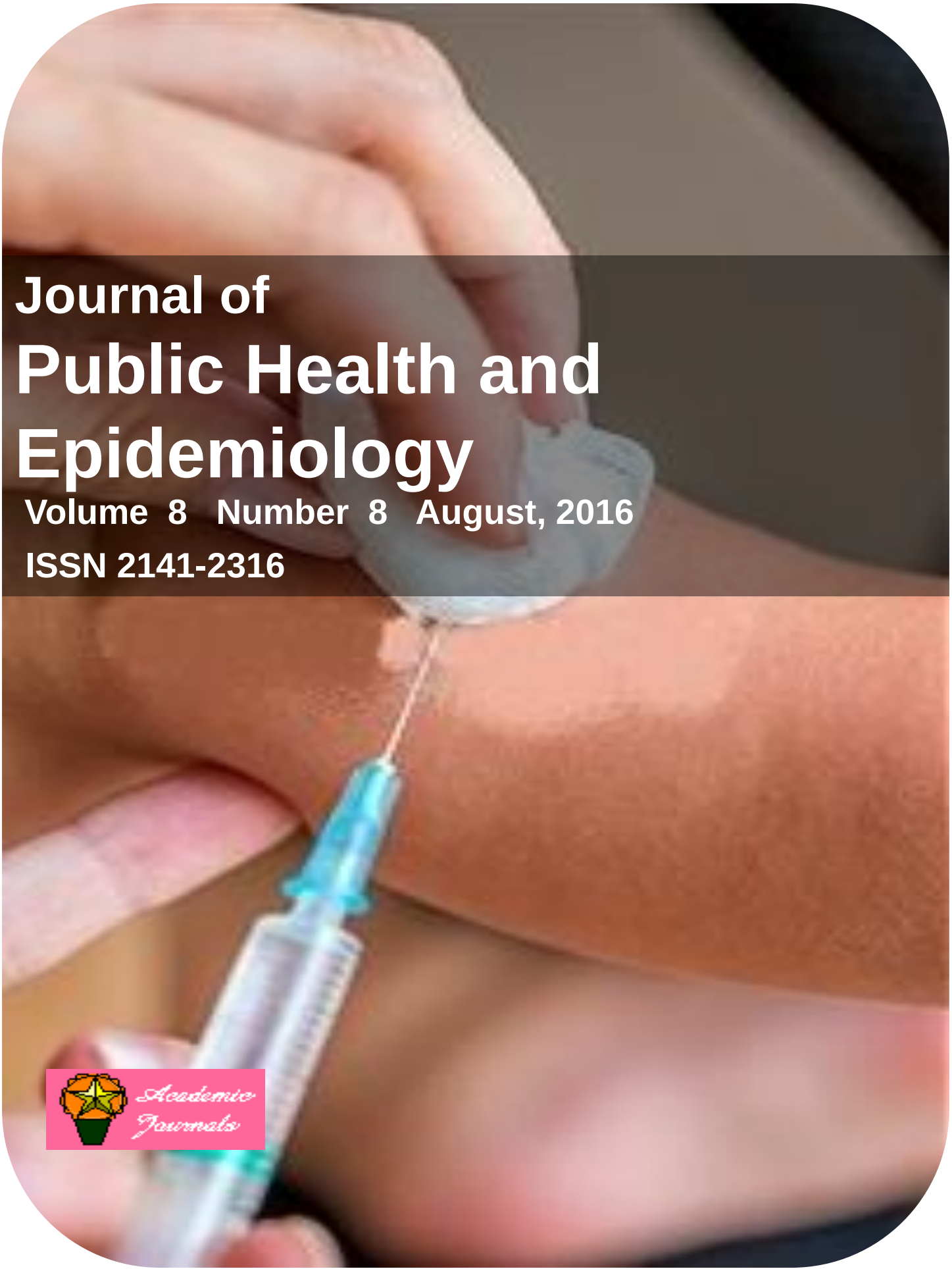

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Table of Content: Volume 8 Number 8 August 2016

ARTICLES

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Full Length Research Paper

Availability of guidelines and policy documents for enhancing performance of practitioners at the Primary Health Care (PHC) facilities in Gaborone, Tlokweng and Mogoditshane, Republic of Botswana

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This study aimed to determine the profile and availability of policies and guidelines as reference documents at Primary Health Care (PHC) facilities in Gaborone and its surrounding in Botswana using the World Health Organisation/Drug Action programme (WHO/DAP) Questionnaire. The Questionnaire is a standard recommended by WHO and therefore was not piloted. All 20 PHC facilities were included in the study, however, data from 18 clinics was collected and analysed. The Matron from each PHC facility was asked to name and produce as evidence, guidelines and policy documents available as reference in his/her PHC facility. Data was entered in an Excel spread sheet and percentages, averages and frequencies were used to describe the profile and availability of the documents at each facility. Fifty two different documents were available at the facilities, 50% of them were on treatment and management of diseases. The remaining 50% were distributed between general information/policy, Ante-Natal Clinic, obstetrics and gynaecological care, and family planning. Except for guidelines for treating sexually transmitted diseases (86%), availability of the other guidelines and policy documents was low (56%) or less. Policy and guideline reference information for disease immunisation and prevention were available at 4 and 13% PHC, respectively. This low availability of such important instruments may be compromising patient care in the studied PHC facilities and should be addressed. While the Ministry of Health has produced many policy documents and guidelines as reference documents for PHC providers, none of the clinics had all the documents, raising questions on what is available at the facilities as reference and guide in the prescription practices. It is recommended that ministries of health and PHC workers should ensure that necessary reference documents are available at the facilities and staff should be trained and retrained on the use of such documents.

Key words: Rational drug use, general policy documents, medical guidelines, benefits of the guidelines, health facilities.

INTRODUCTION

Rational use of drugs is an essential element in achieving quality health care. The World Health Organisation (1993) has advised that *"a rational use of drugs requires that patients should receive medications appropriate to their clinical needs, in doses that meet their requirements, for an adequate period of time, and at the lowest cost to them and their community"*. Regardless of the availability of health practitioner and consumer-focused information, irrational use of drugs occurs in all countries causing harm by increasing morbidity and mortality rates (World Health Organisation, 1993; Lazarou et al., 1998). Many factors contribute to the high rates of adverse effects related to inappropriate drug prescriptions including errors in dispensing the drugs, monitoring adverse effects, and patient's adherence to the regimes (Avery et al., 2002). The consequence of these is on the increase, for example leading to hospital admissions (Hurwitz, 1969; May et al., 1977; Ives et al., 1987; Grymonpre et al., 1988). With the elderly population increasing globally, this challenge is likely to be increased because of the increasing prevalence of chronic comorbidities. Therefore the need and importance of safe pharmacotherapy focusing on evidence-based medicine and quality care have become important issues on global agenda.

In an attempt to alleviate inappropriate drug use globally, the World Health Organisation has established indicators needed to systematically describe drug use in health facilities. The organisation has suggested that such indicators would allow health planners, managers and researchers to make basic comparisons between situations in different areas or at different times. The organisation has also developed drug use indicators to be used as measures of assessing the performance of a facility in three general areas of rational use of drugs in primary care: the prescribing indicators, patient care indicators and facility care indicators (WHO, 1993).

Drug therapy in primary health care is a complex field and a challenge for pharmacists, nurses, doctors, patients, and other stakeholders because it is influenced by many factors including obtaining drug information from evidence-based sources, health care worker's experiences, and interactions with opinion makers, patients or colleagues. The need for objective drug information sources in addition to drug industry-provided information has led to the establishment of local Drug and Therapeutic Committees which on an annual basis produce and implement local treatment guidelines in order to promote rational use of drugs (Milos et al., 2014).

Facility care indicators include treatment guidelines that are important in promoting rational use of medicines because they contain decisions to be followed by health care providers. The Guidelines integrate identified health problems and respective courses of action with the clinical judgment and experience of practitioners. Globally, many guidelines have been developed over the years and have placed treatment alternatives into classes to help practitioners in decision-making on which treatment to use. In addition, treatment guidelines are aimed at standardising healthcare, raising the quality of care, reducing risk to patients, healthcare workers, medical insurers and health plans and help in achieving the best balance between cost and medical parameters such as effectiveness, specificity, and sensitivity (Grimshaw and Russell, 1993).

General practitioners (GPs) all over the world tend to operate in broad clinical areas and use various ways of collecting information from their patients using patient-oriented care questions. The specialists on the other hand rely on sources like printed and electronic journals, treatment guidelines and other literature; or through correspondence and networks with colleagues (Bennett et al., 2005). Although practitioners and other health care workers may be aware of the existence of guidelines, prescribing practices can vary significantly and the causes of the variation can be complex differing from one clinic to another and from one country to another depending on the training backgrounds (Roumie et al., 2007), attitude and perceptions of care and the existing resources.

This report is part of a study conducted to investigate drug use practices at Primary Health Care (PHC) facilities in Gaborone, Tlokweng and Mogoditshane in Botswana as an attempt to create a baseline data on prescribing practices at PHC facilities in the selected study areas. This report focuses on determining the profile and availability of important treatment guidelines and national treatment policies that guide prescribing practices in the studied PHC facilities. The main aim of this part of the study is to map the profile and identify gaps on availability so that appropriate interventions can be developed for improving health care.

METHODS

This is cross-sectional descriptive study carried out between November and December, 2014 using the WHO/DAP drug use indicators guidelines (WHO, 1993). The World Health Organisation

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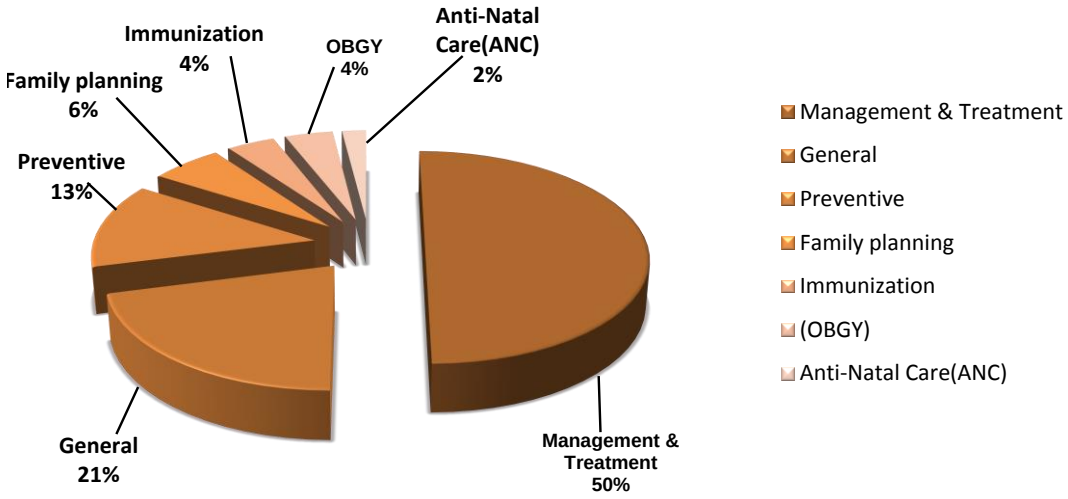

Figure 1. Categories of available guidelines and policy documents at the Primary Health Care facilities in Gaborone, Tlokweng and Mogoditshane. OBGY = obstetrics and gynaecology.

recommends that "*where there are fewer than 20 facilities in a geographical or administrative region to be studied, all facilities should be included in the sample*". There are 20 PHC facilities in the selected study area (Gaborone, Tlokweng and Mogoditshane districts) and all were included in the study. For easy understanding and communication with the practitioners at the PHC facilities, the World Health Organisation Questionnaire for collecting facility indicators (WHO, 1993) was used after being translated into Setswana, the local language. The Matron from each PHC facility was asked to list and produce the treatment guidelines and policy documents available at his/her PHC facility. The information on treatment guidelines and policy documents provided was used to determine the profile of the documents. Based on broad clinical and public health practices, the documents were grouped into seven broad categories. The categories included documents/guidelines related to management and treatment of diseases, general reference information (for example, Safe Motherhood, Botswana Treatment guidelines, British National Formulary, Enrolment Criteria for the National Rehabilitation Programme, Botswana National AIDS, Drug and Related Substances and policy documents), disease prevention, family planning, immunisation, obstetrics and gynaecological conditions and ante-natal care (ANC). Data were entered in an Excel spread sheet for analysis. The percentages, averages and frequencies were used to describe and analyse the data. Validity of the results was assured by data collected by trained health sciences university students and close monitoring of the processes and data analysis by experienced researchers. Ethical clearance was sought from the University of Botswana Institutional Review Board (Ref: URB/IRB/1506) and the Ministry of Health granted the project permit (Ref: PPME.13/18/87) to carry out the study. Permission to have access to the Primary Health Care facilities was obtained from the District Health Management Team in Gaborone. All respondents were asked to consent before the interviews.

RESULTS

There are 20 Primary Health Care facilities in the Gaborone City Council clinics, including Gaborone, Mogoditshane and Tlokweng. A total of 18 facilities took part in the study which brought the access rate to 90%. Two PHC facilities were excluded because one was under rehabilitation therefore out of service, while the other had no patients at the time of the study and the clinic staffs were on leave. Gaborone district constituted the majority 13 (72%) of the clinics followed by 3 (16%) clinics in Mogoditshane and two (11%) clinics in Tlokweng. Data from the 18 clinics were analysed.

The profile of guidelines and policy documents available at the PHC facilities in the studied clinics

Figure 1 shows the profile of the guidelines and policy documents available at the PHC facilities. Fifty two documents were identified from the facilities and the majority (90%) were found in the offices of the Matron therefore not easily accessible in the consulting rooms. Similarly, most facilities had one copy of the documents explaining why they were kept in the Matron's offices. The Management and Treatment category accounted for 50% of all documents available in the facilities followed by the general documents category 11 (21%). The types of the general and policy documents are shown in Table 1. The guidelines on prevention and family planning provide practitioners with definitions, general information, processes and operational procedures for early detection and prevention of diseases. Preventive and family planning documents accounted for 13 and 6%, respectively while immunisation and obstetrics and gynaecology each accounted for 4%. Antenatal care documents accounted for 2%.

Table 1. The frequency of availability of general and policy documents at the PHC facilities in Gaborne, Mogoditshane and Tlokweng districts. PMTCT = Prevention of Mother To Child Transmission of HIV.

Guideline/Policy document	Frequency	% Availability
British National Formulary	9	50.0
Botswana National HIV/AIDS	7	38.9
Botswana Treatment Guideline	6	33.3
Assessment and Classification of Children from 2months to 5 years	3	16.7
Botswana Community TB Care Policy	3	16.7
PMTCT	3	16.7
Baby Care Assessment	3	16.7
Merck Manual of Medical Instruction	1	5.6
Safe Motherhood Guideline	1	5.6
Enrolment Criteria for National Rehabilitation Programme (NRP)	1	5.6
Breast feeding Position and Attachment	1	5.6

Available general guidelines and policy documents

The general guidelines and policy documents are the basic documents prepared by the Ministry of Health and they provide the framework and guide based on local and international standard of care and practices. The distribution of the general documents category is shown in Table 1. Most expected general documents like HIV/AIDS treatment, TB treatment and the Botswana treatment guidelines were hardly available in most facilities. However, the British National Formulary was found in 50% clinics followed by the Botswana National HIV/AIDS Guidelines at 7(39%) of the clinics. The Botswana Treatment Guidelines (2007) was found in only 6(33%) facilities and the remaining, including guidelines like the Botswana Community TB Care Policy, PMTCT Programme and Baby Care Assessment were found in between 6 and 17% of the facilities.

Available guidelines on disease prevention

The highest proportion of availability of guidelines on disease prevention was that of the TB/HIV Active Case Finding Tool Guideline 4(22%) followed by Disease and Control Strategies (Measles) Guidelines, and the Pap Smear Results Management Algorithm Guidelines each found in 3(17%) facilities. Other essential guidelines were hardly available in most of the facilities as indicated in Figure 2.

Available guidelines on family planning

Figure 3 shows that out of the 18 facilities, the guideline (Botswana Family Planning Procedures for Service Providers (Rev, 2012) was available at 5(28%) clinics followed by the guide to family planning and counselling 4(22%). The Methods of Contraception (an important document for empowering women to make choices on contraception) was available at 3(17%) of the clinics.

Available guidelines on the management and treatment of diseases

Figure 4 shows the distribution of the guidelines on the management and treatment of diseases at the facilities. Except for the guidelines for the management of STIs found in 16(89%) facilities the other guidelines were available in about half of the facilities.

Available guidelines on the management of obstetrics and gynaecology, conditions

Figure 5 shows that 2(11%) facilities had the clinical classification and management of abortion, and only 2(11%) had the guidelines for the management of hypertensive disorder of pregnancy. The documents were not found at other facilities.

DISCUSSION

A medical guideline is a document used in guiding decisions and determining criteria for diagnosis, prevention, management, and treatment of diseases in specific areas of healthcare. In the history of medicine such documents have been developed and been used for thousands of years (Kane, 1995). Usually, the documents are subjected to reviews depending on emerging conditions and disease trends. Healthcare providers are therefore required to know and have access to the

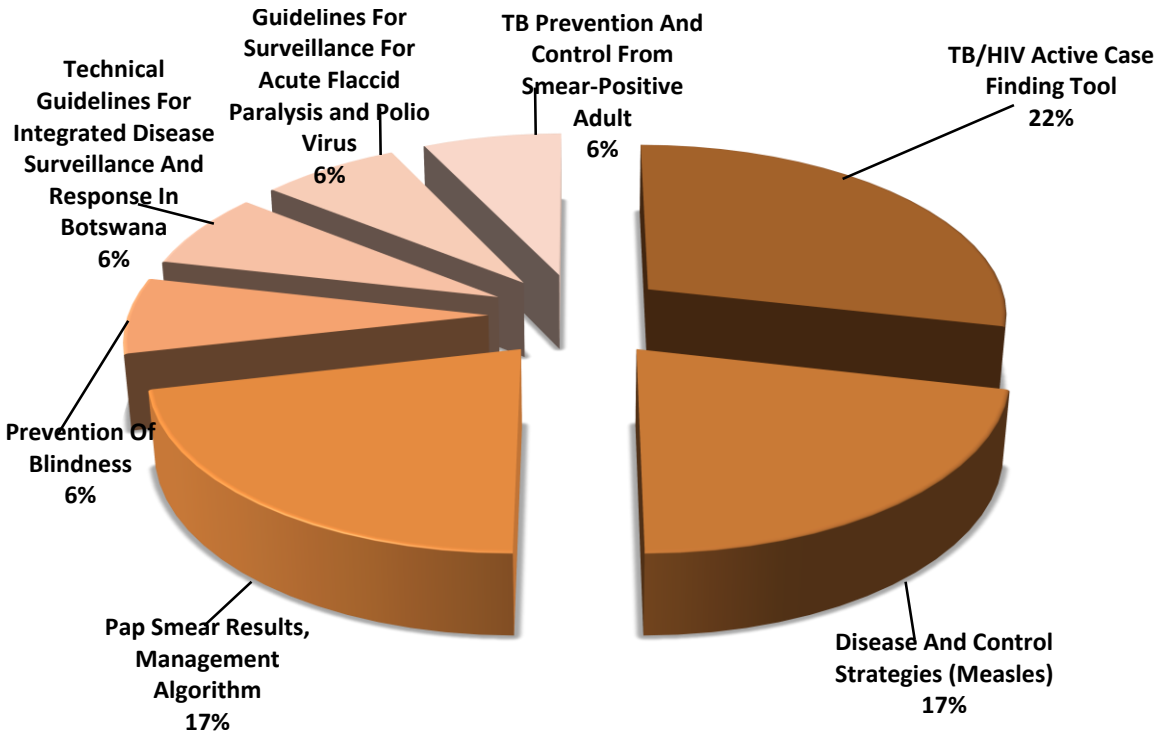

Figure 2. Available guidelines related to disease prevention at the PHC facilities in Gaborone, Tlokweng and Mogoditshane districts.

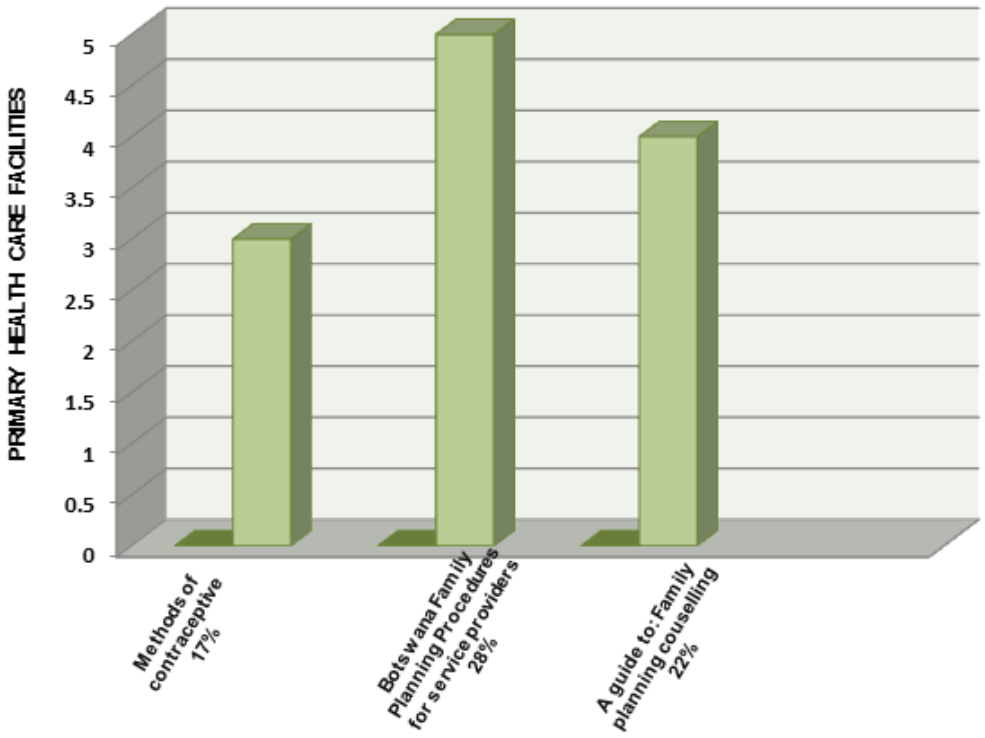

Figure 3. Available guidelines on family planning at the PHC facilities in Gaborone, Tlokweng and Mogoditshane districts.

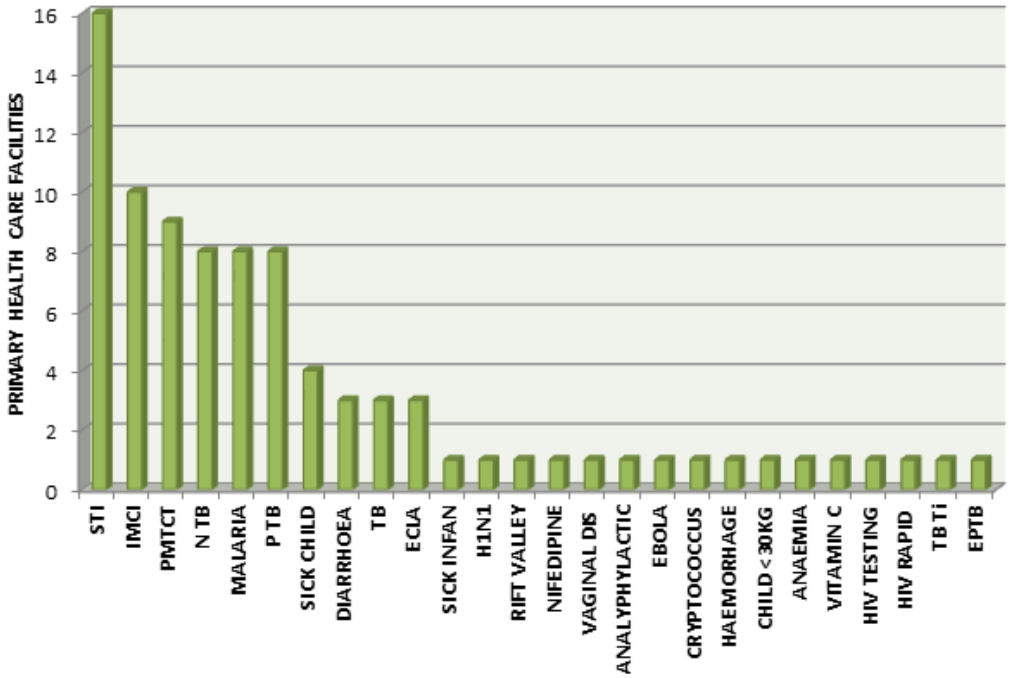

Figure 4. Available guidelines on management and treatment of diseases at the PHC facilities in Gaborone, Tlokweng and Mogoditshane districts. Key: IMCI = Integrated Management of Childhood Illness; NTB = National TB Programme Manual TB; PTB = Algorithm for Ambulatory Management Of Patients With Presumptive TB, Using Expect MTB/RIF; ECLA = Management of Eclampsia; TB Ti = Management Of TB Treatment Interruption; EPTB = Treatment Of Extra Pulmonary TB (EPTB).

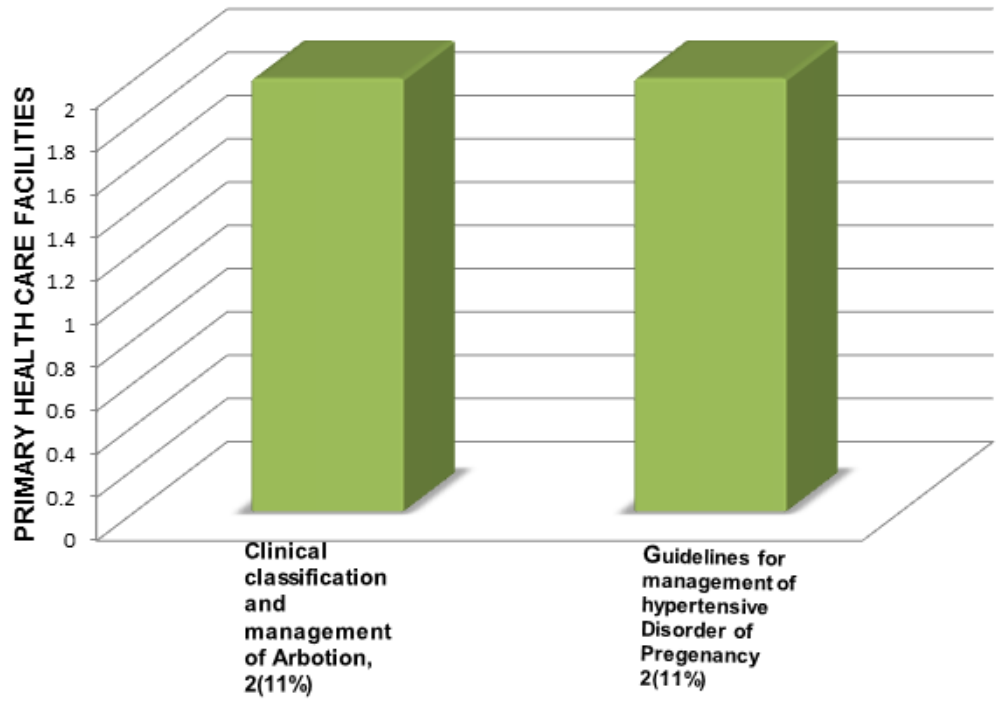

Figure 5. Available guidelines on obstetrics and gynaecology at the PHC facilities in Gaborone, Tlokweng and Mogoditshane districts.

medical guidelines of their profession and have the right to decide whether or not to follow the recommendations of a guideline depending on the disease conditions and trends. Lack of and non-accessibility to such reference resources (guidelines) has a potential to lead to irrational prescribing including misuse of antibiotics with consequent emergence of microbial drug resistance. It is increasingly recognised that overuse of antibiotics enhances the development of antibiotic resistance, increasing morbidity and mortality as well as increasing costs (Goossens, 2006; Costelloe et al., 2010; Sabuncu et al., 2009; Kesselheim and Outterson, 2010; Barnett and Linder, 2014).

The WHO warned that the rates of resistance among nosocomial and community acquired infections are high and need to be addressed (WHO, 2014). In fact, common infections are becoming more difficult to treat with standard drugs compelling prescribers to shift to newer approaches (Fagnan, 1998; WHO, 2001; Falagas et al., 2008; WHO, 2014). The option to go on the more expensive second-line and third-line therapy increases the cost with serious consequences on the provision of healthcare especially in the developing and middle income countries (Hassali et al., 2015). It has previously been reported that inappropriate use of antibiotics may be escalated by limited adherence to guidelines among physicians in a number of countries and non-adherence to guidelines is thought to be more prevalent among physicians in the public sector (40%) than private-for-profit sector facilities at <30% (Holloway et al., 2013; MdRezal et al., 2015). A study in Malaysia's private ambulatory care clinics (third highest category facility) showed high antibiotics utilisation compared to public primary health care centres (WHO, 2012). These findings led to the introduction of drastic measures by the Government of Malaysia and other institutions; including publication of national antibiotics guidelines, mobile phone application to facilitate and promote access of the guidelines by health care workers (Pharmaceutical Service Division, 2015).

The Ministry of Health (MOH), United Republic of Botswana is mandated with oversight and delivery of health services for Batswana. It is responsible for the formulation of policies, regulations, norms standards and guidelines of health services. The ministry is also a major provider of health services through a wide range of health facilities and management structures. MOH provides primary health care services through District Health Management Teams (DHMTs). DHMTs are responsible for the operation of a network of health facilities, hospitals, clinics, health posts and mobile stops as well as community based preventative and promotional services (www.gov.bw/en/Ministires--Authorities/Ministry ofHealth-MOH/A). Over the years, the government has developed several policy documents and guidelines aiming at harmonising prescribing, treatment and prevention practices at the health facilities in the country.

It was anticipated that most of the general policy documents and guidelines would be available in most of the PHC facilities in and around the capital city, Gaborone. However, it was found in this study that there was a paucity of these documents and guidelines at the PHC facilities. This paucity of documents may be worse than reflected in this study because the fact that each clinic has at least two consulting rooms was not taken into account. The finding that the documents were in single copies produced from the Matron's offices suggest that these resources are inadequate and not readily accessible which may lead to serious health care consequences in busy clinics where health care workers attend to many patients and have little access to reference documents.

The two major findings in this study were firstly that most (50%) of the existing general and policy documents and guidelines focused on management and treatment. Because of the emphasis on prevention rather than cure policy, it was anticipated that documents on prevention would contribute significantly to the proportion of available documents. On the contrary, prevention and immunisation documents together accounted for only 17% of the documents. This finding may be a reflection of emphasis on treatment of diseases rather than on prevention. Secondly, not all documents and guidelines are available at all primary healthcare facilities. The low availability of the guidelines at PHC facilities raises questions on why some of the key guidelines and policy documents are not available at all clinics and what practitioners use as reference resources in their practices? These questions need to be answered through a qualitative study. Such answers will provide an in-depth overview of the PHC facilities and the available resources guiding prescribing practices at that level.

The principal benefit of guidelines is to improve the quality of care to patients and communities. Ensuring availability of guidelines at all time has now become more pressing. The 2014 Ebola outbreak in West Africa has taught the global community on the need for immediate action to establish global capacity to: prevent, detect and rapidly respond to biological threats like Ebola. In 2014, countries developed eleven lines of effort in support of the Global Health Security Agenda Action packages designed to outline tangible, measurable steps required to prevent outbreaks, detect threats in real time, and rapidly respond to infectious disease threats (http://www.cdc.gov/globalhealth/security). These can effectively be achieved through among others, strengthening training and deployment of an effective bio-surveillance workforce. The workforce however, would require clearly written documents and guidelines to keep them up to date. The documents should be short, focused, reader-friendly and written in a language that is easily understood. In addition, health care worker at PHC

facilities should be well trained and educated regarding essential guidelines and initiatives to maximise the benefits of the drugs they prescribe. The findings reported in this study suggest that the quality of care to patients may be compromised by suboptimal availability of some essential policy documents and guidelines in most of the PHC facilities in Gaborone, Tlokweng, and Mogoditshane. This shortage of policy documents and guidelines is likely to be worse in areas further away from Gaborone, the capital city. A study of the more remote PHC facilities will clarify this. It is recommended that similar studies should be done in other PHCs in the country and the ministry of health should take full responsibility on regular basis to ensure availability of important guidelines at healthcare facilities and replenish where some of the documents are torn or lost.

Since similar findings are likely to be found in other countries, these findings provide evidence-based information on some of the challenges at PHCs and the Ministries of Health should ensure regular training and retraining of healthcare providers on the use and interpretation of guidelines and policy documents; and determine links of the training with outcomes. Healthcare providers on the other hand should be encouraged to make use of the policies and guidelines; and should on regular basis take stock of the existing documents with the view to ensure that facilities are stocked with necessary policy documents and guidelines.

Limitations

The cross-sectional nature of the study in more closely monitored health facilities may not reflect the extent of the challenge in availability and access of relevant guidelines that are required to improve the performance of the health workers at the primary health care facilities in Botswana, and generalisation to other countries. A repeated survey including some remote PHC facilities would provide some reasonable extent of availability and non-availability of the necessary tools in such facilities.

Conflict of Interests

The authors have not declared any conflict of interests.

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Journal of Public Health and Epidemiology

Full Length Research Paper

Knowledge of risk factors for lifestyle induced chronic diseases among secondary school students in Obio/Akpor LGA, Rivers State

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The study determined knowledge of risk factors for lifestyle induced chronic diseases among secondary school students in Obio/Akpor LGA, Rivers State. The sample for the study consisted of 480 secondary school students. The sample was drawn using multistage sampling procedures. The instrument for data collection was a researcher-designed structured questionnaire. Three experts validated the instrument. Reliability of the instrument was established using Split-half method and Spearman-Brown Correction Formula. The reliability coefficient of the instrument was 0.60. Data analysis was performed using frequency and percentages while inferential statistics of Chi-square (χ^2) was employed to test the null hypotheses. Results showed that students had average knowledge (57.8%) of risk factors for lifestyle induced chronic diseases. Recommendations such as implementation of vigorous awareness campaign through health education on health risks of lifestyle induced diseases in schools, integration of nutrition education into the curricula of subjects such as Health Education, Home Economics, Biology and Health Science will help educate students on risk factors for lifestyle induced chronic diseases were made. In addition, interventions directed at reducing or modifying unhealthy lifestyles such as smoking, substance abuse/misuse and sedentary behaviours should be designed and effectively implemented at schools.

Key words: Physical activity, risk factors, adolescents, unhealthy lifestyles, chronic diseases.

INTRODUCTION

Chronic diseases of lifestyle are a group of conditions accounting for millions of deaths globally each year. In 2008, for example, chronic diseases of lifestyle accounted for 36 million deaths worldwide with 80% of these deaths in low-income countries (Afghanistan and Bangladesh) and middle-income countries (Algeria and

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South Africa), with a projected global increase between 2010 and 2020 of 15% (WHO, 2012). Chronic diseases are a serious threat to health and longevity in developing countries. In all but the poorest countries, the death and disability from chronic diseases now exceeds that from communicable diseases-comprising 49%, compared with about 40% for communicable disease and 11% for injuries (Lopez et al., 2006). Sub-Saharan Africa (SSA), consisting of those countries that are fully or partially located in south of the Sahara Desert, are currently experiencing one of the most rapid epidemiologic transitions characterized by increasing urbanization and changing lifestyle factors (Fezue et al., 2006), which in turn have increased the incidence of non-communicable diseases (NCDs), especially cardiovascular diseases (CVDs).

In countries such as Nigeria, Ghana and South Africa, the prevalence of chronic diseases is increasing, while the threat of communicable and poverty-related diseases (malaria, infant mortality, cholera, malnutrition) still exists (Yach et al., 2004). The influences of urbanization are also apparent in most Nigerian cities; this is usually accompanied by other high risk dietary and lifestyle behaviours (Tesfaye et al., 2009).

Lifestyle diseases are diseases that appear to increase in frequency as countries become more industrialized and people live longer. They can include atherosclerosis, asthma, some kinds of cancer, chronic liver disease or cirrhosis, chronic obstructive pulmonary disease, heart disease, depression and obesity (WHO, 2008). Lifestyle diseases also known as chronic lifestyle diseases (CDLs) are a group of diseases that share similar risk factors, because of exposure, over many decades, to unhealthy diets, smoking, lack of exercise, and possibly stress. These results in various long-term disease processes, causing high mortality rates attributable to heart attack, tobacco and nutrition induced cancers, and many others. Universally, these diseases are also known as non-communicable diseases (South African Medical Research Council, 2013). Lifestyle induced chronic diseases share similar modifiable risk factors, which include tobacco smoking, nutrition, alcohol and physical activity.

A risk factor is any attributable, characteristic or exposure of an individual that increases the likelihood of developing a disease or injury (WHO, 2014). Chronic diseases have multiple preventable risk factors, which operate at different levels, from the most proximal (that is, biological), to the most distal (that is, structural). These risk factors can be classified as ‘modifiable’ and ‘non-modifiable’. Modifiable determinants include factors that can be altered, such as individual and community influences, living and working conditions and socio-cultural factors. On the other hand, non-modifiable determinants include those factors that are beyond the control of the individual, such as age, sex and hereditary factors.

Lifestyle diseases common among adolescents include: obesity and overweight, respiratory diseases, cancers (breast, oral cavity, oesophagus, and pharynx), depression (Kiberd, 2006; Soerjomataram et al., 2007; Perlitz, 2009; Anderson et al., 2009; Ferlay et al., 2010; Soerjomataram et al., 2010). Other factors have also been implicated in the prevalence of chronic diseases among adolescents in developing countries. Rapid urbanization and economic development have also led to the emergence of a nutritional transition characterized by a shift to a higher caloric content diet and/or reduction of physical activity. Together, these transitions create enormous public health challenges, and failure to address the problem may impose significant burden for the health sector and the economy of sub-Saharan African countries (Afshaw, 2005).

At an individual level, efforts to encourage people including secondary school students to be knowledgeable of risk factors for chronic diseases of lifestyle may inadvertently reduce the focus on other disease prevention factors such as lifestyles modifications. This concern is supported to some extent by models of health behavior and coping. The common sense model of self-regulation in health and illness (CSM) (Leventhal et al., 1998) is the most widely used model to explain how people interpret and cope with current and potential health events or threats. The CSM posits that individuals facing a health threat go through several stages, including active processing of cognitive representations of the health threat (including personal ideas about disease etiology or causal beliefs) and using the representations formed to steer the development of action plans for coping with the problem (Lau-Walker, 2006). The CSM explicitly states that people’s cognitive representations of disease (including causal beliefs) directly influence the coping strategies they select to reduce the disease threat (Leventhal et al., 1998). Confidence in the ability of a given intervention or behaviour to reduce disease risk has been labelled ‘perceived response-efficacy’ (Witte and Allen, 2000) or ‘outcome expectancies’ (Schwarzer and Fuchs, 1999), and is widely acknowledged to be one of the key cognitive predictors of behavior change (Norman and Conner, 1999). The CSM suggests a direct relationship between causal beliefs and perceived response efficacy.

Several definitions of knowledge have been presented in literature. Knowledge is a set of structural connectivity patterns and its contents have to be viable for the achievement of goals (Guldenberge, 1999). Knowledge is a familiarity, awareness or understanding of someone or something, such as facts, information, descriptions, or skills, which is acquired through experience or education by perceiving, discovering, or learning (Guldenberge, 1999). Knowledge can refer to a theoretical or practical understanding of a subject. It can be implicit (as with practical skill or expertise) or explicit (as with the theoretical understanding of a subject); it can be more or

less formal or systematic. However, several definitions of knowledge and theories to explain it exist (Atherton, 2013). Knowledge acquisition involves complex cognitive processes: perception, communication, and reasoning; while knowledge is also said to be related to the capacity of acknowledgment in human beings (Atherton, 2013).

Variables associated with knowledge of risk factors for lifestyle induced chronic diseases among in-school adolescents include: age, gender and class of study. WHO (2010) identified adolescence as the period in human growth and development that occurs after childhood and before adulthood, from ages 10 to 19. It represents one of the critical transitions in the life span and is characterised by a tremendous pace in growth and change that is second only to that of infancy (WHO, 2014). Adolescence and youthful periods have been considered the healthiest period of a person's life due to low mortality rate, recent trends have, however, given rise to concerns in many quarters. Blum (2009) noted that there has been a major shift in causes of morbidity and mortality among young people over the past 25 years. In particular, the author highlighted that "what distinguishes the causes of death of young people is that most deaths have behavioural causes exacerbated by national policy or failures of health service delivery systems, or both". The leading health challenges of young people globally are sexual and reproductive health issues, accidental and intentional injuries, mental health problems, substance use and abuse, and unhealthy eating behaviours (Tylee et al., 2007).

Adolescents are different from both young children and adults. Specifically, adolescents are not fully capable of understanding complex concepts or the relationship between a certain inimical behaviour and its consequences, or the degree of control they have or can have over health decision making. Thus, these attributes make adolescents including schooling adolescents in Obio/Akpor LGA vulnerable to unhealthy lifestyles and other risk factors which eventually may initiate onset of chronic diseases. The study was conducted in Obio/Akpor LGA. Obio/Akpor LGA is located in Port Harcourt, Rivers State (Appendix B). Prevention and control of chronic diseases of lifestyle or other cardiovascular diseases has not received due attention among adolescents in many developing countries including adolescents in Obiakpor LGA, Rivers State. It has been established in literature that adolescents exhibit risk factors for chronic diseases with attendant health consequences. Investigating prevailing risk factors for chronic diseases of lifestyle among schooling adolescents will assist in the recognition of predominant risk factors and provide insights into measures for preventing and modifying the risk factors. Therefore, the study sought to determine knowledge of risk factors for chronic diseases of lifestyle among schooling adolescents in Obiakpor LGA, Rivers State with a view to informing policy making and laying the premise for valid public health interventions.

Purpose of the study

The main purpose of this study was to determine knowledge of risk factors for chronic diseases of lifestyle among in-school adolescents in Obio/Akpor LGA, Rivers State. In addition, knowledge of risk factors lifestyle induced chronic diseases was examined based on selected sociodemographic variables such as age, gender and class of study. Based on this, the following null hypotheses were formulated:

(1) There is no significant difference in the knowledge of risk factors for lifestyle induced chronic diseases among secondary school students in Obio/Akpor LGA, Rivers State based on age.
(2) There is no significant difference in the knowledge of risk factors for lifestyle induced chronic diseases among secondary school students in Obio/Akpor LGA, Rivers State based on gender.
(3) There is no significant difference in the knowledge of risk factors for lifestyle induced chronic diseases among secondary school students in Obio/Akpor LGA, Rivers State based on class of study.

MATERIALS AND METHODS

The study utilized descriptive survey research design. The population of this study comprised 22,229 male and female secondary school students in the 20 registered secondary schools in Obio/Akpor LGA, Rivers State (Rivers State Universal Basic Education Board Obio/Akpor Local Government Authority, 2014). The sample for the study constituted 480 students in Obio/Akpor LGA Rivers State. This represented 2.02% of the population. There was no valid estimate for prevalence of lifestyle-induced chronic diseases among students due to dearth of similar study on specific population of secondary school students in Obio/Akpor LGA, thus, the researchers, therefore, assumed that 50% of the secondary schools students would have at least engaged in one unhealthy lifestyle with potential to induce chronic disease at 95% confidence level and 5% margin of error. The sample size was determined using Fisher's (Vaughan and Morrow, 1989) sample size determination formula. The formula and calculation of the sample size are illustrated as:

$$\mathrm{ME} = z\sqrt{\frac{p(1-p)}{n}}$$

where ME is the desired margin of error, z is the z-score, that is, 0.05 for a 95% confidence interval,
p is our prior judgment of the correct value of prevalence of expected attribute/characteristic (50% of students expected to have at least engaged in one lifestyle that has potential to induce chronic disease), and n is the sample size (to be found).
So. in this case, we set ME equal to 0.05, z =1.96 and p=0.5, and n becomes

$0.05 = 1.96\sqrt{0.5\ (1-0.5)/n}$
$0.5 \times 0.5/n = (0.05/1.96)^2$
$0.25/n = 0.00065$

n = 0.25/0.00065 = 384

However, 480 students were eventually included in the study to make up for attrition and non-response. This decision is supported by Gorard's (2003) recommendation that in a survey, due to factors such as non-response, attrition and respondents' mortality, that is, some participants will fail to return copies of questionnaires, abandon research, return incomplete or spoiled copies of the questionnaire, it is advisable to overestimate the sample required, to build in redundancy. All these factors were taken into cognizance during sample size determination for this study. A multi-stage sampling procedure was adopted to select the sample. The first stage involved the use of purposive sampling technique to select four schools out of the existing 20 public secondary schools in Obio/Akpor LGA, Rivers State (Appendix A). This is necessitated by the fact that the four schools selected have large number of students. In similar vein, purposive sampling technique was used to select four classes out of the existing six classes that constituted the secondary school educational system in Nigeria. The rationale for this decision was due to the non-existence of Junior Secondary School Class Three (JSS 3) and Senior Secondary School Class Three (SSS 3) students in the schools at the time of questionnaire administration and retrieval. These groups of students left the schools after their National Examination Council (NECO) and West African Examinations Council (WAEC) conducted exams. Thus, only JSS 1, JSS 2, SS 1 and SS 2 classes were sampled for the study. The third stage involved the use of simple random sampling technique of balloting without replacement to select 30 students each in the four selected classes. This procedure produced a total of 120 students in each of the four selected schools.

Research instrument

A 12-item researcher designed structured questionnaire on risk factors for chronic diseases of lifestyles among students, referred to as Questionnaire on Knowledge of Risk Factors for Lifestyle Induced Chronic Diseases (QKRFLICD) was used to generate quantitative data. The QKRFLICD comprised two major sections, namely: Sections A and B. Section A generated information on socio-demographic variables (age, gender and class of study) of secondary school students. Section B, which comprised nine structured questions with a dichotomous response option of "Yes" or "No" generated information on knowledge of risk factors for lifestyle induced chronic diseases among secondary school students. The respondents were asked to tick (√) either "Yes" or "No" against the questionnaire items. The face validity of QKRFLICD was established by three experts in the Department of Public Health, Faculty of Health Sciences, Madonna University, Nigeria, Elele, Rivers State. Each of the experts was given a draft copy of the questionnaire and accompanied with specific purposes of the study, research questions and hypotheses. The expert's verdict, inputs, corrections and suggestions were used to design the final draft of QKRFLICD. The reliability of the instrument was established using the split-half method and Spearman-Brown Correction Formula. The reliability of instrument was ensured via its administration on 20 secondary school students in Ikwerre local Government Area, Rivers State, which were not part of the study. Copies of the questionnaire were administered once.

In order to gain access to the schools and reach the students, a letter of introduction was collected from the Head, Department of Public Health Madonna University Elele, Rivers State explaining the purpose of study and introducing the investigators. Data collection was done by administering the copies of QKRFLICD to the respondents on face to face basis. The researchers, researcher assistants (RAs) and teachers assisted in administering the questionnaire. Out of 480 copies of the questionnaire distributed, 392 copies were valid and used for data analysis, thus giving 81.7% return rate. A big bag was provided for the secondary school students. They were requested to drop completed copies of the questionnaire into the bag. This helped in ensuring anonymity of the respondents. The completion of the questionnaire was done out of the students' volition.

The data generated were analyzed using Statistical Package for Social Sciences (SPSS version 20). The data were analysed on an item-by-item basis, frequency and percentages were used to analyze the data generated from section B. Chi-square statistic was adopted for data analysis of the formulated null hypotheses. The corresponding p-values of the calculated chi-square (χ^2) values were compared at .05 level of significance and appropriate degrees of freedom.

Inclusion criteria

The inclusion criteria included being a bonafide student of any of the selected schools during 2014/2015 academic session in Obio/Akpor LGA and willingness to participate in the study after given informed consent.

Exclusion criteria

These include not responding to all the items in the copies of the questionnaire, or inappropriate or inconsistent response to the questionnaire items based on the investigators' discretion.

Ethical consideration

Students were given informed consent letters seeking their permission to participate in the study. The students were not coerced to participate in the study.

RESULTS AND DISCUSSION

The prevalence of chronic lifestyle diseases and metabolic syndrome has shown an unprecedented increase in developing nations including Nigeria over the past few decades. Ezzati et al. (2002) reported that in both developing and developed regions, alcohol, tobacco, high blood pressure, and high cholesterol are major causes of the disease burden. There is dearth of information on knowledge of risk factors for lifestyle induced chronic diseases among in-school adolescents. This study was conducted to ascertain of knowledge of risk factors for lifestyle induced chronic diseases among students in Obio/akpor LGA, Rivers State.

Results in Table 1 showed that students had average knowledge (57.8%) of risk factors for lifestyle induced chronic diseases. This finding is in tandem with the findings of Morris et al. (2003) who reported that half of the respondents (49%) agreed that genes can increase the likelihood of medication side effects, 39% endorsed genetic risk for chronic diseases caused by smoking, 27% for influenza and 23% agreed that genes can increase the likelihood of illness in response to environmental exposures such as pesticides.

Data in the Table 2 showed that students within age brackets of 15-19 and 20-24 years had good knowledge of risk factors for lifestyle induced chronic diseases

Table 1. Knowledge of risk factors for lifestyle induced chronic diseases among secondary school students in Obio/Akpor LGA, Rivers State (n = 392).

S/N	Items	Yes		No	
		f	%	f	%
4	Lack of physical activity can lead to obesity and overweight	313	79.8	79	20.2
5	Tobacco use is a risk factor for cancer	274	69.9	118	30.1
6	Eating meals with large calorie content can lead to obesity and overweight	190	48.5	202	51.5
7	Alcohol consumption can lead to cancer	189	48.2	203	51.8
8	Cigarette smoking can cause lung cancer and other respiratory diseases	235	59.9	157	40.1
9	Excessive alcohol consumption is a risk factor for liver disease	243	62.0	149	38.0
10	Consumption of diets with high cholesterol is a risk factor for cardiovascular diseases e.g. hypertension and stroke	142	36.2	250	63.8
11	Abnormal basal metabolic rate is a risk factor for obesity	203	51.8	189	48.2
12	Ageing is a risk factor for stroke and hypertension	250	63.8	142	36.2
	% Average	-	57.8	-	42.2

0-39% = Poor Knowledge; 40-59% = Average Knowledge; 60-79% = Good Knowledge; 80-100% = Very Good knowledge.

Table 2. Knowledge of risk factors for lifestyle induced chronic diseases of among secondary school students based on age (n = 392).

S/N	Items	Age (years)											
		10-14 (n=182)				15-19 (n=176)				20-24 (n=34)			
		Yes		No		Yes		No		Yes		No	
		f	%	f	%	f	%	f	%	f	%	f	%
4	Lack of physical activity can lead to obesity and overweight	143	78.6	39	21.4	153	86.9	23	13.1	17	50.0	17	50.0
5	Tobacco use is a risk factor for cancer	64	35.2	118	64.8	176	100.0	0	0.0	34	100	0	0.0
6	Eating food with large calorie content can lead to obesity and overweight	111	61.0	71	39.0	62	35.2	114	64.8	17	50.0	17	50.0
7	Alcohol consumption can lead to cancer	150	82.4	32	17.6	22	12.5	154	87.5	17	50.0	17	50.0
8	Cigarette smoking can cause lung cancer and other respiratory diseases	64	35.2	118	64.8	154	87.5	22	12.5	17	50.0	17	50.0
9	Excessive alcohol consumption is a risk factor for liver disease	72	39.6	110	60.4	154	87.5	22	12.5	17	50.0	17	50.0
10	Consumption of diets with high cholesterol is a risk factor for CVDs	103	56.6	79	43.4	22	12.5	154	87.5	20	58.8	14	41.2
11	Abnormal basal metabolic rate is a risk factor for obesity	32	17.6	150	82.4	154	87.5	22	12.5	19	55.9	15	44.1
12	Ageing is a risk factor for stroke and hypertension	79	43.4	103	56.6	137	77.8	39	22.2	34	100.0	0	0.0
	% Average	-	49.9	-	50.1	-	65.4	-	36.6	-	62.7	-	37.3

0-39% = Poor Knowledge; 40-59% = Average Knowledge; 60-79% = Good Knowledge; 80-100% = Very Good knowledge.

Table 3. Percentage of knowledge of risk factors for lifestyle induced chronic diseases among secondary school students according to gender (n = 392).

S/N	Items	Gender							
		Male (n=97)				Female (n=295)			
		Yes		No		Yes		No	
		f	%	f	%	f	%	f	%
4	Physical inactivity can lead to obesity and overweight	68	70.1	29	29.9	245	83.1	50	16.9
5	Tobacco use is a risk factor for cancer	54	55.7	43	44.3	220	74.6	75	25.4
6	Eating food with large calorie content can lead to obesity and overweight	57	58.8	40	41.2	133	45.1	162	54.9
7	Alcohol consumption can lead to cancer	56	57.7	41	42.3	133	45.1	162	54.9
8	Cigarette smoking can cause lung cancer and other respiratory diseases	54	55.7	43	44.3	181	61.4	114	38.6
9	Excessive alcohol consumption is a risk factor for liver disease	59	60.8	38	39.2	184	62.4	111	37.6
10	Consumption of diets with high cholesterol is a risk factor for cardiovascular diseases e.g. hypertension and stroke	37	38.1	60	61.9	108	36.6	187	63.4
11	Abnormal basal metabolic rate is a risk factor for obesity	41	42.3	56	57.7	164	55.6	131	44.4
12	Ageing is a risk factor for stroke and hypertension	60	61.9	37	38.1	190	64.4	105	35.6
-	% Average	-	55.7	-	44.3	-	58.7	-	41.3

15-19 years = 65.4% > 20-24 years = 62.7%), while students in age group 10-14 years had average knowledge (49.9%) of risk factors for lifestyle induced chronic diseases. This finding was expected. Evidence from literature reveals that maturation or chronological age is associated with comprehension of certain concepts including risk factors for chronic diseases. As adolescents advance in age their capacity to understand socio-behavioural practices and their inimical consequences improves. The finding is in consistent with those of Sanderson et al. (2011) who found that awareness of genetic risk factors for both diseases was the lowest in the youngest age group, the 16-30-year-olds, which might suggest a need to improve current educational curriculums on genetics. They further stressed that it may be worth targeting genetic educational efforts at young adults, particularly given they are the ones who will be exposed to future genomic developments. The greater awareness of genetic risk factors for chronic diseases amongst older adults may also be due to their greater exposure to death and disease in people close to them, and their consequent greater concern about being healthy and seeking out medical information (Mills and Davidson, 2002). Thus, this finding is tenable.

Data in the Tables 3 and 5 showed that students irrespective of gender had average knowledge of risk factors for lifestyle induced chronic diseases (Female students = 58.7% > Male students = 55.7%). However, female students' percentage score was higher than that of male students. In other words, female students had higher knowledge of risk factors for lifestyle induced chronic diseases than male students. This finding is consistent with those of Peacey et al. (2006) who found high awareness of genetics as a risk factor for breast cancer in an international survey of female students. Results of the study showed that 57% of women were aware of genetic causes overall, and awareness was particularly high among female students in some countries such as the US (94%) and the UK (73%). Female students' consistent exposure to risks associated with chronic diseases may have resulted into acquired experience which might have translated into improved level of knowledge.

Results in the Table 4 showed that JSS 1 and JSS 2 students had good knowledge (JSS 1 = 65.5% > JSS 2 = 63.4%) of risk factors for lifestyle induced chronic diseases, while SS1 and SS2 students had average knowledge (SS 1 = 55.4% > SS 2 = 46.8%) of risk factors for lifestyle induced chronic diseases, respectively. This is a novel finding, because it contradicts results from previous studies conducted on awareness of risk factors for chronic diseases. The finding contradicted the finding of Sanderson et al. (2011) who found that people were significantly more likely to identify genetic factors as influencing heart disease risk if they had higher levels of educational attainment. The inconsistency in

Table 4. Knowledge of risk factors for lifestyle induced chronic diseases among students based on class of study (n = 392).

S/N	Items	Class of Study							
		JSS 1 (n=97)		JSS 2 (n=99)		SS 1 (n=98)		SS 2 (n=98)	
		Yes	No	Yes	No	Yes	No	Yes	No
		f (%)	f (%)	f (%)	f (%)	f (%)	f (%)	f (%)	f (%)
4	Physical inactivity can lead to obesity and overweight	95 (97.9)	2 (2.06)	69 (69.7)	30 (30.3)	89 (90.8)	9 (9.2)	58 (59.2)	40 (40.8)
5	Tobacco use is a risk factor for cancer	72 (74.2)	25 (25.8)	99 (100)	0 (0.0)	46 (46.9)	52 (53.1)	57 (58.2)	41 (41.8)
6	Eating food with high calorie content can lead to obesity and overweight	69 (71.1)	28 (28.9)	30 (30.3)	69 (69.7)	71 (72.4)	27 (27.6)	20 (20.4)	78 (79.6)
7	Alcohol consumption can lead to cancer	44 (45.4)	53 (54.6)	32 (32.3)	67 (67.7)	63 (64.3)	35 (35.7)	50 (51.0)	48 (49.0)
8	Cigarette smoking can cause lung cancer and other respiratory diseases	72 (74.2)	25 (25.8)	67 (67.7)	32 (32.3)	46 (46.9)	52 (53.1)	50 (51.0)	48 (49.0)
9	Excessive alcohol consumption is a risk factor for liver disease	95 (97.9)	2 (2.06)	67 (67.7)	32 (32.3)	54 (55.1)	44 (44.9)	25 (25.5)	73 (74.5)
10	Consumption of diets with high cholesterol is a risk factor for cardiovascular diseases e.g. hypertension and stroke	19 (19.6)	78 (80.4)	34 (34.3)	65 (65.7)	22 (22.4)	76 (77.6)	70 (71.4)	28 (28.6)
11	Abnormal basal metabolic rate is a risk factor for obesity	53 (54.6)	44 (45.4)	69 (69.7)	30 (30.3)	35 (35.7)	63 (64.3)	48 (49.0)	50 (51.0)
12	Ageing is a risk factor for stroke and hypertension	53 (54.6)	44 (45.4)	99 (100)	0 (0.0)	63 (64.3)	35 (35.7)	35 (35.7)	63 (64.3)
	% Average	65.5	34.5	63.4	36.6	55.4	44.6	46.8	53.2

Table 5. Summary of Chi-square analysis of no significant difference in the knowledge of risk factors for lifestyle induced chronic diseases among students based on age (n = 392).

S/N	Items	Age (years)														
		10-14 (n=182)				15-19 (n=176)				20-24 (n=34)						
		Yes		No		Yes		No		Yes		No				
		O	E	O	E	O	E	O	E	O	E	O	E	$\chi^{2\text{-Cal}}$	P-Val.	*Dec.
4	Item 4	143	145.3	39	36.7	153	140.5	23	35.5	17	27.1	17	6.9	24.497	0.000	*
5	Item 5	64	127.2	118	54.8	176	123.0	0	53.0	34	23.8	0	10.2	194.789	0.001	*
6	Item 6	111	88.2	71	93.8	62	85.3	114	90.7	17	16.5	17	17.5	23.810	0.000	*
7	Item 7	150	87.8	32	94.3	22	84.9	154	91.1	17	16.4	17	17.6	175.229	0.001	*
8	Item 8	64	109.1	118	72.9	154	105.5	22	70.5	17	20.4	17	13.6	103.604	0.000	*
9	Item 9	72	112.8	110	69.2	154	109.1	22	66.9	17	21.1	17	12.9	89.542	0.000	*
10	Item 10	103	67.3	79	114.7	22	65.1	154	110.9	20	12.6	14	21.4	82.252	0.001	*
11	Item 11	32	95.2	150	86.8	154	92.0	22	84.0	19	17.8	15	16.2	175.520	0.000	*
12	Item 12	79	116.1	103	65.9	137	112.2	39	63.8	34	21.7	0	12.3	67.069	0.000	*
-	-	-	-	-	-	-	-	-	-	-	-	-	-	104.03	0.000	-

*Significant at $p < 0.05$; *****Dec. = Decision; *Not significant; **Significant. Item 4 = Physical inactivity can lead to obesity and overweight; Item 5 = Tobacco use is a risk factor for cancer; Item 6 = Eating food with large calorie content can lead to obesity and overweight; Item 7 = Alcohol consumption can lead to cancer; Item 8 = Cigarette smoking can cause lung cancer and other respiratory diseases; Item 9 = Excessive alcohol consumption is a risk factor for liver disease; Item 10 = Consumption of diets with high cholesterol is a risk factor for cardiovascular diseases e.g. hypertension and stroke; Item 11 = Abnormal basal metabolic rate is a risk factor for obesity; Item 12 = Ageing is a risk factor for stroke and hypertension.

Table 6. Summary of Chi-square analysis of no significant difference in the knowledge of risk factors for lifestyle induced chronic diseases among students based on gender (n=392).

Items	Gender										
	Male (n=97)				Female (n=295)						
	Yes		No		Yes		No				
	O	E	O	E	O	E	O	E	χ^{2}-cal	P-Val	*Dec
Physical inactivity can lead to obesity and overweight	68	77.5	29	19.5	245	235.5	50	59.5	7.605	0.006	*
Tobacco use is a risk factor for cancer	54	67.8	43	29.2	220	206.2	75	88.5	12.401	0.000	*
Eating food with large calorie content can lead to obesity and overweight	57	47.0	40	50.0	133	143.0	162	152.8	5.468	0.019	*
Alcohol consumption can lead to cancer	56	46.8	41	50.2	133	142.2	162	152.8	4.676	0.031	**
Cigarette smoking can cause lung cancer and other respiratory diseases	54	58.2	43	38.8	181	176.8	114	118.2	0.983	0.321	**
Excessive alcohol consumption is a risk factor for liver disease	59	60.1	38	36.9	184	182.9	111	112.1	0.074	0.785	**
Consumption of diets with high cholesterol is a risk factor for cardiovascular diseases e.g. hypertension and stroke	37	35.9	60	61.1	108	109.1	187	185.9	0.074	0.786	**
Abnormal basal metabolic rate is a risk factor for obesity	41	50.7	56	46.3	164	154.3	131	140.7	5.196	0.023	*
Ageing is a risk factor for stroke and hypertension	60	61.9	37	35.1	190	188.1	105	106.9	0.206	0.650	**
	-	-	-	-	-	-	-	-	**4.076**	**0.291**	*

*Significant at p < 0.05. *****Dec.: Decision. *Not significant; **Significant.

findings of both studies may be attributed to subjects' composition, data collection procedures and study settings.

Table 5 indicates that no significant difference (χ^{2} = 104.03, p = 0.00 < 0.05) was found in the knowledge of risk factors for lifestyle induced chronic diseases among students based on age. This implied that knowledge of risk factors for lifestyle induced chronic diseases among secondary school students was not dependent on age.

Table 6 shows that a significant difference (χ^{2} = 4.08, p = 0.291, p = 0.29 > 0.05) was found in the knowledge of risk factors for lifestyle induced chronic diseases among students based on gender. This implied that knowledge of risk factors for lifestyle induced CDs differed by gender among students.

Table 7 indicates that no significant difference (x^{2} = 63.69, p = 0.00 <0.05) was observed in the knowledge of risk factors for lifestyle induced chronic diseases among students based on class of study. This implied knowledge of risk factors for lifestyle induced chronic diseases among secondary school students was not dependent on class of study.

In conclusion, our finding shows that students had average knowledge of risk factors for lifestyle induced chronic diseases. It is important to understand the impact of information dissemination on risk factors for lifestyle induced chronic diseases in the public domain including school settings especially among adolescents who constitute the most vulnerable group. Prospective studies are now needed to determine whether introducing valid health information via health education to students who were previously unaware of it is equally benevolent, and to find ways to communicate health information on risk factors for lifestyle induced chronic diseases that maximize positive outcomes and minimize negative outcomes.

RECOMMENDATIONS

(1) Implementation of vigorous awareness campaign through public health education and school health education on health risks of unhealthy lifestyles.
(2) Integration of nutrition education into the syllabuses of subjects such as Health Education, Home Economics, Biology and Health Science that will help educate students on risk factors for lifestyle induced chronic diseases.
(3) Interventions directed at reducing smoking, obesity and alcohol use as well as increasing physical activity, fruit and vegetable intake, which are necessary to prevent onset of chronic disease of lifestyle become expedient should be implemented.
(4) Efforts should be geared towards eliminating

Table 7. Summary of Chi-square analysis of no significant difference in the knowledge of risk factors for lifestyle induced chronic diseases among secondary school students based on class of study (n=392).

Items	Class of Study																		
	JSS 1 (n=97)				JSS 2 (n=99)				SS 1 (n=98)				SS 2 (n=98)						
	Yes		No		Yes		No		Yes		No		Yes		No				
	O	E	O	E	O	E	O	E	O	E	O	E	O	E	O	E	χ^2–cal.	P-val.	*Dec.
Item 4	97	77.5	0	19.5	69	79.0	30	20.0	89	78.3	9	19.8	58	78.3	40	19.8	64.152	0.000	*
Item 5	72	67.8	25	29.2	99	69.2	0	29.8	46	68.5	52	29.5	57	68.5	41	29.5	74.464	0.000	*
Item 6	69	47.0	28	50.0	30	48.0	69	51.0	71	47.5	27	50.5	20	47.5	78	50.5	86.489	0.000	*
Item 7	44	46.8	53	50.2	32	47.7	67	51.3	63	47.3	35	50.8	50	47.3	48	50.8	20.776	0.001	*
Item 8	72	58.2	25	38.8	67	59.3	32	39.7	46	58.8	52	39.3	50	58.8	48	39.3	20.861	0.000	*
Item 9	97	60.1	0	36.9	67	61.4	32	37.6	54	60.8	44	37.3	25	60.8	73	37.3	118.158	0.000	*
Item 10	19	35.9	78	61.1	34	36.6	65	62.4	22	36.3	76	61.8	70	36.3	28	61.8	71.660	0.000	*
Item 11	53	50.7	44	46.3	69	51.8	31	47.2	35	51.3	63	46.8	48	51.3	50	46.8	23.462	0.001	*
Item 12	53	61.9	44	35.1	99	63.1	0	35.9	63	62.5	35	35.5	35	62.5	63	35.5	93.151	0.000	*
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	63.690	0.000	-

*Significant at $p < 0.05$.

currently known risk factors for lifestyle induced chronic diseases among students.

Conflict of Interests

The authors have not declared any conflict of interests.

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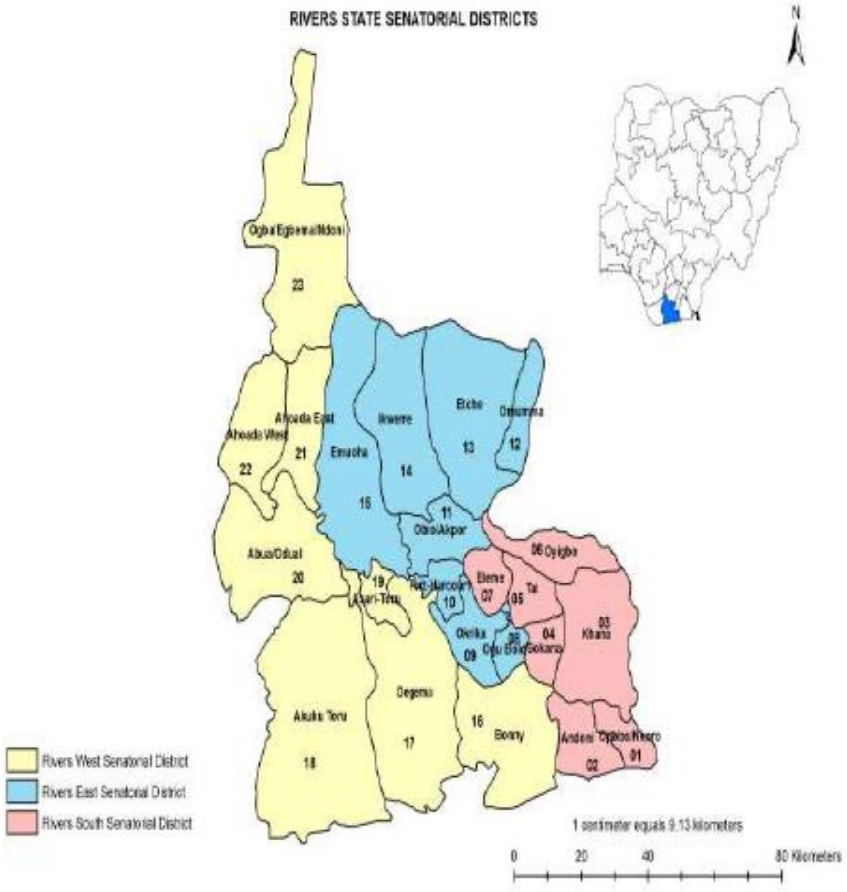
Appendix A. List of secondary schools in Obio/Akpor LGA, Rivers State.

S/N	Name and location of school
1	Army Day Secondary School
2	Community Boys Secondary School, Elelenwo
3	Government Secondary School, Eneka
4	Community Secondary School, Mgbuoshimini Rumueme
5	Oginigba Community Secondary School, Oginigba
6	Community Secondary School, Okosonuodu
7	Community Secondary School, Okporo
8	Community Secondary School, Olanada
9	Government Technology College, Portharcourt
10	Community Secondary School, Rumuokwurusi
11	Model Girls Secondary School, Rumueme
12	Government Girls Secondary School, Rumuokwuta
13	Community Secondary School, Rumuekini
14	Community Secondary School, Rumuolumeni
15	Community Secondary School, Rukpoku
16	Community Secondary School, Rumuapara
17	Community Secondary School, Rumuomasi
18	Community Secondary School, Rumuodumaya
19	Community Secondary School, Rumuepirikom
20	Community Secondary School, Ogbogoru



Appendix B. Map of River State Senetorial District.

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Full Length Research Paper

Descriptive epidemiology and predisposing factors to idiopathic talipes equinovarus in South South Nigeria

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Talipes equinovarus (Clubfoot) is the commonest foot deformity with variable incidence across races. Exact etiology remains elusive. The objective of this study is to describe the epidemiology of clubfoot in our centre, looking for predisposing factors. This is a descriptive clinic based epidemiologic study of 106 feet belonging to 69 subjects from January 2014 – December 2015 was conducted. Structured questionnaires were administered to clinically confirmed clubfoot subject's guardian or biologic mothers. Phenotypic data from clubfoot subject were also recorded. Analysis was done using IBM SPSS version 22 for windows. Results revealed the age range of the patients as 3 days to 9 years, with a mean age of 46.17 ± 92.03 weeks. Thirty-seven (53.7%) patients had bilateral deformity while 13 (18.8%) patients had right-sided deformity, and 19 (27.5%) patients had left-sided deformity. Majority 40 (58.0%) of the patients were firstborn out of which 28 were males. Only 2 (2.89%) patients are products of multiple gestations. All mothers were none smokers and there was no reported family history of foot deformities or clubfoot. The mean maternal age was 25.81 years ± 4.99 years. The average length/height of patients at presentation was 64.27 ± 23.93 cm. The average shoulder span of the patients at presentation was 23.93 ± 15.86 cm. The study thus revealed that young maternal age, gender and firstborn are predisposing factors in the etiology of clubfoot.

Key words: Clubfoot, idiopathic, predisposing factors, epidemiology.

INTRODUCTION

Clubfoot or Talipes equinovarus (TEV) is the most common developmental musculoskeletal deformity characterized by forefoot adduction, midfoot cavus, hind foot varus and rigid ankle equines (Omololu et al., 2005; Adewole et al., 2009; Ngim et al., 2013). There are other associated deformities like, anterior bowing of the tibia and hypoplasia of the calf muscles. It is found in otherwise normal infants and has a worldwide cumulative

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incidence of 1-2 / 1000 live births. This however varies between races, ethnicities and countries. In the USA, a study reported 1.29 /1000 births, while in Africa, some studies like in Malawi reported 2/1000 births and in Nigerian, reported 3.4/1000 births (Parker et al., 2009; Mkandawire and Kaunda, 2004; Ukoha et al., 2011). There is usually an underestimation of the true incidence due to under-reporting and missing cases. Eighty-five percent of infants with clubfoot are reported to live in developing countries (Wallander et al., 2006; Saltzmans, 2009).

The foot develops from the 9th week of gestation when the limb bud orientation is in the vertical axis. Early on, the soles of the feet normally face one another, but by the 14th week they should have rotated medially and assumed the position of Adult feet. Pre-natal ultrasound diagnosis of the condition is usually practicable by the17th week of pregnancy. The etiology of clubfoot remains idiopathic but, it has been attributed to various unrelated factors including environmental, hereditary and pregnancy related factors. There are two types of clubfoot; “Typical” and “Atypical”. The Typical variety is usually the commonest and is referred to as idiopathic or congenital clubfoot. The Atypical variety is syndromic and is associated with other congenital malformations. There are various scoring systems but the most commonly used is the Pirani scoring and its modifications, also the Dimeglio scoring system (Werler et al., 2013; Sayit and Sayit, 2015; Adegbehingbe et al., 2015; Lynn,2009**;** www.global-help.org).

Epidemiologic studies have consistently reported higher prevalence of idiopathic clubfoot in males and first-born but any associations with smoking, race/ ethnicity and maternal age are not clear (Cardy et al., 2007; Dickinson et al., 2008; Kancherla et al., 2010; Pavone et al., 2012). These studies are very scanty in Nigeria and to the best of our knowledge no study has focused on idiopathic clubfoot in our country. We seek to describe the epidemiology of idiopathic clubfoot in our centre and isolate predisposing factors.

METHODS

This is a hospital-based prospective Epidemiologic study conducted among patients attending the foot deformity clinic of a tertiary hospital located in the South-South region of Nigeria, offering specialized services in all aspect of Medicine. It is a 500 bed hospital with Pediatric Orthopedic Surgery as one of the subspecialties of Orthopedics practiced in the Centre. Nigeria is divided into six geopolitical regions (North-East, North-West, North-Central, South-West, South-East and South-South) for ease of administration. Patients are received from neighboring states and Republic of Cameroun.

Though the Ponseti method of treatment of clubfoot was introduced into Nigeria in 2009, its application in our centre started fully in late 2012 with the creation of a special clinic (Clubfoot clinic) in early 2013. Approval for this study was obtained from the institutional Health Research and Ethics Committee.

The study recruited consecutive patients attending the foot deformity out-patient clinic from January 2014 – December 2015. Those who met the inclusion criteria were recruited into the study; this consisted of patients with only idiopathic talipes equinovarus. The exclusion criteria include those with other foot deformities such as acquired clubfoot, congenital talipes calcaneo-valgus, metatarsus adductus and congenital vertical talus amongst others. They were excluded to increase the likelihood of detecting only predisposing factors associated with clubfoot.

A structured questionnaire was employed, which elicited the following variables, patients’ sociodemographic data/clinical features, maternal age, position in the family, mode of delivery and multiple gestations etc. All patient parents or guardian gave informed consent.

Statistical analysis was done using Statistical Package for Social Sciences software version 22 for windows (SPSS 22 Trademark of IBM Corporation). P-value of 0.05 was considered statistically significant. The mean age, prevalence among gender, birth order, laterality (foot affected) and gestational factors amongst other variables were determined.

RESULTS

Sixty-nine (69) patients with one hundred and six (106) feet who met the inclusion criteria were recruited for this study. The prevalence is 3 per 1000 live births in our centre. Age ranged from 3 days – 9 years with “mean SD” of 46.17 - 92.03 weeks. There were forty-three males (62.3%) and 27 females (37.3%) with male to female ratio of 1.7: 1 (Table 1).

Thirteen (18.8%) patients have left foot deformity out of which 8 were males and 5 were females, 19 (27.5%) patients have right foot deformity of which 13 were males and 6 were females. Bilateral feet involvement was in 37 (53.7%) patients out of which 22 were males and 15 were females (Table 2). Relationship between laterality of foot affectation and gender was not statistically significant.

Majority of the patients 40 (58%) were first-born of their mother, while 24 (34.8%) were second born of their mother. Within the first-born group, 28(40.53%) out of 40 were males (Figures 1 and 2). This finding was not statistically significant. Median maternal age was 26 years with a “mean SD” of 25.81 - 4.99 years (Table 1).

Two of the patients were products of multiple gestations but no breech presentations were recorded. All mothers in the study sample were none smokers. There was no positive maternal or paternal family history of clubfoot deformity.

DISCUSSION

The prevalence of clubfoot in our centre is 3 per 1000 live births which is similar to some studies that reported 3.4 and 2 per 1000 live birth respectively (Mkandawire and Kaunda, 2004; Ukoha et al., 2011).

The age of presentation ranges from 3 days – 9 years, which was similar to other Nigerian studies which reported 7 days – 4 years and 1 day – 2 years (Mkandawire and Kaunda, 2004; Adewole et al., 2014).

Table 1. Descriptive statistics.

Parameter	Minimum	Maximum	Mean	Standard deviation
Age of patients in weeks	1	468	46.17	91.444
Height of patients in cm	20	126	62.891	18.334
Shoulder span of patients in cm	7	108	25.16	11.879
Maternal age in years	18	35	25.81	4.992

Table 2. Showing laterality among gender and sample.

Gender		Foot affected			Total count (%)	df	P-value
		Right	Left	Bilateral			
Male	Count	8	13	22	43	2	0.805
	Percentage	18.6	30.2	51.2	100		
	Percentage in sample	11.6	18.8	31.9	62.3		
Female	Count	5	6	15	26		
	Percentage	19.2	23.1	57.7	100		
	Percentage in sample	7.2	8.7	21.8	37.7		
Total	Count	13	19	37	69		
	Percentage	18.8	27.5	53.7	100		

Figure 1. Bar chart showing the percentage birth orders of the patient.

The mean age in months was approximately 11.5 months which was still in comparison with other studies in Australia, Bangladesh and India that reported 12 months, 22 months and 4.5 months respectively (Brewster et al., 2008; Chaudhry et al., 2012; Ford-Powell et al., 2013). In the UK and US, some studies have reported mean ages

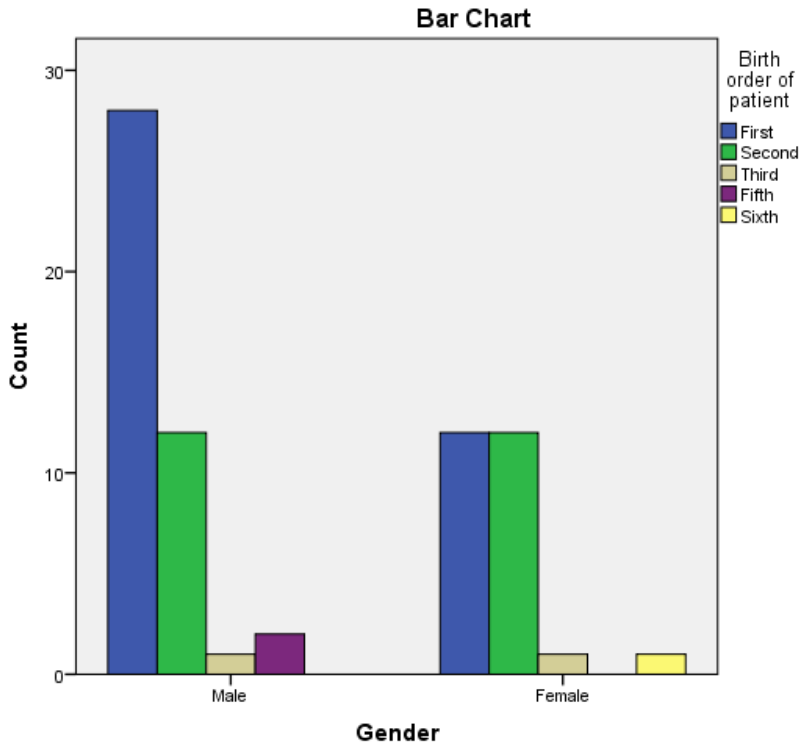

Figure 2. Bar chart showing birth order within the gender.

of 4.5 weeks and 60 days at presentation (Dickinson et al., 2008; Kancherla et al., 2010). The highest age ever reported in Nigeria at presentation was 18 years (Adegbehingbe et al., 2010). This is a reflection of the difference in health awareness of the society to the deformity.

The study shows a strong male preponderance which was similar to other studies in various countries across the world (Werler et al., 2013; Nguyen et al., 2012; Mathias et al., 2010). This confirms the observation by epidemiologic studies that males are more likely to have clubfoot than females. No hypothesis or genetic findings have been reported to fully explain the high prevalence in males.

The findings regarding laterality in our study was not different from other epidemiologic studies but a study by Sayit and Sayit (2015) reported the incidence of foot affected amongst and within the gender, their findings was similar to our study. The tendency that the foot affected would be right or left was not statistically significant. None of the local studies in Nigeria showed this.

The findings that majority of the children affected were first-born (57.9%) of their mother was not different from results of other studies in which the association with primiparity was described (Werler et al., 2013; Cardy et al., 2007; Kancherla et al., 2010). However, this study went a step further to show the number of males and females involved even though this was found not to be statistically significant. This supports to some extent the theory of fetal constraint as a possible etiological factor in the occurrence of clubfoot (Carey et al., 2005).

In our study, none of the mothers was a smoker. This differs from some studies that reported increased risk of clubfoot in women who smoke cigarettes before and during pregnancy (Dickinson et al., 2008; Werler et al., 2015; Skelly et al., 2002). In our culture, smoking by women is a taboo not to mention the married and those bearing children. We took extra effort to probe into their pre-marital social life but could not extract the information. Also, none of the subjects had a family history of congenital clubfoot and foot deformities. This has been proposed as an etiologic factor. The mode of inheritance does not follow any classic pattern as reported by epidemiological observational studies but has been linked to a gene that directly regulates skeletal muscle protein (Engell et al., 2006; Kruse et al., 2008; Wang et al., 2008). However, both genetic and environmental factors are probably involved (Wynne-Davies, 1972). This finding in our study supports the sporadic nature of the deformity.

In our study majority of the mothers were of young age, although “maternal age has been shown to be both inversely and positively associated with clubfoot” (Cardy et al., 2007; Dickinson et al., 2008; Kancherla et al., 2010). Some studies differ in opinion in that they found no association (Werler et al., 2013; Pavone et al., 2012; Carey et al., 2005; Skelly et al., 2002).

Conclusion

Male gender, first-born males and young maternal age are predisposing factors to the development of clubfoot. Multiple gestations were not significant. All of our cases were sporadic in occurrence. There is need for the establishment of an electronic birth registry and surveillance system in my country.

Limitations

i) It is a hospital based study which is not reflective of the entire population. A large cohort study is needed to give an analytical epidemiology.
ii) All of the study subjects have idiopathic clubfeet; therefore certain statistical analysis could not be done.

Conflict of Interests

The authors have not declared any conflict of interests.

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