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A ONE-YEAR STUDY OF THE EPIDEMIOLOGY AND OUTCOMES OF VARIOUS BIRTH DEFECTS IN PEDIATRIC PATIENTS AT GEORGETOWN PUBLIC HOSPITAL COOPERATION

A Case Study by Dr. Unarain, Guyana
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ABSTRACT

BACKGROUND

Although, birth defects are one of the leading causes of infant deaths and long term disabilities and have contributed significantly to the global burden of diseases, extensive researches have not been carried out in Guyana.

METHODS

A retrospective study, of 138 patients, diagnosed with Congenital Malformations at Georgetown Public Hospital Cooperation, between January 2007- December 2007 was carried out. These patients’ medical records; inclusive of infant, neonatal intensive care and postnatal; were located and information was recorded in the form of a questionnaire which had structured and detailed parameters. Exclusion criteria were records for all stillborns, pregnancies terminated at or after 20 weeks of gestation, out-patients and or patients in specialized clinics / institutions. Analysis on various variables (demographic distribution, clinical outcomes, clinical presentation, Apgar score, birth weight, maternal age, sex, ethnicity, previous infant with a birth defect, family history of a birth defect, known teratogenic exposure, maternal medical history, lack of folic acid supplementation and average length of hospital stay) was done using Microsoft Office Excel version 2003 for information on the epidemiology, management and clinical outcomes of the condition in the Guyanese population.

RESULTS

I found an estimate incidence 2240 cases of birth defects occurring annually in Guyana. The majority of cases were from Regions 4 (46.8%) and 3 (10.9%). The majority (73.9 %) of cases was seen in the age group birth-5 months, followed by (9.4%) > 50 months (>12 years old), 6-10 month (5 %) and 21-25 month (4.4 %). There was a male to female ratio of 1.3: 1 of having a birth defect. Afro-Guyanese accounted for almost one half (48%) of the cases followed by Indo-Guyanese, Mixed and Amerindians. The most common types of birth defects were congenital
heart disease, Hirschsprung disease, hypospadias, cryptorchidism, accessory breast, club feet and syndactyl. The average length of stay was 6.5 days. One mother used alcohol and another used an abortifacient during the current pregnancy. 82% of patients underwent surgery while 18% had medical interventions. Few patients had laboratory testing done. Patients generally had excellent clinical outcomes given a mortality rate of 0%.

CONCLUSION

My findings highlight the clinical and public health importance that should be placed on Congenital Malformations in Guyana and to re-evaluate our approach to the condition and to introduce nation-wide screening practices.

KEYWORDS: Birth defects, Epidemiology, Georgetown, Congenital malformations

INTRODUCTION

Congenital anomalies or birth defects have contributed significantly to the global burden of diseases. They account for 15–20% of all stillbirths and 2-3% of all live births, with approximately 60% identified in the first month and 80% by the end of 3 months of life. A major defect is visible at birth in 3 to 4 % of newborns (1% have a monogenic disease, 0.5% a chromosomal disorder, 1-3% a multifactorial disease) while 7.5% of children display a congenital defect by age 5.

According to a World Health Organization (WHO) report, nearly 3 million fetuses and infants are born annually with major congenital malformations, with the most common occurring in the brain (10:1000), heart (8:1000), kidneys (4:1000), limbs (2:1000), and other anatomical locations (6:1000). In 2006, a report by the March of Dimes shows that 8 million babies worldwide are born with gene-related birth defects, which accounts for 6% of all global births in a given year. This same report also published the five most common defects that also account for a quarter of the world's cases. They include heart defects (>million births worldwide yearly), neural tube defects (324,000 births worldwide yearly), hematological disorders such as sickle cell disease and thalassemia (>307,000 births worldwide yearly), Down syndrome (>217,000 births worldwide yearly) and G6PD deficiency (>177,000 births worldwide yearly).

They show no predilection to race, culture, or socioeconomic level. They can be isolated or part of a syndrome and are a leading cause of neonatal and infant morbidity (mental retardation, cerebral palsy, epilepsy, autism, permanent bilateral hearing loss, legal blindness) and mortality with an estimated 495,000 deaths worldwide, of which 20% occurs in developed countries. Approximately 40% of childhood deaths are as a result of birth defects and genetic disorders, whereby they are responsible for almost half of all deaths in term newborns.
They also impact on that country’s resources, particularly in the health care sector and create financial, social and psychological burdens on the families’ of children born with defects. These defects can demand frequent multiple hospitalizations and costly corrective surgical procedures and even after such corrections, patients will continue to experience shortcomings (whether physical, social or psychological) as a result of their condition. Multiple studies have led credence to this statement by documenting in infants with congenital heart diseases, difficulty feeding postoperatively; a higher risk of infection; longer hospitalizations and poor postoperative catch-up growth.3

The etiology of most birth defects is unknown but a complex interaction between multiple environmental exposures (radiation, infection, ACE inhibitors, phenytoin, valproic acid, retinoids, warfarin, tobacco, androgens, rubella, varicella zoster, diabetes, phenylketonuria, alcohol, maternal thyroid disease, maternal obesity4, common cold in the first trimester of pregnancy5), genetic susceptibilities and cultural practices (consanguinity) are probably involved. This complex interaction of factors operates at crucial periods of organogenesis to produce the defect, either in the form of a single anomaly or in syndromes. The genetic susceptibility is usually enhanced by an environmental trigger and the end result is a phenotypic expression (defect) with various degrees of penetrance and manifestation as either sporadic, single or multiple, visible or hidden, gross or microscopic. This complex interaction of factors also affects the incidence of the defect in various populations.

Classification of these defects is confusing but recently a new hierarchical system came into use (see appendix 2). Like any disease, the diagnosis of a birth defect lies within the history, physical examination and any special tests performed. There may be a positive family history of a particular defect; physical findings in the mother carrying a fetus with a birth defect may include a breech presentation, polyhydramnios or oligohydramnios. Special tests, mainly, ultrasonography; amniocentesis; fetoscopy and fetal blood sampling or chorialnic villus sampling are useful in the prenatal diagnostic stage, as a screening tool or to confirm a suspecting defect based on the positive history and obstetrical findings in the mother. In Guyana, we are limited by our history taking, physical examination and ultrasonography.

The approach to the patient should always be multidisciplinary and should include areas for prenatal genetic counseling, specialist care, patient follow up, referral systems and recurrence risk assessment. There are various treatment options and these depend on various factors such as the type of defect, infant characteristics (prematurity, birth weight), socioeconomics and ethical issues such as early selective termination of pregnancy. Hope for a productive life, lies in the fact that certain defects are correctable by surgical approaches, for example, Club foot; Cleft lip/palate; certain Congenital Heart Defects. There is also a role for diet intervention in defects of metabolic/ enzyme pathways such as phenylketonuria. Prenatal therapy for obstructive defects such as hydrocephalus and uropathy, is theoretically possible but in its experimental stages. Last but not least, prevention (screening) is always better than a cure and in this lies the concept of genetic engineering and other interesting approaches (cytogenic / chromosomal with or without skin fibroblast studies, enzyme assays) to birth defects that promise hope for the future.
OBJECTIVES

The objectives of this study will be fourfold: (1) To determine what types of Birth Defects were documented at GPHC in 2007. (2) To determine the epidemiology of these various Birth Defects. (3) To correlate established risk factors (genetic: previous infant with a birth defect, family history of a birth defect, maternal age; environmental: known teratogenic exposure, obesity, diabetes, lack of folic acid supplementation, maternal infection) with these birth defects. (4) To determine the clinical outcome of the patients.

METHODOLOGY

Profile of the study population

The study population comprised of infants with birth defects who were born from January 1, 2007, through December 31, 2007, to women at Georgetown Public Hospital Corporation, Guyana.

Guyana, an English-speaking country of 83,000 square miles (215,000 sq. km.), is found in the northern part of the Amazon Basin of South America, just north of the Equator with Venezuela to the west, Brazil to the south and Suriname to the east. The population of 751,000 is made up of 6 ethnic groups, namely African (40%), East Indian (51%), Chinese, Portuguese, European, Amerindian and Mixed. The Epidemiology Division of the Ministry of Health in Guyana has overall responsibility for disease surveillance.

Georgetown Public Hospital was established in 1838 mainly for the benefit of seamen and later in April 22, 1999 became a Corporation. As of today it is managed by a board of ten members and a management team spearheaded by a Chief Executive Officer. This tertiary health care institution has 550 beds and offers both in-patient and out-patient services in excess of twelve specialties. There is a Central Medical Laboratory, 24-hour Pharmacy services, 24-hour Accident & Emergency services, Library, Sewing room, Laundry room, Neonatal Care Unit, Malaria Clinic, Chest Clinic, GUM Clinic, Intensive Care Unit / High Dependency Unit,

Burns Care Unit and a recently established Caribbean Heart Institute, just to name a few.

Study design:

The researcher undertook a retrospective study using patient records on birth defects from Georgetown Public Hospital for the year 2007.
**Inclusion Criteria:**

Pediatric patients who were selected are those with a birth defect in utero (diagnosed by ultrasonography), at birth or diagnosed within 72 hours of birth and up to 12 years of age. Records (maternal, infant, neonatal intensive care and postnatal) from January 2007- December 2007 were collected and analyzed.

All types of birth defects were included. Patients who died before any complete medical evaluation (this included, physical examination, laboratory investigations and other special tests) was performed, he or she was included in the study population. Those with multiple birth defects were also selected. Mothers, who had multiple births with birth defects, were again included in the study.

**Exclusion Criteria:**

If the patient satisfied the inclusion criterion multiple times within the study period, only the data relating to the first time that patient presented to hospital was recorded. Patients who were managed as out-patients and at the Pediatric Clinics were excluded from the study. Patients who were also referred to specialized institutions (for example, Ptolemy Reid) for care were excluded. Data for stillborn infants, and for pregnancies terminated at or after 20 weeks of gestation was excluded since there was be no definite and scientific means (no postmortem, no chromosomal studies done in Guyana) to confirm that these infants and fetuses had a coexisting birth defect(s).

Birth defects were grouped according to body systems affected and as either major or minor defects. The latter classification was determined based on the severity of the defect, that is, is the defect correctable by surgical approaches (for example, Club foot, Cleft lip/palate, Polycystic Kidneys, Spina bifida, Congenital Heart Defects) or by diet intervention (defects in metabolic/ enzyme pathways) or will the defect lead to significant biological, physical and psychological disabilities; for example, Cerebral Palsy.

**Assumptions:**

Firstly, the researcher assumed that all patient information was accurately entered in the charts and secondly, there was no missing patient information. Thirdly, the attending physicians would have used established scientific criteria and testing to determine what type of birth defect was present.
Data collection:

This study was approved by the Head of Pediatrics Department, Georgetown Public Hospital. A retrospective review of all notified cases of birth defects from the said hospital within the year 2007 was conducted in the form of a questionnaire (see appendix 1).

All available clinical (maternal, infant, postnatal charts and those from the neonatal intensive care unit) and laboratory (inclusive of enzyme assays, hematology reports, biochemistry results, radiological findings, genetic studies) data entries for these cases had determined the final classification for all the cases of Birth Defects. The database system at Georgetown Public Hospital was used to identify the pediatric patients with the various Birth Defects. These charts were then found manually.

Independent variables that were studied were maternal age, sex, ethnicity, previous infant with a birth defect, family history of a birth defect, known teratogenic exposure, maternal medical history (diabetes, hypertension, thyroid diseases, infection), maternal obesity, lack of folic acid supplementation, and demographic distribution of the cases. There was no bias in terms of sex and ethnicity. Age was entered as a categorical variable (birth -5 mo, 6-10 mo….). In the “history of preceding maternal infection”, the investigator looked for any documented signs and symptoms and laboratory evidence of an infection. The demographic distribution included cases from all of the ten natural regions in Guyana. In the category of known teratogenic exposure, the investigator included those substances that have been scientifically established as a direct cause of the birth defect; namely maternal smoking and alcohol use, illicit drug use, ACE inhibitor use during second and third trimesters, skin preparations containing vitamin A (Accutane™).

Dependent variables that were studied included the clinical outcomes. Another dependent variable that was tested was the clinical presentation in the reported Birth Defect cases. Other dependent variables that were investigated were average length of hospital stay after birth, Apgar score, birth weight.

Statistical Analysis:

Specific data was entered into Microsoft Office Excel version 2003 and univariate and or multivariate analysis was carried out. Inferential statistics, in particular the Chi-square ($\chi^2$) test – The One-tailed Test was applied to analyse the data in order to provide answers for my specific objectives. In these tests, a p-value of 0.05 was used. Analyses included correlations between independent and dependent variables. The additional bio-data collected such as patients’ initials and addresses, was collected for the sole purpose of avoiding duplication of cases.

The findings of all of the data analyses was discussed, conclusions drawn, and recommendations made. Written and electronic copies of this report were presented to the supervisor for assessment and to Dr. Madan Rambarran. The investigator will then present her findings using Microsoft Power-point to an audience of her colleagues, supervisor and to other special invitees in November, 2008.
RESULTS

A. Epidemiology

- Incidence.

According to WHO, 3 million fetuses and infants are born annually with a birth defect. The world’s population as of September 2008 is 6.721 billion. Guyana has an estimated population of 751,000\(^6\) and this translates to an estimated 2240 cases of birth defects annually in Guyana.

- Demographic distribution of cases.

Region 4, Demerara/Mahaica, had the majority (68.8\%) of documented congenital malformation cases in Guyana. Regions 3 (Essequibo Islands/ West Demerara) followed closely behind with a percentage of 10.9. Regions 7 (Cuyuni/ Mazaruni), 8 (Potaro-Siparuni) and 9 (Upper Takatu/ Upper Essequibo) had the least documented cases (1.56 \%).

- Age.

The majority (73.9 \%) of cases documented for birth defects was seen in the age group birth-5 months, followed by (9.4\%) > 50 months (>12 years old), 6-10 month (5 \%) and 21-25 month (4.4 \%). No cases were detected in the age groups 26-30 month, 31-35 month and 41-45 months of age.

- Sex.

There was a male to female ratio of 1.3: 1 of having a birth defect.

- Ethnicity.

Afro-Guyanese accounted for almost one half (48\%), with the Indo-Guyanese contributing to more than one third of the cases. More cases were observed in the Mixed population than the Amerindians populations. In one documented case, no ethnicity was charted.

B. Clinical Manifestations.

- Clinical and Work-up findings based on the most common type of birth defects found.

Patients with CHD mainly complained of shortness of breath, fever, easy fatigability, chest pains, and few had cyanosis. Physical examination findings in this subset of patients were varied and included cyanosis, febrile, tachypnea, systolic murmurs, hepatomegaly and digital clubbing. Few had documented laboratory findings (hematological, urinalysis) and radiographic findings (cardiomegaly, lung infiltrations/edema) in the charts and only data for two patients were found to have had echocardiography, of which one was abnormal.
Those diagnosed with hypospadias complained of an abnormal passage of urine from the penis. The majority of these patients only had hemoglobin testing done. None had abdominal ultrasonography, urinalysis or uretrocystographic studies done to rule out any other coexisting defects. Cryptorchid patients had the universal complaint of ‘testes not palpable.’ It was not known, if the surgeon(s) for these cryptorchid patients had any suspicions of testicular cancer in those presenting late for surgical correction.

The parents of patients with club feet knew what the diagnosis was and hence, the chief complaint was that of club feet. These patients had minimal work-up done, in that only a preoperative hemoglobin count was ordered.

Those with syndactyl had various complaints ranging from limb abnormality to webbed fingers. These patients had no laboratory investigations done. Those with aganglionic colon, or Hirschsprung disease complained of chronic constipation. One of these patients had documented findings of aganglionosis on rectal biopsy. Lastly, those with accessory breast tissue, like those with club feet, knew their diagnosis prior to admission. Twenty-two patients had no documented chief complaint(s).

➢ Duration of hospitalization.

The average length of stay was 6.5 days. One patient (myelomengoecele) spent 38 days while one with hypospadias stayed 23 days. Length of hospital stay varied with several factors mainly age, severity of defect, clinical condition, and complexity of surgery. It could not be determined if post-op complications influenced the length of hospitalization.

➢ Relationship amongst prenatal, natal and postnatal histories

By exclusion, 136 charts had no information on the prenatal status while two had documented findings of an ‘unremarkable’ prenatal status. Only three mothers had documented normal obstetrical and gynecological histories.

One mother used alcohol and another used an abortifacent during the current pregnancy while one had a urinary tract infection in pregnancy. Two mothers had previous medical histories of asthma and diabetes mellitus while 5 were hypertensive.

One hundred and ten charts had no data on perinatal history and of the remainder: 2 babies were preterm, three were born by spontaneous vaginal delivery, 18 were breastfed (partially or exclusively could not be determined), 2 never breastfed, all were vaccinated for age and 3 had documented delayed milestones development.

➢ Biological Systems Affected.
The majority of cases were from the Musculoskeletal System (22%), followed by the Genitourinary (20%), Cardiovascular (16%) and Gastrointestinal (14%) systems. The orofacial system had 14 documented cases (10%) while the Reproductive and Central Nervous System had equal number of reported cases (4%). The least number of cases were from the ear (3%) and respiratory system (<1%).

➢ Relationship between birth weight and Apgar scores.

Of the 22 patients (n=138) with documented birth weight, only one had a low-birth weight of 1 kg. Nine patients had documented Apgar scores, and of these all had a 9, 10, 10 score.

D. Management.

Patients with birth defects were either treated medically or surgically or both. An alarming 78 (56%) patients had no documented treatment option. This information was missing from the charts and or failed to be documented by the attending physician.

Of those who were treated, 49 (82%) patients underwent surgery while 11 (18%) had medical interventions in the form of analgesia, antibiotics, diuretics etc. Those who had medical intervention included all CHD (TOF, PDA) and one case of cleft lip and palate.

Of those who had surgery, 20 (41%) had also postoperative antibiotics, 28 (57%) had postop analgesia, 1 post-surgical patient had neither antibiotic nor analgesia. Within the surgical group, 20 (41%) had both postop antibiotics and analgesia.

Those who had surgeries were patients with cleft lip/palate, hypospadias, epispadias, antral polyp, cryptorchidism, ankyloglossia, accessory breasts, club feet, syndactyly, encephalocele, myelomengocele, Hirshsprung disease and those with congenital defects to the toes and femur.

E. Clinical Outcomes & Prognosis.

One of my objectives was to find out what clinical outcomes existed in these patients with birth defects. Of the whole population, 74 (54%) had no documented outcome. Of the remaining, 91% were discharged, 6% improved after intervention, while 1.5% did not improve. 1 (1.5%) patient (with cleft lip/palate) was referred to another unknown institute for further care and management. No patients died while in the hospital, and so no postmortem records were found.

F. Mortality.

I found no reported mortality amongst the study population.
One of the most common urogenital abnormalities in newborn boys is Cryptorchidism or undescended testis. Many risk factors have been identified through epidemiological studies, namely low birth weight, small for gestational age (SGA), prematurity and exposure to estrogens; anti-androgens; diethylstilbestrol.

Cryptorchidism can occur in syndromes, such as the persistent Müllerian duct syndrome, Down’s Syndrome, prune belly, and Prader-Willi (Virtanen et al., 2007). The cause of cryptorchidism remains unknown in most cases but several pathogenetic mechanisms have been expressed. Many theories have been proposed as to the cause, such as placental malfunction and altered hCG secretion, with the former supported by findings of increased incidence of other genital abnormalities such as hypospadias in cryptorchid patients.

Mutations in the genes of androgen receptor, 5-alpha-reductase and insulin-like hormone 3 (INSL3) with its receptor (LGR8) has been found in some cryptorchid patients. Cryptorchidism has also been linked with an increased GGN and CAG repeats. Furthermore, a tendency of familial aggregation of cryptorchidism exists (Elert et al., 2003) and in 2005, Yoshida et al.,
discovered an association with a specific haplotype of the estrogen receptor alpha gene and cryptorchidism. Patients who are homozygous for the gene have increased susceptibility to the effects of estrogenic environmental endocrine disrupters such as pesticides.

Cryptorchidism may also be associated with pre-eclampsia, maternal diabetes, hypogonadotropic hypogonadism and genital under masculinization as a result of impaired gonadotropin action or function, inborn error of cholesterol biosynthesis, or impaired androgen biosynthesis and metabolism (Forest, 2006).

Changes in the activity of the genitofemoral nerve (GFN) and its neurotransmitter CGRP (calcitonin gene related peptide) may also be linked to increased cases of cryptorchidism. Syndactyly is characterized by two or more fused fingers and toes which is inherited as an autosomal dominant trait (except type VIII in which autosomal recessive) with incomplete penetrance and variable expression. It is one of the most common congenital anomalies of hands and feet and can occur as either an isolated abnormality or as part of a malformation syndrome. The overall prevalence of syndactyly is reported to be 3–5 per 10,000 births and the rate of isolated syndactyly is 1.3–2.2 per 10,000 births.

Familial syndactyly is reported to constitute about 10–40% of the total number of syndactyly cases. Implicated in the etiologies are mutations of fibroblast growth factor (FGF) receptors and alterations of transcription factor Msx-2. Types I, II, III and V have been mapped to chromosomal regions 2q34-q36, 2q31-q32, 6q21-q23.2 and 2q31-q32, respectively, whereas type IV has not been mapped as yet and manifesting as a complete syndactyly of all fingers with polydactyly and flexion of the fingers. Right and left sides as well as both upper and lower limbs are affected equally and is frequently bilateral. A recent large population-based study reported an increased risk of congenital digital anomalies, including syndactyly after maternal cigarette smoking during pregnancy. The goals of management are improved function, appearance, and social acceptance. Surgery is rarely necessary.

Congenital cardiovascular malformations are the most common form of birth defects, occurring in 6.6 - 8.1 per 1000 live births. They are categorized as either cyanotic (tetralogy of Fallot, pulmonary atresia, truncus arteriosus, transposition of the great vessels, total anomalous pulmonary venous return, and tricuspid atresia, coarctation of the aorta, critical aortic stenosis, interrupted aortic arch, and hypoplastic left heart syndrome) and noncyanotic lesions with the former accounting for 25% and contribute to significant morbidity and mortality. Diagnosis is mainly done by antenatal ultrasonography but many are identified by the physicians’ physical examination. Treatment is usually medical or surgical. In terms of prevention, many published studies have suggested that routine pulse oximetry on all newborns 4 hours after is an effective screening tool for detection of CCHD, but, The American Academy of Pediatrics has not stated a formal opinion on its use as a screening tool.

Accessory breast tissue, occurs in 0.4-6% of the general population, usually develop along the embryonic milk line with the most common in the axillary region. Many are asymptomatic with the minority causing pain and restriction of arm movement. They can undergo hormonal changes and are subjected to pathologies like those of normally positioned breasts, including neoplastic and fibrocystic changes. Surgery is usually the option in cases of malignancy, in symptomatic cases and for cosmesis purposes.
Acetylcholinesterase staining of rectal suction biopsy specimens is widely performed in the diagnosis of Hirschsprung's disease, but results are sometimes incorrect or atypical in newborns. In a recent study by Kawahara et al, anorectal manometry using sleeve microassembly was found useful in the diagnosis of neonatal Hirschprung’s.

The majority of cases were from the Musculoskeletal System (22%), followed by the Genitourinary (20%), Cardiovascular (16%) and Gastrointestinal (14%) Systems. The orofacial system had 14 documented cases (10%) while the Reproductive and Central Nervous System had equal number of reported cases (4%). The least number of cases were from the ear (3%) and respiratory system (<1%).

Patients with birth defects were either treated medically or surgically or both. An alarming 78 (56%) patients had no documented treatment option. Of the whole population, 74 (54%) had no documented clinical outcomes. Of the remaining, 91% were discharged, 6% improved after intervention, while 1.5% did not improve. 1 (1.5%) patient (with cleft lip/palate) was referred to another unknown institute for further care and management. The mortality rate was zero.

In hopes to establish an etiology, it was discovered that one mother used alcohol, one an abortifacent during the current pregnancy and one had a urinary tract infection in pregnancy. Two mothers had previous medical histories of asthma and diabetes mellitus while 5 were hypertensive. Only two mothers had documented findings of an ‘unremarkable’ prenatal status and three had documented normal obstetrical and gynecological histories. 3 patients had documented delayed milestones development, one a low-birth weight of 1 kg, two were preterm and of the nine patients with documented Apgar scores; all had a 9, 10, 10 score.

Cleft lip and palate, was found to be relatively common major malformation. Notwithstanding, neural tube defects, mainly myelomeningocele; meningocele; encephalocele and spina bifida occur with a significant frequency. Common minor malformations found in my study included club foot, accessory breast.

ANKYLOGLOSSIA AND SYNDACTYL IN DESCENDING FREQUENCY

Ankyloglossia, a short or tight lingual frenulum also referred to as tongue-tied, represents a significant proportion of the identified barriers to successful breastfeeding. It has a prevalence of 4-5%, is more common in males and with an unknown pathogenesis which may involve a genetic etiology manifesting as an autosomal dominant trait. It is associated with feeding (poor infant latch, maternal nipple pain); speech; social and mechanical (dental) problems. Its severity, assessed by the Hazelbaker Lingual Assessment Tool by scoring the function and appearance of the tongue, may indicate the need for future frenuloplasty which has been shown to improve milk transfer; infant growth; maternal nipple pain and breast pathology.

Clefts of the lip and/or palate occur in 1 of 600 newborns worldwide, making them the most common of all major birth defects. The incidence varies with geographic location, ethnic group, and socioeconomic conditions. They are developmental craniofacial abnormalities that result partly from the failure of neural crest cells to migrate completely. The etiology is most likely
multifactorial. Numerous studies suggest that involvement of the pathways of folate metabolism may play a role in the etiology of orofacial clefts. Some studies have suggested that women with a mutation (C677T) in the methylenetetrahydrofolate reductase (MTHFR) gene have an increased risk. Establish related teratogens include alcohol, valproic acid, and cigarette smoking. Seventy percent are isolated clefts (nonsyndromic) and 30% occur as part of syndrome20. Syndromic clefting are linked to sever cognitive deficits and oftensevere while those isolated clefts of the lip and/or palate (ICLP) are less severe. The pattern of cognitive deficits of reported lower than average general IQ with specific deficits in language function. These deficits are due to abnormal brain structure and function since the the development of the brain and face are intimately related. This abnormality is in the pattern of tissue distribution in which the frontal and parietal lobes are increased in volume and the temporal and occipital lobes are decreased in volume with also decrease in cerebellum volume20.

Nonsyndromic cleft lip with or without cleft palate (NSCLP) requires prolonged multidisciplinary rehabilitation. Researches have shown variation in several genes contributing to NSCLP. Recent research shows that 22q12.2 – 12.3 and 8q21.3 – 24.12 may harbor clefting genes21. One recent study reveals that firstly, higher levels of maternal postpartum red cell and serum folate are associated with a lower risk for cleft lip with or without cleft palate and secondly, an increased risk for cleft palate22. This same study published that higher level of serum homocysteine were associated with an increased risk for both cleft lip with or without cleft palate and isolated cleft palate.

The clinical management of orofacial clefts requires a multidisciplinary approach. Surgical repair is the mainstay of treatment and is usually performed at 2 – 3 months of age for cleft lip while repair of Cleft Palate is typically performed at 8 – 12 months of age. Genetic counseling plays a major role. It is recommended that all women of reproductive age use folic acid to reduce their risk.

Neural-tube defects, which include spina bifida, anencephaly, craniorachischisis, and encephalocele, occur in approximately 1 per 1000 births in the United States23. It has been found that although periconceptional folic acid supplementation reduces the occurrence and recurrence of neural-tube defects by 70 percent, most pregnant women with this complication do not have clinical folate deficiency23. To explain this phenomenon, studies confirm autoantibodies in serum from women with a pregnancy complicated by a neural-tube defect that can block cellular folate uptake by binding to the folate receptors, namely ED27 and KB cells on placental membranes9.

Many causes of neural-tube defects exist, including drugs (antifolate, antiepileptic agents), chromosomal abnormalities, and environmental and genetic factors23. Also, the risk of neural-tube defects may increase after abortion or miscarriages and autoimmunity resulting from epitopes of the folate receptors exposed in vivo secondary to injury and proteolysis23.

The clinical picture was quite compelling in some the cases but the majority had scanty specific and scientific entries by the examining physician. The Musculoskeletal, Cardiovascular, Gastrointestinal, Genitourinary, Reproductive, Orofacial, Integumentary, CNS, auditory and Respiratory systems were the most involved in descending order. In terms of the diagnostic work
up of these patients, few had a whole body work-up. The tests were limited to hematological, radiological; sonography and one case had a biopsy (rectal).

The majority had surgical versus medical intervention, in the form of supportive and symptomatic treatment. No patients were screened for a birth defect and no patients died. They were either discharged, improved, unimproved or referred.

Although this study was successful, many limitations were faced, mainly time and electronic malfunctions. In terms of the medical documentation system, I was unable to access all of the records. Many charts were incomplete with scanty clinical documentation by the examining physician.

I conclude that the epidemiology, management practices and outcomes for congenital malformations in Guyana were determined in spite of the alarming proportion of missing data. One disappointment, however, is that comprehensiveness and more details could not be met.

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9) Guyana (webpage on Guyana Profile).


A REVIEW OF COMMUNITY TB CARE INTERVENTION IN NIGERIA – A CARE STUDY OF NGO INTERVENTION – A CAPSTONE PROJECT

A Case Study by Kingsley Chinedum Ochei, Nigeria
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INTRODUCTION

Global burden of TB (1 Frequently asked questions about TB and HIV - http://data.unaids.org/pub/FactSheet/2006/TB_HIV_QA

One third of the world’s population is infected with Mycobacterium tuberculosis, the bacterium that causes tuberculosis (TB). The vast majority of these people never develop active disease; only 5-10% of people infected with TB actually develop TB disease during their lifetimes. However, co-infection with HIV makes TB disease much more likely and 10% of people with TB and HIV co-infection will develop TB disease each year. In its Global TB Control Report for 2008, WHO estimated global TB prevalence of 14.4 million and incidence (new cases) of 9.2 million (139 per 100,000 population) for 2006. The Africa Region has the highest incidence rate per capita of 363 per 100,000 population. It is noteworthy that only 5.1 million (55%) of the estimated new cases were notified to WHO. Sub-Saharan Africa, South East Asia, and Western Pacific regions accounted for 83% of the notifications. Nigeria and South Africa were ranked 5th and 4th respectively among the top five of the 22 high burden countries with India, China, and Indonesia occupying the top three places in that order. There were an estimated 1.5 million deaths from TB in HIV-negative people and 0.2 million among people infected with HIV.

KEYWORDS:- Tuberculosis, Mycobacterium tuberculosis, WHO, Africa

TARGETS AND STRATEGIES FOR GLOBAL TB CONTROL

Set within the framework of the Millennium Development Goals (MDGs), the global TB control targets halting and then reversing global TB incidence by 2015 relative to 1990 levels. Other important non-MDGs targets are the outcomes targets first set by the World Health Assembly in 1991 to detect at least 70% of new smear positive cases in Directly Observed Treatment – short course (DOTS) programs and to successfully treat 85% of detected cases; and impact targets of halving prevalence and death rates by 2015 relative to 1990 levels.
Designed to achieve the 2015 impact targets as well as targets for case detection and treatment, the Stop TB strategy is the primary strategy for global TB control. Launched in 2006, the Stop TB strategy has six major components (See Textbox 1) with DOTS as the central TB service delivery approach. The DOTS program has 5 elements (See Textbox 2), is almost universally accepted and is being implemented in 184 countries worldwide accounting for 99% of all estimated TB cases and 93% of the world’s population in 2006. Almost 700,000 TB patients were tested for TB in 2006, up from 470,000 in 2005 and the number of TB patients enrolled on ART in 2006 was 67,000, more than doubled the 29,000 in 2005. Through health systems strengthening approaches, diagnosis and treatment of TB is fully integrated into general health services in most countries. Among the 22 high-burden countries that collectively account for 80% of the TB cases globally, 14 are scaling-up public-private mix approaches, 13 have conducted knowledge, attitude, and practice (KAP) studies to inform the design of their advocacy, communications and social mobilization activities, and 20 have reported community involvement in TB care and prevention.

COMMUNITY TB CARE

A report on community participation in TB care commissioned by WHO and based on extensive CTBC project reviews in Latin America, Asia, and Africa concludes that CTBC can contribute significantly to achieving the goals of national TB programs (NTP). The report recommends NTPs form partnerships with communities based on the principles of subsidiarity, solidarity, and responsibility. The Africa review entitled “Community TB Care in Africa” project was conducted in 8 districts in 6 countries severely affected by TB/HIV – Botswana, Kenya, Malawi, South Africa, Uganda, and Zambia - concluded these CTBC projects are effective (TB-case finding and treatment outcomes) affordable (costs and cost effectiveness) and acceptable (social science qualitative assessment). The report recommends NTPs should consider harnessing community contribution to TB care where there is the need to increase access to effective TB care. Similar results have been obtained in a community-based project in rural Central Sulawesi in the Republic of Indonesia in 2001.

BURDEN OF TB DISEASE IN NIGERIA

Nigeria’s population is currently estimated at 144 million people, the largest in Africa and 10th largest in the world. TB is a huge public health problem in Nigeria. No nationwide TB prevalence study has ever been carried out in the country; however, in 2008 WHO estimated this at 616 per 100,000 population and ranked Nigeria 5th among the 22 highest disease burden countries in the world and 2nd only to South Africa on the African continent. Nigeria’s generalized HIV epidemic with a 4.4% prevalence rate is an important driver of its TB epidemic as about 30% of HIV positive people also have TB disease.
STRATEGIES AND TARGETS FOR TB CONTROL IN NIGERIA (FMoH ANTENATAL CLINIC SENTINEL SURVEY 2005 REPORT)

In response to the high TB disease burden in the country, Nigeria officially launched the National TB and Leprosy Control Program (NTBLCP) in 1991 with a mandate to coordinate TB and leprosy control activities and spearhead efforts to reduce the burden of the two diseases and adopted the DOTS approach as the primary mechanism for the delivery of TB services in 2002. The components of the national TB control program are shown in text box 3 and include community TB/HIV collaboration and Community TB Care (CTBC). Key objectives of the current TB control strategic plan 2005-2010 include to detect 70% of estimated sputum smear positive TB cases, cure at least 85% of detected smear positive TB, and reduce by 25% the incidence of TB among people living with HIV/AIDS (PLWHAs).

Strategies for achieving these objectives include expanding the DOTS program nationwide, political commitment, TB diagnosis through quality assured acid fast bacilli (AFB) microscopy, uninterrupted supply of ant-TB drugs, and effective M&E through a standardized recording and reporting system. Major technical and financial support for the Nigeria’s NTBCP is provided by the development partners including WHO, GFATM, the United States Agency International Development (USAID), and the Canadian International Development Agency (CIDA), international not-for profit organizations notably the International Federation of Anti-Leprosy Associations (ILEP) such as German Leprosy Relief Association (GLRA), Netherland Leprosy Relief (NLR), Damien Foundation Belgium (DFB) and The Leprosy Mission (TLM); and private healthcare providers.

PROGRESS TOWARDS REDUCING THE BURDEN OF TB IN NIGERIA

Nigeria is making progress, albeit slowly, in its fight to reduce the burden of the TB disease primarily through DOTS expansion and enhancement since 2002. The DOTS program has been rolled out nationwide to all 36 states and the Federal Capital Territory (FCT) Abuja, reaching 91% of the country’s 774 local government areas by 2007. Twenty 22 LGAs have no functional DOTS program including 10 LGAs in Kano State.

There were 2,321 DOTS facilities at the end of 2007 in the country. However, access to DOTS services remains poor and the NTBLCP 2006-2010 Strategic Plan estimates that less than 50% of TB patients are accessing these services. It is noteworthy that the DOTS program has contributed significantly to reaching a total of about 365, 000 cases of all forms of the disease between 2002 and 2007. The NTBLCP reported a massive increase of 177% in registering all forms of the disease in 2007 (86,000) relative to 2002 (31,000), in part due to a US$68 million 5-year grant for TB programs from the GFATM in 2005. Kano State (one of two states where GHAIN is piloting the community TB care (CTBC) project, along with Lagos, Kaduna, and Benue states are the highest contributors to the national TB burden with more than 4,000 each in 2007 against a national average of 2,330 cases.

Most secondary and tertiary health facilities and an increasing number of primary care facilities provide TB microscopy nationwide. However, detection rates for smear positive TB cases
remain very low at 31% in 2007 (national target – 70%), having risen steadily from 15% in 2002 to 26% in 2004 to 29% in 2006. Kano and Cross River states’ case detection rates in 2007 were 30% and 33% respectively. Nigeria is making progress in treatment success rate of smear positive TB, which has increased from 73% in 2004 to 79% in 2007. The national target is 85% by 2010. Kano and Cross Rivers states have treatment success rates of 81% and 78% respectively in 2007. According to the NTBLCP Annual Report 2007, TB death rate declined steeply from 11% in 2006 to 6% in 2007. HIV is a key driver of the TB epidemic in the country, yet only 12 states were providing comprehensive TB/HIV collaborative care in 2007. In the absence of a massive scale up of TB/HIV collaborative activities in the country, it is unlikely that Nigeria will reach its objective of reducing by 25% the incidence of TB among PLWHAs. Despite the fact that the Stop TB strategy and the NTBLCP Strategic Plan 2006-2010 both include CTBC as important component of the TB control program, there are very few CTBC programs in Nigeria as comprehensive as the FHI led GHAIN pilot projects in Nassarawa LGA in Kano and Yakurr LGA in Cross River states started in 2007. GHAIN started six new CTBC projects in late 2008 in the Federal Capital Territory (FCT) Abuja, and Enugu, Sokoto, Bauchi, Taraba, and Edo states.

The NTBLCP strategic plan calls for establishment of CTBC projects in at least 5 LGAs per state by 2010. Once established it is expected that these communities will assume at least 25% overall responsibility of TB patient management. Training for a very small number of people on CTBC has taken place under the GFATM Round 5 grant but actual implementation of CTBC activities is yet to start.

THE GHAIN CTBC PROJECT

Following USAID Nigeria’s evaluation of its support to TB prevention and control activities in Nigeria, the USAID-funded Global HIV/AIDS Initiative in Nigeria (GHAIN) was identified to undertake pilot CTBC activities, based on its existing infrastructure and wealth of experience in TB care. GHAIN worked with the NTBLCP and associated State TB and Leprosy Control Programs (STBLCP) to identify three LGAs in which to pilot the CTBC project. Nassarawa LGA in Kano State and Yakurr LGA in Cross River State were designated as pilot sites for FHI and Ajeromi/Ifeodun LGA in Lagos State was designated pilot site for German Leprosy Relief Association (GLRA), a member of the consortium implementing the GHAIN project. The purpose of the pilot CTBC project in the 3 LGAs is to support the NTBLCP strategic plan 2006-2010 of introducing community TB care in 6 states, strengthen TB diagnosis and treatment services within the selected LGAs, and support the strengthening of the NTBCP CTBC M&E system. The review covers only Nassarawa and Yakurr LGAs where FHI is the technical lead within the GHAIN project consortium for the CTBC project.

Nassarawa LGA is a poor urban area within Kano metropolis whereas Yakurr LGA is a hard-to-reach rural area. The GHAIN CTBC pilot project activities were organized in two phases: a preparatory phase with no CTBC services being delivered followed by an implementation phase in which TB services were delivered in the two LGAs. The preparatory work in both LGAs
started in about July 2007. Service delivery activities in both LGAs started about the same time, in earnest in January 2008.

The GHAIN project, led by FHI, is implementing the CTBC project as a component of its HIV/AIDS, Sexual and Reproductive Health, and TB (HAST) service delivery approach. The HAST approach is designed as a holistic, integrated decentralized disease management approach at the LGA level with operational structures that enhance health promotion, screening and early detection of the three diseases. This delivery approach integrates the three disease programs to obtain synergies and strengthen the health care delivery system with a focus on improving governance, health management information system, logistics, supply chain management, and patient referral between and among healthcare facilities and the community. Important intentions of the approach are to private partnership and provide opportunities for meaningful involvement of communities, community-based organizations, and community volunteers.

**METHODOLOGY OF THE REVIEW**

**DOCUMENT REVIEW**

Many documents were reviewed. These include the GHAIN CTBC proposal to USAID, project baseline assessment report, and progress reports and M&E documents of the CTBC project. Documents detailing FHI experience in TB work in other countries especially Asia were also reviewed. Documents relating to the NTBLCP in Nigeria were reviewed including its strategic plan and annual reports and the Nigerian Country Coordinating Mechanism TB proposals to, grants from, and reports to the GFATM. Other documents that were reviewed include WHO and UNAIDS documents on TB and HIV generally and specifically on Nigeria. A List of the Documents Reviewed is attached as *Appendix 1*.

**FINDING FROM THE CTBC PROJECT REVIEW**

1. *Implementing CTBC within the LGA HAST Services:*

   The baseline results provided evidence used to strengthen critical areas of the LGA healthcare delivery system including a responsive governance structure, good management, physical infrastructure restoration and maintenance, improved PHC workforce competencies, and an effective M & E system. The HAST approach has increased access to improved healthcare for the three diseases by creating effective partnerships between the community and the LGA programs of the three diseases based on the principles of subsidiarity, solidarity, and responsibility. Table 1 shows improvements in the key services delivery infrastructure with regard to the CTBC project with accompanying text describing key areas in which the HAST approach has strengthened the overall health system at the LGA level.
**Table 1: Improvements in service delivery capacity in Nassarawa and Yakurr LGAs as a result of CTBC project**

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>No of Wards</td>
<td>11</td>
<td>13</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>No of Health facilities in LGA</td>
<td>15</td>
<td>24</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>No of wards covered by CTBC</td>
<td>0</td>
<td>11</td>
<td>0</td>
<td>13</td>
</tr>
<tr>
<td>4</td>
<td>No of health facilities involved in CTBC project</td>
<td>0</td>
<td>4</td>
<td>0</td>
<td>10</td>
</tr>
<tr>
<td>5</td>
<td>No of health workers trained in CTBC</td>
<td>0</td>
<td>40</td>
<td>0</td>
<td>38</td>
</tr>
<tr>
<td>6</td>
<td>No of AFB microscopist trained</td>
<td>0</td>
<td>5</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>7</td>
<td>No of TB microscopy laboratories used for CTBC</td>
<td>0</td>
<td>2</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>8</td>
<td>No of CVs trained for CTBC</td>
<td>0</td>
<td>40</td>
<td>0</td>
<td>38</td>
</tr>
<tr>
<td>9</td>
<td>No of CBOs involved in CTBC</td>
<td>0</td>
<td>5</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>10</td>
<td>No. Of LGA CTBC communities</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>11</td>
<td>No of functional Ward development committees</td>
<td>0</td>
<td>11</td>
<td>0</td>
<td>13</td>
</tr>
<tr>
<td>12</td>
<td>No of DOTs sites in LGA</td>
<td>0</td>
<td>4</td>
<td>3</td>
<td>11</td>
</tr>
</tbody>
</table>

2. *Improvement of workforce for HAST services*

The Ministry of Health (MoH), particularly at the PHC level, suffers from chronic shortage of skilled health workforce. In support of its HAST services, GHAIN in collaboration with the MoH developed training curriculae for HIV/AIDS, STI, and TB
and Standard Operating Procedures (SOPs) based on the Integrated Management of Adult Illness (IMAI) strategy, which it uses to train health workers. GHAIN has found the curriculae and SOPs good and user-friendly.

3. **Strengthening physical infrastructure to deliver the HAST services:**

The baseline assessment indicated many of the physical infrastructures necessary for delivering quality HAST serves were in need of repair and/or replacement. GHAIN made a modest financial investment in refurbishing selected facilities including the provision of additional space to provide services such as HIV counselling and testing (HCT), prevention of mother to child transmission (PMTCT) of HIV, laboratory diagnosis and TB- DOTS. Additional support included the provision of basic laboratory equipment and consumables including microscopes and the supply of computers for data storage and management.

4. **Strengthening the management of Health services**

5. **Integrated and strengthening of the M&E system**

### DELIVERY OF CTBC SERVICES

The delivery of TB services started in earnest in January 2008 following the completion of the capacity building interventions for the 2 LGAs carried out by GHAIN between July and December 2007. The utilization of key TB services between January and September 2008 including number of TB suspects referred by CVs for AFB sputum microscopy, TB patients placed on treatment, and number of TB patients receiving support from CVs in the community is presented in Table 2 for both Nassarawa and Yakurr LGAs.

Poor services with inadequate recording and reporting capabilities makes it impossible to get similar utilization data in Nassarawa and Yakurr LGAs for the period January - September 2007 for comparison purposes; both LGAs were selected as CTBC project sites precisely because of these challenges. The review therefore decided to compare TB services utilization in Yakurr LGA (CTBC intervention area) with Ikom LGA (conventional TB-DOTS expansion area) in Cross River State and Nassarawa LGA (CTBC intervention area) with Unguggo LGA (TB- DOTS expansion program) in Kano State.

Comparison LGAs, as much as possible, were paired to have similar critical confounding variables such as geographic terrain and socio-economic status. The major difference between the pairs is the presence or absence of CTBC project activities. This data is included in Table 2 for the period January – September 2008.

The TB prevalence is not known for the states or the LGAs. It is not unreasonable to expect that TB prevalence rates will not be significantly dissimilar between LGAs in the same state with similar geographic terrain, transport and communication infrastructure, socio-economic status, and health infrastructure. A comparative analysis of the data shown in Table 2 between Nassarawa LGA and Unguggo LGA in Kano State, and between Yakurr LGA and Ikom LGA in Cross River State is shown below:
Table 2: TB service statistics Jan-Sept 08: CTBC project LGA vs. non-CTBC LGA (January to September, 2008)

<table>
<thead>
<tr>
<th>Data Element</th>
<th>Kano State</th>
<th>Cross River State</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Nassarawa LGA (CTBC project areas)</td>
<td>Ungugo LGA (non-CTBC area)</td>
</tr>
<tr>
<td>Population Estimates for 2008</td>
<td>634,000</td>
<td>433,000</td>
</tr>
<tr>
<td>No of sputum AFB positive smears</td>
<td>901</td>
<td>165</td>
</tr>
<tr>
<td>No of sputum AFB positive smears done</td>
<td>153</td>
<td>40</td>
</tr>
<tr>
<td>No of TB patients started on Treatment (new casea)</td>
<td>201</td>
<td>75</td>
</tr>
<tr>
<td>No of TB suspects referred by CVs for diagnosis</td>
<td>521</td>
<td>0</td>
</tr>
<tr>
<td>No receiving DOTs in community of TB patients on treatment</td>
<td>55</td>
<td>0</td>
</tr>
<tr>
<td>No of TB microscopy units participating in EQA</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>No of stock out of anti – Tb drugs</td>
<td>yes</td>
<td>NO</td>
</tr>
</tbody>
</table>

CONCLUSION

Nearly 15 months since the CTBC projects began and only 8 months into the delivery of TB services in the communities, the review guardedly makes the following conclusions:

1. The Yakurr LGA CTBC project is efficient and effective in increasing access to quality TB prevention, treatment and care and support services; however, the efficiency and effectiveness of Nassarawa CTBC project needs improving by ensuring that anti-TB drugs are available for TB patients at all times and that prolonged stock-outs of anti-TB
drugs are a thing of the past. The review team is convinced that similar efficiencies and effectiveness can be realized in other communities identified for future CTBC expansion if anti-TB drugs are always available and stock-outs avoided.

2. The CTBC project is relevant to the national TB control program and acceptable to communities as a mechanism for providing quality TB services in Nassarawa and Yakurr LGAs. The CTBC approach for TB control will continue to be relevant as long as TB remains a major public health challenge in a resource-constrained Nigeria. Poor and hard to reach communities will continue to accept CTBC projects as long as these increase access to quality TB services. Community acceptance of CVs as key players in TB control will improve with community education and the generation of huge TB cure rates for TB patients receiving care and support from CVs.

3. With moderate effort by all stakeholders, the CTBC project can be scaled up and rolled out to other LGAs in Cross River and Kano States. Community volunteers are a critical element for the success of the CTBC project and their motivation is central to this. Nassarawa LGA in Kano state motivates its CVs by paying a monthly stipend to them; Yakurr LGA does not pay any stipends and has witnessed some attrition in CVs numbers but has replaced these. Yakurr LGA authorities and those of other LGAs that will implement CTBC projects in future should adapt Nassarawa LGAs mechanism of support for the CVs.

4. The CTBC project is heavily dependent on external sources of funding. It is therefore highly unlikely that it can be sustained when donor support is withdrawn without significant political commitment and very substantial and sustained financial investment from federal, state, and local governments.

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A STUDY OF THE KNOWLEDGE, AWARENESS, PERCEPTIONS AND BELIEFS (KAPB) ON HIV/AIDS OF TEENAGERS IN THE LOWER EAST COAST DEMERARA (GUYANA)

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ABSTRACT

The purpose of this study is to investigate the Knowledge, Awareness, Perceptions and Beliefs (KAPB) of teenagers aged between 15 and 19 living on the Lower East Coast of Demerara (Cummings Lodge to Mon Repos) on HIV/AIDS. Randomly selected sixty Lower East Coast of Demerara teenagers were interviewed using a four page questionnaire and twenty one questions. The questionnaire was selected from the module on HIV/AIDS in the UNICEF End Decade Multiple Indicator Cluster Survey (MICS).

In response to a planned 2000 World Summit for Children, the United Nations Children Fund (UNICEF) developed the Multiple Indicator Cluster Survey as a useful tool for collecting data on primarily women and children. The following organizations worked together to develop the first MICS - UNICEF, World Health Organization (WHO), the United Nations Statistics Division, the London School of Hygiene and Tropical Medicine and the United States Centers for Disease Control and Prevention (CDC). Five rounds of MICS were done globally in 1995, 2000, 2006, 2009 and 2012 – 2014.

The results are presented in a manner that is consistent with UNICEF End Decade MICS Model Report. The results of the study will summarize key findings associated with teenagers aged between 15 and 19 living on the Lower East Coast of Demerara knowledge of the modes transmission of HIV/AIDS from mother to child, discriminatory attitudes towards people living with HIV/AIDS, knowledge on three means of preventing HIV transmission, their beliefs/misconceptions about HIV transmission. This study will calculate the percentage of teenagers who have ‘sufficient knowledge’ of HIV/AIDS transmission.
Given that Guyana has a high rate of teenage pregnancy. It is important that these issues be examined. This study is particularly relevant at this time when HIV/AIDS has emerged as an important health issue.

**KEYWORDS:-** KAPB, HIV, UNICEF, Multiple Indicator Cluster Survey, Demerara

**INTRODUCTION**

Guyana has a high rate of teenage pregnancy (see table 1). It is important to measure how much knowledge teenagers have on how AIDS is transmitted and how to prevent transmission of AIDS. Data has been collected on Guyana on this but because of the nature of Guyana settlement patterns, disaggregated data for regions (Guyana is divided into ten regions) and sub-regions is not readily available. This study focuses on Knowledge, Awareness, Perceptions and Beliefs (KAPB) on HIV/AIDS of teenagers from Cummings Lodge to Mon Repos in the lower East Coast Demerara (Guyana).

**Table 1: Adolescent birth rate per 1000 women aged 15 to 19, Caricom Countries, 1991/2010**

<table>
<thead>
<tr>
<th>Country</th>
<th>Adolescent birth rate per 1000 women aged 15 to 19, 1991/2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Guyana</td>
<td>97</td>
</tr>
<tr>
<td>Belize</td>
<td>90</td>
</tr>
<tr>
<td>Dominica</td>
<td>83</td>
</tr>
<tr>
<td>Jamaica</td>
<td>72</td>
</tr>
<tr>
<td>Haiti</td>
<td>69</td>
</tr>
<tr>
<td>Suriname</td>
<td>66</td>
</tr>
<tr>
<td>Barbados</td>
<td>50</td>
</tr>
<tr>
<td>Saint Lucia</td>
<td>49</td>
</tr>
<tr>
<td>Bahamas</td>
<td>41</td>
</tr>
<tr>
<td>Trinidad and Tobago</td>
<td>33</td>
</tr>
</tbody>
</table>


**MULTIPLE INDICATOR CLUSTER SURVEY (MICS)**

In response to a planned 2000 World Summit for Children, the United Nations Children Fund (UNICEF) developed the Multiple Indicator Cluster Survey (MICS) as a useful tool for collecting data on primarily women and children. The following organizations worked together to develop the first MICS - UNICEF, World Health Organization (WHO), the United Nations Statistics Division, the London School of Hygiene and Tropical Medicine and the United States

**GUYANA MICS**

The MICS survey was first implemented in Guyana in 2000 that produced baseline data, this survey was funded by UNICEF. Below are the indicators on HIV/AIDS from this survey, women aged 15-49 were interviewed.

<table>
<thead>
<tr>
<th>Indicators</th>
<th>World Summit for Children Indicators</th>
<th>Percentage</th>
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</thead>
<tbody>
<tr>
<td>Knowledge of preventing HIV/AIDS</td>
<td>Proportion of women who correctly state the three main ways of avoiding HIV infection</td>
<td>42.8 percent</td>
</tr>
<tr>
<td>Knowledge of misconceptions of HIV/AIDS</td>
<td>Proportion of women who correctly identify 3 misconceptions about HIV/AIDS infection</td>
<td>45.1 percent</td>
</tr>
<tr>
<td>Knowledge of mother to child transmission</td>
<td>Proportion of women who correctly identify means of transmission of HIV from mother to child</td>
<td>42.3 percent</td>
</tr>
<tr>
<td>Attitude to people with HIV/AIDS</td>
<td>Proportion of women expressing a discriminatory attitude towards people with HIV/AIDS</td>
<td>39.2 percent</td>
</tr>
<tr>
<td>Women who know where to get tested for HIV</td>
<td>Proportion of women who know where to get a HIV test</td>
<td>69.0 percent</td>
</tr>
<tr>
<td>Women who have been tested for HIV</td>
<td>Proportion of women who have been tested for HIV</td>
<td>15.7 percent</td>
</tr>
</tbody>
</table>

*Source: Guyana MICS Report, Bureau of Statistics (Guyana), July 2001*

A follow up MICS survey was done in Guyana in 2006.

**SAMPLE**

Sixty respondents in the Lower East Coast Region (Cummings Lodge to Mon Repos) of Guyana were randomly selected and interviewed during November 2013 using a four page questionnaire, the questionnaire was the HIV/AIDS module of the end decade MICS Survey. The method of data collection was face-to-face interviewing using a trained interviewer supervised by an experienced supervisor. The 60 respondents who were interviewed were from the teenage group (between 15-19 years).

Forty three percent of the sample was males while 53 percent of the sample was females. 47 percent of the sample was Indo-Guyanese, 43 percent were Afro-Guyanese and 10 percent were “Others”, this is similar to the population of the Lower East Coast Demerara. Ninety seven
percent of the sample completed secondary education while 3 percent completed post secondary education. Sixty three percent of the sample was aged 15-17 while 37 percent were aged 18-19.

**AIDS KNOWLEDGE**

It is important to promote accurate knowledge of how AIDS is transmitted and how to prevent transmission. Equally important is collecting scientific data to determine the level of knowledge and misconceptions on HIV/AIDS.

Among the 60 persons aged 15-19 interviewed in the Lower East Coast of Demerara (Guyana), 100 percent have ever heard of AIDS, this percentage is very high.

Persons aged 15-19 interviewed in the Lower East Coast of Demerara were read several statements about means of HIV/AIDS transmission and asked to state whether they believed the statements were true. Eighty Two percent believe that having only one uninfected sex partner can prevent HIV transmission. Eighty Seven percent believe that using a condom every time one has sex can prevent HIV transmission and 58 percent agreed that abstaining from sex prevents HIV transmission. See Figure 1. Overall, 40 percent knew all three ways and 90 percent were aware of at least one of the means of preventing transmission.

**Figure 1: Percentage of persons aged 15-19 who have knowledge of HIV/AIDS transmission**

![Figure 1](image)

Differences across gender is not particularly large; the percentage of women who know all three means is 44 percent among 15-19 year olds whereas it was 36 percent for males aged 15 to 19 years old. Also, age is a very important factor in AIDS knowledge. The percentage who knows all three means of preventing transmission is more than two times greater among persons aged 15–17 years old compared to persons aged 18–19 years old.

Eighty four percent of persons aged 15–19 correctly stated that AIDS can’t be transmitted by supernatural means whereas 60 percent stated that AIDS can’t be spread by mosquito bites. More
than eight in ten persons aged 15–19 correctly believe that a healthy looking person can be infected. Males aged 15–19 are more likely to believe misconceptions about AIDS transmission than females aged 15–19. Persons aged 18–19 are more likely to recognize all three misconceptions than persons aged 15–17. Still, less than half (42 percent) of the persons aged 15–17 correctly identified all three misconceptions.

Ninety percent of persons aged 15–19 know that AIDS can be transmitted from mother to child. When asked specifically about the mechanisms through which mother to child transmission can take place, 78 percent said that transmission during pregnancy was possible, only 46 percent said that transmission at delivery was possible, and 67 percent agreed that AIDS can be transmitted through breast milk. Females aged 15–19 are more likely to know all three modes of transmission than males aged 15–19. Persons aged 15–17 are more likely to know all three modes of transmission than persons aged 18–19. Slightly more than one in five persons aged 15–19 knew all three modes of transmission.

**ATTITUDES TO PERSONS LIVING WITH HIV/ADIS**

This survey also attempted to measure discriminatory attitudes towards people living with HIV/AIDS. The respondents were asked whether they agreed with two questions. The first asked whether a teacher who has the AIDS virus but is not sick should be allowed to continue teaching in school. The second question asked whether the respondent would buy food from a shopkeeper or food seller who the respondent knew to be infected with AIDS.

One fifth of the respondents believe that a teacher with HIV/AIDS should not be allowed to work. This percentage is higher with the persons aged 15–17 at 21 percent and lowest with persons aged 18–19 at 9 percent. Similar proportions of male and female respondents expressed this discriminatory attitude. Fifty percent of persons aged 15–19 years old would not buy food from a person infected with AIDS. See Figure 2. This measure shows a similar gender pattern as with the first question. Male and female respondents express a similar discriminatory attitude on this question. However, 68 percent of persons aged 15–17 and 18 percent of persons aged 18–19 express a similar discriminatory attitude on this question. Overall, 52 percent of respondents agree with at least one of the discriminatory statements. The proportions of male respondents and female respondents agreeing with at least one of the discriminatory statements is similar but 71 percent of persons aged 15–17 agree with at least one of the discriminatory statements compared with 18 percent of persons aged 18–19.
AIDS TESTING

Voluntary testing for AIDS is important as this allows persons to know their HIV Status and those infected could then seek counseling and treatment. Respondents were asked if they were ever tested for HIV, if they have been tested were they told the results and if they know of a place where HIV tests are done.

Figure 2: Percentage of persons aged 15-19 who express a discriminatory attitude towards people living with HIV/AIDS

- Would not buy food from a person with HIV/AIDS: 50%
- Believe that a teacher with HIV should not be allowed to work: 20%

Figure 3: Percentage of persons aged 15-19 who know a place to get tested for AIDS

Eighty five percent of respondents know a place to get tested for AIDS. See figure 3. Respondents aged 15-17 were more likely to know a place, compared to those aged 18-19.
Eighty two percent of males aged 15-19 years old know of a place to get tested compared to 88 percent of females aged 15-19 years old.

Twenty five percent of respondents have been tested for AIDS. This percentage is highest for respondents aged 18-19 at 32 percent, lowest for respondents aged 15-17 and males aged 15–19 at 21 percent and 28 percent for females aged 15–19.

The majority of respondents who have been tested were told the result (87 percent), however, there is some variation across gender. All males aged 15–19 who were tested were told their results while the corresponding results for females aged 15–19 was 78%. There was little variation across gender. Persons aged 15-17 are the least likely of any age group to have been tested and least likely to know the result

CONCLUSION

All respondents have heard of HIV/AIDS. Ninety percent of persons aged 15–19 know that AIDS can be transmitted from mother to child. Slightly more than one in five persons aged 15-19 years old knew all three modes of transmission - during pregnancy, at delivery or through breast milk.

This survey also attempted to measure discriminatory attitudes towards people living with HIV/AIDS. One fifth of the respondents believe that a teacher with HIV/AIDS should not be allowed to work and 50 percent of persons aged 15–19 would not buy food from a person infected with AIDS.

Eighty five percent of respondents know a place to get tested for AIDS, 25 percent of respondents have been tested for AIDS and 87 percent who have been tested were told the result.

This study collects data on respondent’s knowledge on three means of preventing HIV transmission – having on faithful uninfected partner, using a condom every time, and abstaining from sex. 42 percent of persons aged 15-19 knows all three ways. This study also collect data on respondents who can correctly identified all three misconceptions about HIV transmission – that HIV can be transmitted through supernatural means, that it can be transmitted through mosquito bites, and that a healthy looking person cannot be infected. Forty percent of persons aged 15-19 correctly identified these misconceptions. Finally, the percentage of persons aged 15-19 who have ‘sufficient knowledge’ of HIV/AIDS transmission’. These are respondents who know all three ways of preventing HIV transmission and correctly identified all three misconceptions. Only 22 percent of persons aged 15-19 had have ‘sufficient knowledge’ of HIV/AIDS transmission’. Given that Guyana has a teenage pregnancy rate of 97 per 1000 women, this is a source of concern.

All respondents have heard of HIV/AIDS. Ninety percent of persons aged 15–19 know that AIDS can be transmitted from mother to child. Slightly more than one in five persons aged 15–19 years old knew all three modes of transmission - during pregnancy, at delivery or through breast milk.
This survey also attempted to measure discriminatory attitudes towards people living with HIV/AIDS. One fifth of the respondents believe that a teacher with HIV/AIDS should not be allowed to work and 50 percent of persons aged 15–19 years old would not buy food from a person infected with AIDS.

REFERENCES


marital sex, and therefore at higher risk of contracting HIV/AIDS. According to NDHS 2008 report, 52.8% of females and 44.3% of males within 20-24 years age group have had premarital sex. This study equally found that 59.1% and 40.9% of males and females respectively in this age group have ever had sexual intercourse. In addition to this, it has been found that half of people who acquire HIV worldwide become infected before they turn 25 and that AIDS is the second most common cause of death among 20-24 years olds (Omoregie, 2002)

Majority (90.2%) of respondents to this study knew that HIV is the cause of HIV/AIDS, but their overall knowledge of HIV infection is not impressive as over half (54.4%) of them had poor knowledge of HIV/AIDS. This poor overall knowledge of HIV/AIDS is at variance with the result of a study by Durojaye O.C (2010) that found that 83 percent of undergraduates in Lagos had high level of knowledge of HIV/AIDS. Similarly, 40.9% and 47.0% of respondents had poor knowledge of the mode of transmission and method of preventing HIV infection respectively. These findings, though far from desired; showed a better level of knowledge compared to the progress report by UNAIDS/WHO in 2008 that found that only 17% of young females and 20% of young males have adequate knowledge of HIV infection. This improvement in knowledge is probably due to increasing sensitization of students through HIV/AIDS awareness programs, the activities of NGOs and also an increase in the level of HIV affiliation in Nigeria among others.

Further analysis of respondents’ knowledge of modes of transmission and methods of prevention of HIV infection showed that majority (85.8%) of them knew the commonest mode of HIV transmission i.e unprotected sexual intercourse with an HIV infected partner which account for about 80% of HIV infection in this country; fewer percentages however knew the other modes of transmission. It is alarming to note that almost half (47.6%) of respondents are not aware that HIV can be transmitted from an infected mother to her unborn child, 4.1% still have the wrong notion that HIV can be transmitted through mosquito bites while 2.4% believed that one can get infected through physical contact with an infected person.

In a similar fashion, most respondents agreed that abstinence from sex (60.5%), correct and consistent condom use (61.5%) and faithfulness in a sexual relationship (56.8%) are means of preventing HIV infection, however; about 7.8% of them erroneously believe that avoidance of physical contact with an infected person will discourage transmission of infection.

This wrong perception about HIV transmission and prevention put a big question mark on the effectiveness of AIDS enlightenment and prevention campaigns within these institutions of higher learning and therefore, emphasizes the need to reappraise these campaign programs in order to correct these wrong notions.

A statistical significant association was observed between participation in anti-HIV campaign program and respondents’ overall knowledge of HIV at p>0.01. This substantiates the fact that HIV campaign programs are strong determinant of respondents’ overall knowledge of HIV.

A vast majority of respondents (77.2% males and 61.9% females) are sexually experienced with alarming proportions having multiple sexual partners (52% of males and 31.3% of females). This high rate of sexual activity and keeping multiple sexual partners corroborated the findings of A.O Arowoju et al (2002) in their study among undergraduates in South West Nigeria that revealed that 87% of them were sexually active while 66% had more than one sexual partner. It is quite disheartening to note that appreciable proportions (42.2% of males and 37.3% of
females) of this sexually active sub-group did not use condom during their last sexual intercourse despite their good knowledge of condom being a method of HIV prevention.

The prevalence of males having had sexual intercourse and having multiple sexual partners compared with their female counterparts might be due to the influence of socio-cultural and gender norms that had already shaped the sexual behavior of these undergraduates from adolescence. Boys perceived social encouragement and pressure to be sexually active, while girls who have sex are labeled as having poor moral character.

A statistically significant proportion of these sexually active undergraduates however agreed that they have some risk of contracting HIV infection (P<0.01). The fact that significant proportions of respondents rate their risk of contracting HIV infection correctly indicates that obstacles abound leading to a gap in the risk assessment and corresponding uptake of HIV screening services.

In addition to above findings, a linear relationship was found between respondents’ age group and previous sexual experience; 84.4% of those above 24 years had had sex compared with 71% of those in 20-24 years and 47.8% of those in 15-19 years age group. This association was found to be statistically significant at p<0.01. This relationship concurs with the report of the national HIV/AIDS and Reproductive Health Survey conducted in 2003 which revealed that 84% of young people aged 20-24 years and 96.9% of persons within the age group 25-29 years were sexually active. The NDHS 2008 report equally stated that there were more young people in the 20-24 years age group had had premarital sex compared to those in the 15-19 years age group.

Despite the high level of sexual activity reported by these undergraduates, it is worrisome to note just a slight difference in the acceptability of HIV VCT between the sexually active and inactive groups, 51 percent of those that are sexually active and 47.7 percent of those that are not sexually active had had previous VCT. This is even more disheartening due to the fact that majority of the respondents knew that HIV can be transmitted through unprotected sexual intercourse. This relatively low uptake of VCT among sexually active respondents; despite their knowledge of the fact that sexual intercourse is a risk for contracting HIV infection might be as a result of their wrong believe of insusceptibility to HIV infection.

The low rate of condom use among these undergraduates is also a matter of concern, considering its dual protective ability. Condom is protective against sexually transmitted diseases such as HIV/AIDS and it also prevents unwanted pregnancy with its unwholesome consequences such as criminal abortion. Possible explanation for low condom use among Nigerian students includes misperception about, and unwarranted fears of condom.

Surprisingly, there is a relatively high acceptability of VCT among this group as half (50%) of them had had HIV test at least once; with a slightly higher acceptance among male respondents (51.2%) compared with their female counterparts (48.5%). This finding shows a better uptake than the findings of U.E Ezeoke (2009) that 29.9% of undergraduates of University of Nigeria, Enugu campus had had VCT. The proximity of both institutions to a ‘Heart-to- Heart’ centre where free HIV VCT services are provided might be responsible for the high uptake.

In spite of this relatively high acceptability of HIV voluntary counseling and testing, there exists a marked difference in the level of uptake of testing by respondents from the two
institutions studied. A higher proportion of respondents (72.9%) from Achievers’ University had been tested for HIV against 39 percent of respondents from Rufus Giwa Polytechnic. This remarkably high level of uptake of VCT among respondents from Achievers’ University is similar to the findings of Adekeye O.A (2010) which showed that 93% of respondents from Covenant University, Ota Ogun State, Nigeria, (also privately-owned); have had HIV VCT.

This relatively higher uptake of VCT among respondents of Achievers’ University possibly explain their better knowledge of the modes of transmission and methods of prevention of HIV infection compared to their counterparts from Rufus Giwa Polytechnic. A significant association was observed between respondents’ uptake of HIV counseling and testing and their knowledge of HIV infection at p=0.03, thus implying a positive effect of counseling and testing of respondents’ knowledge of HIV. In both institutions, 60.8 percent of those that had had previous HIV counseling and testing compared to 48 percent of those with no previous testing and counseling had good knowledge of HIV/AIDS.

The higher socioeconomic status of the parents of students of Achievers’ University giving them better access to information and health care services might be a factor responsible for their higher uptake of HIV testing compared to their counterparts from Rufus Giwa Polytechnic. Other socio-cultural factors that might account for the differential uptake of HIV testing by respondents from these institutions are not explored by this study. However, previous HIV/AIDS awareness programs in these institutions might equally be a relevant factor; 65 percent of respondents from Achievers’ University compared to 51 percent of those from Rufus Giwa Polytechnic participated in HIV/AIDS awareness programs in their respective institutions within twelve months preceding this study.

Respondents that had had VCT now practice faithfulness in a sexual relationship (33.8%), abstain from premarital sex (32.4%); and use condom consistently (14.9%). Faithfulness in a sexual relationship is of particular importance in this setting bearing in mind the increased risk of transmission of STDs including HIV/AIDS posed by transactional sex and high turnover of sexual partners among undergraduates.

The overall knowledge of respondents that had undergone VCT about its conduct is commendable, however; more than one-third (36.5%) of them do not know that a client can refuse the test after counseling. This information is important as counseling provides clients with necessary information that could lead to change in sexual behavior and thus limit the spread of HIV/AIDS and such counseling is not necessarily tied with testing. Equally; knowing that refusal of test is allowed even after a session of counseling may be enough encouragement especially for those that are so fearful of a positive test result to access VCT services.

More than half of respondents that are yet to have HIV VCT reported no intention to seek opportunity for testing and the most reported reasons why respondents are not willing test are fear of a positive test result (30.9%), not sexually active (24.7%), denial of risk (17.3%) and fear of stigma and discrimination (16%). A study conducted by Akande A. (1994) in Nigeria and Zimbabwe similarly revealed that a large proportion of undergraduates in both countries considered themselves as being not at risk for HIV/AIDS. Nonetheless, those that had at one time or the other thought of having HIV test done indicated lack of access to a screening facility (40.3%), inconvenient testing hours (32.8%) and lack of trust in health care workers (13.4%) as major hindrances to testing.
CONCLUSION

This study investigated the acceptability and factors hindering the uptake of HIV voluntary counseling and testing among undergraduates in Owo, Ondo State Nigeria. Despite the fact that the uptake of HIV counseling and testing is relatively high among this study group compared with reports from other studies, obstacles abound militating against uptake of HIV test. Lack of access to screening facilities, inconvenient testing hours; and lack of trust in health care workers constitute major hindrances to acceptance of HIV counseling and testing. Similarly, the negative attitude of the society which is often expressed by stigma and discrimination against a person infected with HIV is a strong factor that have discouraged a proportion of respondents from considering being tested for HIV.

A high proportion of respondents to this study are sexually active with alarming proportions having multiple sexual partners and not using condom consistently. In spite of the high level of risky sexual behaviors among these undergraduates, it is disheartening to note that most of the respondents that have never been tested for HIV reported no intention to have test done even in the nearest future. This low intention to test might attribute to the poor overall knowledge of HIV among these students. It is therefore pertinent that efforts be geared towards improving the knowledge of HIV among these undergraduates in order to encourage higher uptake of HIV VCT by them.

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42. WHO HIV operational research instrument.
ACTIVE TB CASE FINDING THROUGH HIV TESTING AND COUNSELING CENTERS IN ZIMBABWE

A Case Study by Stephano Gudukeya, Zimbabwe
(B.Sc. Medical Laboratory Sciences, MPH Student of Texila American University)
Email: sgudukeya@psi-zim.co.zw

INTRODUCTION

Zimbabwe is ranked 17th among the 22 high burden TB countries (HBC) in the world and has the second highest TB mortality rate in the world. Tuberculosis is one of the top 10 causes of infant and maternal mortality, and top five causes of death in children 1 – 4 years old (Zimbabwe National Health Profile, 2008). In 2008 pulmonary tuberculosis was the leading cause of death in the age group 5 years and above and the second most common cause of death in hospitals in all ages, after acute respiratory infection (National Health Profile). The crude death rate is 20 per 1000 and is mainly attributed to the high co-morbidity with HIV.

The single most significant contributing factor to the TB epidemic is the HIV and AIDS epidemic. In the 1980s, tuberculosis notifications had declined to such a level that TB had ceased to be a public health problem. The rise in HIV and AIDS cases preceded the rise in TB cases by about 6 years. TB remains the commonest cause of death among people living with HIV and AIDS (PLWHA). Although the HIV prevalence has declined from a high of 24.6% in 2003 to 13.7% in 2009, HIV continues to fuel the TB epidemic. According to the 2009 TB cohort analysis (WHO Global Report 2010), the proportion of all TB patients tested for HIV was 61% of whom 78% were HIV-infected. The proportion of HIV-positive TB patients on Cotrimoxazole prophylaxis is 79%, the proportion of HIV-positive TB patients on ART is 31%. Data is now easily available following the revision of the TB M&E tools to capture information on HIV.

The 2010 WHO Global TB Report indicates that in 2009 the country had an estimated incidence of 96,000 of all forms of TB (incident rate of 765/100,000 and case-detection rate of 46%). Using these estimates, the burden of all forms of TB disease has more than doubled from 329 cases/100,000 population in 1990. The WHO, as of 2010, no longer reports estimates of new smear positive TB cases which were last reported in the 2009 Global report 40,000 new smear positive cases were estimated for 2007 in Zimbabwe (298/100,000 and case detection rate of 27% in 2007).

As one of the 22 high-burden countries, the Zimbabwe Stop TB Strategy aims to detect and treat sputum smear positive cases, by providing comprehensive geographic coverage of DOTS. Only two regimens are used for treating TB (WHO category 1 and 2). Fixed-dose combination tablets (FDCs) were introduced in 2007. Direct observation of treatment, although strongly
recommended, is only practiced in very few settings. Although treatment of MDR/XDR-TB/XDR-TB is addressed in the NTP Manual (2007) and a clear policy for management exists, very few cases are currently receiving treatment for MDR tuberculosis in Zimbabwe.

The HIV epidemic has caused a dramatic increase in TB incidence starting in the early 90’s. The TB control strategy recommends that all TB patients be offered HIV counseling and testing with referral to HIV services and provision of ART as appropriate. Screening of HIV infected individuals for TB and use of prophylactic Cotrimoxazole is recommended in co-infected persons. IPT is not currently recommended due to constraints in TB diagnostics; however, the strategic plan suggests piloting this initiative when resources are available. Culture is not utilized to test smear-negative HIV-infected suspects. Currently, clinical algorithms are utilized to diagnose and treat smear-negative TB cases among HIV-infected persons. Although the TB and HIV units are co-located in the MoHCW, further strengthening of collaborative activities is required.

Population Services International, Zimbabwe (PSI/Z) operates a network of HIV Testing and Counseling centers branded New Start. Since their establishment in 1999, the centers have tested almost 3 million Zimbabweans, with a current HIV prevalence of about 12%. Starting 2004, and acknowledging the relationship between TB and HIV, PSI/Z introduced TB symptom screening in all its centers for all clients regardless of HIV status. Presumptive TB cases were referred to Public treatment facilities for diagnosis and treatment. Active follow-up of referrals was conducted.

In 2010, a snap survey of clients referred to a major referral center in Harare revealed the following information for 9,400 referred cases:

- Only 55% of the clients arrived at the referral center
- About 27% of the successful referrals were confirmed as TB cases and were started on treatment
- 23% of the TB cases were smear positive.

These findings revealed that while screening efforts at the HTC centers were yielding TB cases, there were missed opportunities because almost half of the referred presumptive TB cases were lost during referral. To tackle this, TB diagnostic services were supposed to be introduced within the HTC site. Because the majority of TB cases were found among HIV positive cases, ones that were likely to be smear negative because of reduced immunity, the newly introduced Polymerase Chain Reaction GeneXpert test had to be introduced to increase sensitivity of the TB testing services in this population.

Community awareness and participation in treatment programmes (CBTC) is recognized as an important part of the national TB strategy and PSI/Z has successfully developed and implemented a national TB/HIV campaign including Mass Media as well as interpersonal communications activities. Nevertheless, information on TB, especially TB and HIV co-infection is still lacking in most communities and TB patients often present very late for diagnosis. Participation of the private sector is limited to provision of DSM. NTP acknowledges that the private sector is an untapped resource that could provide a much greater contribution to the TB control in Zimbabwe.
KEYWORDS: TB, Testing, Counseling, HIV, AIDS

METHOD

The intensified TB case finding was implemented in the major urban areas and peri-urban areas of Harare, Bulawayo, Chitungwiza, Mutare and Masvingo. In these urban areas health services are provided by several city health clinics, which are operating under the local government. The city health clinics assist in the identification and referral of TB suspects to TB diagnostic centers, supervision and observation of treatment and follow-up of contacts and defaulters.

TB diagnostic laboratory services, using smear microscopy and chest X-Ray are available in all 5 urban areas. Nevertheless, access to TB diagnostic laboratory services is not uniform for all groups of the population, especially for those in the peri-urban areas, due to transport challenges, long distances and long waiting times at the clinics to access the services. The diagnostic services are often hampered by the availability of reagents and the lack of laboratory scientists to conduct smear microscopy. Overall, at this time, an estimated 30% of suspects are not offered smear microscopy for diagnosis in Zimbabwe.

All individuals accessing New Start HTC services were screened for TB symptoms using a standard questionnaire. Anyone with clinical symptoms of TB was asked to submit 2 sputum specimens, at least one hour apart. This was done to reduce the likelihood of clients submitting just one sample for diagnosis. LED fluorescence microscopy was used to test submitted specimens. Further, smear negative samples from HIV positive individuals were tested on the GeneXpert TB diagnostic platform.

TB awareness sessions were also conducted in the communities, targeting high-density areas, where people are likely to be poor and coinfected with TB and HIV. Awareness sessions covered topics like TB symptoms, how to prevent the spread of TB, what diagnostic services are available in the neighborhood how treatment is treated. Attendees with TB symptoms were also invited to submit sputum specimens for laboratory testing at the static site. Results were returned to the clients the following day.

TB outreach services were conducted in different settings, where the Most at risk populations are found. These included prisons, mines, returned migrants, sex workers and internally displaced communities. TB case finding was also done in the generally community as part of the HTC outreach services.

Because there are many diagnostic sites that have limited capacity and are unable to test all submitted samples, PSI allowed them to submit some samples for testing. The majority of such samples came from City Health Clinics in Bulawayo. After testing, results were returned to the referring clinic. Clinic staff was responsible for informing clients of their results and ensuring that they are started on treatment.

The NTP monitoring and Evaluation tools were used for the whole program. This made it easy for the program to provide progress reports to the NTP. In addition, program specific data reporting tools, allowing the disaggregation of clients by risk profile were developed and used.
The laboratory quality assurance system consisted of internal and external elements. The National TB Reference Laboratory visited the sites quarterly to perform blinded rechecking of the testing conducted. The Zimbabwe National Quality Assurance Programme (ZINQAP) distributed 10 blinded sputum microscopy slide panels quarterly. Testing known smear positive and smear negative cases with every batch to be stained was done, as part of internal quality control.

Patients identified as TB cases were referred for treatment at public clinics and hospitals, because TB treatment is controlled in Zimbabwe. Efforts were made to ensure that these clients reach the treatment center and are started on treatment. Follow-up of clients sometimes included home visits, when they didn’t return to pick their results and referral slips.

RESULTS

Between October 2011 and March 2013, a total of 242,239 individuals were screened for TB symptoms. A further 4,816 suspects were referred from different institutions that required assistance with laboratory testing. A total of 15,701 suspects were tested for TB using either smear microscopy or GeneXpert, yielding 1,390 bacteriologically confirmed TB cases. About 90% of the TB cases were successfully started on treatment within 5 days of diagnosis. Table 1 below gives the detailed description of the results.

<table>
<thead>
<tr>
<th>Process Indicators</th>
<th>Totals</th>
<th>Proportions</th>
<th>NNS*</th>
</tr>
</thead>
<tbody>
<tr>
<td>TB Case Finding: Community mobile outreach</td>
<td>Total screened for TB symptoms (urban &amp; peri-urban areas)</td>
<td>104,754</td>
<td></td>
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<tr>
<td></td>
<td>Total suspects identified (urban &amp; peri-urban areas)</td>
<td>4,587</td>
<td>4%</td>
</tr>
<tr>
<td></td>
<td>Total TB cases (SM+ and/or GeneXpert+) confirmed (urban &amp; peri-urban areas)</td>
<td>118</td>
<td>0.1%</td>
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<tr>
<td>TB Case Finding: HTC Static Sites</td>
<td>Total screened for TB symptoms (Static site)</td>
<td>133,446</td>
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<tr>
<td></td>
<td>Total suspects identified (Static site)</td>
<td>5,535</td>
<td>4%</td>
</tr>
<tr>
<td></td>
<td>Total TB cases (SM+ and/or GeneXpert+) confirmed (Static site)</td>
<td>596</td>
<td>0.4%</td>
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<td>TB Case Finding:</td>
<td>Total screened for TB symptoms through HTC mobile teams</td>
<td>4,039</td>
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Table 1: Summary of Outputs by Process Indicator
MARPS | Total suspects identified through HTC mobile teams | 763 | 19% |
<table>
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</thead>
<tbody>
<tr>
<td></td>
<td>Total TB cases (SM+ and/or GeneXpert+) confirmed through HTC mobile teams</td>
<td>40</td>
<td>1%</td>
</tr>
</tbody>
</table>

TB Case Finding: Among Referrals | Number of suspects referred from other facilities | 4,816 |
<table>
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<tbody>
<tr>
<td></td>
<td>Number of TB cases (SM+ and/or GeneXpert+) confirmed from referrals</td>
<td>636</td>
</tr>
</tbody>
</table>

Totals | Number of Suspects identified, all interventions | 15,701 |
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<tbody>
<tr>
<td></td>
<td>Number of TB cases (SM+ and/or GeneXpert+) confirmed</td>
<td>1,390</td>
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</tbody>
</table>

*NNS: number needed to screen, refers to the number of individuals screened for every TB case identified.

CONCLUSION

It is both feasible and beneficial to integrate HIV testing and TB laboratory diagnosis within client initiated HIV testing and Counseling centers. For community TB case finding to be effective however, careful targeting is required. The number needed to screen in the general community was 8 times more than that of the mobile and vulnerable population groups. Coupled with the fact that substantially more resources are needed to conduct TB case finding in the community compared to the most at risk populations, emphasis should be placed on the later populations. The number needed to screen at HTC centers to identify one TB case was double that of the most at risk population. This is very reasonable, considering that the TB diagnostic services will be riding on already existing infrastructure.

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ASSESSING FACTORS ASSOCIATED WITH CD4 CELL ABSOLUTE COUNT IN PATIENTS AT GULU REGIONAL REFERRAL HOSPITAL

A Case Study by Marc Sam Opollo, Uganda
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ABSTRACT

Background: This study is set to assess individual, enviromental and medication factors associated with Cd4 cell count in patients attending HIV/AIDS treatment and care clinic in Gulu Regional Referral Hospital. Gulu Regional referral hospital is located in the northern district of Gulu in Uganda. Gulu regional referal hospital performs CD4 cell counts to monitor HIV +ve patients.

Methodology: A cross sectional study, with study population of Gulu and target population being HIV +ve Patients attending HIV clinic in Gulu regional referral hospital. Systematic random sampling will be used. Questionaires will be administered to patients after informed consent.

Results: will be presented in Texts, Tables, Graphs.

KEYWORDS: CD4, Gulu, HIV infection, HIV, Cell Absolute Count

INTRODUCTION

1.0 BACKGROUND

Gulu Regional Referral Hospital (GRRH) is located in Gulu town, Gulu District in northern Uganda. Gulu has 4 hospitals: St mary’s hospital Lacor, Gulu Independent Hospital, 5th division military hospital and GRRH. GRRH is one of the 13 RRHs in Uganda which are mandated and eqiuped to perform specialised laboratory tests. GRRH has an Infectious Disease Clinic (IDC) which is for diagnosis and care of HIV/AIDS patients. Amongst other tests, GRRH laboratory performs CD4 cell counts for the monitoring of patient treament and cilinical staging of HIV infection.

HIV infection is known to reduce the CD4 cell counts but there are other factors like stress, nature of work, medication, diet, drug (alcohol) use and age which also influence the CD4 cell
count. CD4 cell count on the other hand influences the disease outcome in HIV infection. Some environmental factors may also modify the disease outcome during the low CD4 cell count status.

1.0 PROBLEM STATEMENT

Currently there is no documented evidence of factors associated with CD4 cell count in HIV positive patients attending IDC at GRRH.

STUDY QUESTIONS

1. What are the CD4 cell count sample statics (Mean, Range) of the HIV positive patients attending IDC at GRRH?
2. What are the individual factors associated with CD4 cell count in patients attending IDC in GRRH?
3. What are the medication factors associated with CD4 cell count in patients attending IDC in GRRH?
4. What are the environmental factors associated with CD4 cell count in patients attending IDC in GRRH?

1.2 GENERAL AND SPECIFIC OBJECTIVES

General Objectives: to assess the factors associated with CD4 absolute cell count in HIV positive patients attending IDC at GRRH.

Specific objectives: The purpose of this study id to:

1. Assess the CD4 cell absolute count (mean, range ) in HIV positive patients attending IDC at GRRH
2. Assess the individual factors associated with CD4 cell count in HIV positive patients attending IDC at GRRH
3. Assess the medication factors associated with CD4 cell count in patients attending IDC at GRRH
4. Assess the environmental factors associated with CD4 cell count in patients attending IDC at GRRH
5.

1.3 RATIONALE OF THE STUDY

There is no documented evidence of factors associated with CD4 cell count in HIV positive patients attending IDC at GRRH. It an assumption that HIV sero-status is the determinant but
other factors could be playing a role yet no one has done any work to prove yet. The findings of this study may give a recommendation for a larger study country wide. The data obtained from this study will also avail information which can inform policy and influence the HIV/AIDS care in GRRH and nationwide.

**METHODOLOGY**

2.1 **STUDY DESIGN**

This is a cross-sectional study which will utilise both qualitative and quantitative method of data collection.

2.2 **STUDY AREA**

The study area is going to be GRRH and the catchment areas.

2.3 **STUDY POPULATION**

The study population is going to HIV positive patients and the target group is going to be HIV positive patients who are attending IDC at GRRH.

2.4 **SAMPLING AND SAMPLE**

A sample size of 60 has been purposely selected due to the scope of the study and time limit. Sixty patients will be sampled from amongst those attending IDC at GRRH. A systematic random sampling will be done. Every 3rd patient will be enrolled in to the study. To determine which patient to start with, the last digit on a currency note serial number will be used.

2.5 **DATA COLLECTION AND MANAGEMENT**

Pre-tested semi-structured questionnaires will be used to collect data from the patients in a face to face interview. The results of the Blood samples collected for CD4 cell counts will be collected from the clinical laboratories registration book.
2.5.1 QUALITY ASSURANCE

All questionnaires will be checked for completeness. The research assistants will be trained before data collection begins.

2.5.2 DATA ANALYSIS

Datasheet will be prepared in EpiInfo. The data will entered in EpiInfo.cleaned. Data will then be exported to SPSS, cleaned and analysis will be done using SPSS version 17.0. Frequencies and odds ratios will be determined. The results will be presented in texts, graphs and tables.

2.6 ETHICAL ISSUES

A written informed consent will be sought from the patients before enrolling into the study. The participants will be informed of the purpose of the study, possible risks, confidentiality and the right to pull out any time they feel like without any loss. The data will be backed up and restricted from those who are not involved in the study.

2.7 LIMITATION OF THE STUDY

The study will consider only a limited number of patients because of the scope of the study and time. There is likely to be a selection bias because this data will represent those who come for care and treatment at GRRH but not Gulu town or district.

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ASSESSMENT OF KNOWLEDGE AND USE OF RAINWATER HARVESTING IN A RURAL COMMUNITY OF EDO STATE

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ABSTRACT

In areas of low rainfall or high altitude, rain water harvesting (RWH) becomes an important source of water supply for domestic use. The study assessed the practice of rain water harvesting in a rural community in Edo state Nigeria. Using a cross sectional study design, a pre-tested structured interviewer administered questionnaire was administered to selected households. A structured observational checklist was used for assessment of quality of rainwater harvesting system.

Data was analysed using SPSS version 20, results were presented as frequencies, with statistical test applied where appropriate. Ethical clearance was obtained from the Ethical review board of the Irrua Specialist Teaching Hospital, Irrua.

Findings show that RWH was practiced by over 80% of households, with the roof top as the catchment area. Stored water was most commonly used for personal hygiene purposes. RWH practice was found to be unsatisfactory in the majority of households. Health education should focus on informing households on appropriate design and maintenance of RWH systems.

KEYWORDS:- Rainwater Harvesting, Rural, Water supply, Health Education, Households

INTRODUCTION

1.1 BACKGROUND

Water is essential to man, animals and plants; without water, life on earth would not exist. An adequate supply of safe water is a prerequisite for the socio-economic development of a community. Good drinking water quality is also essential to the health and well-being of all people. Acceptable water quality occurs when there are no bacteria of faecal origin present that may cause human diarrhoea and other life-threatening diseases (e.g. typhoid fever), there is no levels of chemicals (e.g. heavy metals) or chemical substances that would cause harm to human health, and water does not have a bad taste or smell [1].
Rain water is a form of precipitation in which liquid water falls to the earth’s surface. It forms a major part of the hydrologic cycle in which water from the oceans evaporates, condenses into clouds and precipitates back to the earth and eventually returns to the ocean via streams and rivers, to repeat the cycle again. [2,3]. Rainwater can be harvesting using roof and other above ground catchments and stored in tanks for use.

Rainwater harvesting (RWH) is any human activity involving collection and storage of rainwater in some natural or artificial container either for immediate use or use before the onset of the next season for domestic, agricultural, industrial and environmental purposes [4-6]. The concept of RWH is both simple and ancient, and systems can vary from small and basic, such as the attachment of a water butt to a rainwater downspout, to large and complex, such as those that collect water from many hectares and serve large numbers of people [7].

Rainwater harvesting technology involves three basic stages, namely; catchment areas (rooftops and land surfaces), conveyance systems (plastic or corrugated iron gutters) and collection devices (storage tanks).

In rural areas, the most common technique is small-scale rooftop rainwater harvesting [8]. The quality of rainwater is directly related to the cleanliness of catchment gutters and storage tanks. In certain areas, roof rainwater is usually of good quality and does not require treatment before consumption. Rooftop catchment of rainwater can provide good quality water, clean enough for drinking, as long as the rooftop is clean, impervious, and made from non toxic materials [9]. In other areas, rooftop catchment surfaces collect dust, organic matter leaves and bird droppings, which can contaminate the stored water and cause sediment build up in the tank.

Sometimes, materials or coatings of the storage tank may cause adverse taste or odour, and some metals can dissolve to give high concentrations in water [10]. Research has shown that the initial first flush of runoff is more polluted than subsequent flows and that the concentration of contaminants associated with a given rainfall event tend to reduce exponentially with time. Therefore, diverting the initial portion of runoff generated by a storm away from the storage device will mean that the quality of water entering storage is improved and the need for subsequent treatment reduced or even eliminated altogether [9,10]. Where automatic diverters to prevent the first 20-25 liters of runoff from being collected in the storage are not available, detachable down-pipe can be used manually.

Storages need to be protected with covers to discourage mosquito breeding and algal growth. Cracks in the wall and withdrawal of water using contaminated pots can contaminate stored water. Mechanisms such as taps or outlet pipes that enable hygienic abstraction of water are preferred. Cartridge filters or other treatment at the point of consumption may be installed to ensure better quality of drinking water and reduce health risks [10].

Household rainfall catchment systems are appropriate in areas with an average rainfall greater than 200mm per year, and no other accessible water sources. Rainwater harvesting in urban areas can provide supplemental water for the city’s requirements, to increase soil moisture levels for urban greenery, to increase the ground water table through artificial recharge, to mitigate urban
flooding and to improve the quality of groundwater. [11,12]. In urban areas of the developed world, at a household level, harvested rainwater can be used for flushing toilets and washing laundry. Indeed in hard water areas it is superior to mains water for this. It can also be used for showering or bathing. It may require treatment prior to use for drinking. As rainwater may be contaminated, it is often not considered suitable for drinking without treatment [1,12].

1.2 STATEMENT OF THE PROBLEM

One reason safe drinking water is of paramount concern is that 75% of all diseases in developing countries arise from polluted drinking water [13]. Each day some 25,000 people are said to die from their every day use of contaminated water. Millions more suffer from frequent and devastating water borne illnesses. [14]. About half of the people that live in developing countries do not have access to safe drinking water and 73% have no sanitation, some of their wastes eventually contaminate their drinking water supply leading to a high level of suffering. The provision of water for domestic and other uses in rural and urban centers is one of the most intractable problems in Nigeria today [15] and fifty two percent (52%) of Nigerians have no access to improved drinking water supply [16].

As much as one-tenth of the global disease burden could be prevented by improving water supply, sanitation, hygiene and management of water resources. Such improvements reduce child mortality and improve health and nutritional status in a sustainable way [17]. The absence of public water system in the rural areas and the inability of water facilities to function effectively in the towns and cities of Nigeria have made it impossible for most of her population to have access to portable water [15].

Water scarcity in many countries places considerable strain on communities which rely directly on rainfall to sustain their livelihoods. Irregularity in timing and distribution of rainfall may leave many communities without access to water for even the most basic daily requirements. Projected changes in climate in the future may result in even greater irregularities in the availability of water for daily use. [18].

Nigeria is endowed with enormous surface and groundwater resources, yet the provision of potable and safe water supply is still inadequate.[19] The Millennium Development Goals (MDGs) of halving by 2015 the proportion of people without sustainable access to adequate and affordable safe drinking water will be hard to achieve due to low levels of existing coverage, but this will become almost impossible if sustainability levels cannot be improved.[19]

Apart from air, and dietary intake, drinking water plays an important role in the bodily intake of trace elements. The concern that trace elements in drinking water presents potential health hazard if they are present in higher than recommended concentrations prompted several regulatory bodies like WHO, to establish maximum allowable concentrations for these elements in drinking water supplies [20,21]. Despite the seeming intractable problem of water scarcity in Nigeria, the high neonatal and childhood moratlity of which diarrheal disease accounts for as much as 28%, and the common practice of RWH, particularly in Edo state, there is little attention paid to the assessment of the state of RWH systems.
LITERATURE REVIEW

The increasing demand of growing populations on water, coupled with expanding industrialization and lack of political commitment by government in the provision of urban water supply works has left many urban centres facing water supply shortages. The implementation of rainwater harvesting on domestic allotments has emerged as a viable solution to these supply crises, with potential to decrease demand on municipal supplies, mitigate storm water discharge and reduce infrastructure costs for new housing developments.

2.1 BRIEF HISTORY OF RWH

Rainwater collection is one of the oldest means of collecting water for domestic purposes. In India, simple stone-rubble structures for impounding rainwater date back to the third millennium BC [22]. It was also a common technique throughout the Mediterranean and Middle East. Water collected from roofs and other hard surfaces was stored in underground reservoirs (cisterns) with masonry domes. In Western Europe, the Americas and Australia, rainwater was often the primary water source for drinking water. In all three continents it continues to be an important water source for isolated homesteads and farms [23].

Rainwater harvesting is practiced worldwide. It is estimated that approximately 40% of households in South Australia use rainwater to supplement the supply of drinking water, as is done in several regions such as South-East Asia. In Malaysia, for example, rainwater is also used for commercial purposes including car washing via the placement of plastic collection tanks in places like parking lots [21,23]. Indeed interest in rainwater harvesting grew rapidly over the last two decades. It is of particular importance and relevance for arid and semi-arid lands, small coral and volcanic islands, and remote and scattered human settlements. The increased interest has been facilitated by a number of external factors, including:

1. the shift towards more community-based approaches and technologies which emphasize participation, ownership and sustainability;
2. the increased use of small-scale water supply for productive and economic purposes (livelihoods approach);
3. the decrease in the quality and quantity of ground- and surface water;
4. the inability of governments particularly in developing countries to provide sustainable pipe borne water supplies
5. the flexibility and adaptability of rainwater harvesting technology;
6. the replacement of traditional roofing (thatch) with impervious materials (e.g. tiles and corrugated iron);
7. the increased availability of low-cost tanks (e.g. made of ferro-cement or plastics) [23].

Rainwater harvesting can be categorized according to the type of catchment surface used, and by implication the scale of activity (Fig 1)
2.2 PRACTICE OF RWH

Rain water provides adequate sources of water for rural communities especially in rainy seasons. A study conducted of rain water harvesting activities in Matara and Badulla district, Sri Lanka, reported that households used rain water for 65% of their water demand and only 33% fetched from other water sources. As a result there was a reduction in more than 50% water collected from dug wells. In another region of Sri Lanka, Dematawelihinna, less than 10% of the rain water users used it for drinking purposes. Most reason for not drinking rain water was found to be the perception of water quality. Lacks first flush or filters in these system thought to be contributing to low confidence in water quality [24]. A study conducted in Badulla district Sri Lanka revealed that rain water harvesting increased the water consumption and water security in the household as much as 80% during the wet season [25]. A study conducted in 2005 in Inginimitiya in Kurunegala district recorded that majority (95%) of the households used water from the rain water tank for drinking, while 91% used it also for cooking [26]. Another survey conducted in the Southern Province on tsunami resettlement areas in Sri Lanka, showed that more than 80% of the households use the rain water for drinking purposes [27].

2.3 QUALITY OF WATER FROM RWH

Rainwater is relatively free from impurities except those picked up by rain from the atmosphere, but the quality of rainwater may deteriorate during harvesting, storage and household use. Wind-blown dirt, leaves, faecal droppings from birds and animals, insects and contaminated litter on the catchment areas can be sources of contamination of rainwater, leading to health risks from the consumption of contaminated water from storage tanks. Poor hygiene in storing water in and abstracting water from tanks or at the point of use can also represent a health concern and should be minimized by good design and practice. Well designed rainwater harvesting systems with clean catchments and storage tanks supported by good hygiene at point of use can offer drinking-water with very low health risk, whereas a poorly designed and managed system can pose high health risks. Microbial contamination of collected rainwater
indicated by E. coli (or, alternatively, thermotolerants coliforms) is quite common, particularly in samples collected shortly after rainfall. Pathogens such as Cryptosporidium, Giardia, Campylobacter, Vibrio, Salmonella, Shigella and Pseudomonas have also been detected in rainwater. However, the occurrence of pathogens is generally lower in rainwater than in unprotected surface waters, and the presence of non-bacterial pathogens, in particular, can be minimized. Higher microbial concentrations are generally found in the first flush of rainwater, and the level of contamination reduces as the rain continues. Storage tanks can present breeding sites for mosquitoes, including species that transmit dengue virus [23,24].

METHODOLOGY

2.1 STUDY AREA

The study was carried out in Usugbenu. Located in Esan Central local government area, Edo state, in the South-south geopolitical region of Nigeria. Located between Latitude 60 451N and Longitude 60 081E, the area has Mean annual rainfall of 1500mm and mean temperature range of 27°C to 35°C. The community is made up of 10 quarters or hamlets. Inhabitants are mainly Esan in origin, predominantly peasant farmers and petty traders. Geographically, the community is upland, with soil mainly laterite, but fertile for farming.

2.2 STUDY DESIGN

A descriptive cross sectional study design was utilized for the study.

2.3 STUDY POPULATION

Study population comprised households within the community. Household head or any adult within the household aged over 18 years and who meet the inclusion criteria were invited to participate. Inclusion criteria is: living in the community for not less than one year, as this was enough time to have built a water harvesting system and used it for water supply considering the two seasons prevalent in the community. Consenting. Exclusion criteria is household with no adult present at the time of the study, non-consenting.

2.4 SAMPLE SIZE CALCULATION

Sample size was calculated using the formula for prevalence study with z as 95%, p set as 84% being the prevalence of people who were aware of sources of rainwater contamination in a study carried out in Uganda [28], non-response rate of 10%. Sample size was calculated as 232.

2.5 SAMPLING TECHNIQUE

Multi stage sampling technique was used for sample selection. The community was desegregated into quarters and 50% of the quarters selected. In each selected quarter, a count of the number of houses was undertaken, and proportionate allocation used to
determine the number of houses required from each cluster. Using a count of the number of streets/roads in the cluster, an estimate of the average number of houses per street was obtained, and the number of houses required for participation per street calculated. Random sampling was used to select houses in each street. In all selected houses, the head of household or in his/her absence, an adult who meets the inclusion criteria was invited to participate.

2.6 RESEARCH ASSISTANTS

Research assistants included final year medical students of the Ambrose Ali University, on posting in the Department of Community Health. They were trained for one-day on questionnaire administration to enable uniformity in data collection.

2.7 DATA COLLECTION METHOD

Data was collected using quantitative data collection tools: a survey questionnaire, checklist and bacteriological assessment of water quality.

- The survey questionnaire focused on demographic characteristics of the respondents, practice of RWH, knowledge of water related disease and perceptions of water quality.

- The checklist provided a tool for assessing the state of the reservoir.

- Assessment of physical and bacteriological quality of water provided an objective assessment of the physical quality of the water, bacterial type and load. For Water quality assessment, water samples will be collected from 15% of survey households, selected through random sampling. For all reservoirs, water sampling was done using guidelines of the World Health Organization for the quality of drinking water in a sterile container provided by the Public health laboratory of the Edo state Ministry of Health, Benin. Every bottle were marked with an identification number corresponding to the questionnaire number and submitted for analysis within 4 hours of collection. The Microbiological quality of the water was assessed quantitatively through the enumeration of colony forming units (CFU) of Escherichia Coli, which was used as an indicator for faecal contamination [9,12]. Samples with 0 coliforms /100mls will be graded as excellent, 1-10 coliforms /100mls acceptable, and 10 coliforms/100mls as polluted.

2.8 PRETESTING OF THE DATA COLLECTION TOOL

The survey questionnaires was pretested amongst 20 households in a neighboring community for validity.
2.9 DATA ANALYSIS

The completed questionnaires were screened for completeness, coded and entered by the researcher into the Statistical package for scientific solutions (SPSS) version 17.0 software for analysis. Discrete data were presented as proportions (percentages) while continuous variables such as age were expressed as means ± standard deviation. Where continuous data was skewed, median values were stated as well. Statistical analysis of difference between proportions were carried out using of chi-square test. Statistical significance was set at p<0.05 for all values of the chi square test.

2.10 ETHICAL CONSIDERATION

Ethical clearance to conduct this research was obtained from the Irrua Specialist Teaching Hospital Ethics Committee. Permission to conduct this study was sought from the Traditional ruler and Council of chiefs in the Local Government Area. Informed consent was obtained from each respondent before the conduct of interviews after adequate information must have been given to the respondents by the interviewers. Confidentiality and privacy was respected during the course of interview. To ensure confidentiality, households were identified by alphabets, and for respondent’s, serial numbers were used rather than name. Respondents were informed that there was no penalties or loss of benefit for refusal to participate in the study or withdrawal from it. There will be no risk of harm or injury to the participants during or after the study is conducted. All data were kept secure and made available only to the researcher. At the end of the study, the researcher, in collaboration with the Public Health department of the Irrua Specialist Teaching Hospital, gave health talks to participating families.

RESULTS

The result is presented under the following sub-headings:
- Socio-demographic characteristics
- Assessment of RWH practice
- Knowledge of water borne disease
- Perceptions of water quality
- On-the-spot assessment of RWH system

DISCUSSION AND CONCLUSION

The study was carried out to assess the practice of RWH in a rural community in Edo state. The large number of households who tap and store rain water for use has been reported not only in the country, but in other parts of the world, especially where rain fall is limited, and ground water is deep below the surface.

The study showed that rain water was harvested primarily from rooftops. In Brazil, Argentina and Paraguay, RWH is done using surface water collected into cisterns or surface ponds. For quality reasons rainwater for human consumption is preferably collected from roofs. The use of runoff from non-roof tops, often described as the livelihood approach, promotes the use of runoff water for productive purposes, such as small scale irrigation for domestic food production, watering small stock, watering tree nurseries, brick-
making etc. For these purposes, the quality of runoff water harvested from other surfaces, such as a slope, does not create a problem. The runoff is stored in ponds or small underground storage tanks [23].

Rain water is considered the purest form of water, except where environmental pollutants reduce water quality. Where roof tops are rusty and covered with dirt, rain water collected from roof tops may have higher chemical contents than otherwise.

Most of the rooftops in the present study were of corrugated iron sheets, subject to rust, and the overhanging vegetation observed in over one-third of houses, has the disadvantage that pollution of water from dead leaves and bird droppings can make the water unsafe for drinking in its untreated state.

The greater proportion of reservoirs that were built with cement and partly submerged in the ground was noted in the study site. Above ground storage makes access to and maintenance of the tank easier. Advantages of below-ground tanks include structural support of the soil, temperature moderation and protection from vandalism. However, it is more difficult to detect and repair leaks in these storage containers. Expansion and contraction of soil, particularly clay-rich soils, can lead to cracking, leaking and structural damage if proper reinforcement of the tank is not present.[29] Another benefit of surface tanks over sun-surface ones, which are partly or completely underground, is that water can be easily extracted through a tap just above the tank’s base [5].

The common practice of washing gutters and reservoirs yearly, was also documented in a study carried out in South Australia [30], and which is in contrast to the three to four monthly interval recommended [31]. Rainwater users can reduce their risks of disease from contaminated rainwater consumption by regular maintenance. [31]

The average length of time reservoirs had been in use was similar to what was reported in South Australia [30]. The importance of this finding is that increase in family size or activity may warrant the addition of more reservoirs to cope with increasing water demand. Also, the use of a particular reservoir for long periods will require that attention is paid to the maintenance of the reservoir to prevent it from being an additional source of hazard to users.

Gutters were predominantly made from metal, as was reported in a previous study in Mkpata community, Swaziland [32]. Gutters are generally made of metal or plastic, and have also been constructed from bamboos sticks and wood [23].

The use of first flush diverters, leaf control devices on reservoirs and leaf control screen on gutters by less than 20% of households is lower than what was reported in South Australia, where it was found to be 30.8% households, 57.2%, and 25.5% respectively [30]. Research has shown that the initial ‘first flush’ of runoff is more polluted than subsequent flows and that the concentration of contaminants associated with a given rainfall event tend to reduce exponentially with time. Therefore, diverting the initial portion of runoff generated by a storm away from the storage device will mean that the quality of water entering storage is improved.
and the need for subsequent treatment reduced or even eliminated altogether.[31,32] The absence of gutter screens and first flush systems in the study area, implies that first rains are not diverted, and go on to contaminate reservoir water. Studies have often shown deficiencies in the use of rainwater catchment systems and components cited include: lack of maintenance; inadequate disinfection of the water; poorly designed delivery systems and storage tanks; and, failure to adopt physical measures to safeguard the water against microbiological contamination [31]. It is important that health educators ensure that households understand the use and see the need to incorporate these devices during construction of RWH systems in their homes.

Harvested rain water was used for drinking by about 76% of households, similar to what was reported in a previous study carried out in Sri Lanka [27]. This figure is a far cry from the value of 30% observed in a study carried out in Ethiopia [12]. Slightly above half of all households surveyed claimed to treat the drinking water, most commonly with water guard. Made of chlorine compounds, water guard is easily obtained from local chemist, can be applied with no adverse health effects, and when compared to boiling of water, more cost effective. Boiling was the more common method for water treatment in a study carried out in 9 provinces in Sri Lanka [33].

On the contrary, a study carried out in three villages in Paikgacha Thana, Khulna in Bangladesh found as much as 66% of households drinking water from RWH systems without any form of treatment [34]. While it is most imperative to treat rain water from tanks particularly in a developing country like Nigeria, where pollutant in atmospheric air readily contaminate rain water, it is also important to note that the quality of rainwater is ensured by a natural treatment chain in the tank. This system reduces the presence of bacterial and metal contaminants. Bacteria, organics and chemicals form flocs that become biofilms on surfaces or settle to the bottom of the tanks to form sludge. The processes of flocculation, settlement and biofilms in tanks act to improve the quality of rainwater. [31]

Personal hygiene was the most common use of harvested rain water among households studies. This is similar to what was observed in Kaduna, in the northern part of the country [15]. During dry seasons, some families supplemented harvested water with water from stream, contrary to what was reported in Kaduna [15], where the hand dug well was more popular.

Rain water harvesting in the study site was found to be the main source of water for household use during rainy season, with some turning to alternative sources during dry season. This was similarly observed in Trinidad, [35]. The latter study also found respondents satisfied with quality of harvested water, as was also observed in the present study where complaints of water having smell, taste or color were minimal.

The poor knowledge of water borne disease noted among respondents in the present study is worrisome, as should stir up active campaigns by health workers . Little wonder that diarrheal disease may be ascribed to other causes such as eating sweet items, instead of polluted water.
The finding of better managed RWH systems among female headed households and singles is not surprising, as women are generally more interested in the health and safety of their families, and pay closer attention to matters of sanitation and hygiene. The better practice among Christians may be as a result of the Christians to be more in a monogamous relationship, with closer family ties and attention to health of family members.

Most respondents reported that there had never been any inspection of their RWH system. This situation is unfortunate, as government health departments are meant to be fore-runners in the protection of health and drinking water quality through inspection and supervision of constructed domestic RWH systems. Similar reports have been documented in Uganda, where about 61.5% of households had had not been visited by health or project officers from non-profit health education programmes since installation of water storage system [36]. Very few households had ever checked their water for chemical or microbiological contamination. Individuals could also be encouraged to subject collected rain water to laboratory investigation.

The low microbial content of the water observed may be due to the fact that the study was done during the rainy season, so much of the dirt may have been washed off with the first rains.

CONCLUSION

The study shows gaps in the implementation of RWH in this community, a factor that can increase pollution of water and spread disease. Aggressive health education is required to give instruction as to the standard design for a RWH system, and motivate the people to comply. Advocacy to local leaders may help in this regard. Government should play an active role in addressing the gaps observed in the installation of RWH systems to prevent disease outbreaks.

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CAN ENVIRONMENT CONTROL MEASURE AND LABORATORY DIAGNOSTIC TECHNIQUE BE USED TO CONTROL THE SPREAD OF SALMONELLA INFECTION

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INTRODUCTION

Salmonella infection is the one of the most common foodborne diseases in the world and is caused by a bacterial infection. There are many serotypes of Salmonella bacteria which may cause salmonellosis in animals and human. The two most commonly found types of Salmonella are S. typhimurium and S. enteritidis, however, the frequency of Salmonella serotypes varies between countries. 1 Approximately 40,000 cases of salmonellosis are reported annually in the U.S., 400 of these end in death, often as a result of dehydration from chronic diarrhea. 1 It is also estimated that the actual number may be at least 30 times the number reported by the CDC since milder cases of salmonella are not diagnosed or reported.1 Any person can contract salmonellosis, however, it is most often found in children below the age of ten years old. Those with impaired immune systems such as young children and old adults, as well as people with illnesses are most likely to have severe infections.

Additionally, people with AIDS are especially vulnerable, not only suffering from the most severe infections but also from episodes that are likely to recur. In the last decade salmonella infections have been shown to be decreasing in the United States, however, some types are still increasing. Although this disease can be found across the world, cases occurring in North America and Europe are most often reported by health experts. 2 A number of Salmonella serotypes have developed resistance to several antibiotics most often used in salmonella treatment, this presents a potentially serious public health threat.1

The purpose of this review is to examine the effectiveness of environmental control measures and laboratory diagnostic techniques in controlling the spread of salmonella worldwide. This is an important question to address because of the high frequency of infections of salmonella globally as well as the nature and vulnerability of the populations most at risk. This literature review format is appropriate in answering this question because it deals with the comparative evidence of antimicrobial resistance from different points of transmission and geographical locations and will address factors that promote progress in salmonella treatment and may provide insight into preventive actions that can be employed.
KEYWORDS: Salmonella infection, Foodborne disease, Salmonellosis, Laboratory diagnostic technique

TRANSMISSION

Food products such as eggs, meat, and poultry and sometimes unwashed fruit are common places where the Salmonella bacteria can be found. Surfaces used to prepare food can become cross-contaminated with Salmonella bacteria when they come in contact raw meat and poultry products. The Centers for the Disease Control and Prevention (CDC) has also recently reported cases of salmonella infection occurring after consumption of raw alfalfa sprouts grown in contaminated soil. Salmonella can also be contracted from pets, particularly reptiles. Salmonella can become a chronic infection even if the patient does not have visible symptoms. In addition, though no symptoms may be present, the disease can still be spread by failure to wash hands properly before preparing food for others. Health experts recommend that persons infected with Salmonella should not handle or prepare food or water for others until laboratory tests confirm that the Salmonella bacteria is no longer present.

SYMPTOMS

Salmonella may include a range of symptoms including diarrhea, fever, abdominal cramps, and headache. Sometimes there are additional symptoms associated with Salmonella which may last up to 7-9 days these may also include, dramatic appetite loss, vomiting, and possible nausea. More severe symptoms will occur in individuals with compromised or weak immune symptoms such as the elderly, young children, and individuals with chronic conditions such as diabetes or HIV.

REITER'S SYNDROME

Persons infected with salmonella will normally recover however in a few individuals a chronic condition known as Reiter’s syndrome may develop. Reiter’s Syndrome can last for years and may lead to the individual developing arthritis. Symptoms include joint pains irritable eyes and painful urination. Inadequate treatment of salmonella can result in the organism spreading to other organ of the body and may eventually lead to death.

TYPHOID FEVER

Salmonella typhi bacteria is the causative agent for typhoid fever. This can be fatal if left untreated and it is of particular importance in developing countries. Approximately 21.5 million persons are affected by typhoid each year. This is mainly due to the consumption of contaminated water. The Centers for Disease Control and Prevention (CDC) has indicated that
approximately 400 cases occur annually in the United States, of this 75 percent are acquired through international travel.

DIAGNOSIS

Healthcare provider use lab tests that identify Salmonella in human body fluids and stool. Salmonella can also be isolated from food and water sources. A medical history and a physical examination performed by a physician are required to make a diagnosis for Salmonellosis. The physician does this by first asking questions about the patient’s symptoms, recently consumed foods, as well as work and home environments. The diagnosis is confirmed using laboratory tests on human and food samples.

TREATMENT

In most cases salmonella leaves the body on its own as a result of the work of the immune system within five to seven days and further treatment will not be necessary, however, if the patient has symptoms which include severe diarrhea then intravenous fluids are required. People who have been treated with oral antibiotics and younger people tend to carry the bacteria longer than others which may last up to several months. If the disease spreads from the intestines of the patient into the bloodstream, then the healthcare provider should be able to treat it with antibiotics. Many Salmonella serotypes have developed resistance to several antibiotics normally used to treat people with salmonella disease, this may a become potential public health threat.1

OVERVIEW OF RESEARCH STUDIES

METHODOLOGY

A total of ten journal articles, two books and 4 web based articles were reviewed with regards to the issue of Laboratory diagnosis, antimicrobial susceptibility, environmental control and prevention of Salmonella that causes food borne diseases and typhoid fever. The research studies chosen for this literature review focused on the impact of salmonella bacteria in both food-borne disease and typhoid and also investigations of antimicrobial resistance of salmonella. Textbooks covering the subject area as well as journals from National Centre for Biotechnology Information (Pubmed database), Pubmed Central, JSTOR, Proquest, Highwire and EBSCO were the main sources of electronic literature research. In addition web based articles from the Center for Disease Control (CDC) and New South Wales (NSW) proved useful for the review. The literature selected for review were based on current publications no older than 10 years, with the majority chosen from between and including 2005 to 2013.

LABORATORY DIAGNOSIS AND ANTIMICROBIAL RESISTANCE TESTING

Salmonella can be isolated from several sources or sites. The salmonella organism can be found in food such as eggs poultry and meats and also from human specimen blood, feces and...
urine Salmonella is a gram negative rod bacteria and is divided into three subgenera and consists of several hundred different serotypes. These serotypes are differentiated based on their antigenic make-up. A limited number of sera can be used to serotype the organism. 

In order to isolate salmonella blood is taken from persons with a febrile disease. Approximately 10 mls of blood is placed in a 90-100 ml of bile broth and incubated at 35°C. The incubation period last up to 14 days before a negative sample is reported. For persons who are being investigated for Salmonella typhoid the samples should be taken during the first or second week of onset. If the samples are negative then repeat samples should be taken in the second week of onset. Blood cultures from the same patient will show positive results before the organism is picked up in the stool. Antimicrobial testing can be done using several different techniques

1. Tube dilution method – The organism’s susceptibility (ability to grow in varying concentrations of antibiotic prepared using serial dilutions is tested

2. Agar plate dilution method – The antibiotic is incorporated into solid agar in varying concentrations and the organism’s susceptibility is examined. The point at which no growth occurs is determined as the minimum inhibitory concentration level

3. Standardized Disc – Agar Diffusion method – Filter discs are impregnated with antimicrobial agents and placed on agar plates that have been inoculated with bacterium. The size of the diameter of the zone of no growth around the disc will determine if the organism is susceptible

A comprehensive look at 5 articles reviewed for Antimicrobial Resistance of Salmonella illustrates a trend of increasing antimicrobial resistance exhibited by various strains of salmonella over the last decade. These increased levels of resistance come from salmonella isolated from various points of transmission which include, animal-human, food-human and human-human. One study specifically identifies a recent increase in the level of resistance in salmonella to the drug ciprofloxacin.

A similar trend was observed for animal isolates, in regards to resistance to ceftriaxone particularly from salmonella in cattle which had increased from 0% in 1997 to 21.6% in 2003 and then leveled-off according to the study. The results of one study shows that there is a variation among resistance patterns of organisms isolated from humans and animals. In organisms isolated from humans the average resistance to tetracycline was 16.9% and from animals, 34.9%, and in particular the average resistance for turkey and swine was greater than 50%. The resistance patterns for Sulfamethoxazole/sulfisoxazole isolated from humans was 15.3% and for animals, 19.9% Streptomycin resistance was 14.4% in humans and 26.3% in animals. Ampicillin and resistance chloramphenicol was 14.3% and 8.8% and 16.0% and 7.3% for animals respectively. The resistance for gentamicin was 2.1% in humans and 6.5% in animals however, this drug is not usually used to treat human infections in the U.S. Levels of resistance to gentamicin was detected at 2.1% in isolates from humans and 6.5% from animals.

In another study conducted from a farm in Kentucky a stratified random collection of 1,888 samples was gathered between 2009 to 2011 from cattle, camels, poultry, fish, vegetables, and humans. The Salmonella isolates obtained were then serotyped and tested for antimicrobial susceptibility by MIC determinations. 149 isolates representing 17 serotypes were isolated with
(7.9% prevalence). The overall antimicrobial resistance was low, however S. Enteritidis and S. Eko revealed much variability in its antimicrobial resistance patterns as well as 7 out of the 17 tested antimicrobials from S. Kentucky for ciprofloxacin and nalidixic acid susceptibility. There were 3 isolates that showed decreased resistance. The S. Hadar isolates revealed reduced susceptibility to ciprofloxacin and susceptibility to nalidixic acid and harbored the plasmid-mediated quinolone resistance gene qnrS1.4

In a study done from 2000-2011 in France 1% of all Salmonella strains were identified as S. Kentucky, the same study conducted in Morocco had 30 of 226 of isolates from soil samples belonging to S. Kentucky. Results reveal an increase in the resistance to the antimicrobial drug ciprofloxacin in France and 40% of isolates from S. Kentucky obtained had a resistance in 2000-2008, which later rose to (83%) or 376 of 489 had a resistance in 2009-2011.

There is also evidence of lateral gene transfer among Salmonella strains and other bacteria species which also plays a major role in the increase of antimicrobial resistance in Salmonella serotypes such as S. Kentucky to antimicrobial drugs and medicine. The history and originations obtained from the study suggested that S. Kentucky infections originated predominantly in east Africa, North Africa, West Africa, the Middle East, and India. β-lactamase (CTX-M-1, CTX-M-15), plasmid-encoded cephalosporinase (CMY-2), or carbapenemase (OXA-48, VIM-2) genes by ciprofloxacin-resistant isolates of S Kentucky ST198-X1 from the Mediterranean area since 2009.3

In another study done in Japan a total of 82 Salmonella isolations from food animals were tested for antimicrobial susceptibility. Resistance was shown to a variety of antimicrobial drugs used to combat various strains of Salmonella these include: ampicillin, dihydrostreptomycin, kanamycin, oxytetracycline, chloramphenicol, bicozamycin, nalidixic acid, oxolinic acid and trimethoprim. Salmonella Dublin demonstrated high levels of resistance particularly to older quinolones. There was also one strain, Salmonella Choleraesuis, isolated from pigs which showed resistance to Fluoroquinolone, this was the first ever incidence of Fluoroquinolone resistant salmonella reported Japanese which implies that the is a recently developed strain of Salmonella.

Most Salmonella Typhimurium isolates showed resistance to ampicillin, chloramphenicol, dihydrostreptomycin and oxytetracycline. S. Typhimurium DT104 accounted for 40.7% of S. Typhimurium isolates and was more often multi-drug resistant. There were also Salmonella isolated from poultry such as S. Infantis which was dihydrostreptomycin, oxytetracycline, trimethoprim or kanamycin resistant. There was also one strain of salmonella, Salmonella Enteritidis, which is the most common cause food-poisoning in Japan, that show resistance only resistance to dihydrostreptomycin.5

**DISCUSSION**

From the mid-20th century to present Antimicrobial compounds have been an important part of the treatment used for bacterial infections. Due to the highly success rate in treating various diseases these were then widely used in both human and veterinary medicine. However, resistance to these compounds was detected in target pathogens only a few years after initiation
of therapeutic use in humans (Alanis, 2005). The selective pressure created by the use of antimicrobials was identified as a driving force behind the emergence of resistance which was genetically encoded, inherited by subsequent progeny of the resistant pathogens, and in some cases could be transferred horizontally even to distantly related bacteria [as reviewed by Linton

These AR antimicrobial drugs were also widely used in the food animal industries to promote growth of livestock in order produce yield of meat. However these drugs were often given below the required dosages to adequately destroy all the bacteria and as a result surviving bacteria proliferated and AR resistance quickly began to emerge. The number of human infections as a result of AR strains also began to dramatically increase.

Salmonella, a common pathogen was among the long list bacteria species that developed antimicrobial resistances. Goldberg and Rubin et al. explains that some strains of Salmonella for example serovars of S. enterica can survive in a wide variety of hosts and cause different diseases such as Salmonella Typhimurium, which causes no symptoms in adult poultry, can cause gastroenteritis in humans, or cause highly invasive systemic enteric fever in mice. The type of hosts utilize can also vary among food animals to companion animals to humans. D'Aoust, 1997; Lavigne and Blanc-Potard, 2008). Further studies also indicate that certain servora stains can shift the frequency in which type of hosts they are found in over time. Servora’s have also become host specific such for example Salmonella typhi.

In the U.S., Salmonella is estimated to cause over one million human infections each year (Scallan et al., 2011). Most of the infections are resolved after a few days and may simply result in gastroenteritis however in more severe cases where those with compromised immune systems are concerned this requires the use of Antimicrobial drug treatment in order to prevent further morbidity or mortality (Alcaine et al., 2007). In order to successfully treatment salmonella in the U.S. drugs have been categorized in first line, second line and third line drugs based on the level resistance that salmonella virus displays. First line resistance drugs typically included typically a fluoroquinolone-like ciprofloxacin or a third generation cephalosporin β-lactam such as ceftriaxone (Mandal, 1990; Guerrant et al., 2001; Hohmann, 2001; Habib, 2004; Parry and Threlfall, 2008), if the salmonella strain proved resistant they move to the second line of drugs which were also usually reserved for more chronic infections.

CONTROL AND PREVENTION

Salmonella infections occur after eating contaminated food or sometimes after contact with another person with the infection. The principal vehicle is water, milk, or food contaminated by feces. The most dangerous link in a chain of infection is the food handler who is a carrier.

A comprehensive list of strategies to prevent the spread of salmonella may be enumerated under four main categories: Cooking, Food Handling, Temperature Control and Food Contamination. Food infection is caused by the multiplication of bacteria. This multiplication usually takes place in the intestine. Food that is prepared in large quantities is more often the source of infection than when smaller quantities of food is prepared. This as the food prepared in large quantity is sometimes not penetrated with enough heat to destroy the bacteria. If the meat of infected animal is not cooked properly it may convey the disease to man but it is usually
conveyed from outside sources. These sources are the intestinal contents of the slaughtered animal, the intestinal contents of animals that have contaminated the food or human carriers who have prepared or handled the prepared food.

When cooking meats for example: poultry, beef or fish one needs to make sure all foods are thoroughly cooked before consumption. Eating foods that are not well done or those that have a pink or red center increases the chances of salmonella infection. Additionally, consumption of raw meats should be avoided. Eggs should also be cooked thoroughly. It is recommended that poultry products are cooked to an internal temperature of 170ºF for breast meat and 180ºF for thigh meat.6

It is recommended that human carriers of Salmonella should not work in the food industry and if possible should undergo gallbladder removal and antibiotic therapy for an attempt to cure the carrier state. Public-health authorities will recall products that have been contaminated will salmonella or other pathogenic organisms.6 Recalls for contaminated beef in July and August 2009 contained Salmonella with multiple drug resistance.6 It is recommended that people should wash their hands after contact with animal feces. Reptiles should not be as pets.7 This as reptiles are particularly likely to have Salmonella, and it can contaminate their skin, everyone should immediately wash their hands after handling reptiles.7 Children can be exposed to the bacteria by simply holding, cuddling, or kissing the birds. Children should not handle baby chicks or other young birds. Everyone should immediately wash their hands after touching birds, including baby chicks and ducklings, or their environment.7

In October 2010 to February 2011, there was an outbreak of 91 Salmonella Enteritidis infections in Alberta, Canada. An investigation conducted by local public health department revealed that the 91 cases were all associated with the consumption of food that was purchased from mobile food-vending vehicles that operated from worksites in Alberta. A catering company which provided lunch to the trucks and vendors was also implicated. In 85 (93%), of the cases it was reported that patients consumed food prepared by the catering company 7 days before getting sick. Six of the patients were employed to the catering company. It was found that two of the food samples collected from the catering company tested positive for Salmonella Enteritidis. From investigation it was deducted that the source of the contamination was from food obtained from illegal source. The contamination was deemed to have happened directly or indirectly from eggs contaminated with Salmonella Enteritidis and by employees who were infected with Salmonella Enteritidis. The intervention that was made by Public Health personnel to control the spread of the disease included the screening for Salmonella, removal from duty employees involved in food-handling and training.16

The use of liquid soap and chlorine for the cleaning and disinfection of contaminated surfaces on a frequent basis is an effective measure to control the transmission of salmonella in food preparation facilities.

In a study on residual viral and bacterial contamination of surfaces after cleaning and disinfection, data on infectious doses and efficiencies of transfer was used to estimate a target
level to which the residual contamination should be reduced. It was found that a single wipe with liquid soap then with 250-ppm free chlorine solution was sufficient to reduce the contamination to below the target level for most of the pathogens tested. 9 “The sterility of surfaces is monitored in hospitals by determining the levels of reduction of bacteria like Staphylococcus and also Salmonella Enterica, Serovar and Enteritidis in food preparation facilities.”9

Temperature control is also important in preventing the spread of salmonella. Eggs products must be kept refrigerated and cracked or dirty eggs should always be discarded. Raw or unpasteurized milk and dairy products should also be avoided. Pasteurized milk products should be kept refrigerated. The expiry date should also be inspected before consumption and preferably before purchase at the local food store.

Food contamination also plays an important role in the spread of salmonellosis. This occurs when the virus does not originate from within the food but instead is brought to it by an external agent. Hands are one of the main culprits, which is why the proper washing of hands are emphasized. Utensils and surfaces must also be kept clean. Contamination may also happen before the product reaches to the store therefore it is important to wash foods immediately after they are purchased.

A study in China concluded that water and food sanitation and environmental awareness is very effective in reducing food and water borne diseases. This study was conducted between 2006-2010 and aimed to “identify the sources, transmission processes, and determinants of typhoid and paratyphoid fever in the Hongta District.”17

In this retrospective case-control study, (80 cases and controls) geographical detectors and epidemiological surveys were used to identify transmission sources and population that had been exposed. The results showed that there was an increased risk of salmonella infection (typhoid and paratyphoid fever) from adding fresh mint (OR = 2.17, 95% CL: 1.04–4.54) to breakfast, eating uncooked vegetables (OR = 2.29, 95%CL: 1.24–4.24) at restaurants or roadside food sites, and eating flavoring that contained fresh caraway and mint (OR = 2.38, 95%CL: 1.00–5.69).17

A study conducted in Taiwan in January 2009 to October 2010 revealed that salmonella was the most common isolate in children suffering from gastroenteritis. A matched case control study ( 360 cases 930 controls )was conducted in children less than 5 years a Multivariate analysis which identified household contacts with symptoms of diarrhea was conducted using conditional logistic regression, the matched Odds ratio was 17.9; 95% confidence interval [CI]: 8.82-36.34; P < 0.0001), Milk powder consumption (mOR, 2.04; 95% CI: 1.05-3.94; P = 0.0344), Heath center visits (mOR, 1.66; 95% CI: 1.12-2.48; P = 0.0126) ground water (mOR, 1.50; 95% CI: 1.06-2.11; P = 0.0214.All factors were associated with an increased risk of salmonella infection. Factors such as hand washing, breastfeeding, chicken consumption and preparation of food by caregivers showed a decreased risk of salmonella infection. The study concluded that major mode of Salmonella infection in Taiwanese Children was found to be person-to-person, waterborne and environmental contacts. The study could not eliminate the possibility of powdered milk and groundwater contamination as routes of Salmonella infection as well. 11
The underlying consensus from all the articles agreed that salmonella infections occur after eating contaminated food or sometimes after contact with another person with the infection.

VACCINATION

Salmonella vaccines are available for poultry and animals, typhoid vaccines are available for humans. Research is ongoing for the development of vaccines against other types of salmonella. Animal vaccines are currently being used in Europe to reduce the likelihood of hens transmitting diseases to their eggs and to other hens. Egg producers using the vaccine on poultry should continue to maintain sanitary conditions since the vaccine is not 100% protective.

CONCLUSION

The control of Salmonella remains a worldwide challenge it contributes to millions of human infections and deaths per year. It is also a real threat in children particularly so in developing countries as one of the organisms associated with diarrheal disease that result in 1.4 million deaths annually.

Given the high level of resistance in salmonella it is important that antimicrobial susceptibility tests be conducted on organisms isolated from food and human samples to identify effective treatment regimes. These tests should be done before the drug administration. There is a need to ensure that treatment guidelines are revised to include relevant information on antibiotic treatment. There is evidence to support that plasmids that encode multidrug resistance may contribute to the spread of drug resistance. It is therefore important to control this as it can pose a significant problem in emerging and re-emerging infections.

Prevention is the most effective strategy to control salmonella infection. Prevention strategy should include approaches on a personal and community basis. On a personal basis measures must be put in place to prevent the transmission of disease for the ill person and approaches from the community basis should include implementation of effective mechanisms to provide and monitor pasteurized milk, water supplies, sewage disposal, public food production and eating facilities, Diagnosis and effective treatment of infected persons and carriers, control of flies and administration of vaccines where required. It is very important to provide information to the public during outbreaks. This information should include information about the outbreak, implicated food products and advice on personal hygiene.

REFERENCES


COMMUNICATION STRATEGIES FOR MARKETING HEALTH PRODUCTS AND SERVICES

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ABSTRACT

Health services are intangible products, which need marketing strategies to optimize benefits to the individuals, families and the community. Like every product, tangible or intangible, an optimum marketing mix involving pricing, product quality, product promotion and product packaging or merchandising, can improve consumer satisfaction and their patronage of health products and services. Apart from training of trainers’ programs and specialized health education programs, the audience for a health service is generally heterogeneous, uncontrolled and diverse. There is a need for marketing research in order to select or segment an audience so that health services and products can be, designed in such a way that they are, affordable, accessible, comprehensible, user-friendly and attractive to consumers. Research must be targeted at defining community needs and perspectives while messages concerning health services and products must have clearly defined objectives. In addition, expected benefits from the health products and services must be clearly stated to the target audience. However, marketing policies should be implemented against the background of the humanitarian nature of health services and fundamental human rights.

KEYWORDS:- Communication Strategies, Marketing, Health Products, Services

INTRODUCTION

Communication is a two way process of exchanging or shaping ideas, feelings and information. The ultimate goal of communication is to bring about a change in the desired direction of the person who receives the message. Ability to influence others depends on communication skills in speaking, writing, reading and reasoning. Communication may also occur without words. These include body movements, postures, gestures and facial expressions. (Park, 2007) It is probably through these non-verbal interactions, such as smile, frown and shrugging of shoulders, that health service consumers are able to detect and interpret the emotional feelings (care, confidence, or indifference) exhibited by the health service provider.

Communication channels include interpersonal communication, mass media and folk media. The communication channel, which will be most effective in delivering a message, depends on the type of audience, their level of sophistication and geographical spread. (Park, 2007)
Audience may be homogenous or heterogeneous. Homogeneous audience is a standardized group which is held together by a common interest. Examples include a group of health educators attending a conference or training of trainers’ program and pregnant women in the health education session of an antenatal clinic. Such a group facilitates effective communication. A heterogeneous audience is a gathering of people who have joined the group out of curiosity and with different motives. An example is a gathering of people at the village or market square on hearing the sound of the music of a dance troupe hired by health educators to mobilize people towards the arena of delivery of a health message. Such a group poses a challenge in terms of getting them to listen, understand and give a feedback to the health educator. This is particularly difficult when there is a high level of illiteracy in the audience. Diversity of dialects and languages may also pose a problem. Segmenting the audience in terms demographic, psychosocial, behavioral and geographic variables or combinations of these and other variables may solve the problem of heterogeneity. (Weinstein, 1994; Boslaugh et al., 2007)

One of the key steps in the health communication and social marketing process is identifying the population segments that can benefit from a specific health behavior. (Kreuter, 2003) The more one knows about the primary segment, the better one can reach them with messages, activities and policies. The upfront research includes understanding the needs and wants of the target audience (Pickton and Broderick, 2005) on a more personal level, and their motivations and lifestyles so that one can be truly engaged with them. This effort will pay dividends later when one begins preparing campaign activities, health messages, channels and campaign materials.

The medium of communication depends on the geographical spread of the target audience. A message to a large community or country may have to be communicated through the print and electronic media. The advantage of the print and electronic media over the word of mouth is that distortion of messages is avoided. However, distortion may occur when such messages are reverberated by word of mouth.

Innovatory approaches to health communication based on social marketing techniques are now being used in projecting health messages in order to promote health. Social marketing can be defined as a systematic application of marketing along with other concepts and techniques to achieve specific behavioral goals for a social good (Gordon, 2006; McDermott et al., 2006). It is a process of creating, communicating, and delivering value in order to influence target audience behaviors in ways that benefit society (Kotler and Lee, 2008). Social marketing is the application of marketing principles and techniques to achieve social goals such as effective health communication.

The process involves

- Clearly defined measurable goals such as promotion of the use of insecticide treated nets or condoms.
- Research to define community needs and perspectives such as determination of what people want or need and what they are prepared to buy and at what price.
• Optimization of product design based on research findings such as packaging contraceptives in attractive packages that can easily enter women’s purse and producing condoms with attractive and pleasant scent.

• Effective communication of expected benefits of a health service or product such as explaining the benefit of birth spacing in managing limited financial resources for children education. (Lucas and Gilles, 2006)

DEFINING MEASURABLE GOALS

The goal of a health service must be clearly defined. It should be specific, measurable, attainable, realistic and time bound. (Araoye, 2004) It should be able to evaluate the output and the impact of a health service. For example, it should be able to determine the increase in the number of condoms bought by or distributed to the target community three months after a health talk on birth spacing in a rural community and also determine the number of women who have spaced their child birth by at least two years, five years after the introduction of family planning service in the community.

DEFINING COMMUNITY NEEDS

Community needs may be felt or unfelt. They are felt when they are perceived as necessary by individuals, families and communities and unfelt, when they are not perceived as necessary. Needs may be unfelt because of social-cultural and psychological barriers of ignorance, prejudice and misconceptions of a health problem (Park, 2007) For example, pipe borne water may be unavailable in a community, which has a number of unprotected sources of water such as streams and ponds. Most members of such a community may not perceive the need for pipe-borne water, even when there are several cases of guinea-worm (dracunculus medinensis) infestation in the community. (Biswas et al., 2013) Community research by a health educator is able to determine the link between the guinea-worm infestation and the lack of pipe-borne water.

The health educator then proceeds to give a health talk to the community on the need for pipe-borne water. He uses the health message, information, education and communication materials to increase the community awareness to the point that they are able to perceive the need for pipe-borne water. Through reinforcement in subsequent health talks, he is able to influence the community to see the need for pipe-borne water as a felt need. Intensifying the felt need in the community, through further dissemination of the health message by health service providers and members of the community, through formal routes and informal routes (the grapevine), leads to a demand for community or government action. This makes the pipe-borne water available. The marked decrease or eradication of guinea-worm infestation (Biswas et al., 2013) in the community confirms the worth of the health message and gives rise to further reinforcement of the need to use pipe-borne water by members of the community and even beyond.
HEALTH AS A PRODUCT

Health services may be tangible or intangible. Tangible services are those services that are tied to a physical product. Clinical medicine seeks to restore health through the use of drugs and surgical treatment. Drugs are tangible products while the surgical treatment is intangible in that it is not a physical product. (Kotler, 1999) Public health includes medical interventions with the use of immunization and chemoprophylaxis but more importantly, it emphasizes control of the environment and of human behavior. (Lucas and Gilles, 2006). The product is the desired behavior, as well as key perceived benefits for adopting the behavior, and any tangible objects or services that add value. (Kotler and Lee, 2008)

Communication is a necessary tool for making health services effective and efficient. Without communication, awareness of health services is not possible. There is therefore a need for developing communication strategies for the optimum delivery of health services. An innovative strategy for promoting health care delivery is borrowed from the marketing field and may be named health marketing mix. The components of this mix include Product quality, Pricing, Promotion, Placing, Packaging and People. (Kotler, 1999)

QUALITY OF HEALTH SERVICES AND PRODUCTS

Quality is no doubt the most important attribute of a health service or product. However, health service consumers may perceive quality of a health service in different perspectives. Some may see health service as effective in the sense of providing the expected remedy but some others may consider the approach of the provider to the clients. In addition to providing quality service or health products, health service providers must show care, confidence and charisma. They must explain the benefit of the service to the consumer. Benefits are reasons the target audience might be interested in adopting the behavior or what might motivate them to do so. (Kotler and Lee, 2008)

The language must be understood by the consumer and use of medical jargons and slangs must be avoided. Health Educators must avoid smoking, chewing gum and eating while communicating with the client. Health service providers should reinforce the formal teaching in health education by their own example. (Gilles and Lucas, 2006) The members of the community observe the behavior of health workers and compare it with what they have learnt from posters, lectures and other forms of health education. Therefore health care providers must maintain good social habits, high standard of personal hygiene and environmental sanitation of health centers, clinics and institutions. Diets served in hospitals must have semblance with the balanced diet so often recommended to health service consumers. Every contact with the health care provider must be a continuous exercise in health education.

OPTIMIZING A HEALTH SERVICE/PRODUCT DESIGN

The manner of presentation of a health message and the packaging of the supporting health products may affect the perception of consumers and make or mar the consumer acceptance and usage. The location of the venue for delivering a health message must be easily identifiable,
convenient and accessible. Sitting arrangement must be comfortable. Health messages should be delivered in short time duration otherwise they become boring. They should be delivered in a language that the target audience understands. Medical jargons should be avoided. The mannerisms of the health educator should be such that they connote interest and concern about the community welfare. He must not engage in distractions like answering phone calls during the health message or paying unnecessary attention to whimpering and whisperings. Products displayed must be attractive and user friendly and not be presented in numbers and colors that are culturally offensive. To some communities, red may mean danger while black signify demons or death. Many Caucasians attach a jinx to number thirteen.

APPROPRIATE PRICING OF A HEALTH SERVICE OR PRODUCT

Health products and services come with a price which is dependent on the cost of raw materials, technology, transport and packaging. No matter the quality of a product, pricing may determine its usage. A high price may lower the demand and a low price may increase demand. In addition, a high price may be used to discourage undesirable lifestyles such as tobacco or alcohol abuse while a low price may be used to encourage desirable practice such as contraception. (Kotler and Lee, 2008) However, providing a health service or a product at a low price does not necessarily increase demand. Sometimes, a very low price may cause rejection of a health service (Taylor, 2012) as members of the community may read negative meanings (substandard product, expired product, lure for sterilization) to the excessive subsidy. The Alma–Ata declaration specified a cost at which individuals, families and communities can afford in the spirit of self reliance and social justice. (International Conference on Primary Health Care, 1978) Community research must therefore be carried out to determine the price that can be paid for a product or service before it is introduced. In doing this, cognizance must be taken of the cost to the provider. The health care provider can reduce cost by sourcing from manufacturers or by mass production. In the case of a health service, he can increase the number of recipients in order to reduce unit cost. He can also charge higher fees to paying clients in order to cater for the poor. In many cases, government or donor subsidy may make a service or product affordable. For example, certain non-governmental organizations like Bill and Melinda Gates foundation are funding the treatment and control of Acquired Immune Deficiency Syndrome (AIDS) in many parts of Africa and Asia (Tran et al., 2013) while the Carter foundation is funding Guinea-worm eradication program. (Ruiz-Tiben, E. and Hopkins D. R., 2006)

Pricing-related strategies to reduce costs and increase benefits include the following: (Kotler and Lee, 2008).

• Increased monetary and non-monetary benefits for the desired behavior.
• Decreased monetary and non-monetary costs for the desired behavior
• Increased monetary and non-monetary costs for the competing behavior.
PROMOTING COMMUNITY HEALTH SERVICES

Health services may be promoted through word of mouth, folk songs, print and electronic media. Information on product benefits and features, fair price and easy accessibility need effective and efficient communication to bring to the target audience and inspire action. Promotion strategy is needed to maximize the success of communication. The development of these communications is a process that begins with the determination of key messages, continues with the selection of messages and communication formats and channels, moves on to the creation of communication elements and ends up with the implementation of these communications. (Cheng et al., 2009) In most countries there is legislation against advertisement of medical services by appropriate medical councils. Unfortunately this is not the case with unorthodox health practices by charlatans, religious leaders and quacks. These quacks and charlatans are allowed to advertise through loud speakers in moving vehicles to unsuspecting ignorant and poverty stricken members of the community. In some countries like Nigeria, trade fares are organized for herbalists and telecasted to members of the public (Personal observation.) Religious leaders openly boast of having cures to cancers and Acquired Immune Deficiency Syndrome and tell members of the public that treatment of sexually transmitted diseases in one person can immunize the partner, thereby perpetuating the ping-pong phenomenon of sexually transmitted diseases. In spite of legislation, health services can be promoted by sponsoring community events in which the health service is discussed by a charismatic speaker and free or subsidized services are offered to the audience and interested members of the community. Notable musicians and inspirational artists may be invited to such occasions and made to sing about or demonstrate the theme of the health message. The presence of such artists and musicians can improve the attendance and motivate the audience to listen and remember health messages. The number of attendees in a health promotion event featuring a musician as popular as late Michael Jackson in the demonstration of condom use to the youths is better imagined. In traditional settings, local dance troupe may be equally effective. This strategy has been referred to as ‘edutainment’ (Cheng et al, 2009)

Several health services including primary health centers are government owned. It is a paradox that though the government has established the use of these primary health centers for public use, many potential clients who live close to the health centers are unaware of the available health facilities. Many of these facilities were put in place without community involvement in the planning and implementation. The government should involve members of the community in every stage of the planning process to the implementation of the program. (Gilles and Lucas, 2006) Such health services should be inaugurated with community participation and involvement and a form of social gathering in which some health service providers are introduced to the members of the community.

LOCATING A HEALTH SERVICE (PLACE)

Research should be carried out to determine the place for a health service. Place is largely where and when the target audience will be encouraged to perform the desired behavior and/or to obtain tangible products or services associated with a health campaign. (Cheng et al., 2009) This will remove socio-cultural and religious barriers to the usage of the health service. A health service must not be sited in an area of dispute between neighboring communities or a
sacrilegious location. Opinion leaders and community heads in the catchment area of a health service must be consulted before locating a health service. An attempt should be made to locate a health service in an accessible location which should preferably be relatively equidistant from user communities in the catchment area. Timing of a health service should also be based on research. Taking a health message to a local community during their cooking hours will exclude women from such health services.

COMMUNICATING EXPECTED BENEFITS OF A HEALTH SERVICE OR PRODUCT

To ensure compliance, the audience of a health message should be informed about the expected benefits. In doing so, the health educator must divulge only those benefits that are certain and avoid benefits that are equivocal. While it is true that insecticide treated nets prevents malaria, it cannot prevent malaria if people spent a greater part of their evenings telling folk tales in their unprotected verandah. Condoms may prevent pregnancy but appropriate, consistent and regular usage before their expiry dates must be ensured to provide the expected benefits. Health educators should bridge the gap between consumer perceptions and reality in delivering health messages. Use of seat belts may prevent chest injuries in road traffic accidents. However, excessive speed may facilitate a chest injury from the seat belt, when brakes are suddenly applied. Provision of pipe borne water in a community can only prevent guinea worm if the members of the community stop drinking other sources of water such as unprotected ponds and pools of water from a stream. Thus expected benefits must be presented with specifications.

CONCLUSION

Health services and products need effective communication strategies based on research to be of benefit to consumers. Like other services and products, it is necessary to devise innovative health marketing strategies, if a health service must be effective and efficient in the modern world of technological breakthroughs, free market enterprise and human rights. (Vienna Declaration, 1993)

REFERENCES


KNOWLEDGE OF DIABETES MANAGEMENT AND CONTROL AMONG DIABETIC PATIENTS ATTENDING FEDERAL POLYTECHNIC CLINIC, KAURA NAMODA, NORTH WEST NIGERIA

A Case Study by Dr Abdullahi Mohammed Lawal, Nigeria (MBBS, PhD in Public Health Student of Texila American University)  
Email: lawaldirect@yahoo.com

INTRODUCTION

Diabetes is one of the chronic diseases that affect both the young and old in our society. According to World Health Organization (2006), at least 171 million people worldwide suffer from diabetes and it is more prevalent in developed countries. According to American Diabetes Association (2006), there were about 20.8 million people with diabetes in United States alone, while in developing countries, increase in prevalence is expected to occur especially in Africa, where most patients will likely be found by 2030. This increase in incidence of diabetes in developing countries follows the trend of urbanization and lifestyle changes perhaps most importantly a “Western – Style” diet (World Health Organization, 2006). In Nigeria though no estimate of the individuals suffering from diabetes has been made, in a recent screening exercise carried out in Warri and Sapele (south east, Nigeria) where 787 people attended, 65% were diabetic and hyper-tensive (Urhobo National Association of North America, 2004). Also at University of Nigeria Teaching Hospital Enugu the number of patients that attend Wednesday diabetic clinic is alarming.

Diabetes is characterized by a disorder in metabolism of carbohydrate and subsequent derangement of fat and protein metabolism. Disturbance in production and action of insulin, a hormone secreted by the islets of langerhans in the pancreas is implicated in the disease (Shafer, 2000). In addition to insulin, aging, over weight and several other hormones affect blood glucose level there-by preventing glucose from entering the cells (Clavell, 2005). This leads to hyperglycemia, which may result in acute and chronic complications such as diabetic keto-acidosis, coronary artery disease, cerebrovascular disease, kidney and eye diseases, disorders of the nerves and others (Iwueze, 2007). The management of diabetes poses a challenge to medical and nursing staff as well as to the patients themselves. Since diabetes is a chronic disease, most diabetic patients need to continue their treatment for the rest of their lives. The emphasis is usually therefore, on the control of the condition through a tight schedule of blood glucose and urine sugar monitoring, medication and adjustment to dietary modification (American Diabetes Association, 2003; Iwueze, 2007). Such a chronic condition requires competent self-care, which can be developed from a thorough under-standing of the disease process and the management challenges by the patient and family members.
diabetes education and counseling for the patient and family members. According to Colbert (2007) educating and supporting diabetic patients in managing their daily lives are important goals of diabetic patients care today. Unfortunately, about a third of the people suffering from diabetes may not be aware of it early considering the insidious onset and development (Iwueze, 2007). Regrettably too, many who are diagnosed with the condition demonstrate fears about the future and a general distaste because of the predominant misconceptions about the disease. This is heightened by the superstitious explanation of causation of diseases dominant in Africa where most diseases are caused by “poison” and/or “evil spirits”. Some of these problems highlighted can be taken care of if patients and indeed the general public are exposed to diabetes education (Iwueze, 2007).

**KEYWORDS:-** Diabetes, Diabetes Management, Federal Polytechnic Clinic, Metabolism

**GENERAL OBJECTIVE**

To determine the level of knowledge of diabetes and control measures by patients attending federal polytechnic clinic, kaura namoda, Northwest Nigeria.

**SPECIFIC OBJECTIVES**

1. To determine the level of knowledge of diabetes mellitus in patients.
2. To determine the knowledge of control measures/management in diabetes by patients.
3. To make recommendations for improved care by patients, the polytechnic clinic, and the polytechnic management.

**Knowledge of diabetes**

This involves the understanding of what diabetes is by the diabetic patients as shown by their answers to specific knowledge questions on diabetes. Knowledge of diabetes management: This involves understanding of the care given to the diabetic patients such as nutrition, exercise, self-monitoring and drug therapy, etc.

**Knowledge of self-care**

This involves the diabetic patients understanding of how to take care of themselves, in terms of the standard management; healthy diet, self monitoring, administration of insulin or oral drugs, care of the feet, nails and personal hygiene.
METHODOLOGY

Forty eight diabetic patients visiting the outpatient department of the federal polytechnic kaura namoda were be selected using simple random sampling technique. The instrument of data collection was close ended questionnaire consisting of five sections which was pre validated by a supervisor before use. The first section consists demographic features, the consists questions on causes of diabetes, the third consists questions concerning self care to prevent/ control diabetes, the forth consists questions on self care measure in urine testing for glucose, the fifth section consists of questions on kind of food to eat by a diabetic patient.

A pilot test was conducted using 10 patients before the full study to identify any unforeseen problems to rectify. Some selected staff of the polytechnic clinic was trained as research assistants for data collection.

RESULT

Table 1

What is diabetes?

<table>
<thead>
<tr>
<th>Options</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bone disease</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Heart disease</td>
<td>1</td>
<td>2.1</td>
</tr>
<tr>
<td>Liver disease</td>
<td>5</td>
<td>11.5</td>
</tr>
<tr>
<td>Sugar disease</td>
<td>39</td>
<td>81.2</td>
</tr>
<tr>
<td>Do not know</td>
<td>3</td>
<td>6.3</td>
</tr>
</tbody>
</table>

Table 2

Causes of diabetes?

<table>
<thead>
<tr>
<th>Options</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poison</td>
<td>37</td>
<td>77</td>
</tr>
<tr>
<td>Heredity</td>
<td>5</td>
<td>10.4</td>
</tr>
<tr>
<td>Eating a lot of starchy food</td>
<td>25</td>
<td>52</td>
</tr>
<tr>
<td>Eating a lot of protein food</td>
<td>4</td>
<td>8.3</td>
</tr>
<tr>
<td>Insulin deficiency</td>
<td>7</td>
<td>14.6</td>
</tr>
<tr>
<td>Do not know</td>
<td>4</td>
<td>8.3</td>
</tr>
</tbody>
</table>
Table 3
Self care to prevent/control diabetes?

<table>
<thead>
<tr>
<th>Options</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduce intake of starchy food</td>
<td>42</td>
<td>87.5</td>
</tr>
<tr>
<td>Regular exercise</td>
<td>4</td>
<td>8.3</td>
</tr>
<tr>
<td>Healthy Eating Plan</td>
<td>2</td>
<td>4.2</td>
</tr>
<tr>
<td>Consistent drug therapy</td>
<td>14</td>
<td>29.2</td>
</tr>
<tr>
<td>Using herbal drugs</td>
<td>26</td>
<td>54.1</td>
</tr>
<tr>
<td>Checking Pharmacy</td>
<td>36</td>
<td>75</td>
</tr>
</tbody>
</table>

Table 4
Self care measure in urine testing for glucose?

<table>
<thead>
<tr>
<th>Options</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test Strip</td>
<td>6</td>
<td>11.5</td>
</tr>
<tr>
<td>Test Tabs</td>
<td>9</td>
<td>18.8</td>
</tr>
<tr>
<td>Testing with the tip of the tongue or observation of ants around urine</td>
<td>33</td>
<td>68.8</td>
</tr>
</tbody>
</table>

Table 5
What is the kind of food to eat by a diabetic patient?

<table>
<thead>
<tr>
<th>Options</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>A lot of grains, vegetable and fruits</td>
<td>7</td>
<td>14.6</td>
</tr>
<tr>
<td>A lot of proteins</td>
<td>17</td>
<td>35.4</td>
</tr>
<tr>
<td>A lot of starchy food</td>
<td>1</td>
<td>2.1</td>
</tr>
<tr>
<td>A lot of beans, meat, and vegetables</td>
<td>23</td>
<td>47.9</td>
</tr>
</tbody>
</table>

The findings showed that many of the patients (65%) were in the age range of 50 years or more and 4% were in the age range of 30 -39 years old. 76.2% were females whereas 23.8% were males. They were mostly married (94%) and majority (79%) were literate. 83% of the respondents were civil servants while 7% were traders. As shown in Table 1, majority of the subjects (81.2 %) knew what diabetes is in terms of knowing that it is a sugar disease while only
6.25% did not know what diabetes is. Table 2 showed that most of the respondents (77.0%) stated that diabetes was caused by poison while only 14.6% had knowledge of the main cause of diabetes—lack of insulin. According to Table 3, majority of the subjects (88.5%) stated that avoiding starchy foods is a self-care measure in the prevention/control of diabetes, 74.0% stated that going to the chemist/patent medicine store for treatment is another measure, while only 4.2% stated that embracing a healthy eating plan is a self-care measure in diabetes prevention/control. In assessing methods of urine testing, 69.8% reported that non-scientific methods should be used. The results also indicated that 11.5% claimed to know they should use test strips, whereas 18.75% indicated that test tablets should be used (Table 4).

Knowledge of the kind of food a diabetic patient should eat revealed that 47.9 and 35.4% agreed with eating of beans/meat and a lot of other proteinous foods, respectively, while 14.6% opted for whole grains, fresh vegetable and fruit.

**DISCUSSION**

Majority of the subjects (81.2%) know what diabetes is in terms of knowing that it is a sugar disease. This finding was expected since all of them were already sufferers and most of them were literate. The findings agree with Ngwu (2005) in her study, which found that 75% of diabetic patients attending University of Nigeria Teaching Hospital Enugu had good knowledge of the disease. The belief of the respondents that diabetes is caused by “poison” despite their high level of literacy was surprising. This is likely to have grave consequences on their health-seeking behavior as well as on the general population because people might be dying of this diabetes, while seeking unorthodox treatment in a bid to rid themselves of the so-called “poisons”.

The knowledge of the subjects regarding self-care measures to manage/control diabetes in order to prevent complications revealed that significant number of subjects (74.0%) believed in patronizing patent medicine stores, while a minority (4.2%) agreed that embracing a healthy eating plan is necessary. This showed lack of knowledge. Prevention of complication of diabetes involves complying with drug treatment and diet regimen as well as adopting simple health and self-care measures that prevent injury especially to the lower extremities of the body as well as maintain skin integrity. Lacks of knowledge of this magnitude will likely place diabetics at risk of doing those things that might predispose them to complications. More than half of the respondents thought that herbs could cure diabetes. This again is another important finding because even though there are many potent herbs available for the treatment of many ailments, many of those works have not been conclusive.

The implication of this finding is that it may likely affect their compliance to orthodox treatment. These two findings did not agree with (Ngwu, 2005) and (Badruddia et al, 2002) who both found that the knowledge and awareness of respondents about diabetes was satisfactory. However, they agreed with (Badruddia et al, 2002) in their findings that misconceptions were common. Majority of the respondents (87.5%) stated that the avoidance of starchy foods is a self-care measure to prevent and control diabetes. This is a fairly good knowledge regarding diabetes management, which will likely guide them in the planning of their diet. Regarding the Information about the knowledge of self-care in management of diabetes, their knowledge about
method of urine testing was assessed. Majority reported that they utilized non-scientific method in testing urine for sugar.

These include using the tip of the tongue to test urine and voiding on the ground and observing if ants will come around it. Testing urine by non-scientific methods will not give accurate information about the level of the sugar in urine. The implication is that complications like hypoglycemia may still occur among the respondents. The kind of food a diabetic patient should eat was another factor considered in determining the knowledge of self-care by the diabetic patients. The findings showed that only few patients had good knowledge of the nutritional management, which is an important factor in self-care. The percentage that responded positively to the option that they should eat a lot of whole grains, fresh vegetables and fruits was low. This showed lack of knowledge of the value of fruits and vegetables, as regards the role of antioxidants contained therein, in scavenging free radicals. These free radicals have been implicated in the causation of oxidative stress, which is fast becoming the nutritional and medical buzzword of the 21st century. It is stated that it is beyond any doubt, the root cause of well over seventy (70) chronic degenerative diseases, of which diabetes is one (Strand, 2007). It has also been noted that whole grains and legumes fulfill the four dietary objectives for diabetics – high complex carbohydrates, high fiber, low fat and refined sugar (Dyuff, 2006). She also counseled that vegetables and fruits should be part of every meal. However, only 14.6% of the respondents knew this.

This will likely have implications on their diet and overall health. Regarding responses to the nature of health information received by the patients from the health care providers, the respondents were tested on two aspects of information received on diabetes – the cadre of health care providers taught them anything on diabetes and the areas covered. Nurses were the least followed by the doctors. The findings were actually demoralizing because doctors and nurses were the irreducible pair that has the highest contact time with the patients, so they are expected to take the lead in providing relevant information to the patient/client. However, they have neglected this important aspect of their service. This agrees with the fact that there is no concrete evidence to show that diabetic patients are periodically informed of the things they should do to be able to manage the disease (Bushfield, 1986). The implication is that these patients may not receive adequate information. Some of the patients got no information at all, yet they consulted doctors and were cared for by nurses. This finding is significant and implies that nurses and doctors despite their strategic position in the care of these patients are not living up to their responsibilities of health counseling and education of patients/clients.

RECOMMENDATIONS

1. A well-organized and structured education/counseling program should be established at the Federal polytechnic clinic, Kaura namoda as quickly as possible for diabetic patients.
2. Outreach programs should be organized in schools, civil service centers and rural communities.
3. Health care providers should take time to explain in depth on diabetes, causes and prevention/control through health and self-care measures to prevent complications.
4. Family members of diabetic patients should also be counseled to adopt a healthy lifestyle in order to prevent diabetes.

5. Programs such as exercise and self-care monitoring should be organized to equip them to effectively monitor their blood glucose level as well as control their diet accordingly. Studies on similar context but with wider scope and much larger sample size are recommended to confirm findings of this study.

CONCLUSION

Based on the findings of the study, it was observed that majority of the diabetic patients attending the federal polytechnic clinic Kaura namoda have knowledge of what diabetes mellitus is but do not know the causes, prevention, control, self monitoring and other self care measures. It will be beneficial if information center for teaching diabetic patients is established. Also doctors, nurses and other members of health team should join hands to help these diabetic patients live healthy lives by providing them with the right information at every available opportunity.

REFERENCES


EPIDEMIOLOGICAL ASPECT OF PATIENT CONSULTING AT DENTAL CLINIC AT HLLOTSE, LERIBE, LESOTHO

A Case Study by Dr Jonathan Tshimwanga Lukusa, Lesotho (MBBS, Master in Public Health Student of Texila American University)
Email: jontshimwang@yahoo.fr

ABSTRACT

A descriptive study has been conducted between March and August 2008 on 196 patients consulting the oral clinic named MENO APA at the Eastern of D.R Congo (Goma) aimed to determine their epidemiological patterns. The findings are as follow:

- The dental cavity is the most common oral disease with 40.0% and 34.8% of which in severe clinical form;

- The range of age between 6-10 years is consulting more than all others ranges the oral clinic with 17.7%;

- The dental care (brushing) is performed once a day with 72.2% and horizontally with 64.1%. The children less than 5 years and between 6-10 years do not perform any dental care per day in 28.6% (CI=28.6±3.9)

- The intake of sugar (especially free sugar) is highest than any with 80.8% and the patients with high intake of sugar developed dental cavity in 81.8%;

- The odds ratio between the sugars’ intake and the development of the dental cavity is 2.19 (OR 2.19; CI=44.3±6.7)

- The frequency of jobless was 42.4%

- The facial trauma especially fractures and dislocations of teeth represent 22.7% and are highly more frequent than periodontal diseases which represent 9.5%.

- The frequency of congenital malformations was 4.0%

KEYWORDS:- Epidemiological, Dental cavity, WHO
INTRODUCTION

According to the WHO, the dental illnesses as the tooth decay, the periodontal diseases and the cancers of the oral cavity and the pharynx pose a problem of health everywhere in the world, in the industrialized or developed countries as well as developing country and very serious in the poorest communities. (WHO, 2000 and Peterson, 2013)

Some developing countries essentially struck by poverty like Lesotho ignores the features and the determining factors of these dental illnesses due to lack of continuous and multidisciplinary research in a particularly Lesotho context. What logically lead to an incomplete preventive control departing of recommendations of the WHO that, in its dental report, find that the dental health system must be oriented on the prevention and the primary health care. In the current practice, we realize the insufficiency of the prevention and even lack of dental cares as most of the mouth diseases are that health professional (the general practitioner and the nurse) transfer to the dental practitioner who, moreover, is rare otherwise absent.

The fact that there is scarceness of dental practitioners and especially the lack of research in this domain aggravates the situation that is already precarious. This precariousness is being essentially due to poverty. This lack of research is confirmed by the fact that we couldn’t find any old or recent scientific article related to the dental illnesses in Lesotho especially in Leribe. Indeed, we couldn’t find any previous study done regarding moth health in Hlotse at Leribe District. To the fact, the only absence or better yet the crying quasi-absence of the scientific articles in this part of the country on a bottom of upsurge observed of dental illnesses is sufficient, to this stage, to justify this modest survey. This is how this survey has been led with an objective to determine the epidemiological aspects of the patients consulting the dental clinic in Hlotse at Leribe in Lesotho.

MATERIAL AND METHODS

This is descriptive and retrospective study spreading on the period of two months from the 1st July 2013 to 31st August 2013. The data have been collected at Motebang Dental Clinic located in Hlotse. The total number of the patients having consulted the Motebang dental clinical from May 2013 to July 2013 rose to 987 (Armstrong, 2003 and Leedy, 2010). The total number of 987 patients constituted our population of survey from which the size of the sample has been pulled according to the table of Stoker (As de Vos et al., 2002):

<table>
<thead>
<tr>
<th>Population</th>
<th>Percentage suggested</th>
<th>Number to investigate</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>100%</td>
<td>20</td>
</tr>
<tr>
<td>30</td>
<td>80%</td>
<td>24</td>
</tr>
<tr>
<td>50</td>
<td>64%</td>
<td>32</td>
</tr>
</tbody>
</table>
As our study population is close to 1000 in the tableau of Stoker, our sample size is 140. During our data collection we totalized 246 patients files who have been interviewed of which 196 have only been included and 48 others have been excluded.

Indeed, all patient of any age and gender who consulted the dental clinic during the period of July 2013 to August 2013 were included in this study we had a total number of 246 patients. However, we excluded all patients whose questionnaire was filled incompletely by omission of gender, age or any question in the survey or any file that doesn’t have a specify diagnosis.

Among the 48 excluded, 32 have been excluded for omission to specify age in years and 16 have been excluded for omission to specify the retained diagnosis. Therefore, we kept the sample size of 196 respondents, what is extensively superior to 140 suggested by the table of Stoker.

The category "others" regroup all less frequent diagnoses. That wants to say, of the diagnoses that have only been kept twice an all along the harvest of the data. It is about of:

- Diagnoses retained only one times: fluorosis, oral candidiasis, parodontitis, hypercalcification, cyst of the tongue, mandubular Burkitt, mylolysis, oral polyp.
- Diagnoses retained two times: oral abscess, abrasion, phlegmon, included, semi-included, granuloma. We took the four classic tastes as a basis (sugary, salty, sour and bitter) to try to determine the preferences of consumption.

For that, we have submitted to patient open-ended questions with sub-questions in relation to what is really consumed once he/she recognizes his/her gustatory preference.

This is how the majority of patients investigated recognized the daily consumption repeated of sugars as cookies, the sugars crystals in the market, the sweet and chocolates. Some investigated ticked two tastes at a time, to know the sugary-salty and sugary-sour. We considered in our survey that all the one that generates any money allowing him to enjoy a certain autonomy by any work, had to be taken in the category "workers" to separate them from true unemployed person.
The following formulas have been used for the calculation of the interval of confidence to study different variables (Bohn et al., 2010):

- For a proportion, $IC = p \pm 1.96 \sqrt{pq/n}$
- For an average, $IC = m \pm 1.96 \sqrt{S^2/n}$

Where $p$ is the proportion observed in the sample, $q = 1 - p$, $n$ is the size of the sample, $m$ is the average in the sample, $S^2$ is the variance in the sample. The odds ratio has been also used for evaluation of the association between the consumption of sugars and the apparition of the tooth decay according to the following formula (Mash, 2011):

$$\text{Odds ratio} = \frac{a \times d}{b \times c}$$

We chose the acronym CAO that informs us on the number of the teeth Carries (C), Absent (A) and Obstructed (O)

The tooth presents several faces, to know,:;

- Face occlusal (or grinding for the molars and premolar) presenting some reliefs (cusps) and of the pits (furrows). One speaks of free side for the canines and the incisors.
- Face proximal or the face mesial
- Face distal
- Palatine face for the superior teeth or lingual face for the lower teeth
- Vestibular face

The data have been seized and treated with the help of the SPSS (Software Package of Social Sciences), version 14.0.1 for the cross tabulation and frequency table analysis.

RESULTS

2.1. Distribution of patients according to age.

Tableau 1: distribution of patients according to ages
This table shows the class of age lower or equal than 5 years and the class of age of 6-10 himself brush not of the all per day in 28,6%(IC=28,6±3,8) of case whereas the majority of the class of age of 6-10 years only brush once per day in 21,7% (IC=21,7±2,9) of case.

2.2. Distribution of patients according to gender

Tableau 2: distribution of patients according to gender

<table>
<thead>
<tr>
<th>Gender</th>
<th>Frequency</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Masculine</td>
<td>98</td>
<td>49.5</td>
</tr>
<tr>
<td>Feminine</td>
<td>100</td>
<td>50.5</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>198</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

This picture shows that the two genders are fairly affected either 49,5% (IC=49,5±6,8) for the male gender and 50,5% for the female.

2.3. Distribution of patient according to profession

Table 3: Distribution of patient according to profession.

<table>
<thead>
<tr>
<th>Employment</th>
<th>Frequency</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>No job</td>
<td>84</td>
<td>42.4</td>
</tr>
<tr>
<td>Employee</td>
<td>26</td>
<td>13.1</td>
</tr>
</tbody>
</table>

107
This table shows that the unemployed person consult the clinic more than come student and pupils respectively 42.4% and 18.7% of cases.

2.4. Distribution of patient according to the number of teeth brushing per day

<table>
<thead>
<tr>
<th>Tooth brushing</th>
<th>Frequency</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>7</td>
<td>3.5</td>
</tr>
<tr>
<td>Once a day</td>
<td>143</td>
<td>72.2</td>
</tr>
<tr>
<td>Twice a day</td>
<td>40</td>
<td>20.2</td>
</tr>
<tr>
<td>Three times day</td>
<td>6</td>
<td>3.0</td>
</tr>
<tr>
<td>Imprecise</td>
<td>2</td>
<td>1.0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>198</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

The majority of our investigated patient proceed to the brushing of the teeth once a day means 72.2% of case.
2.5. Distribution of patient according to the manner of teeth brushing per day

Table 5: distribution of patient according to the manner of teeth brushing per day

<table>
<thead>
<tr>
<th>Manner of brushing</th>
<th>Frequency</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vertical</td>
<td>6</td>
<td>3.0</td>
</tr>
<tr>
<td>Horizontal</td>
<td>127</td>
<td>64.1</td>
</tr>
<tr>
<td>Combined</td>
<td>53</td>
<td>26.8</td>
</tr>
<tr>
<td>Imprecise</td>
<td>12</td>
<td>6.1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>198</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

It is evident from this picture that the majority of our investigated patient prefer the sugary taste means 80,8% of case.

2.6. Odds ratio between sugar consumption and dental decay

Table 6: Odds ratio between sugar consumption and dental decay

<table>
<thead>
<tr>
<th>Sugar / decay</th>
<th>Yes</th>
<th>No</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>71 (44.3%)</td>
<td>55 (34.3%)</td>
<td>160 (100%)</td>
</tr>
<tr>
<td>Non</td>
<td>10 (37.0%)</td>
<td>17 (62.9%)</td>
<td>27 (100%)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>81</strong></td>
<td><strong>72</strong></td>
<td><strong>340</strong></td>
</tr>
</tbody>
</table>
2.7. Distribution of patient according to diagnosis

Table 7: Distribution of patient according to diagnosis

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pulpitis</td>
<td>137</td>
<td>69.1%</td>
</tr>
<tr>
<td>Traumatism</td>
<td>36</td>
<td>18.2%</td>
</tr>
<tr>
<td>Parodontopathy</td>
<td>17</td>
<td>9.5%</td>
</tr>
<tr>
<td>Dental mal-obstruction</td>
<td>16</td>
<td>8.1%</td>
</tr>
<tr>
<td>Caries</td>
<td>11</td>
<td>5.6%</td>
</tr>
<tr>
<td>Dental stump</td>
<td>9</td>
<td>4.5%</td>
</tr>
<tr>
<td>Malformations</td>
<td>8</td>
<td>4.0%</td>
</tr>
<tr>
<td>Necrosis of pulp</td>
<td>7</td>
<td>3.5%</td>
</tr>
<tr>
<td>Pericoronitis</td>
<td>8</td>
<td>4.0%</td>
</tr>
<tr>
<td>Others</td>
<td>17</td>
<td>8.6%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>198</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

This picture shows that the majority of our investigated patient have pulpitis that is to say 69.1%; those consistent of traumatisms 18.2%. Then comes parodontopathy 9.5%, dental mal-obstruction 8.1% and caries represent 5.6%.

2.8. Crossorting between the food taste preference and the diagnosis

Table 8: Distribution of patients between the food taste preference and the diagnosis

<table>
<thead>
<tr>
<th>Food taste and diagnosis</th>
<th>Sugary</th>
<th>Salty</th>
<th>Sour</th>
<th>Bitter</th>
<th>Sugary-salty</th>
<th>Sugary-sour</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pulpitis</td>
<td>55</td>
<td>6</td>
<td>2</td>
<td>1</td>
<td>4</td>
<td>1</td>
<td>69</td>
</tr>
</tbody>
</table>

79.7% 8.7% 2.9% 1.4% 5.8% 1.4% 100%
<table>
<thead>
<tr>
<th>Condition</th>
<th>Count</th>
<th>2</th>
<th>5</th>
<th>10</th>
<th>10</th>
<th>1</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traumatism</td>
<td>26</td>
<td>5</td>
<td>3</td>
<td>0</td>
<td>2</td>
<td>1</td>
<td>36</td>
</tr>
<tr>
<td></td>
<td></td>
<td>72.2%</td>
<td>13.9%</td>
<td>8.3%</td>
<td>0%</td>
<td>5.6%</td>
<td>1.4%</td>
</tr>
<tr>
<td>Malformations</td>
<td>6</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>75.0%</td>
<td>0%</td>
<td>25.0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Parodontopathy</td>
<td>14</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td></td>
<td>93.3%</td>
<td>6.6%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Dental mal-obstruction</td>
<td>15</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td></td>
<td>93.8%</td>
<td>0%</td>
<td>6.3%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Dental stump</td>
<td>7</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td></td>
<td>77.8%</td>
<td>11.1%</td>
<td>0%</td>
<td>0%</td>
<td>9.1%</td>
<td>0%</td>
</tr>
<tr>
<td>Caries</td>
<td>9</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td></td>
<td>81.8%</td>
<td>0%</td>
<td>0%</td>
<td>9.1%</td>
<td>9.1%</td>
<td>0%</td>
</tr>
<tr>
<td>Necrosis of pulp</td>
<td>7</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>100%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Pericoronitis</td>
<td>7</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>87.5%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>12.5%</td>
<td>0%</td>
</tr>
<tr>
<td>Others pathology</td>
<td>14</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>17</td>
</tr>
<tr>
<td></td>
<td></td>
<td>82.4%</td>
<td>0%</td>
<td>11.8%</td>
<td>0%</td>
<td>12.5%</td>
<td>0%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>160</td>
<td>14</td>
<td>10</td>
<td>3</td>
<td>10</td>
<td>1</td>
<td>198</td>
</tr>
<tr>
<td></td>
<td></td>
<td>80.8%</td>
<td>7.1%</td>
<td>7.1%</td>
<td>1.5%</td>
<td>5.1%</td>
<td>0.5%</td>
</tr>
</tbody>
</table>
This picture indicates that the investigated patient that prefer the sugary taste developed the caries and pulpitis more in 82.05% (64)

**DISCUSSION**

### 3.1. DISTRIBUTION OF THEM INVESTIGATED ACCORDING TO THEIR AGES IN YEARS

The class of age of 6-10 years is the more concerned means 17.7% (IC=18.7±2.5) of cases consult the dental clinic. It is explained by several factors of which notably a deficient dental hygiene of the children on this age. It has been revealed by the cross sorting analysis between the dental hygiene and the age while showing that the age ≤ 5 years and the age of 6-10 years don't brush at all per day in 28.6%(IC=28.6±3.8) of case whereas the majority of age 6-10 years only brushes once per day.

WHO, in its report on the dental disease, found that 60 to 90% of the children in school age have some caries (WHO, 2000 and Peterson, 2013). However our survey found that 31.1% (IC=31.1±4.2) of the children between 6 and 10 years (what corresponds roughly to the school age) have the caries. This difference could be due to the fact that WHO report of is based on fundamentally communal studies (community of school children) whereas our study is done in the hospital setting including all ages.

It has also been found in this study that the age ≥ 36 years was the more concerned means 18.7% of case. However this class is too large in its interval because it is covering from 36 to 80 years and therefore it would not represent this proportion of 18.7% (IC=18.7±2.5) if it was split up into intervals of 5 years. This is how we retained the age of 6-10 years as being truly the more touched.

### 3.2. DISTRIBUTION OF INVESTIGATED ACCORDING TO THEIR GENDER

The two genders are touched fairly mean 49.5%(IC=49.5±6.8) for the masculine gender and 50.5% for the feminine gender.

### 3.3. DISTRIBUTION OF THEM INVESTIGATED ACCORDING TO THEIR PROFESSION

The unemployed person consult more the dental clinical followed by the student respectively 42.4% and 18.7% of case. It is especially important because the WHO affirms that the dental health is a serious problem in the poor communities (WHO, 2000 and Peterson, 2013).
3.4. DISTRIBUTION OF INVESTIGATED ACCORDING TO THE NUMBER OF TIME AND DENTAL BRUSHING MANNER

Our investigation showed that the majority of the patients not having consulted the dental clinical use to brush their teeth only once per day mean 72.2% of case.

The dental brushing done only once a day is 72.2% and those brushing on horizontal manner is 64.1%. The children of less than 5 years and those between 6-10 don't brush the teeth mean 28.6% (IC=28.6±3.9), whereas a study in Corsica showed that the majority of the children of 6 and 12 years brushes two times per day (Delaney et al., 2000 and Infante et al., 1973). The majority of our investigated proceed to the brushing in a horizontal manner is 64.1% of case. However the manual of the dental health published by the WHO for dental program recommends a daily dental hygiene and to be maintained for the whole life, from the calf tooth at 6 months to 8 months for the central incisors, the mouth and the teeth must be cleaned, to the minimum once per day or to best after every meal.

A simple mouth rinsing with water is not sufficient to eliminate the dental plate (this soft and whitish deposit on the teeth that is colonized by more and more numerous and pathogenic bacteria as it accumulates), but it is recommended after rinsing the mouth to use again the toothbrush or the stick rub-tooth. The brushing must reach the surfaces of all teeth as well as the gums, it is necessary to insist on the fact well that the brushing of the occlusal side of the tooth; the food deposits and the dental plates especially accommodate themselves to the level of the collar and between the teeth; these zones will be therefore the main targets of cleaning.

The molars and the Palatine faces of the teeth are very often forgotten. They will be the subject of a particular attention. The bleeding must not be an obstacle to the brushing. On the contrary, a regular brushing will eliminate the bleeding.

Indeed, it is necessary to always brush from the gum toward the tooth but ever horizontally (to brush the red toward the white), to brush the teeth on all their faces while using the brush vertically for the previous teeth and to brush with a horizontal movement on the occlusal face of the molars.

Finally, the brushing must be efficient without being brutal. It will last six minutes means that three minutes each side of the mouth (Moreiro et al., N.D).

3.5. DISTRIBUTION OF INVESTIGATED ACCORDING TO THEIR DIAGNOSIS

Our study shows that the majority of our investigated suffering from tooth decays is essentially 40.4% consistent of traumatisms facts of fractures and dislocations are 18.2% of case. The parodontopathies essentially made of desmodontitis and loosening only represents 9.5% of case.

The stumps, that represent 4.5% of case, are the dental fractures occurring at the level of the gum. Indeed, they should be classified among the traumatisms. However for the same aforesaid reasons, they are separated from the traumatisms. Thus, taken in them totality, the traumatisms represent 22.7% of case.
Our results are corroborated with a lot of studies and reports which confirm that the tooth decay is the most frequent dental pathology (Peterson, 2013; Delaney et al., 2000 and Burt et al, 1989). However, contrary to our investigation, this same studies also mention that the parodonpathy is as frequent as the tooth decay.

Indeed, it has been recognized that the maxillo-facial traumatism increases in alarming manner in Africa with shapes of traumatism due to the interpersonal violence in the community.

The observation of dental health few data are provided on the prevalence of congenital illnesses and benign tumours and it is due to the deficiency of reliable information and lack of research (Moynihan, 2005). However, our survey found that the congenital malformations represent 4,0% of pathologies essentially diagnosed composed of teeth supernumeraries and hypoplasics. To the fact, comparatively to other dental diseases, the tooth decay was the more frequently recorded despite the fact that some studies indicate that his its prevalence is generally low and static.

3.6. DISTRIBUTION OF INVESTIGATED ACCORDING TO THEIR FOOD TASTE CONSUMPTION PREFERENCE

The majority of our investigated prefer the sugary taste 80,8% of the cases and developed the caries more in 82,05%(64) compared to the other dental pathologies diagnosed.

The odds ratio between the consumption of sugars and the tooth decays is of 2,19. (OR 2,19; IC=44,3±6,7). It shows that the consumption of sugars is a risk factor in tooth decay. Indeed, the human experimental studies, the epidemiological studies and the animal studies brought proofs convincing the association between the quantity, frequency of the fermentable sugars intake and the dental illnesses, essentially the tooth decay (Moynihan et al., 2004 and Moynihan, 2005).

Certainly, it is true that several risks factors are incriminated in the tooth decay occurrence. However, these factors didn't constitute the object of this survey, except the consumption of sugars. It is about of:

- Factors of general order: (for example: diabetes) and food.
- Factors of local order: dental plate and tartar.

Indeed, the absorption of sugars allows the bacteria to multiply on the dental plate to develop (WHO, 2000)

CONCLUSION

It clears through this study that the tooth decay is the most frequent dental pathology in Hlotse / Leribe what means that the patient consults the dental clinical in advance stage of the illness.
The interval age of 6-10 years consults more the dental clinic. It means that it is this age group that should be considered as our target stage to stage our sensitisation as priority and the preventive measures.

The tooth brushing is sometimes done inadequately because the majority of our investigated brush solely of a horizontal way and that the children of less than 5 years and a proportion of the children of 6-10 years don't brush the teeth at all. It gives account of one deficient dental hygiene.

The dental traumatisms made fractures, stumps and dislocations are highly more frequent than the parodontopathies contrary to the magazine of the literature.

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FACTORS AFFECTING DISCLOSURE OF HIV STATUS TO SEXUAL PARTNERS AMONG WOMEN ATTENDING ANTENATAL CLINIC IN STATE SPECIALIST HOSPITAL, IKERE-EKITI

A Case Study by Dr Akinyemi Patrick Ayodeji ,Nigeria
(MBBS, Master in Public Health Student of Texila American University)
Email: kindepat@yahoo.com

ABSTRACT

BACKGROUND:

In this study, the factors affecting level of disclosure of HIV status to sexual partners was studied among HIV positive women in Ikere Ekiti.

PATIENTS AND METHODS:

An interviewer administered questionnaire was administered to 50 female respondent attending care and support group meeting. The degree of correlation between disclosure of HIV status to sexual partner and level of education was studied using chi square method at level of significance of $\alpha = 0.05$. other factors were also compared e.g. stigmatisation, fear of divorce etc.

RESULT:

Despite effort and resources available for HIV care including counselling service, 76% of patient who have not disclosed their status are not ready for disclosure. The study also shows that there is no relationship between level of education and significance.

Stigmatization is still a big challenge in the fight against the scourge as majority attached non disclosure to fear of stigma.

CONCLUSION:

Much effort is still required in the aspect of disclosure of HIV status among sexual partners through improvement of counselling section, legislation against non disclosure that is harmful to others and adoption of contract referral system into our health policy.

KEYWORDS:- HIV, Sexual Partners, Chi square method
IDENTIFICATION OF PROBLEM

Human Immunodeficiency Virus and Acquired Immune Deficiency Syndrome (HIV and AIDS) is now a chronic infectious disease due to availability of potent antiretroviral drugs to inhibit its progression. Despite the availability of potent antiretroviral drugs, it still remains the leading cause of death from infectious diseases especially among the reproductive age group in the developing world in which Ikere Ekiti in southwestern Nigeria is not an exemption.

The disease prevalence is more in women than men. A survey conducted in Nigeria put the prevalence in women between ages 15-24 years to be three times higher than that of men. It also revealed that female constitute about 58% of people living with HIV and AIDS (PLWHA)\(^1\).

HIV prevalence in Nigeria is 3.6% in the year 2013 while the median prevalence among pregnant women is 4.1%\(^1\).

Despite the mass enlightenment about the disease, it is still difficult to disclose ones status either openly or to a close relative and sexual partners due to stigma attached to the disease and many on towards effect.

Data on rate of disclosure either among sexual partners or to other people in Nigeria are not readily available and nil national survey to that effect despite its high importance in curbing the spread of the infection which in one of the most important goal in HIV and AIDS control programme.

Local study at the State Specialist Hospital, Ikere Ekiti in Southwestern Nigeria which serves as main treatment center for the city and its neighboring towns revealed that about 64.6% of pregnant women attending Prevention of Mother to Child transmission clinic (PMTCT) have not disclosed their status to their sexual partners.

LITERATURE REVIEW

HIV and AIDS is one of the highly stigmatized diseases in this part of the world. Other diseases in this category are leprosy, epilepsy, pulmonary tuberculosis and psychiatric illnesses. Despite the wide campaign and series of legislation on the disease, people living with HIV and AIDS are still being discriminated against virtually in all aspect of the society particularly in term of social relationship with others in the community, housing, employment and other basic needs of man which may even weigh the patient down even developing psychiatric disorders like depression.

Disclosure is the process of telling another person or community about ones HIV status. It is an act of revealing ones state of health, in this contest HIV status, to those that are important to the
patient i.e. people that are affected by his/her HIV status. These people may include the sexual partners, children and other patient’s dependant.

Disclosure of HIV status could be very challenging and require a lot of encouragement and counseling (Disclosure counseling)

Disclosure of status is affected by many factors in our local environment which includes major factors like:

- Fear of being neglected by the loved ones.

- Fear of broken family due to high risk of being divorced and it’s on towards effect on the children- children of broken home are prone to risky behaviour due to lack of parental guidance and poverty e.g. engaging in prostitution to make ends meet.

- Fear of stigmatization

- Fear of physical abuse and exposure by the sexual partner. This is particularly common in those that have being having estranged relationship. Women in Africa especially among the uneducated are prone to abuse from their male partners.

- Patient in a polygamous family setting may find it difficult to disclose due to fear of reaction from other wives and fear of being blamed for introducing the disease to the household which is not usually true in most cases as studies done has shown that male risky sexual behavior account for larger proportion of HIV/AIDS transmission.

- Other factors include having new sexual partners e.g. a newly married patient after previous divorce or death of sexual partner- fear of being lonely again. Patient with multiple sexual partners may not want to disclose her status due to lack of commitment /importance attached to the relationship or well being of the partners e.g. in cases of commercial sex workers which still serves as main source of infection in our environment.

Enabling factors for disclosure include:

- Stable and harmonious relationship- people in a long term and very cordial relationship have confidence and find it easy to reveal their status to their sexual partners than those in casual or estranged relationship.
Known status of partners: it is easier for a patient to disclose to a sexual partner if the status of the partner is known to be positive unlike in discordant couples.

Previous discussion between sexual partners about HIV and AIDS goes a long way to determine attitude towards disclosure.

Attitude/ temperament of the partner.

A study conducted in Cape Town, South Africa revealed that 20% of 630 HIV infected men and women have not disclosed their status to their partners. In a similar study carried out at adult clinic in kemissie district of North-East Ethiopia revealed that out 360 patient studied, 93.1% have disclosed their status to their sexual partners with 74.5% accepted, 10.8% of them faced with minor challenges or suspicion of result and 7.8% were faced with physical abuse and blame. The level of acceptance in this study is very significant and can be adduced to factors like high level of awareness of the disease among people and knowledge of safety precaution.

Prior studies on the role of gender in disclosure have shown no significant difference, however, the barriers and motivators of disclosure varied by gender.

In a study conducted putting various ethnicity into consideration (including black, white, latino) and different risk of transmission (IV drug user, homosexual and heterosexual) about 60% have disclosed their status while 40% have not disclosed.

The odd that individual with 1 sexual partner disclosed was 3.2 times the odds that a person with multiple sexual partners disclosed. The odds that an individual with high spousal support disclosed was 2.8 times the odds of individuals without spousal support. The odds that whites or latinos disclosed was 3.1 times the odds that black disclosed.

This study corroborate the fact that multiple sexual partners is one of the main factors millitating against disclosure. This is common among the blacks in which Ikere people are not an exemption. Though Ekiti State is one of states in Nigeria with least HIV prevalence, ranking second to Kebbi State, Ikere Ekiti is one of the town with highest prevalence in the State. Non disclosure as evidenced by the local data collected in HIV positive women under PMTCT with about 64.6% not ready to disclose their status to their husband / sexual partner despite series of disclosive counselling is a major challenge to the control of spread of HIV infection. Hence the high prevalence rate.

There is increase rate of coarbitation and pregnancy out of wedding as many youth get involved in unsafe sex practice. This has greatly increased due to effect of improved access to multimedia and internet facilities which has greatly influenced our adolescents and youth.

Nigeria is a typical example where study shown that with advent of GSM (Global System Mobile telecommunication) around year 2000, there has been significant increase in risky
behaviour like unsafe sexual practice, homosexuals, changes in mode of dressing – copying body revealing type of dressing in the western world. This has in turn increase the prevalence of raping particularly in female. Most youth were also found to be accessing internet for pornographic video and picture to enhance sexual stimulation.

Involvement of younger age in unplanned marriage particularly in some cultures in Nigeria is a great risk in disclosure as most ladies (adolescent) are bethrothed to an elderly person or arranged into marriage without her full consent or even when she is too young to make a sound decision. This predispose to poor relationship (Boss to servant relationship) hence, low spouse support.

Non disclosure has also been found to have adverse effect of the patient themselves in term of their adherence to medications, regularity in clinic and care and support group meeting. About 73% of patient under PMTCT who have not disclosed in SSH Ikere were found to be irregular with their drug pick up and adherence. Reasons for these usually include inability to give genuine reason to the husband for going to hospital often (monthly) and fear of being asked for the reason and purpose of the medication they take daily make their regularity on medication very poor hence reason for poor adherence, default and lost to follow up. The non disclosure due to afore mentioned factors is partly responsible for increase rate of drug resistance that we are having.

Among the patient who have not disclosed in a study, 57% used condom less than all the time. This also apply to our local setting as infected sexual partner do avoid raising suspicion from their sexual partners, hence may not practice protected sexual intercourse (use of condom)

There is no general conclusion as to when to disclose ones HIV status in those with new sexual partner but what is advocated is disclosure before sexual intercourse.

Means of disclosure include:

- Self disclosure- this is commoner among those in long term and steady relationship
- Through the assistance of the counselor or any other health care workers in charge of her management
- Involvement of religious leaders( priest and Imam)
- Any respectable person in the family or the community for the fear of negative reaction from the partner.

Benefit of disclosure.

- Disclosure help in ensuring that negative sexual partner is not infected.
- Encourage partner to access health care to know their status and receive care if positive.
- Reduction in risk of vertical transmission.
- Encourage provision of emotional support for the loved ones, thus relieving the patient from psychological trauma usually associated with the disease.
• Encourage adherence to medication as the patient can easily use the sexual partner as treatment supporter and there is no need for hiding the medications

PROJECT DESIGN.

Like in many other diseases especially those that are associated with stigma, there is challenge of under-reporting.

Majority of the patients under care were gotten from the routine antenatal clinic screening, this is partly responsible for high female preponderance in population of people living with HIV and AIDS.

STUDY AREA: The study was performed in Ikere Ekiti, Ekiti State in southwestern part of Nigeria (7° 30’N, 5°14’E/7.5°N, 5.2° E) with population of more than 100000 inhabitants using State Specialist Hospital in the town as treatment center. The center serves as referral center in the area for PMTCT and adult ART services. Many patients from the neighboring towns also utilize the center due to fear of stigma in their environment. The town has a tertiary institution thus making high risk behavior very rampant in the environment particularly among the youth.

DATA COLLECTION

Quota method of sampling was utilized in which pregnant women attending care and support group meeting under PMTCT were involved in the study.

Structured interviewer administered questionnaire was administered to elicit factors affecting disclosure of HIV status to their sexual partners.

RESULT: Out of 50 respondents studied, 52% have not disclosed their status to their sexual partner while only 48% have disclosed. This large chunk is really a cause for worry as non disclosure is a great risk for transmission of infection as most are involved in unprotected sexual intercourse like other people to avoid suspicion.

In the study of relationship between level of education and disclosure of HIV status.

<table>
<thead>
<tr>
<th>EDUCATION</th>
<th>YES</th>
<th>NO</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary</td>
<td>2</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Secondary</td>
<td>11</td>
<td>11</td>
<td>22</td>
</tr>
<tr>
<td></td>
<td>Tertiary</td>
<td>Total</td>
<td></td>
</tr>
<tr>
<td>-------</td>
<td>----------</td>
<td>-------</td>
<td></td>
</tr>
<tr>
<td>O</td>
<td>11</td>
<td>24</td>
<td></td>
</tr>
<tr>
<td>E</td>
<td>14</td>
<td>26</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>14</td>
<td>25</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Observed (O)</th>
<th>Expected (E)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>1.44</td>
</tr>
<tr>
<td>1</td>
<td>1.56</td>
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<tr>
<td>11</td>
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<td>11</td>
<td>11.44</td>
</tr>
<tr>
<td>11</td>
<td>12.00</td>
</tr>
<tr>
<td>14</td>
<td>13.00</td>
</tr>
</tbody>
</table>

\[
X^2 = \Sigma_{i=1}^{n} \frac{(O - E)^2}{E} = 0.996
\]

**HYPOTHESIS**

H\(_0\): There is no association between level of education and disclosure of HIV.

H\(_A\): There is association between level of education and disclosure of HIV status.

Level of significance \(\alpha = 0.05\) (5%)

Decision rule:

Reject H\(_0\) if chi square calculated is greater than chi square tabulated.

Degree of freedom:

\[
df = (r - 1)(c - 1)
\]

\[
(3 - 1)(2 - 1) = 2
\]

At df of 2, \(X^2_{\text{tab}}\) at 0.05 = 5.999

Calculated \(X^2_{\text{cal}} = 0.996\)
Decision and conclusion:

Since $X^2$ tabulated is greater than $X^2$ calculated. Null hypothesis ($H_0$) is accepted.

Based on our finding; it shows that with or without education, people declare their HIV status.

**FACTORS AFFECTING NONDISCLOSURE OF HIV STATUS TO SEXUAL PARTNERS.**

![Bar chart showing factors affecting non-disclosure](chart.png)

Despite adequate awareness and past effort globally effect of stigmatization is still on high side as it account for large proportion of reason for non disclosure. Fear of divorce is also very important. This is expected as women in Africa at large place high value on their married life and will do all they can to preserve their family.

**DISCUSSION:**

Despite the global effort aimed at preventing and cubing the spread of infection. Much effort is still required particularly at the local level. Due to dominating power of male in the family in African setting, there is need for more incorporation of male into health care particularly ANC as it is the major source of detecting patient HIV status.

There is also need for improvement in counselling service at local level as 76% of those who have not disclosed their status are not ready to disclose to their sexual partners. There should also be legislation against refusal to disclose. Deliberate refusal to disclose to sexual
partner should be punishable under the law or adoption of contract referral system into our national health policy. This is the system in which patient make contract to notify partner by a particular date after which the health department or counsellor can contact the partner.

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