the nets distributed are properly used and if possible provide more nets and sensitize the community on the importance of these nets and also add that in all areas of consultation if malaria is diagnosed the clients should be educated on the importance of its prevention and if possible a net should be provided so that we can invest in the future while defeating malaria as the theme of the world malaria day theme set by the Roll Back Malaria partnership 2015.

Conclusion

Most people do not use nets because the nets are insufficient and may be because of increasing number of people per household compared to the number of LLINs given per household. In the community the relationship between mosquito and malaria well known but many people are not aware of the fact that the female anopheles mosquito that transmit the malaria parasite frequently bite at night time when people are

asleep. Equally, many people are still reluctant to hang the nets properly, tuck them appropriately under the mattress at night and tie and hang them at dawn as a primary preventive measure against malaria.

The peripheral level of the health care system has a great task in the implementation of the proper use of LLINs and to let the net users understand that heat sensation and not breathing well are minor effects to some people at the beginning of the use of LLIN but after sometime these effects will disappear; this therefore ties with the study hypothesis.

Recommendations

To the ministry of public health

To encourage more research in order to assess many more factors why LLINs are not properly used in many other areas where malaria prevalence is only increasing instead of rolling back.

To supply more nets and develop strategies of making the nets properly used by the communities.

To the staff of batibo health center

To continuously educate the community on the Importance of using LLINs, the effects of not using LLINs and also how to care for the LLINs.

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Community based approach to achieving Universal Access to HIV Testing and Counseling

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Abstract

Introduction: Achieving universal access to HIV services requires a mixture of strategies to increase opportunities for people to know their HIV status. APIN in conjunction with civil society organization and with funding support from Global Fund (GF) and National Agency for AIDS Control (NACA) embarked on community HTC outreach campaigns in Lagos, Plateau and Oyo States of Nigeria. Community entry, advocacy and mobilization were key start up strategies.

Methods/Approach and Result: Partnership with Civil Society Organizations with strong presence leadership roles within the communities was the main approach to a community based approach to increasing uptake of HTC services in the three (3) states of Nigeria where AIDS Prevention Initiative in Nigeria operated. Eighteen (18) LGAs, 189 communities and 154 ANC locations across three states benefited from the outreaches. 54,841 (1.2% positivity rates) people among the general population and 36,061 (0.19% positivity rates) pregnant women were provided with HCT services over three weeks.

Conclusion: Alternative approaches to facility based HTC are critical to achieving universal access to HTC. Community based approach to HTC that relies on strong partnerships and collaboration with organizations that have commitments and leadership roles in the communities can improve uptake of services. It is a veritable approach for expanding access, availability and coverage of HTC services.

Keywords: Community, Partnership, Access, Uptake, eMTCT, Advocacy, Mobilization

Introduction

HIV/AIDS is a major global public health issue responsible for about 39 million deaths worldwide since the beginning of the epidemic (WHO, 2015). Sub-Saharan Africa is the most affected region, with about 24.7 million infected people, which constitutes about 70% of the global burden (UNAIDS, 2014).

HIV/AIDS is a chronic disease that increases medical, social and economic burden on individuals, family and communities (WHO, 2005). However, early identification and enrolment of HIV infected patients into treatment programs play a critical role in reducing this burden. HIV Testing and Counseling (HTC) provides the opportunity to identify infected persons and is the gateway into HIV prevention, care and support, and treatment services, including Prevention of Mother to Child Transmission (PMTCT) of HIV (FMOH 2014). It provides an opportunity for people to learn about HIV/AIDS, know their sero-status and cope with the outcome of their test results (USAID, 2014).

Literature review

Nigeria, the most populous country in Africa, is estimated to have a population of about 170 million people (UNIDO, 2014), with HIV prevalence of 3.4% (FMOH 2013) in the general population making it one of the countries with the highest burden of the disease in Sub-Saharan Africa (Souleymane et al, 2006). Like in other low and middle income countries (LMIC), despite the serious challenge that HIV poses, progress towards universal coverage of HTC services has remained inadequate (WHO 2012a).

Even though the absolute numbers of individuals who were counselled, tested and given results in Nigeria more than doubled between 2012 and 2013, and the numbers of HTC sites increased by 34% from 2009-2013; only 23.5% of male and 29.2% of female reported ever testing for HIV in 2012 (NACA, 2014a).

Nigeria has explored various models for the delivery of HIV counselling and testing in an attempt to improve access to HTC. In the early stages of the national HIV response, access to HTC services was limited to health facilities where health care providers requested for HIV testing based on high index of suspicion (clinical and behavioral). Following this, HTC was then expanded to stand-alone and Heart-to-Heart centers which offered voluntary counseling and testing to members of the community in addition to hospital-based HTC. A variant of hospital-based HTC later emerged which emphasized Provider Initiated Testing and Counseling (PITC). This focused initially on all pregnant women attending antenatal care clinics within the health facility with the option to opt out.

While PITC has generally been shown to increase access to HIV testing with reasonable positivity yield, it has not helped to achieve universal coverage of HIV counseling and testing (Hensen et al, 2012; Baggaley et al, 2012). The barriers that have been reported include wrong public perception of HIV as a tool for only diagnosis, low risk perception in the population, stigma and inability to reach subgroups in the population who do not routinely access hospital services (NACA 2014a; Matovu 2007). This brought to the fore the need to “expand community based options and innovations to reach the population beyond the health facility” (WHO, 2012b) in order to reach sub-populations who will not routinely seek care in the hospitals and so unlikely to benefit from hospital based HTC.

In line with National Prevention policy (NACA, 2014b) and the move towards universal access in Nigeria, AIDS Prevention Initiative in Nigeria (APIN) with support from the Global Fund for community-based outreaches in its 3 states of operation in Nigeria to emphasize the need for a strategic mix of hospital based and community based approaches to HTC. The objectives of the community-based outreaches conducted were:

1. To scale up HTC services to the general population and pregnant women within the community
2. To promote early identification and referral for early care and treatment of HIV infected persons within the community

Methodology/Approach

The community based HCT services in this reported activity is an intervention to improve access to HCT services towards scaling up universal access, supporting people to know their HIV status outside the routine hospital facility settings and provide linkage and access to further care and treatment for identified positive cases.

APIN, in conjunction with Civil Society Organizations (CSOs) and health care workers in specific Local Government Areas (LGAs) across three (3) states of Nigeria (Lagos, Oyo and Plateau states), carried out community based HTC outreaches over a period of 3 weeks. These community based outreaches was conducted with funding support from the Global Fund (GF) and National Agency for the Control of AIDS (NACA). It focused on testing people not previously reached with HTC services in the preceding 6 months and pregnant women receiving ANC services in informal settings such as Traditional Birth Centers (TBC) and Faith Based Centers (FBC) within the communities. It also emphasized messages about HIV/AIDS, care and treatment opportunities and improved linkage and referral of HIV positive patients to health facilities.

Geographical location selection and determination of coverage

The following factors were considered in deciding the location for these activities:

- a) The available prevalence structure of HIV in the state, LGA with high burden and high populations were selected for these activities.

- b) Previous epidemiological survey about high-risk populations and their distributions within the state and the LGA was also considered.
- c) Antenatal attendance records and population estimates of the possible number of pregnant women were also considered to help in deciding locations for HCT for pregnant women.
- d) Availability of HIV care and treatment facilities to receive newly diagnosed cases with minimal need for long travels.

The above four factors were used to ensure that the exercise has the best impact and yield for such community based campaign.

Community engagement and stakeholder sensitization

The next step in the process was partnership with CSOs who had capacity and strong presence within communities in Lagos, Oyo and Plateau states. A one-day sensitization meeting with CSOs was held where the methodology for the outreach and proposed coverage were agreed. CSOs were linked to Global Fund-supported treatment facilities to facilitate collaboration and effective referrals. Rapid Test Kits (RTKs), consumables, data collection tools and targets to be reached in each LGA were distributed to the CSOs.

Advocacy and sensitization

Advocacy and sensitization visits were made to community stakeholders and gatekeepers by the CSOs to solicit their support and participation in mobilizing their community members. Letters of introduction and notice of HTC for general population and pregnant women were sent to chairmen of the respective LGAs, Local AIDS Control Agency (LACA) Managers, Medical Officer of Health (MOHs), community heads, National Union of Road Transport Workers (NURTW), churches (FBCs), mosques, schools, market associations and TBCs. This was followed by sensitization visits to further engage with key gatekeepers within the LGAs where the communities to be targeted were discussed and agreed on. The various gatekeepers mobilized their communities to participate in the exercise.

Mobilization drives within selected communities were carried out through the use of town criers, condom distribution, talk show, use of indigenous dance and drama groups and musicians Rallies were also staged in tertiary institutions, market places and motorcycle and taxi/bus parks. House-to-house campaigns to improve participation were also employed in some communities.

HIV testing and counselling

HTC was provided to the general population at motor parks and under tents at strategic places within the community. Volunteer counsellors collaborated with Birth Attendants (BAs) at TBCs and FBCs to provide HTC for pregnant women in line with National guidelines. Referral for family Planning services, sexually transmitted infection (STI) screening, and linkage to treatment facilities for additional care and treatment were integrated into the HTC services.

Health care workers from designated GF-supported treatment facilities also facilitated client referral. Identified HIV positive clients among the general population and pregnant women were referred using the client referral forms with the option of being accompanied to the facility by a support group member.

Ethical approval

Data used for this analysis was collected as part of routine data from program implementation. This was approved for exemption by the National Health Research Ethics Committee of Nigeria (NHREC), with NHREC approval number: NHREC/01/01/2007-15/05/2013.

Data collection and analysis

Data was collected using the National data collection forms and registers for HTC and PMTCT during the implementation of the outreach. The HTC client intake form provided the counsellors a checklist guide for pre-test and post-test counseling, and documenting HIV test results for each client. In addition to the counselling, the form included HIV knowledge assessment, HIV risk assessment as well as symptomatic screening for Tuberculosis and sexually transmitted infections. Data from the client intake forms were summarized into the HTC register for the general population or PMTCT testing register for the pregnant women.

HIV positive clients were referred to the treatment facilities for enrollment into HIV care using the client referral form. Data from these were summarized into the referral registers.

Data was further summarized by LGA for the general population and pregnant women using a summary form which was designed for the purpose of the community-based outreach. Data analysis was performed using simple excel functions to develop cross-tabulations that allowed from comparison across states.

Results

Outreaches for HTC in the general population were conducted in 47 communities across 6 LGAs in Lagos state; 56 communities across 5 LGAs in Oyo state and 86 communities in 7 LGAs in Plateau state. 47 ANC locations (which included 38 TBCs and 9 FBCs) in Lagos state; 79 ANC locations (which included 42 TBCs, 25 FBCs and 12 maternity homes) in Oyo state and 28 ANC locations (all TBCs) in Plateau state conducted HTC for pregnant women.

Table 1. Summary of results from community based outreach

State	LGAs	HTC Communities (General Population)	ANC Locations	HTC (General population)	Number Positive (Positivity rate)	HTC (Pregnant Women)	Number Positive (Positivity rate)
Lagos	6	47	47	18,177	47 (0.26)%	9,007	17 (0.19%)
Oyo	5	56	79	18,189	36 (0.2%)	12,068	4 (0.03%)
Plateau	7	86	28	18,675	72 (0.38%)	14,989	15 (0.1%)
Total	18	189	154	55,041	155 (0.28%)	36,064	36 (0.1%)

The outreaches witnessed strong community support as some communities provided comfortable space for HTC and free accommodation for volunteers that worked in hard to reach areas during the period of the outreach.

As in table 1, during the outreaches across the three states, 55,041 adults within the general population were provided with HTC, while 36,064 pregnant women were counseled and tested for HIV.

Of the 54,841 adults tested within the general population, 155 persons were identified as HIV positive, giving a positivity rate of 0.28% while a total of 36 pregnant women were identified as HIV positive out of the 36,061 pregnant women tested, giving a positivity rate of 0.1%.

With regards to complete referral, 131 (84%) HIV positive clients among the general population and 26 (72%) HIV positive pregnant women were completely linked to GF-supported treatment facilities. Most of the gaps in referral were in Plateau state where 14 HIV infected clients among the general population and one (1) pregnant women were already receiving HIV care at some other facilities but still went ahead to receive HTC. The remaining HIV infected clients were still in denial at the time of referral and refused to access HIV care. These were followed up within the community to make sure that they accessed HIV care.

Discussion

Over time, HTC was voluntary and mostly facility based, and access required some welfare loss to transportation cost. This community based outreach removed structural, logistic and social barriers by taking services to the community (WHO 2012b) to reach persons who may not ordinarily access healthcare in a health facility. All commodities for HTC were available at points closest to the homes and HTC was delivered by trained volunteers. According to WHO and UNAIDS, community based HTC can increase knowledge of HIV within the community (11) (WHO, 2012b). Structured messages about HIV, its transmission and prevention, and availability of care and treatment to HIV infected community members were included during the counselling sessions.

Partnership with civil society organizations that have strong presence within the communities and collaboration with health care providers was found to improve community participation and uptake of the services. Without doubt, partnership and collaboration are very important strategies for improving population health (Shortell et al, 2002), which succeed most when mutual understanding of the goal, rules of engagement, coverage and strategies exist (14) (Centre for Disease Control). The CSOs that were engaged have long standing relationships implementing various programs with the communities and thus, are key stakeholders who are seen as leaders within the communities.

The results of the three week community based approach for HTC increased access and uptake of HTC when compared with facility based reports for HTC from the treatment facilities between January 2014 to December 2014 in the same communities (19,344 clients in the general population were provided HTC; 13,093 pregnant women received HTC). The outreach also served as a screening program for early identification of HIV infections in the various communities.

Focusing on the results of HTC among pregnant women during this outreach further illuminates the need for continuous programming for PMTCT to include HTC at informal ANC settings. Our observation was that, there were many TBCs and FBCs around treatment facilities and deep within the communities. It thus appears that the communities had greater trust in the TBCs and FBCs which make them very important structures and further create barriers to facility based ANC (Sibley, 2007). HIV positivity rates in TBC and FBCs in the community based outreach was 0.1% which can translate into the proportion of HIV exposed infants that would be delivered to these communities. There is, therefore an urgent need to actively include these informal ANC settings as part of programs to eliminate mother to child transmission of HIV (eMTCT). This will, however, raise questions about the ethical and legislative considerations for full implementation of eMTCT to include dispensing of anti-retroviral drugs at these informal settings.

Comparing HIV positivity rate in facility based HTC and this community based HTC, we observed lower HIV positivity rate in community based HTC. Reports of HTC from the treatment facilities by state from January 2014 to December 2014 was 9% in Oyo and Plateau states and 11% in Lagos state among the general population; and 1.6% Oyo state, 2%, in Plateau state and 1.9% in Lagos state among pregnant women. HIV positivity rate was calculated as 'Number of new HIV infections' divided by 'Number of individuals that received HTC multiplied by 100. Similar observation of lower HIV positivity rate in community based HTC was made by Suthar et al after reviewing 14 studies (Suthar et al, 2013).

Notwithstanding, early identification of these clients and structured post-test counseling focused on behavior change will likely reduce the spread of HIV infection within these communities (NACA, 2014b). Earlier diagnosis of HIV and immediate linkage of clients to HIV treatment centers to commence HIV care and treatment will sustain the productivity of the client (FMOH, 2014), reduce the likelihood for early HIV related morbidities and mortalities (Bradley et al, 2014) and fewer children will become orphans. HIV positive pregnant women, who would have carried an HIV exposed baby to term unknowingly, were linked to the treatment facilities where they were provided with triple anti-retroviral therapy to prevent mother to child transmission of HIV. This will also reduce the chances of birthing an HIV infected child and the attendant socio-economic challenges to the families.

Recommendations

1. Outreach campaigns are effective ways of rapidly scaling up HCT services and it has the capacity to improve universal access and coverage for HCT services.
2. For outreaches to be successful, careful planning, adequate community mobilization and participation, stakeholder's engagement and adequate logistic support for the exercise are key considerations that must be addressed in detail.
3. Non-financial incentives and behavioral change communication messages will help improve HCT service uptakes during outreach campaigns. Effective referral support and immediate linkage to care and treatment programs must be readily available to further support newly identified cases to take up treatment for their disease.
4. Programming around eMTCT can be expanded to include informal ANC settings

Conclusion

Alternative approaches to facility based HTC is critical to achieving universal access to HTC. Community based approach to HTC that relies on strong partnerships and collaboration with organizations that have commitments and leadership roles in the communities can improve uptake of services. It is a veritable approach for expanding access, availability and coverage of HTC services. Ultimately, new HIV infections are identified and linked immediately to treatment facilities for HIV care and treatment. Community Based HTC with strong partnership base is recommended for scale up of services in resource limited settings like Nigeria.

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Preventing Obesity In Junior High Schools, Its Consequences And Lessons Learnt

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Abstract

Objective: To evaluate the factors leading to the prevalence and secular trends for overweight and obese among the adolescents in junior high schools.

Methods: A qualitative study review of literature was conducted on facilitating factors to the prevalence and secular trends, obesity prevention in junior high schools. Theoretical sources of information relevant to obesity (idea-based) were used. Primary, secondary and tertiary sources were used to have a broader overview of obesity. The general approach was a combination of chronological thematic and conceptual concepts. A descriptive analysis of the objectives was done

Results: The obesogenic prenatal environment or the physical form of our community play a vital role and that can also promote obesity in young people through epigenetic effects

Conclusion: It was found that high-fat and energy dense diet has tremendously increased in the 21st century while most young population have increasingly lead sedentary lives. The life style of fast foods and little physical activity have increased the prevalence of obesity among school going children, adolescent and adults too. The related obesity and chronic disease risk factors have become major public health concerns. Multilevel model is related to local ecological model on the principal of preventing obesity. Therefore multilevel is a good model to prevent obesity in school. The risk regulations–health behaviour–genetic factors model approach laid a good ground for strategic prevention of obesity and evaluation of multilevel model practices, food intake, production and physical activities.

Key words: Obesity, Junior high schools, Obesogenic prenatal environment, Multi-level model, Risk regulators-Health behaviour-Genetic factors.



1. Introduction

1.1 Background

The problem of childhood obesity is a public health challenge that is global and increasingly extends into the developing world (Puksa, 2004 page 1). Obesity currently affects 25% of children in developed countries like the United States (Troiano, 1995, page 1085-1091).

Obesity in Africa especially in North Africa and Middle East is quite another notable issue. Unhealthy life styles are associated with risk factors that increase obesity, overweight, diabetes, cardiovascular diseases and cancer due to elevated consumption of energy–dense nutrient-poor foods that are high in fat, sugar, salt and reduced physical activity at home and at school (World Health Report 2002, page 2).

Table: 1.1.1 Classification of overweight and obesity in adults according to body mass index

Classification	BMI (kg/m ²)	Sex - Waist Circumference			
			Risk metabolic complications	Men	Women
Underweight	<18.5	Alerting 	Increased	94	80
Normal Range	18.5-24.9				
Over weight	>25				
Pre -obese	25.0-29.9				
Obese class I	30.0-34.9	Action Zone 	Substantially increased	102	88
Obese class II	35-39.9				
Obese class III	>or equal 40				

Source: WHO

We live in an obesogenic environment or society having many factors making it challenging to maintain reduced overweight and obesity (Relly,2007 page 82).The obesogenicity of an environment has been defined as the “sum of influences that the surroundings, opportunities or conditions of life have on promoting obesity in individuals or populations”.

This report seeks to understand the best practices to prevent and control obesity in junior high schools in Zambia.

1.2 Rationale

Schools are an important player in the battle with childhood obesity. It is important that educators are aware of the health risks and that they learn what they can do to change the situation either through strengthening the school policy or curriculum. Education should involve both transmission and transformation of knowledge about physical activity cultures of society and pattern of food children should eat (Tinning, 1990 pages 90). Schools need to work in partnership with the parents and the community so that there is a shared understanding and purposes around physical activity and food eaten to minimise or reduce obesity.

The plan for this paper is as follows: First section provides the background to obesity. Section II describes the objectives of the study where focused question will be clearly stated. Section III presents the methods to be undertaken for the study. Section IV details the review of literature. Section V details general discussions of the results on multilevel model to address obesity, level of determinants and the social-ecological model of obesity in adolescents. Section VI, provides the conclusion in light of original problem statement and supporting the theory to solve the original problem.

1.3 Purpose of the study

The purpose of this review study is to discover the important factors to the prevention of obesity and its consequences and lessons learnt. Obesity in adolescents and children has become a serious public health issue with many social and health consequences that have continued in adulthood be in developed or developing countries. Implementation of public health programs and comprehensive understanding for adolescents has been described to be very important in prevention and control of obesity in junior high schools.

2. Objectives

General objective

- a. To find a good model to reduce obesity and review literature on the prevalence of associated risk factors for obesity in junior high schools in order to come up with preventive and promotion measures.

Specific objectives

1. Review literature on historical development of obesity in adolescents and discover important practices and activities that enable easy monitoring and evaluation of obesity in schools.
2. Determine to what extent the practices for physical activity are applicable in schools.
3. To understand about the obesity model
4. To know the causes of obesity in school children
5. To describe how obesity can be prevented in schools

3. Methodology

3.1 Study design and methods

The review of literature looked at the previous theoretical sources of information relevant to obesity, theoretically (idea-based). Primary, secondary and tertiary sources were used in order to have a broader overview of obesity. The review has been put in the context of what is already known in obesity to identify gaps, concepts and issues. The general approach was a combination of chronological, thematic and conceptual concepts.

In order to achieve the study objectives, a descriptive analysis of the objectives was done. The review is more of qualitative study.

This is a scholarly paper and the project acts as a culminating experience for the PhD program in public health.

3.2 Research question

“How can adolescent obesity be prevented and interventions sustained in junior high schools in order to promote healthy adolescents and subsequent healthy adults”.

3.3 Theoretical frame work of the multilevel model to address obesity

This paper`s Theoretical Frame Work focuses on three variables: **Risk Regulators, Health Behaviours and Genetic Factors.**

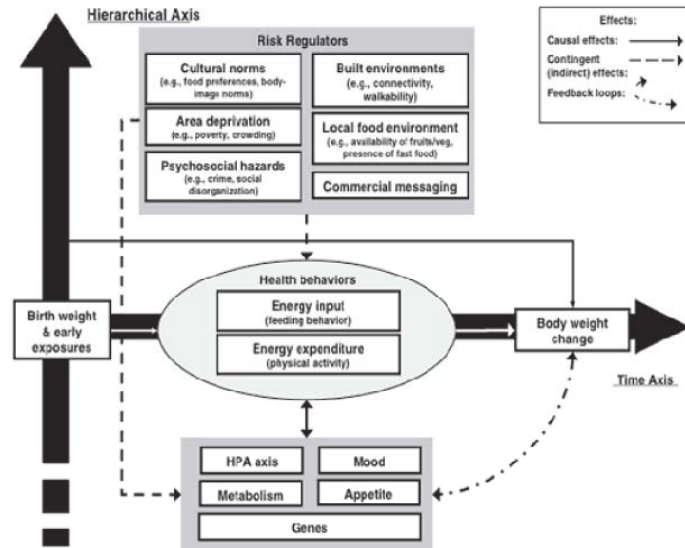


Figure 1. A systems multi-level model of obesity

4. Results

This chapter presents the findings from the model; that are on the cultural norms, built environment, area deprivation, local food environment, psychological hazards and commercial messaging and finally on the energy input and energy expenditure and the genetic factors as having influences on obesity. The concepts of the model stems from the social-ecological theories that are new in public health and emphasizes the importance of environmental and social factors that determine human behaviour and health out-comes (McLeroy et al., 1988, 351-77). One of the biological view of obesity is the intake of energy (increased) and its expenditure (decreased) that overtime become discordant.

When high-fat and high sugar foods are readily available in the environment these raise the threshold for metabolic tolerance that has been found to promote obesity (Levin, 2005 pages 633-9). It has been found that failures in losing weight attempts are in part as the result of very strong biological drivers to store and maintenance of energy in the bodies.

The obesogenic prenatal environment; the built environment or the physical form of our community to play a vital role and that can also promote obesity in young people through the epigenetic effects (Whitaker, 2004 pages 29-36). The factors that trigger the biological response to food to make people eat in the way that increases weight gain are the elements of physical and social environment (Frank et al., 2003 pages 87-96). To prevent obesity one has to understand the built environment and the way it influences the increase in the Body Mass index (BMI).

The elements of the built environment are land, use patterns, the way activities are located across space and the system in place for transportation, the services and facilities' that link one station from the other. These elements determine together access to opportunities for healthy eating and physical activity that influences in turn nutrition behaviour and physical activity that have implications for obesity. Recent studies have shown a link between obesity and suburban sprawl (Ewing et al., 2003, pages 47-57). There exists also a relationship between the absence of community infrastructure and obesity for both health eating and physical activity (Catlin et al., 2003 pages 249-258).

The social-ecological model of the behaviour applied in the health of the community is mostly part of the influences at community level on health matters especially obesity (Sallis et al., 2006 pages 297-322). The ecological approaches usually shift the focus from the individual to the environment with the objective of making healthy food choices and physical activity more accessible to community members.

The influences to increase in BMI in adolescents.

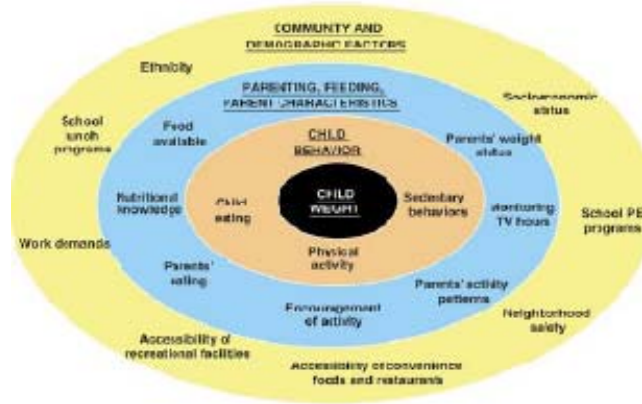


Figure 2. An ecological model for the aetiology of childhood overweight
Adapted from Davidson and Birch 8

A model showing the relationship among influences, behaviours and Health Outcomes

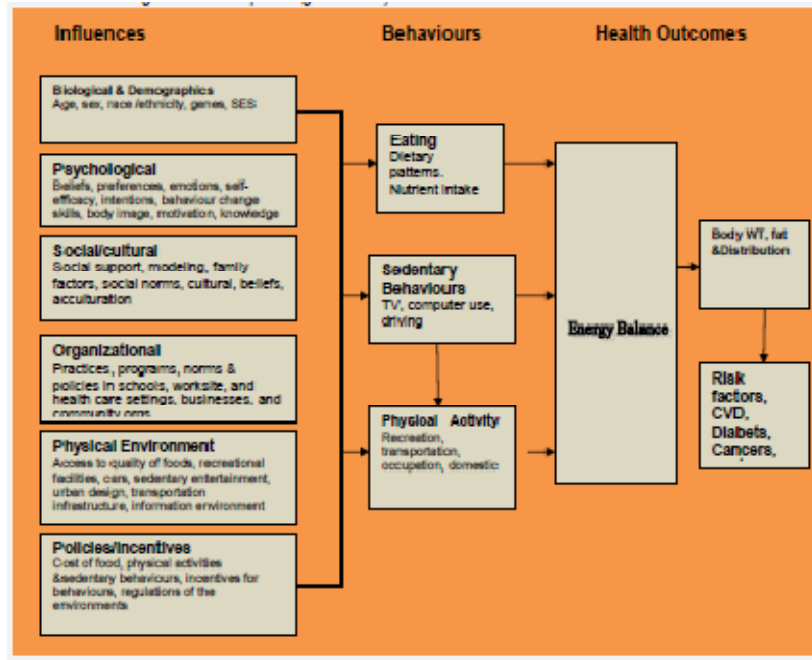


Figure 3. An ecological model of diet, Physical Activity and Obesity

The availability, accessibility and subsequent marketing of general foods contribute to the world consumption pattern either by enabling or restricting food choices or by modulating the biological processes that affect eating. The marketing of foods that have high calorie food contents through packaging and retailing and use of the media to children has increased the influence on purchasing and the way this food is consumed (Mc Gunnis, 2006 pages 30-40). Physical activity improves glucose haemostasis, insulin sensitivity and the metabolic profiles (Jones 2007, pages 394-408). These in turn have an impact on adiposity (Johnson 2001 pages 3182-7). The reduction in sedentary activities such as television viewing, computer utilization in children reduces obesity and is usually mediated through reduction in energy intake than an increase in physical activity (Epstein et al., 2008 pages 239-45).

Neurologic responses also act as mediators between obesity and sedentary activity. Obesity is also influenced by varying norms on food and physical activity behaviours and body image ideals. In some places overweight is viewed as a symbol of health by some cultures (Adams 2005, pages 146-52). Culture forces have been barriers to the prevention of obesity. In order to overcome such fundamental aspects of this socio-political culture long term interventions to obesity prevention must be considered.

Most foods adolescents eat have high proportions of dietary fats, refined grains and sugar their cost has steadily reduced while the supply has increased steadily in the last forty years (Drewnowski, 2005 page 82). Energy poor and nutrient rich diet have much higher costs per calories.

Then supply part of food chain has been found to be influenced by the agricultural policies on farming out-put, while the demand side has been influenced by variables such as availability, income and pricing. The current interventions for obesity should start at community level, including multiple stakeholders that connect people, families, governments, partners, the private sector and schools.

Policy factors at all levels that have influence on the prevalence of obesity.

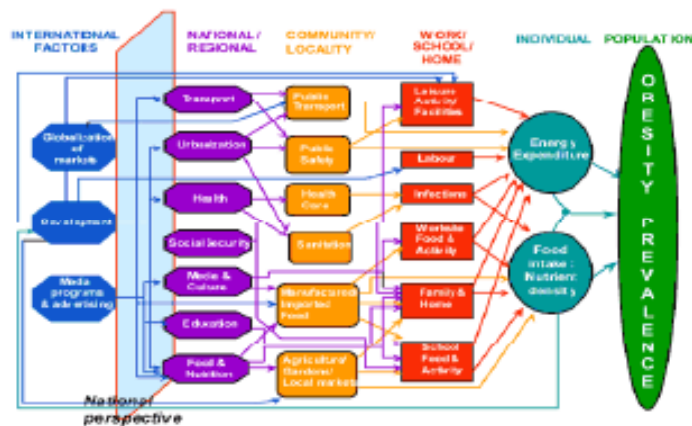


Figure: 4 Societal policies influencing the population prevalence of obesity

5. Discussion

This report brings together all known records of obesity in the 21st century. There is an increase of adolescent obesity in most schools both in developed and developing countries. In the introduction section an overview on influences to increase in Body Mass Index such as the risk regulators, health behaviours and genetic factors was given. Adolescents are susceptible to obesity because of their decline in physical activity and availability of fast foods that are void of nutritional value.

The current obesity levels reflect the complex social-cultural changes and biological susceptibilities and their interactions particularly during the past forty years. Eating and physical activity as individual behaviour does not just happen in a vacuum but is usually influenced by biological processes. The change in behaviour can not only be sustained if the drivers for behaviour have not been considered.

Adolescent obesity more in -depth

Children today are more obese in schools as the problem of obese is growing both in adults and children. Those who have adiposity changes in early child hood also tend to be fatter. This problem is world over. The problem has to be addressed in all nations. The most associated health condition with adolescent obesity is the non insulin dependence type 2 diabetes (diabetes mellitus) leading into more serious health complications. Obese children have more chances of having risk factors associated with cardiovascular diseases including high cholesterol levels and high blood pressure, greater risk of bone and joint problems, sleep apnoea, social and psychological problems.

Obese children have further risks of social and psychological problems such as poor self-esteem and stigmatization. These children are likely to remain obese in adulthood. Diet and exercise have been the major factors. Children of the current generation no longer eat health foods as children of the past generations. Today's children eat more and more and exercise less due to wide availability of food and computers, television and video games.

The problem of obesity

Obesity is no longer a problem of the developed world but now cuts across all nations. The world has built a society that wants things to be done quickly. The consumption of fast food by the school going children has an adverse effect on the dietary quality in the way that could plausibly increase the risk of obesity.

Most of these foods are high in calories, fats and sugars. The general problem is nutrition. The more combination of a diet high in calories and fats coupled with sedentary lifestyle has doomed many adolescents and adults. Before the problem of adolescent obesity can be addressed there is an urgent need to overcome the many barriers. These barriers are: **Children's parents, education, school systems, money and culture**

Parents- Every parent believes is doing his/her best for their child. Most the beliefs lead to barriers to physical activity and type of food the child eats. A parent may give reasons against increasing physical activity like "lack of time, competing interest, perceived lack of motor skills and fearing the child might get injured and active health living: prevention of obesity through increased physical activity. Those decisions made by parents are usually without proper education

Education-Parents need education and sensitization. They lack proper education on the right quality and quantity of food for their children.

The school systems

Children no longer receive proper nutrition and the physical exercises are no longer reinforced in schools. Physical education and physical activities are no longer being implemented in schools. Schools hire restaurant owners who focus in business with food high in calories, fats, sugars and with a lot of unhealthy preservatives.

Money-In developed countries money is not a constraint for foods but for physical activity. In developing countries parents fear they cannot afford to deal with the injuries arising from physical activity.

Culture-The American culture is all about doing what feels good. It has been taken that those high foods in fat taste good. The culture of advertising food has affected the adolescents and also adults. There is a lot of advertising on unhealthy foods.

School Systems-During the duration of the stay of the child schools should develop psychological, social, physical and intellectual skills. Schools should play an important role not only improving academics but also improving children's health and social outcomes. The schools should have a wellness policy.

6. Major findings

The study has shown that the risk regulators-health behaviours-genetic factors relationships are important in preventing obesity. The findings suggest that a systems-oriented, multilevel is a good model to implement in junior high schools to prevent obesity. Good multi-level model requires knowledge about data on the health of school children. The school policy governing the implementation of wellness activities work together synergistically.

7. Limitation of the study

First, the review relied on published secondary data. The most significant limitation lies in the fact that although there is huge body of literature on obesity in schools, there is no literature on obesity from the Zambian health care system.

8. Recommendation

The review of literature recommends that further research can be done on cost-effectiveness of implementing the systems-oriented- multi-level model to the study of obesity. Physical activity has to be promoted in schools to prevent obesity. It is not straight forward as the promotion of physical activity involves a lot of complex issues such as knowledge requirements, including physiological activities, behavioural environment, legislative and cultural. Various partnerships should be strengthened including school authority, the government, educators, parents, community, industries and trading organisations, mass-media and professional organisations.

9. Conclusion

Multilevel model is related to social ecological model on the principles of preventing obesity. Therefore multilevel model is a good model to prevent obesity in schools. The risk regulators-health behaviours-genetic factors model approach lay a good ground for strategic prevention obesity, evaluation of Multilevel model practices, food intake, production and physical activities.

The most important effective strategies could be theory-based and the involvement of the community and that the significance of family involvement. There seem to be no culturally appropriate and relevant designed programs for the diversity of adolescents regarding the elements.

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Obstetric utilization of blood components at the referral Princess Marina Hospital, Gaborone, Botswana

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Abstract

Obstetric haemorrhage is the leading cause of maternal mortality and morbidity. Different Obstetric conditions can present as ante- partum haemorrhage or post – partum haemorrhage. Blood supply management and its timely availability have been identified as key interventions. This study retrospectively reviewed the patterns in utilization of blood components by Obstetric units at the referral Princess Marina Hospital, in Gaborone, Botswana. Permission to conduct the study was sought from the relevant Ethics Committees and Review Boards. A total of 422 women were transfused in Obstetric wards between 1 January 2014 and 31 December 2014 out of 3258 transfusions in the whole hospital. This means that Obstetric units utilize 13.0% of all blood components. Simple random sampling was performed and random number generators were used to come up with the required sample size of 159. The sample population had an age range (in years) of 15 – 39, with a mean of 26 +/-5.8 and median of 25. Blood groups O Pos (38%), A Pos (28%), B Pos (22%) and AB Pos (5%) accounted for more than 90% of the sample population. The average number of transfused units was 2.2, 3.6 and 3.6 for packed cells, FFPs and platelets respectively. The pre- transfusion Haemoglobin levels (g/dl) ranged from 4.4 to 16 with a mean of 7.97 +/- 2.2. The main reasons for transfusion were anemia (57%), PPH (23%), APH (13%) and HELLP syndrome (7%). The Decision – Transfusion Interval had a range of 55 minutes to 27 hours 45 minutes, median of 4 hours 30 minutes and a trimmed mean of 6 hours 37 minutes +/- 6 hours. There were observed inconsistencies in transfusion practices. It is recommended that there be transfusion protocols to standardize practice. An improvement in supply and follow up of blood for transfusion will also help to shorten the decision – transfusion interval.

(Key words: Obstetric, blood components, transfusion)

Definitions

Maternal mortality – “Refers to a female death from any cause related to or aggravated by pregnancy or its management (excluding accidental or incidental causes) during pregnancy and childbirth or within 42 days of termination of pregnancy, irrespective of the duration and site of the pregnancy.” (UN – MDG indicators, 2015)

Maternal Morbidity – “Admission into an intensive care unit, eclampsia or transfusion of four or more units of packed cells and other serious events” (De Jonge .A. et al, 2013)

Cross match – Testing done prior to blood transfusion to check if donor cells are compatible to recipient’s serum. A full cross match is performed in 3 stages, room temperature, 37°C and AHG phases (AABB,2005).

Immediate- spin cross match – This is a shortened or abbreviated cross match procedure only consisting of the room temperature phase. This can replace a full cross match when the recipient is negative for an antibody screen (AABB,2005).

Massive transfusion – In adults this is a transfusion of half of one blood volume in 4 hours, or more than one blood volume in 24 hours (adult blood volume is approximately 70 mL/kg). Hence in a 70kg person, one blood volume is approximately 5L, or 8 to 10 units of red cells (Austin Pathology, 2015)

HELLP Syndrome – A condition named after 3 features of the disease; namely haemolysis, elevated liver enzymes and low platelets (PREECLAMPSIA Foundation, 2015)

Obstetric units/wards – In this Research paper, Obstetric units/wards refers to ante- natal (2F), Labour and post- natal (4G) wards of Princess Marina Hospital

Introduction

Problem statement

There is a shortage in the supply of blood for transfusion in Sub – Saharan Africa. The criteria for issuing blood for transfusion is based on laboratory parameters of lowered Haemoglobin and haematocrit levels, amount of blood loss as well as clinically determined haemo dynamics and tissue perfusion status. However due to lack of protocols and transfusion guidelines, transfusion practices vary between Clinicians and there can be unnecessary blood transfusions and wastage of the scarce resource. If the clinical details are not clearly put across, Clinicians in obstetric care may not get blood for deserving cases, or get it much later than they should have. This research attempted to describe the patterns in Obstetric utilization of blood products with respect to the clinical diagnosis, relative usage of blood components and promptness of availability.

Purpose of the study

The purpose of this study was to describe the patterns in utilization of blood components by Obstetric units at Princess Marina Hospital, Gaborone, Botswana

Context of the Study

Blood Banking and Blood Transfusion has evolved from transfusion of whole blood to mainly transfusion of blood components (Gupte, 2013, Li, 2011, Repine et al, 2006). Botswana now currently issues predominantly blood components, for transfusion. The National Health and Medical Research council (NHMRC) and Australian Society of Blood Transfusion (ASBT) guidelines (2001) reported an inconsistency in transfusion practices amongst doctors within and across different institutions. Nigam (2013) reported that despite the risks associated with blood transfusion, Obstetricians are still too aggressive to transfuse blood. Fears about blood availability and safety have prompted efforts to encourage evidence based blood transfusion (Parker et al, 2009, Green, 2014)

In a research article by Ray et al (2010), about underlying causes of maternal deaths in Botswana. Haemorrhage was found to be the leading direct cause of death accounting for 39% of maternal deaths. This is consistent with other research articles that have singled out obstetric haemorrhage as the leading direct cause of maternal deaths and morbidity (Pembe et al, 2014; Wise and Clark, 2010; Bonnar, 2000). In these studies, it was noted that avoidable factors in most maternal deaths caused by haemorrhage included a delay in the correction of hypovolaemia, a delay in the diagnosis and treatment of defective coagulation and a delay in the control of bleeding. A critical shortage of blood for transfusion in sub – Saharan Africa means that there may be delays to transfuse as the appropriate blood component is sought (WHO – Maternal mortality, 2014; Khan, 2006). In a study done in Nigeria, the mean decision – transfusion interval was found to be 12 +/- 4.3 hours (Lawani et al, 2013)

A type and screen policy is now routinely implemented in most blood banking units (Ekeroma, et al, 2005 and US Guidelines, 2011). This means that patient samples that are submitted for cross matching prior to transfusion are grouped (ABO and Rhesus); while those that have an anticipated request for blood are screened for presence of unexpected antibodies (Indirect Coombs test). Patients who have a negative antibody screen will only go through a shortened cross match procedure known as “immediate – spin cross match”. However where an antibody screen has not been performed, blood for transfusion is availed in a longer period as a full cross match is performed. This can even be much longer if the antibody screen is positive (US guidelines 2011; NHMRC and ASBT, 2001).

Study Objectives:

- To outline the pattern of usage of blood components by obstetric wards
- To determine the leading obstetric conditions requiring blood for transfusion
- To determine the decision transfusion interval for obstetric wards

Literature Review

Search Strategy

Key words	related terms/ synonyms
Utilization	- Use, transfusion
Blood components	- red blood cells, packed cells, platelets, fresh frozen plasma, FFP, haemorrhage
Obstetrics	- Maternity

Various combinations of the key words were used to search the sources named below for articles relevant to the research topic. To maintain relevance of search results, BOOLEAN tools 'AND' 'OR' were used with the key words. The date of publication was altered between 5 years, 10 years and 'all search' so as to obtain a reasonable number of search results

Sources

- Google scholar - <http://scholar.google.com/>
- PUBMED - <http://www.ncbi.nlm.nih.gov/pubmed>
- South African Medical Journal (SAMJ) - <http://www.samj.org.za/index.php/samj>
- Internet

Table 1 - Record of the relevant search results

No.	Date	Source	Search Terms	Publication date	No. of results
1	9/4/15	Google scholar	allintitle: obstetric AND Blood components Utilization OR Use	ALL	3
2	9/4/15	Google scholar	allintitle: obstetric transfusion	5 years	46
3	9/4/15	PUBMED	(transfusion[Title]) AND obstetrics[Title]	5 years	10
4	9/4/15	PUBMED	((transfusion[Title/Abstract]) AND obstetrics[Title/Abstract]) AND Africa [Title/Abstract]	10 years	4
5	9/4/15	PUBMED	(obstetric haemorrhage[Title/Abstract]) AND developing world[Title/Abstract]	ALL	2
6	9/4/15	SAMJ	obstetric transfusion	ALL	1
7	9/4/15	SAMJ	obstetric haemorrhage	ALL	6

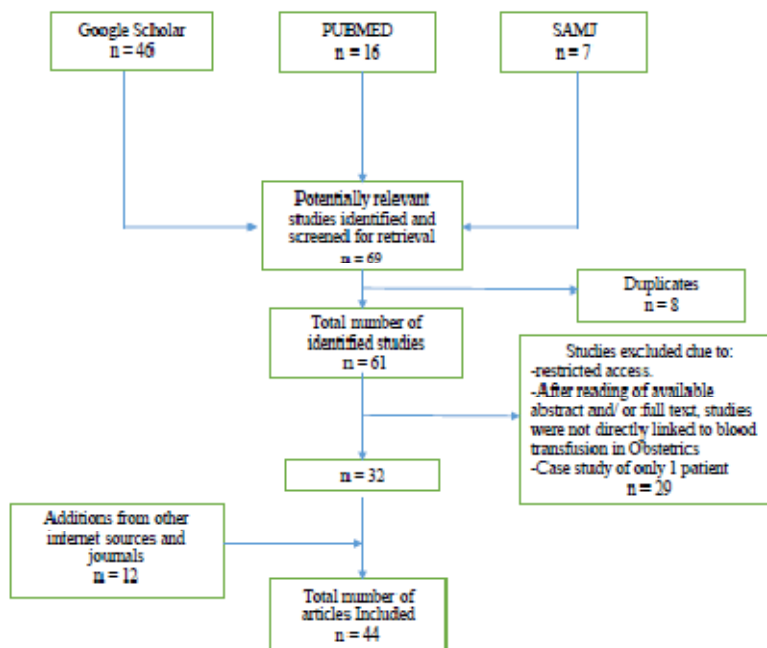


Fig 1 - Flow chat summarizing results of literature search

Table 2 showing results of literature search

Author	Year	Country	Type of study	Sample size	Main results	Comments
Gupte SC	2013	India	Retrospective	12 178	Increase in blood component and reduced WB transfusion. The mean pre transfusion Hb levels were 6.4 for pregnancy anemia, 8.1 for surgeries and 7.3 for Obs/Gyn bleeding	Full Text
Shhabra C	2014	India	Review	48 papers	Need to replace routine compatibility testing by the 'type, screen and hold' policy for procedures with CTRs > 2.5, low transfusion indices (<0.5). For blood loss during labour, < 15% results in minimal symptoms, 15 – 30% causes tachychadia, 30 – 40 % shock and >40% severe shock	Full text
Patterson J A	2014	Australia	Retrospective	89	Transfusion rate 1.4%. Transfusion rate moderately correlated with maternal morbidity	Full text
Mehdi R	2014	India	Descriptive		Placenta previa, uterine atony, ectopic pregnancy and PPH predispose patients to a significant blood loss. Criteria for transfusion in PPH are mainly based on amount of blood loss.	Full text
Bloch E M	2012	South Africa	Cross Sectional	15 725	2.8% obstetric transfusion rate. Incidence of blood transfusion is higher in HIV positive compared to HIV negative patients.	Abstract
Butwick A	2015	-	Review	-	Obstetric transfusion rate 0.9 – 2.3%. Type and screen done for all obstetric patients may not be cost effective, instead there should be protocols specific to certain obstetric patients to avoid unnecessary antibody testing. Massive transfusion protocols are needed and key to outcomes in severe PPH	Abstract
Patel VB	2014	India	Retrospective	2200	20% transfusion rate of which 70% is due to haemorrhage and 30% due to anaemia in pregnancy. 80% of patients received only red	Full text

					cell transfusion while the other 20% had red cells plus other blood components	
Sumiko E	2014	Japan	Retrospective	80	Genital tract trauma, uterine atony, placental abruption and uterine inversion all caused major obstetric haemorrhage.	Abstract
Green L	2014	United Kingdom	Retrospective	181	Guidelines for transfusion were followed in only 25% cases. There is need for evidence based transfusion triggers	Abstract
Simmons	2013	Australia	Retrospective	28	28 women had obstetric haemorrhage requiring massive transfusion over a 3 year period. There was rapid product administration with no consistent pattern in the ratio of transfused blood components.	Abstract
Goodnough LT	2011	United States of America	Retrospective	31	24% of issued red cells were uncrossmatched O Negative blood. Wastage rates of RBC, platelets and plasma were 0.7%, 16% and 3% respectively	Abstract (MT only)
Matsunaga S	2011	Japan	Retrospective	220	Positive correlation between volume of red cells and that of FFPs transfused. For MT, median FFP:PC ratio was 1:1.3-1.4	Abstract
Zhou X	2011	China	Retrospective	18	Blood component transfusion plays an important role in the treatment of obstetric haemorrhagic shock with DIC precursor	Abstract
Li Zi- Yan	2011	China	Prospective Cohort	36	Blood component transfusion is efficient and safe in obstetric DIC treatment	Abstract
Nigam A	2013	India	Review		Transfusion reactions; 4 in a 100 for non-haemolytic and 1 in 40 000 for haemolytic. Most donated blood processed into components. Obstetricians too aggressive to transfuse blood despite risks and available alternatives	Abstract

Lawani OL	2013	Nigeria	Prospective descriptive	151	7.04% transfusion rates of all pregnant mothers. Mean decision transfusion interval 12+/- 4.3hrs. Mean number of transfused units 1.77 +/-0.93. Main indications for transfusion were anaemia, shock, PPH and APH	Full text
Osei EN	2013	Ghana	Retrospective	519	Supply and units transfused per patient similar in full supply and restricted supply modes. 85% of the requested blood units were transfused. Appropriateness of transfusion was difficult to assess	Abstract
Wise A	2010	United Kingdom	Review		Obstetric haemorrhage is the biggest cause of maternal death. Early recognition, assessment and resuscitation key to management of obstetric haemorrhage	Abstract
McLintock C	2005	New Zealand	Review		Prompt recognition and treatment of women with severe ongoing blood loss is essential to prevent morbidity and mortality.	Abstract
Ray S	2013	Botswana	Retrospective	56	66% of maternal deaths occurred at the 2 referral hospitals. Haemorrhage was the main direct cause of death (39%). Better blood supply management was identified as critical.	Full text
Holm S	2012	United Kingdom	Retrospective Cohort		The transfusion rates of vaginal delivery and planned C – section were 2.24% and 2.63% respectively. Clinical estimates of blood loss are uncertain	Abstract
Matsunaga S	2011	Japan	Retrospective	220	Positive correlation between volume of red cells and that of FFPs transfused. For MT, median FFP:PC ratio was 1:1.3-1.4	Abstract

Note: Haemoglobin (Hb) results are in g/dl

Gaps in knowledge

There are no published studies of this nature that have been conducted in Botswana or Southern Africa. Knowledge of current patterns in utilization of blood components gives an insight into way forward for better practices. Key to managing major obstetric haemorrhage is prompt blood component transfusion; however only one study recorded a decision transfusion interval of 12 +/- 4.3 hours (Lawani, 2013). It was of interest to this study to determine the decision transfusion interval at PMH Obstetric units.

A Public Health Problem

The 5th Millennium Development Goal (MDG 5) aimed at reducing Maternal mortality by 75% between 1990 and 2015 (WHO:MDG 5, 2014). In 2010, the Maternal mortality rate (MMR) for Botswana was estimated to be 160 maternal deaths per 100 000 live births (Index mundi, 2014; UNICEF statistics, 2014). Obstetric haemorrhage has been identified as the leading direct cause of maternal deaths and morbidity in Botswana (Ray et al, 2010) and elsewhere (Pembe, et al, 2014; Wise and Clark, 2010; Bonnar, 2000). Abruptio placenta and placenta praevia/accreta can present as ante- partum haemorrhage (APH), however they are themselves risk factors for post-partum haemorrhage (PPH). Uterine atony and inversion, retained products of conception and genital tract trauma all cause PPH and account for the majority of cases of major haemorrhage (Mehdi 2014, Liumbruno and Rafanelli, 2012; Bonnar, 2000).

Amongst other areas for potential improvement, these studies have identified predicting and assessing blood loss and a timely availability of the correct blood component for transfusion as key interventions towards lowering Maternal mortality and morbidity. Du Plessis (2013) reported that prompt resuscitation and reversal of coagulopathy were very critical while definitive measures are carried out to stop bleeding.

Blood transfusion in Obstetric haemorrhage

Estimation of blood loss in pregnancy is often difficult and is usually under- estimated (Langenegger and Rout, 2010; Ekeroma et al, 2005; Jadon 2014; Holm 2013). A blood loss of up to 15% total body volume (750ml in 64kg adult) would normally not affect a patient's blood pressure. However Chhabra (2014) reported that a blood loss from 750ml to 1500ml and above would cause symptoms from tachycardia to severe shock. Ekeroma, et al (2005) reported that it was safe to treat a blood loss of up to 1500ml with colloids and crystalloids as long as there were no medical complications, risk of further bleeding or haematological parameters of Hb < 10g/dl and Hct < 21%. A blood loss of more than 2 500ml is considered life threatening. There is need for early recognition and action to prevent mortality and morbidity (McLintock, 2005; Saule 2011).

In severe haemorrhage, a resuscitation strategy that restricts colloid infusion and allows early administration of blood components in pre- determined ratios retards onset of coagulopathy (Cheng and Lew, 2014) and thus prevents mortality and morbidity. There is need for a clear line of communication so that the laboratory can anticipate a request for blood transfusion. This would ensure that all the necessary tests are performed; and when blood is needed, only an immediate spin cross match is performed.

Need for an evidence based blood banking system

Clinical decisions should be based on the best available research evidence, which should be integrated with clinical expertise and patient values (Vamvakas, 2004). Fears about blood availability and safety have prompted efforts to encourage evidence based blood transfusion (Parker et al, 2009). In two separate studies, Butwick et al (2009) and J. Parker et al (2009) reported that transfusions were done without specific reasons for transfusion identified in 34% and 43% of the patients respectively. Green (2014) reported that where transfusion guidelines existed, they were only followed 25% of the time. The Australian Society of Blood Transfusion (2001) urged the Hospital Transfusion Committees to play an active role in their facilities. These committees would be tasked with continually reviewing blood stock levels and transfusion practices as well reviewing Maximum Surgical Blood Ordering Schedules (MSBOS) and other guidelines.

Challenges faced

Sub – Saharan Africa is faced with challenges of poor access to basic obstetric care and shortage of blood products for transfusion. There is a shortage of basic commodities such as electricity for refrigeration of reagents and blood (Dyer et al, 2014). In a study assessing the availability of blood for transfusion in maternity units in Malawi (Kongnyuy and Van Den Broek, 2007), the study reported that maternity units used 15- 30% of all blood donor units. The study also reported that 86.8% of the demand for blood is met. Due to inconsistencies in transfusion practices and lack of protocols, the study reported that most hospital blood bank departments in Malawi requested less blood from the national transfusion centre than they actually required. This means that; the supply actually meets less than the 86.8% of the demand which is documented.

Blood components

Whole blood has a shelf life of 35 days, however once refrigerated (at the recommended temperature of 2 to 80C, platelets lose their potency and labile coagulation factors are depleted. Most blood transfusion centres now separate a unit of whole blood into different blood components. A blood banking unit normally stocks units of packed cells, platelets and fresh frozen plasma (FFP). The additive that is used in packed cells adds an extra week to the shelf life of whole blood. Packed cells thus have a shelf life of 42 days when stored at 2to 80C (Avery D.M and Avery K.T, 2010). Platelets have a shelf life of 5 days at the optimum temperature of 22oC while FFPs have a shelf life of 1 year when stored at a minimum temperature of 18oC. The short shelf life of platelets means they relatively scarce when compared to packed cells and FFPs.

Safety of blood transfusions

Nigam (2013) reported that non- haemolytic transfusion reactions occurred in 4 out of every 100 transfusions, while haemolytic reactions occurred in 1 per every 40 000 transfusions. There is always a risk that is associated with using blood and blood products and their safety cannot be guaranteed. Despite safeguards and tests to ensure that donor blood is not contaminated, blood units are still being released that are in fact contaminated (Schoeman, 2010; Rosenberg, 2001). The overall median risk of being infected with HIV, HBV, HCV through blood transfusion in Sub Saharan Africa was found to be 1, 4.3 and 2.5 infections per 1000 units respectively (Jayaraman et al, 2009).

Conclusion of literature review

Improving Maternal health and achieving the goals of the 5th Millennium Development Goal needs a multi – disciplinary approach to tackle the individual causes of Maternal mortality. Blood transfusion practices need to be continually reviewed to assess the blood supply situation and its timely availability in treating haemorrhage and anaemia. Africa faces a shortage in supply of blood for transfusion and the available resources have to be used wisely to achieve maximal benefit to patients with minimal risk. Facilities need to develop, implement and review guidelines for use of blood components.

The Public health departments need to oversee and continually educate pregnant women and the community on the importance of a good diet, ante- natal care and adhering to prescriptions of iron supplements so as to avoid anaemia in pregnancy. Clinicians in Obstetric need to find the right balance between denying a transfusion when it is needed and being too aggressive to transfuse. Systems should be put in place to shorten turnaround times and Decision – transfusion intervals.

Methodology of study

Study setting, target and population

All women who were transfused at least one unit of any blood component while in Antenatal ward (2F), labour ward or Post Natal ward (4G) of Princess Marina Hospital (PMH) between 1 January 2014 and 31 December 2014 were eligible to be enrolled into the study

Botswana has two public, referral hospitals. Nyangabwe Referral Hospital (NRH) in Francistown caters for the Northern part of the country while Princess Marina Hospital (PMH) in Gaborone caters for the Southern part of the country. PMH admits an approximated 25 000 patients annually. Patients are admitted in 2F before delivery, then moved to Labour ward for delivery, while 4G is the post -delivery ward. PMH also receives a lot of referrals from surrounding hospitals and clinics as well as home deliveries.

Study design

This was a Retrospective Descriptive Study of the Obstetric transfusion practices at Princess Marina Hospital over a 1 year period covering January 2014 through to December 2014. This design allowed use of both qualitative and quantitative data to give a clear picture of the blood transfusion practices by obstetric units at PMH. A retrospective design is cheaper and quicker than other designs yet yielding equally important information.

Sample size

Obstetric units in Botswana are reported to use 11.7% of donated blood (Poole, 2012). At 95% confidence intervals with an allowable error of 5%. $Z = 1.96$, $p = 0.117$, $d = 0.05$. Using the formula $n = (z^2 * p(1-p)) / d^2$ (Charan, 2013). Sample size was calculated to be 159.

Sampling

Simple random sampling was performed. All eligible women were identified from the Blood Bank Laboratory Cross match books. A total of 422 women were found to have been transfused in obstetric units between 1 January 2014 and 31 December 2014. All the 422 women were eligible to be enrolled into the study. Each study participant was given a number from 1 to 422. Random number generators were used to come up with the required sample size of 159.

Variables, definitions and data sources

PMH Blood Bank Laboratory records were reviewed to obtain details of women that received a blood transfusion between 1 January 2014 and 31 December 2014 while in obstetric units.

Upon identifying the 159 women making up the sample size, data was collected from patient files in Medical records, IPMS and Blood bank cross match books.

A Microsoft excel spreadsheet was used for Data collection. Data collected included Demographic data, clinical details, pre transfusion haemoglobin results, blood component request, time when decision was made to transfuse, times of unit cross matching, issuing and transfusion.

Ethical Considerations

The research proposal was submitted and approved by the Texila American University Ethics Committee and Review board.

The research proposal was also submitted and approved by the Ethics Committee and Review Boards of Botswana Ministry of Health and Princess Marina Hospital (PMH).

Since this was a retrospective study involving analysis of patient records, there was no contact with study participants and it was not possible to get informed consent. A waiver for informed consent was sought and granted by the PMH Ethics Committee.

Participants of this study did not have a direct benefit from it, however the findings of this study will lead to better Obstetric blood transfusion practices and benefit future mothers.

To ensure confidentiality, both Microsoft excel spreadsheet forms were securely protected by a password.

Strengths

The study was conducted at tertiary, referral hospital and the findings of this research can give a rough picture of Obstetric transfusion practices in Botswana. The researcher is an employee at the study site, hence familiarity with the system and processes aided ease of data collection.

Limitations

Since this is a retrospective study, there was a lot of reliance on accuracy and completeness of records used in data collection. This was however not always the case as some records were not completely filled and some patient files could not be located.

Study timelines

	2014			2015						
	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL
Protocol Development	XX	XX	XX	XX	XX	XX	XX			
Submission of protocol to TAU for approval			XX	XX	XX	XX	XX			
Submission of protocol for Ethics approval – Ministry of Health								XX		
Submission of protocol for Ethics Approval – PMH								XX		
Data collection								XX	XX	
Data Analysis									XX	
Writing of Thesis									XX	XX
Submission of Thesis										XX

Data collection

Two Microsoft Excel spreadsheet forms that were securely protected by a password were used. From the Laboratory records, all women eligible to be enrolled in the study were given unique study codes using form A. Starting from 1 January 2014, the Cross match book was reviewed to find the women who had received a blood transfusion from the Obstetric units. The name, lab number, hospital account number, ward and date of cross match were recorded for all the eligible participants. By 31 December 2014, a total of 422 women were found to be eligible to be enrolled into the study.

Using random number generators (<http://www.statrek.com/statistics/random-number-generator.aspx>), without allowing for duplicates, a list of 159 study participants was generated. These were transferred to Form B (spreadsheet) which was the principal form used for data collection.

Form B contained the participant study code obtained from Form A, and was used to collect information on blood group, diagnosis or reasons for transfusion, Haemoglobin level (Hb), platelet count, number of transfused units and type of blood component transfused, time decision was made to transfuse, time of cross matching, time when the first unit was collected and time when the first unit was put up to commence transfusion.

Data analysis

Descriptive statistics were used with tables, graphs and charts drawn for a better visualization of the patterns in demographic distribution, blood component transfusion patterns, reason for transfusion, unit collection - transfusion interval, decision – transfusion interval and pre – transfusion Haemoglobin levels for the study participants.

Descriptive statistics variables such as mean, median and standard deviation were determined using Microsoft excel.

Outliers were accounted for by sorting data from smallest to largest values and then removing 5% of values from either side.

Results

In the period covering 1 January 2014 through to 31 December 2014, a total of 422 women were transfused from obstetric units. During the same period, a total of 3258 patients were transfused in the whole hospital. This means that Obstetric units utilize 13.0% of all blood components.

Using simple random sampling, a total of 159 women were enrolled into the study. The Age range was 15 – 39 years with a Mean age of 26 years, Median 25 years and standard deviation of 5.8 years.

More than 90 % of the sample population were Rhesus positive with the most common blood groups being O Pos (38%), followed by A Pos (28%), B Pos (22%) and AB Pos (5%). This is illustrated in Table 1 and Fig. 1 below

Table 3 shows the Blood group distribution of study population

Blood group	A Pos	A Neg	B Pos	B Neg	O Pos	O Neg	AB Pos	AB Neg	Total
Number/percentage	45 (28%)	2 (1%)	35 (22%)	4 (3%)	60 (38%)	5 (3%)	8 (5%)	0 (0%)	159 (100%)

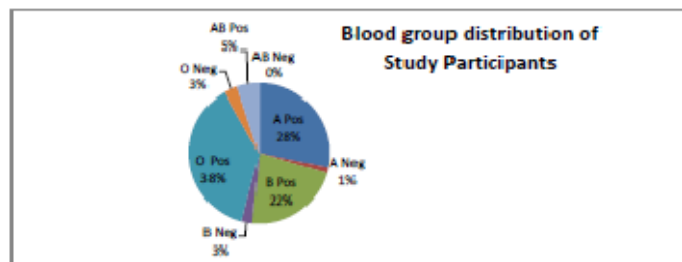


Fig 2 shows a pie chart illustrating the relative proportions of blood groups of the study population

Blood Component transfusion

a) Packed cells issued

Of the study population, 96.9% were transfused with packed red blood cells. The number of units transfused ranged from 1 to 13 units with a mean of 2.2 and median of 2 units. Two patients received a massive transfusion (8 units of red cells in 24 hrs)

b) Fresh frozen plasma

Of the study population, 17.6% were transfused with FFPs. Of this group, 85.7 % were transfused FFPs and packed cells (24 out of 28). The number of transfused FFPs ranged from 2 to 14 units with a mean of 3.6 and median of 2.5 units

c) Platelets

Of the study population, 5% were transfused with platelets. The number of transfused platelets ranged from 1 to 6 units with a mean of 3.6 and median of 3.5 units.

This is illustrated in tables and figures below:

Table 4 shows the number of units of transfused packed cells

No. of PCs transfused	1	2	3	4	5	6	8	13	Total
Number of participants	31	96	11	9	2	3	1	1	154

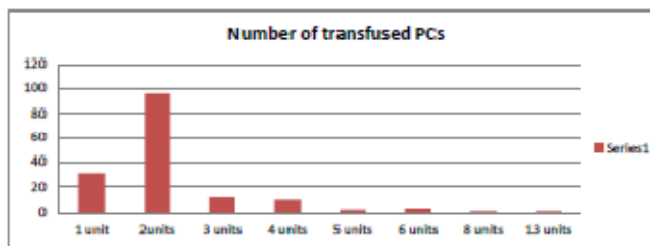


Fig. 3 is a bar graph showing the number of units of transfused packed cells

Table 5 shows the number of units of transfused FFPs

No. of FFPs transfused	2	3	4	9	13	14	Total
No of participants	14	6	5	1	1	1	28

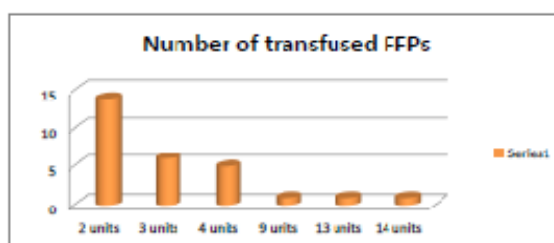


Fig. 4 is a bar graph showing the number of units of transfused FFPs

Table 6 shows the number of units of transfused platelets

No. of plts transfused	1	2	3	4	6	Total
No. of participants	1	1	2	2	2	8

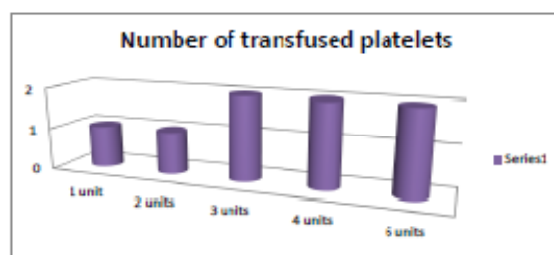


Fig. 5 is a bar graph showing the distribution of number of units of transfused platelets

Haemoglobin level

The W.H.O (2001) defines anaemia in pregnancy as Hb < 11g/dl, while severe anaemia in pregnancy is Hb < 7g/dl and very severe anaemia in pregnancy is Hb < 4g/dl.

The Haemoglobin levels (g/dl) of the population ranged from 4.4 to 16 with a mean of 7.97 +/- 2.2 and a median of 7.7. This distribution is illustrated in Fig. 5 below

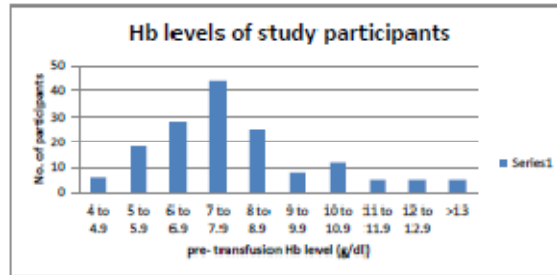


Fig 6 shows the distribution of pre – transfusion Haemoglobin levels of study population

Of the study population, 90.4% had a pre- transfusion Hb <11g/dl while 33.3% had a pre – transfusion Hb < 7 g/dl and none had an Hb <4 g/dl

Reasons for blood transfusion

The various obstetric conditions were classified into one of anaemia in pregnancy, ante- partum haemorrhage, post- partum haemorrhage and HELLP syndrome.

The main reason for blood transfusion was anaemia in pregnancy (57%) followed by PPH (23%), APH (13%) and HELLP syndrome (7%).

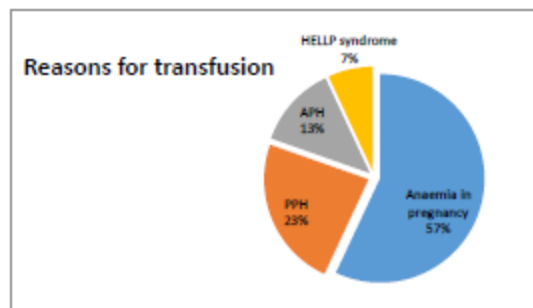


Fig 7 below shows a pie chart illustrating the relative proportions of reasons for transfusion

Note: Where anaemia was secondary to APH, PPH or HELLP, it was not recorded as the reason for transfusion

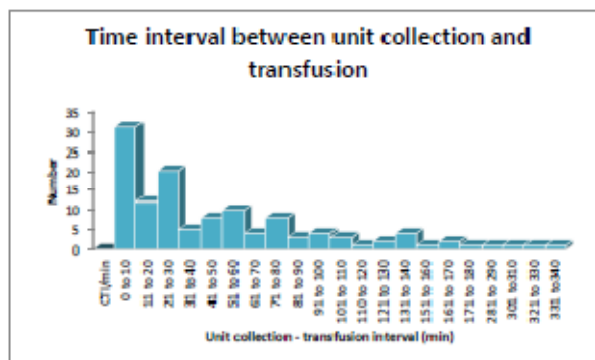


Fig 8 - Graph showing the Collection - transfusion interval (CTI) which is skewed to the right

The time interval between collection of first transfused unit and commencement of transfusion had a mean of 55min and a median 30 min.

Decision transfusion interval

This was calculated from 144 of the 159 study participants.

Note: Where the time of transfusion was not recorded, this was estimated as unit collection time plus 30min (CTI median)

The time interval between deciding to transfuse and commencing transfusion ranged from 49 min to 9736min (6days 18hrs), with a mean of 599.84 min (10hrs), median of 270 min (4 hours 30min) and Standard deviation of 1169.32hrs (19hrs 29min).

When data was corrected to remove outliers, entries were sorted in ascending order and 5% of values from either side were removed. This gave a range of 55min to 1665min (27hrs 45min), with a trimmed mean of 396.94min (6hrs 37min) and standard deviation of 361.88min (6hrs 2 min)

Discussion

In this study, there was no transfusion of whole blood. All transfusions were for blood components. This was consistent with current literature which has noted a decrease in whole blood transfusions. Obstetric units were found to use 13.0% of all blood components. A Botswana National Blood Transfusion Service publication (Poole, 2012) reported that maternity units in Botswana used 11.7% of all donated blood while Kongnyuy and Van Den Broek (2007) reported that maternity units in Malawi used 15 – 30% of all blood donor units. There is a consistent pattern in utilization of blood products in Southern Africa. This can be attributed to the similar challenges and constraints faced.

Packed red blood cells were the most transfused blood product (96.9%), followed by FFPs (17.6%) and platelets (5%). The number of units transfused shows that for all the blood components, the mean and median were between 2 and 3.6 units. 2 patients received a massive transfusion, with one receiving 8 units of packed cells and 14 units of FFPs while the other received 13 units of packed cells, 13 units of FFPs and 6 units of platelets. This gives a FFP:PC ratio of 1:0.6 and 1:1 respectively. The second patient also has a Plt:RBC ratio of 1:2.2. The first patient was not transfused with platelets, neither was there any record of their request and their unavailability. Other studies have reported that in massive transfusion, the median FFP:RBC ratios were actually between 1:1.3 and 1:1.6 while the PLT:RBC ratio was 1:1.7 (Matsunaga, 2011, Saule 2011 and Aoki, 2014).

Platelets were the least transfused blood component (5%). It was however noted that there were a number of instances where platelets were requested for and they were out of stock. This would not be surprising as platelets have the shortest shelf life of 5 days, when compared to packed cells (42 days) and FFPs (1 year). What was of concern however was that some of these patients were then transfused with FFP without a record of active bleeding? A look at the number of platelet units transfused reveals inconsistencies with standard practice. An adult dose of platelets is given as 1 unit per 10kg body weight and will typically be one apheresis unit or 4 – 6 pooled platelet units (AABB, 2005). Of those transfused with platelets, 50% of were transfused with 3 units or less. This may indicate unavailability of the required units or single units being inappropriately used as apheresis units. This therefore highlights a need for transfusion protocols and guidelines to be put in place so as to standardize practice. The Hospital transfusion Committee will then have to regularly monitor their implementation and review as needed.

Anaemia in pregnancy was the major reason for transfusion (57%), followed by PPH (23%), APH (13%) and HELLP syndrome (7%). This was consistent with a Nigerian study which reported that anaemia, PPH and APH were the main indications for transfusion (Lawani, 2013).

It was noted that at times the estimation of amount of blood loss was not recorded. However, Mehdi (2014) reported that the criteria for transfusion in PPH are mainly based on the amount of blood loss. In as much as it has been noted that estimation of blood loss in pregnancy is often difficult and under – estimated, attempting to estimate will not only help the clinician in ordering the right number of units, but will also alert the Blood bank personnel of the seriousness of the matter. A common understanding of the emergency at hand will undoubtedly lead to quicker processing and availability of blood.

The Decision – Transfusion Interval (DTI) was calculated as the time interval between deciding to transfuse and commencement of transfusion. The mean DTI was 10hrs +/- 19hrs with a median of 4hours and 30 minutes and a range of 49 minutes to 6 days 18 hours. Challenges of retrospective studies lie in

data which is not completely filled. Adding the Collection – Transfusion Interval median to the time of unit collection was done to estimate the time of commencing transfusion. DTI of up to 6 days revealed challenges ranging from unavailability of blood to inadequate follow up of blood for transfusion. From the ward side, there are instances where shifts hand over to each other that they are still awaiting blood for transfusion, without actually making a follow up with the Blood bank for the blood. From the Blood bank side, there are instances where there is a request of blood, but due to stock outs, they report that no blood is available but there is no system in place to inform the wards when blood is now available. There are also instances where upon request, the Blood bank asks the wards to check later, without a specified time frame, and hence blood may be prepared but not collected until much later because of poor communication.

Having accounted for outliers, this gave a DTI range of 55 minutes to 27 hours 45 minutes, trimmed mean of 6 hours 37 minutes +/- 6 hours 2 minutes

There were no transfusion reactions reported in the study. However, there was one patient for whom uncrossmatched blood had been collected and on performing the emergency cross match, it was realised that the units were incompatible with the patient. The Blood bank managed to call the ward to stop the transfusion and units were returned to the laboratory before any adverse reactions.

Conclusion

The findings of this research work are consistent with what other researchers have reported. Improving maternal health needs a concerted effort from all departments involved. Red blood cells are the most commonly used blood component followed by FFP and then platelets. The stock outs encountered can be countered by better practices and avoiding unnecessary transfusions, while efforts are made to increase the pool of donated blood. Anaemia and haemorrhage are the major causes of blood transfusion in Obstetrics. There are however inconsistencies in transfusion practice with what other researchers have published. Developing of transfusion protocols will help to standardise practice and have patients transfused with components they actually need, and in the right quantities. The time interval between deciding to transfuse and commencement of transfusion is way too long. Since other studies have noted that shortening of the decision – transfusion interval is key to lowering mortality and morbidity, addressing the identified factors will thus prove beneficial to future mothers and get transfusions to be commenced within a reasonable timeframe.

Opportunities for improvement

- Resuscitation of the Hospital Transfusion Committee
- Developing of transfusion protocols to standardise practice
- The Blood bank to put in place systems to notify the wards when blood is now available and specify time when blood is ready
- An improvement in follow up of blood for transfusion and recording of all communications
- Programmes to increase the amount of blood donations to reduce on stock outs

Appendices

Form A –Identification form for potential study participants

Participant Study Code	Name	Age	Ward	Date of processing	P.A/ P.M number	Laboratory Specimen Number

Form B – Data collection form

Study code	Date	Ward	Blood group	Diagnosis	Hb (g/dl)/Plt (X103)	Type of component and No. of units transfused	Time of deciding to transfuse	Time of XM request	Time of XM	Time 1st unit collected	Time of transfusion	Mode of delivery

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