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Annals of Medical Research (AMR), the official publication of the College of Medicine, Ambrose Alli University, Ekpoma, Nigeria, publishes original research papers, review articles, techniques, short reports case reports, letters conferences proceedings and book reviews from all over the world, in all aspects of medical sciences.

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Tables should have titles and be numbered (Arabic) according to order of mentions in the text.

Units of Measurement

All measurement should be in SI (system International Units).

Book Reviews

AMR will review selected books in all aspects of sciences from time to time. Authors interested in having a book reviewed should send a copy to the Editor-in-Chief.

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A review of seborrhoeic keratoses seen in a tertiary institution.

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Abstract

Introduction: Seborrhoeic keratosis (SK) is the most common benign cutaneous epidermal tumour. Its association with premalignant and malignant epidermal neoplasm and the cosmetic complication underscore the importance of this lesion. The aim of this study is to determine the frequency, histopathological sub type, age and sex distribution of seborrhoeic keratosis at the University of Benin Teaching Hospital, Benin City, Edo State, Nigeria.

Methodology: This was a retrospective study of all seborrhoeic keratoses diagnosed histologically between January 2004 and December 2013 in the Department of Morbid Anatomy, University of Benin Teaching Hospital. Haematoxylin and eosin stained slides and paraffin embedded tissue blocks in the departmental archives were retrieved, reviewed under the light microscope and the diagnosis recorded against the corresponding patient's name on a data spreadsheet. The data obtained from this study was analysed using the SPSS statistical package version 16, (V.16.0).

Results: Twenty-four cases of SK were seen during the 10year study period. Ten of these cases occurred in males while 14 cases occurred in females giving a male to female ratio of 1:1.4. The mean age for SK was 41.83 years (SD = 17.73). The mean age for SK in males is lower than that of females. The acanthotic variant of SK was the major sub type.

Conclusion: Seborrhoeic keratosis is not common in our environment when compared to the western world and most cases are encountered in the 3rd and 4th decades of life.

Key words: Acanthoma, seborrhoeic keratosis, basal cell papilloma, acanthotic sub type

Introduction

Seborrhoeic keratosis (SK) belongs to a group of benign tumours of epidermal keratinocytes known as acanthoma that are characterised by a benign behaviour; epidermal hyperplasia; and lack of dysplasia; that is to say neither that solar keratosis nor Bowen's disease would be considered as members.¹ Seborrhoeic keratosis also known as Basal cell papilloma or Senile wart is the most common benign cutaneous epidermal tumour.² It is mostly seen in the Caucasians,² although it can be found in all race.³ ⁴An important, yet neglected, problem in dermatopathology, is the evaluation of the benign acanthomas, the benign

tumours of epidermal keratinocytes.³ Data on SK is lacking in our environment in particular and Nigeria in general. The aim of this study is to determine the frequency, histopathological sub types, age and sex distribution of seborrhoeic keratosis at the University of Benin Teaching Hospital, Benin City, Edo State, Nigeria. It is therefore imperative that baseline data in terms of frequency, histomorphologic variant, age and sex distribution of this lesion be established at the University of Benin Teaching Hospital. This is important because aside adding to the body of knowledge; it helps to compare the findings of future research paper on the subject matter and the trend may be invaluable for planning and allocating hospital resources (human and capital) if the burden of this lesion on available resources is known; it may also

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serve as to stimulate research interest in this area from other centres in the country.

Material and Methods

This was a retrospective study of all seborrheic keratoses diagnosed histologically between January 2004 and December 2013 in the Department of Morbid Anatomy, University of Benin Teaching Hospital. Information for this study was obtained from the surgical pathology registers, histology request cards, patients' case notes, duplicate copies of histology reports, haematoxylin and eosin stained slides and stored paraffin embedded tissue blocks stored in the departmental archives. The surgical pathology register, histology request form and duplicate copies of the histology report and patient case notes were useful in providing information on the age, sex, nature of specimen, hospital number, histology laboratory number, clinical presentation and clinical diagnosis of each case. Histology slides were retrieved, reviewed under the light microscope and the diagnosis recorded against the corresponding patient's name on a data spread sheet. The data obtained from this study was analysed using the SPSS statistical package (V.16.0)

Results

During the 10year study period, a total of 375 skin tumours were diagnosed, 188 cases were benign the rest being malignant. Twenty-four cases were SK which represents 6.4 % and 12.7 % of all skin tumours and benign skin tumours respectively. Ten(10) cases occurred in males while 14 cases occurred in females giving a male to female ratio of 1:1.4.

Table 1 shows the age and sex distribution. The age range was 4 – 70 years with a mean age of 41.83 years (SD = 17.73) and a peak in the 3rd decade. The mean ages for SK in males and females were 36.60 years (SD=17.46) and 45.57 years (SD=17.59) respectively. The anatomic site of specimen was specified in only 5 cases, with 2 cases each in the upper and lower extremities and 1 in the head and neck.

The acanthotic variant of SK was the major sub type observed in this study. It was present in 19 cases (79.1%). The irritated and hyperkeratotic variants accounted for 12.5% (3 cases) and 8.3% (2 cases) of SK sub types respectively. Figure 1 show

photomicrograph of an acanthotic seborrheic keratosis.

Table 1, show Age group and sex distribution of Seborrheic keratosis (SK)

Seborrheic keratosis			
AGE	M	F	Total
0 – 9	-	-	-
10 – 19	-	-	-
20 – 29	3	4	7
30 – 39	1	2	3
40 – 49	3	1	4
50 – 59	3	1	4
60 – 69	-	5	5
70 – 79	-	1	1
80 – 89	-	-	-
90 – 99	-	-	-
100 – 109	-	-	-
110 – 119	-	-	-
TOTAL	10	14	24

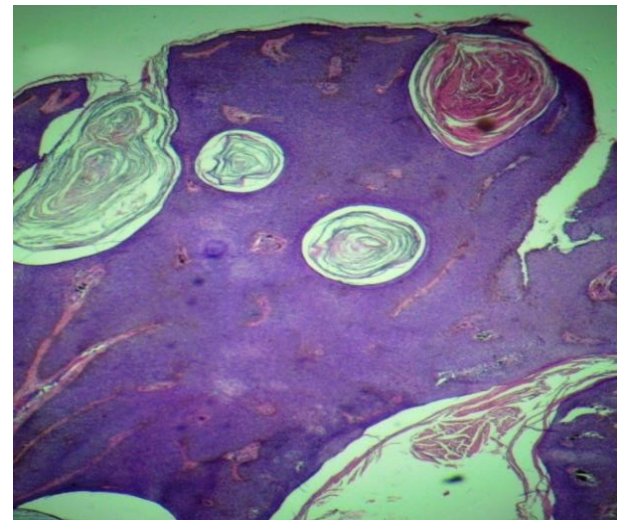


Figure 1. Seborrheic keratosis, showing acanthosis, horn cysts (containing laminated keratin) and pseudo horn cyst. H and E. X 100 magnification

Discussion

In this study, 24 cases of seborrheic keratosis (SK) were recorded over the 10year study period accounting for 2.4 cases / year. This is much less than 639 cases recorded by Lim⁵ in a study that spanned 12-months. This figure is equally less than what was obtained by Vunet *al*⁶ in Australia. This is however, not surprising

as SK has been noted to be more common among Caucasians.^{2,7}

Previous studies,^{4,8} have reported the acanthotic type as the most common histopathological subtype. This is in agreement with the index study in which the acanthotic type was the major sub type encountered.

In Caucasians,^{7,9} and Indians¹⁰ SK has been reported to increase with advancing age and are in fact most commonly encountered in the elderly. Girisha et al¹¹ also reported that SK usually develop after the age of 50 years and can occasionally occur in young adulthood. This is in sharp contrast to findings in this study as the peak incidence of SK was observed in the 3rd and 4th decades, declining thereafter with advancing age. The low incidence of SK in the elderly in this study may be accounted for by the low population of the elderly in our society, the life expectancy being 53 years in males and 55 years in females.^{12,13}

A slight female preponderance for SK was noted in this study with a male to female ratio of 1:1.4. Arthur K Balin,⁷ a member of the American Academy of Dermatology wrote a review article on Seborrhoeic keratosis (SK). He documented that SK occurs equally in both sexes. In the same vein, World Health Organization (WHO)² documented that SK exhibits no sex predilection. These findings are consistent with the reports from the study done in Indian by Rajesh et al.¹⁰ Girisha et al¹¹ also reported no sexual predilection as noted in previous studies. Reasons for the slight female preponderance in the current study are however not clear.

The worries or fears of individuals presenting with asymptomatic SK are the likelihood of skin malignancy and cosmetic complications as SKs are unattractive.¹⁴ Previous studies have reported development of Bowen's disease (squamous carcinoma in situ), squamous cell carcinoma, basal cell carcinoma and malignant melanoma in the foci of SK.^{5,6,15,16} This is in contrast to the index study in which there was no recorded case of malignant lesion in the same focus as SK.

The clinical presentation of most SK with their stuck-on, symmetric, keratotic, and waxy look make them easy to identify. However they may clinically mimic melanoma or squamous cell carcinoma. A simple

biopsy is invaluable to rule out a malignant lesion, thus revealing their benign nature and allaying any worries.¹⁷ Seborrhoeic keratosis that has undergone recent clinical change should be considered for biopsy and histological examination.⁵ Nevertheless, the cost and morbidity associated with the biopsy of benign lesions should not be underestimated.¹⁷

The etiology is not well-known, although heredity, sunlight and human papilloma virus (HPV) have been suggested as risk factors. Recent genetic studies have suggested that somatic mutations in Fibroblast Growth Factor Receptor 3 (FGFR3) gene are important in the development of these lesions.¹⁸

Conclusion

SK are present in our own environment to an extent that is far less than that seen in Caucasians, the acanthotic sub type is the most common worldwide, while it peaked in younger age group as opposed to the elderly in Caucasians. There is a slight female affectation in our environment when compared to no sexual predilection in Caucasians. A likelihood of development of malignant lesion in the setting of SK exists, although rare and absent in the index study.

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Awareness and prevalence of sexual violence among female undergraduate university students in Ilorin

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Abstract

Sexual violence is any sexual act, attempt to obtain a sexual act unwanted sexual comments or advances or acts to traffic and otherwise directed against a person's sexuality, using coercion by any person regardless of their relationship to the victim in any setting including but not limited to home and work.

The harm caused by sexual violence can last a lifetime and span generations with serious adverse effects on health, education, employment, and on the economic wellbeing of individual families' communities and societies. This study assessed the awareness and prevalence of sexual violence among female students of the University of Ilorin

The study was a descriptive cross sectional survey of female students of full time undergraduate female students in the University of Ilorin, Nigeria. A multistage sampling technique was used to recruit 400 participants from the faculties, departments and level of study.

Ninety three (23.2%) students have experienced sexual violence of which 80 (86%) had between 1 to 3 episodes. Respondents' friend/fellow students were the commonest perpetrators for sexual advances 31 (33.3), unwanted body contacts 52 (56.0), forced to have sex 20 (56.0). The study recommends that school authorities develop/ reinforce policy statement on sexual harassment in schools and establishment of telephone hotlines for counselling and prompt response for vulnerable students.

Keywords: Sexual violence, Gender, Undergraduate, University, Ilorin

Introduction

Sexual violence can be defined as any sexual act, attempt to obtain a sexual act unwanted sexual comments or advances or acts to traffic and otherwise directed against a person's sexuality, using coercion by any person regardless of their relationship to the victim in any setting including but not limited to home and work. Coercion may encompass varying degrees of force blackmail threats, or psychological intimidation.¹ Forced sexual contact can take place at any stage of a woman's life and include a range of behaviours from forcible rape

to non-physical forms of pressure that compels girls and women to engage in sex against their will.²

Sexual harassment in the education system is a burning issue globally.³ Tertiary institutions and universities are by conception, knowledge dissemination centres where knowledge is both brought in and taken out by students as well as teachers and it further inculcate moral values that will influence positive behaviour change to students in the course of training.⁴ Sexual violence is becoming rampant with female students being most at risk which both male students and lecturers take undue advantage to abuse. True incidences of sexual violence are not known because of the fear of stigmatisation, reject, embarrassment among colleagues and society and this

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leads to underestimation of the magnitude of the problem.⁴

The prevention of sexual violence in tertiary institutions should be seen as an educational challenge. The focus is shifting from avoidance of liability to the need to educate students and lecturers on the effect of sexual violence, the myths surrounding it and the role that culture plays in the perception of sexual violence.

Sexual violence is a serious public health and human right problem globally that affects millions of women. It is one of the prevailing grossly underreported social problems globally and Nigeria. Because of their nature, the occurrence and impact of intimate partner violence and sexual violence are frequently 'hidden' resulting in a significant underestimation of the real level of harm caused.⁵ Worldwide, it is estimated that 300 000 women are raped and 3.7 Million women are confronted with unwanted sexual activity annually.⁶ In Africa, sexual violence is not only widespread but also socially acceptable in many settings, this is largely due to the belief that men are superior and that women with whom they are in relationship or contact with are their subordinate.⁷ In Nigeria every woman can expect to be a victim of sexual violence at some point in her life. Girls and women at every stage of their lives are often victims of sexual violence. Current estimates of gender based violence indicates that 8-70% of women worldwide have been physically or sexually assaulted by a male partner at least once in their lives.⁸ In the United States of America nearly 1 in 4 women may have experienced one form of sexual violence at some point in their lives.⁹ Studies from around the world, including Africa, South Asia, Europe and America, have documented that substantial proportions of girls report experiencing sexual harassment and abuse in school and university premises, including classrooms lavatories and dormitories, by peers and by teachers. In the United States of America nearly two-thirds of college students experience sexual harassment.³ In a study done in the United Kingdom on prevalence of sexual harassment in tertiary institution over 68% of respondents have experienced some kind of verbal and non-verbal harassment in and around their institutions, majority of perpetrators were students.¹⁰ In a study done in University of Maiduguri Nigeria among female students 51.3% of respondents reported to have been sexually assaulted.¹¹

Sexual violence is a profound health problem that saps women's energy compromise their physical and mental health, erodes their self-esteem. In addition to causing injury, sexual violence increases a woman's long term risk of developing a number of other health problems including chronic diseases, drug and alcohol abuse, sleep difficulties, depression, post-traumatic stress disorder, unintended pregnancies, sexually transmitted diseases, HIV/AIDS, miscarriages, suicide behaviours, and suicide.⁹

Tertiary institutions are peculiar such that though both males and females are educated at the same environment, the social environments they inhabit differ significantly. Female students are usually the victims of rape sexual assault and harassment on campus and in most institutions nothing is put in place to measure the incidences of these crimes. Sexual violence and harassment in universities has been understood as the exercise of power by specific individuals and has been dealt with via insufficient policies and grievances procedures. Sexual harassment by university lecturers of their female student is a fact of campus life and the silencing thereof is part of the reason for the historical invisibility of the problem.³ The problem of sexual violence is so severe in some universities that it limits women's academic excellence. For example fear of studying in the library at night or even attending seminars because they fear they might be raped or sexually harassed if they venture into campus alone.¹²

The harm caused by sexual violence can last a lifetime and span generations with serious adverse effects on health, education, employment, and on the economic wellbeing of individual families' communities and societies. In spite of the profound consequences of sexual violence in tertiary institutions in Nigeria there are no targeted efforts to reduce the menace. Tertiary institutions have no anti sexual violence policies, no designated security units specialised in combating sexual violence and no telephone hotlines for help. This study assessed the awareness and prevalence of sexual violence among female students of the University of Ilorin

Material and Methods

Study design

The study was a descriptive cross-sectional survey of female students of full time undergraduate female

students. In order to obtain uniform academic levels for all programmes, the 500L and 600L students were excluded. Also excluded were students on suspension of study for any reason.

Setting

The University of Ilorin, sometimes known as Unilorin, is a Federal [University](#) in [Ilorin](#), [Nigeria](#). It is located in Ilorin, [Kwara](#) State, and north central Nigeria. The Campus currently houses the Faculties of Science, Communication and Information Sciences, Engineering & Technology, Agriculture, Education, Law, Arts, pharmacy, veterinary medicine Business and Social Sciences. The university has a counselling and human development centre. Altogether, there are over 60 academic departments in the existing fourteen faculties. Undergraduate degree programmes run for 3, 4, 5, or 6 years, depending on entry qualifications and discipline. The staff and student populations were 3,040 and 25,084 respectively. The total number of female students in the University of Ilorin is 11,473.¹³

Sample size

Percentage of female students who have experienced sexual violence in a previous study (53.1%),¹¹ degree of accuracy usually set at 0.05, expected response rate of 90%; 400 female students were selected using a four stage random sampling technique based on the faculties, departments and academic levels in the school.

Simple random sampling by balloting of four faculties from the fourteen faculties in the institution. Equal number of 100 female students from each faculty was selected from the calculated sample size of 400. Selection of 4 departments from each faculty using simple random sampling by balloting. Respondents were proportionally allocated based on the total number of female students per departments.

Pretested semi structured questionnaire was used to collect quantitative data on socio demographic characteristics, awareness, perception, perceived risk factors and knowledge of prevention of sexual violence among female students of the University of Ilorin. A pre-test of the questionnaire using 10% of the sample size equivalent to 44 female students was done at the Al Hikmah University Ilorin.

Statistical methods

The proportion of respondents who correctly answered 5-10 questions on knowledge of sexual violence would

be considered good knowledge while respondents who answer 0-4 questions would be considered poor knowledge. The analysis was done using SPSS frequency table. P value of less than 0.05 was considered significant at 95% confidence level. Informed consent was obtained from the respondents and the nature of study was explained.

Results

Majority of the respondents 371 (92.8%) were between 16-25 years of age. None was less than 16years and only 3 (0.7%) were above 31 years. A high number 260 (65%) of respondents stays away from home, 389 (97.2%) of the respondents were single. **Table 1.**

Table 1: Distribution of socio-demographic characteristics of respondents

Characteristics (N=400)	Frequency	Percentage
Age group in years		
16-20	181	45.3
21-25	190	47.5
26-30	26	6.5
≥31	3	0.7
Mean age(±sd)21.0(±2.8)		
Place of Residence		
Campus Hostel	102	25.5
Private Hostel	158	39.5
Home	140	35.0
Academic Level		
100L	114	28.5
200L	104	26.0
300L	92	23.0
400L	90	22.5
Religion		
Christianity	232	58.0
Islam	168	42.0
Marital Status		
Single	389	97.2
Married	11	2.8
Family Type		
Monogamy	287	71.7
Polygamy	113	28.3

Almost all the respondents 395 (98.8%) were aware of what sexual violence. Majority of the respondents 369 (92.2%) considered being forced to have sex as a form of sexual violence, 267 (66.8%) and 224 (56.0%) agreed that request for sex in return for scores and request for sex in return for money respectively were forms of sexual violence. **Table 2.**

Majority 369 (92.3%) of the respondents were aware that sexual violence is a public health problem in Nigeria. **Table 3.** Many 93(23.2%) of respondents had experienced at least one form of sexual violence in the past. Most 80 (86.0%) of the respondents who have been victims have experienced between one and three forms of sexual violence. **Table 4.**

Table 2: Awareness of respondents on the true definition of sexual violence

Awareness on sexual violence (N= 395)	Frequency (%)
Forced to have sex	369 (92.2)
Request for sex in return of scores	267 (66.8)
Request for sex in return for money	224 (56.0)
Touching one's breast	216 (54.0)
Unwanted kiss	198 (49.5)
Buying a drink for someone	32 (8.0)
Pictures of sexual dealings to encourage one to have sex	195 (48.8)
Unwanted embraces	147 (36.7)
Unwanted comments or talks suggesting initiation of sex	139 (34.7)

Multiple responses

Table 3: Awareness of respondents on sexual violence as a public health problem in Nigeria

Awareness of sexual violence as a public health problem	Frequency	Percentage
Yes	369	92.3
No	31	7.8
Total	400	100

Table 4: Respondents experience and numbers of time of sexual violence

Experience of sexual violence	Frequency	Percentage
Yes	93	23.2
Numbers of times		
1-3	80	86.0
4-6	10	10.8
7-9	3	3.2

Among the respondents who have experienced sexual violence 35 (37.6%) of them have experienced unwanted comments suggesting initiation for sex, another 35(37.6%) have been forced to have sex, 32 (34.4%) have experienced unwanted kiss, 26(28.0%) unwanted

embraces, 26 (28.0%) touching of breast while only 13(13.9%) and 9(9.7%) have been offered money and scores in return for sex respectively. **Table 5.**

Table 5: Forms of sexual violence ever experienced by the respondents

Forms of sexual violence (N=93)	Frequency (%)
Unwanted comments or talks suggesting initiation for sex	35 (37.6)
Forced to have sex	35 (37.6)
Unwanted kiss	32(34.4)
Unwanted embraces	26(28.0)
Touching one's breast	26(28.0)
Pictures of sexual dealings to encourage one to have sex	19(20.4)
Request for sex in return of money	13 (3.3)
Request for sex in return of scores	9(9.7)

Multiple responses

Table 6: Perpetrators and forms of sexual violence experienced by the respondents

N = 93, Frequency (Percentage)

Perpetrators	Sexual advances	Unwanted body contacts	Forced to have sex
Friend/fellow students	31 (33.3)	52 (56.0)	20 (56.0)
Family member/elderly known person	8 (8.7)	1 (1.1)	6 (6.5)
Lecturer	3 (3.2)	1 (1.1)	1 (1.1)
Stranger	6 (6.5)	6 (6.5)	5 (5.4)
Boy friend/Fiancé	0 (0.0)	6 (6.5)	0(0.0)

Multiple responses

Table 7: Age at first sexual violence experience by the respondents

N=93

Age	1-10 Years	11-20 Years	21-30 Years
Forms of sexual violence	Frequency (%)	Frequency (%)	Frequency (%)
Unwanted sexual advances	3(3.2)	47(50.5)	14(15.1)
Unwanted sexual body contacts	9(9.7)	57(61.3)	11(11.8)
Forced to have sex	10 (10.8)	21 (22.6)	2 (2.2)

The commonest form of sexual violence was unwanted sexual body contacts 66(71.2%). Commonest perpetrators of unwanted sexual advances were their friends/fellow students with 31(33.3%) unwanted sexual body contacts 52(56.0%) and 20(21.5%) forced to have sex respectively. **Table 6.** The age at first sexual violence experience between 11-20 years has the highest perpetration of unwanted sexual advances 47(50.5%), unwanted sexual body contacts 57(61.3%) and episodes of being forced to have sex 21(22.6%) respectively. **Table 7.**

Discussion

Most 92.8% of the respondents were within the age group of 16-25years. A high number 65% of respondents of respondents stay away from home and parental guidance. The age group of the respondents, their single status and their residence away from home is a reflection of a young and sexually active population who are free to experiment relationships especially male searching and dating, all of which are linked to risk taking behaviour with regards to sexual relationships, alcohol and drug consumption, cohabiting before formal marriage, multiple sexual partners etc that are associated with instances of sexual violence among women.

Majority 58% of the respondents were Christians. Most 71.7% were from monogamous homes which agree with the marriage pattern of most Christian homes.

Majority 98.8% were aware of what sexual violence means, which is in keeping with a study done in a tertiary institution in Osun state where 97% of respondents were aware of sexual violence¹⁴ and the study in University of Port Harcourt where there was good knowledge of what sexual violence means.¹⁵

Although majority (92.2%) of respondents were aware that forced sexual intercourse was a form of sexual violence, the awareness of other forms of sexual violence varied. The result shows that though the awareness of sexual violence is high, the respondents were not aware of the complete definition of sexual violence and the continuum of acts that encompasses sexual violence. The implication of this is that an individual may be exposed to a progression of perpetration from attempt to act, which could have been nipped in the bud if identified early and prompt action and help is sought.

The study showed that 23.2% of the respondents have experienced at least one form of sexual violence. Which means approximately one in every five female students had experienced sexual violence. This finding agrees with other studies done in tertiary institutions in Nigeria that show that sexual violence is a common problem among their study population, though the prevalence vary^{11, 15}

Majority (86%) of respondents had experienced between one to three forms of sexual violence. This shows that one previous experience of sexual violence is a risk factor for another especially if it is not identified as such by the victim. Most victims were also between the ages of 11-20years which is within the age group with the highest number of people living with HIV/AIDS and other sexually transmitted diseases which are some of the consequences of sexual violence.¹⁵

The commonest form of sexual violence experienced by the respondents were unwanted comments or talks suggesting sex (37.6%) and forced to have sex(37.6%). In a study done in Osun State, the commonly reported sexual violence were rape (75%), unwanted physical contact (15%), offer of sex for marks (10%).¹⁴

In the past, it was believed that sexual violence was perpetrated mostly by strangers; recent researches have shown that most perpetrators are acquaintances of the victims which range from friends, lecturers, and fellow students. In a study done in Maiduguri, 75.1% victims were previously acquainted with the perpetrators, boyfriend (33.2%), classmates (14.6%), lecturers (16.1%), strangers (23.9%).¹¹ In this study, among respondents who have experienced sexual violence the highest frequency of perpetrators were friends followed by family members and strangers. These imply that sexual violence is no longer a 'stranger in the bush phenomenon' but are perpetrated mostly by those known to the victims.

Conclusion

The study assessed the awareness and prevalence of sexual violence among female students of the University of Ilorin. The study revealed that although majority of female students of University of Ilorin were aware of what sexual violence means and majority know that forced sexual intercourse is a form of sexual violence, they were not aware of the complete definition and the

various acts that encompass sexual violence. The study also showed that respondents have experienced varying forms of sexual violence and most common perpetrators were acquaintances of the victims. This study calls for the need to address sexual violence in its entirety with a shift from criminal justice perspective to public health perspective. It is also important to educate everyone on the comprehensive definition of sexual violence and the role of every individual in the fight against sexual violence.

Recommendations

The study recommends that school authorities develop/reinforce policy statement on sexual harassment in schools and establishment of telephone hotlines for counselling and prompt response for vulnerable students.

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Evaluation of thyroid disorders among type 1 and type 2 diabetes mellitus patients in Edo State, Nigeria.

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Abstract

Thyroid disorders can have significant effect on blood glucose levels and if left untreated, have effect on diabetes control. To evaluate the thyroid disorders among diabetes mellitus patients in Edo state, Nigeria, blood samples from 267 subjects consisting of 164 diabetic patients (24 Type 1 DM, and 140 Type 2 DM) and 103 non-diabetic apparently healthy individuals [as controls] were analysed. The thyroid stimulating hormone [TSH], triiodothyronine [T3] and thyroxine [T4] levels were determined using enzyme link immunosorbent assay [ELISA], while plasma glucose level was determined using standard spectrophotometric method. Of the 164 diabetic subjects studied, 51.8% showed abnormal thyroid functions (43.9% had hyperthyroidism and 7.9% had hypothyroidism) and of the 51.8% that showed abnormal thyroid functions, 45.1% were type 2 Dm while 6.7% were Type 1 DM. The biochemical results showed that the mean plasma glucose of Type 1 diabetes (213.65 ± 20.35) and Type 2 diabetes (218.78 ± 7.85) were significantly ($P < 0.05$) higher than that of non-diabetic control (81.88 ± 17.22) mg/dl; The levels of T3 and T4 were significantly ($P < 0.05$) higher in Type 2 diabetes (1.80 ± 0.80 ng/ml and 8.80 ± 3.01 ug/dl) than the non-diabetic control (1.50 ± 0.50 ng/ml and 7.81 ± 1.60 ug/dl) respectively; while the level of TSH in Type 1 diabetes (0.93 ± 0.76 Miu/ml) and Type 2 diabetes (1.14 ± 0.97 ng/ml) were significantly ($P < 0.05$) lower than the non-diabetic control (1.77 ± 0.73 Miu/ml). There were positive but not significant ($p > 0.05$) correlations between T3 and Glucose levels among DM ($r = 0.232$), Type 1 DM ($r = 0.40$) and Type 2 DM ($r = 0.210$). There were strong positive and significant ($p < 0.05$) correlations between T4 and Glucose levels among Type 1 DM ($r = 0.530$) and Type 2 DM ($r = 0.500$). The association of thyroid disorders with diabetes mellitus in Edo State is high, with secondary hyperthyroidism in type 1 DM and primary hyperthyroidism in type 2 DM. It is therefore recommended that all diabetic patients should undergo bi-annual screening to detect asymptomatic thyroid dysfunction and other biochemical variables to improve the quality of life and reduce thyroid associated morbidity.

Introduction

People with diabetes mellitus experience thyroid disorders more frequently than the general population. There have been controversial reports in previous studies concerning hyperthyroidism and hypothyroidism in diabetes mellitus. Winker et al. [2000] recorded cases of hyperthyroidism and hypothyroidism [higher percentage] in diabetes

mellitus. Granner [2000], recorded that iodothyronines are insulin antagonist with high level diabetogenic. Gurjeet *et al*, [2011] reported a high incidence of abnormal thyroid hormones levels in Type 2 diabetes mellitus. Also, Udiong *et al*. [2007] in his separate study, found and reported altered thyroid hormones levels of different magnitude in diabetic patients. The above studies have shown that thyroid disorders are associated with Diabetes mellitus (both Type 1 and Type 2 DM), but there were no clear distinctions as to which type of thyroid disorder is peculiar to Type 1

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DM or Type 2 DM; This study will resolve the controversy in the previous studies and establish the pattern of thyroid profiles in type 1 DM, type 2 DM

Materials and Methods

Area of study: The study was carried out in Irrua Specialist Teaching Hospital in Edo central and Edo North Senatorial Districts of Edo state, Nigeria, located between approximately Latitude 05° 44'N- 07° 34'N and Longitude 05° 04'E- 06° 43'E, covering an estimated area of 20,000 km².

Ethical approval: Approval was obtained from the Research and Ethics committee of Irrua Specialist Teaching Hospital Irrua for this study. Also verbal consent to participate in the study was obtained from the control subjects as questionnaires were given to them to fill the required personal information and data that were necessary for the study (ISTH/ETHICS COM/7)

Sample Size: A total number of 267 subjects consisting of 164 Diabetes mellitus subjects within the age range of 23 to 83 years; and 103 apparently healthy individuals within the age range of 20 to 53 years as controls were used for this study. This was obtained using the 'precise prevalence' formula described by araoye., [2004].

Subjects and selection criteria: The 267 subjects for this study were divided into two major groups of 164 diabetes mellitus subjects (consisting of 24 type 1 and 140 type 2 DM patients) and 103 apparently healthy subjects as control group. The diabetic subjects were recruited from both in-patients and out-patients attending diabetic clinic of Irrua Specialist Teaching Hospital, which serves as medical centre for the study location. The selection of diabetic subjects were initially based on the physician's provisional diagnosis and then confirmed by the fasting plasma glucose of more than 126mg/dl or random blood sugar of more than 200mg/dl. The criteria used for separating Type 1 DM from Type 2 DM subjects were based on; first, the clinical classification that included the patients history, age of onset of the DM (less than 35 years) and total dependence on insulin therapy alone to achieve normal plasma glucose concentration; and second, the laboratory classification using fasting C-peptide levels of less than 0.38ng/ml (approximately 0.4ng/ml) for

Type I DM (Udiong *et al.*, 2007). The known DM subjects were already on drugs such as insulin and some oral hypoglycaemic agents. Their thyroid conditions were not known. The control subjects were selected from staff and students of Irrua Specialist Teaching Hospital and Ambrose Alli University, Ekpoma respectively who are apparently healthy, free from thyroid disorders, and non-diabetic. The following guidelines for detection of thyroid dysfunctions were considered (Gurjeet *et al.*, 2011). Normal function: when T3, T4 and TSH were within normal range; Primary hypothyroidism: When TSH is increased and T3 and T4 are less than the normal values; Secondary hypothyroidism: When T3 and T4 are less than normal values but TSH is within normal; Sub clinical hypothyroidism: when TSH is increased but T3 and T4 are within normal range; Primary hyperthyroidism: when TSH is decreased and T3 and T4 are more than normal values; Secondary hyperthyroidism: When T3 and T4 are more than the normal value but TSH is within normal; Sub clinical hyperthyroidism: when TSH is decreased but T3 and T4 are within normal (William *et al.*, 2012).

Analytical methods: The plasma glucose was determined using the Oxidase-peroxidase method as described by Barham (1972) Plasma Thyroid stimulating Hormone (TSH) was quantitatively determined using Drg-diagostics ELISA(2012) according to Uotila *et al.*, (1981). Plasma total T3 was quantitatively determined using Drg-diagostics ELISA(2017) according to Walker, (1977). Plasma Thyroxin (T4) level was determined using Drg-diagostics ELISA(2016) according to Walker, (1977).

Results

Table 1 shows the distribution of thyroid disorder in type 1 and type 2 DM. Out of 164 diabetic subjects studied, 51.8% shows abnormal thyroid functions(7.9% hypothyroid and 43.9% hyperthyroid) and 58.2% shows normal thyroid profile. And out of the 51.8% that shows abnormal thyroid functions, 45.1% were type 2DM while 6.7% were type 1 DM. Table 2 shows that the mean plasma glucose of Type 1 DM and Type 2 DM patients was significantly [$p<0.05$] higher than the control subjects; Likewise, the mean plasma T3 and T4 levels of Type 2 DM subjects were significantly [$p<0.05$] higher than those of the control subjects.

Table 3 showed that there were positive correlations between T3 and Glucose levels among DM ($r = 0.232$), Type 1 DM ($r = 0.40$) and Type 2 DM ($r = 0.210$), and the correlations were statistically not significant ($p > 0.05$). There were strong positive correlations between T4 and Glucose levels among Type 1 DM ($r = 0.530$) and Type 2 DM ($r = 0.500$), and the correlations were statistically significant ($p < 0.05$). But there was no significant correlation ($r = 0.204$; $p > 0.05$) for the DM (table 4). Table 5 showed that there were weak negative correlations between TSH and Glucose levels among DM patients ($r = -0.02$); Type 1 DM ($r = -0.02$) and Type 2 DM ($r = -0.03$), and the correlations were statistically not significant ($p > 0.05$).

Table 1: Types of thyroid disorders Among type 1 and Type 2 Diabetes mellitus subjects in the study area.

	Pry hyper	Sec hyper	Subclinical hyper	Pry hypo	Sec hypo	Subclinical hypo	Thyroid disorders	Euthyroidism
Type 1DM (N=24)	1	4	3	0	3	0	11 (6.7%)	13 (7.9%)
Type 2DM (N=140)	10	45	9	0	10	0	74 (45.1%)	66 (40.2%)
Total DM (N=164)	11 (6.7%)	49 (29.9%)	12 (7.3%)	0 (0%)	13 (7.9%)	0 (0%)	85 (51.8%)	79 (48.2%)

Table 2: Comparisons of the mean thyroid profiles of type 1 and type2diabetes mellitus, with control group using analysis of varianc[ANOVA]

Parameter	Control Mean±sd N=103	Type2,dm Mean±sd N=140	Type1,dm Mean±sd N=24	F-value	P-value	Remark
Glucose [mg/dl]	81.88 ±17.22 ^a	218.78 ±92.66 ^b	213.65 ±97.55 ^b	29.032	0.000	S
T3 [ng/ml]	1.50 ±0.50 ^a	1.80 ±0.80 ^b	1.51 ±0.76 ^a	4.307	0.000	S
T4 [µg/dl]	7.81 ±1.60 ^a	8.80 ±3.01 ^b	7.71 ±2.57 ^a	3.310	0.001	S
TSH[Miu/ml]	1.77 ±0.73 ^a	1.14 ±0.97 ^b	0.93 ±0.76 ^b	3.631	0.000	S

Values in a row with diff. superscripts are significantly different at $p < 0.05$ using post hoc.

KEY: S= SIGNIFICANT; NS= NOT SIGNIFICANT; N=NUMBER OF SUBJECTS

Table 3. Correlation of T3 with glucose among dm patients

DM CASES	GLUCOSE [mg/dl] MEAN±SD	T3[ng/ml] MEAN±SD	r	P-VALUE	SIGNIFICANCE
DM N=164	218.05 ±7.31	1.76 ±0.79	0.232	0.053	NS
TYP1 DM N=24	213.65 ±20.34	1.51 ±0.76	0.40	0.319	NS
TYP2 DM N=140	218.78 ±7.85	1.80 ±0.80	0.210	0.090	NS

Table 4. Correlation of T4 with glucose among dm patients

DM CASES	GLUCOSE [mg/dl] MEAN±SD	T4[µg/dl] MEAN±SD	r	P-VALUE	SIGNIFICANCE
DM N=164	218.05 ±7.31	8.64 ±2.97	0.204	0.060	NS
TYP1 DM N=24	213.65 ±20.34	7.71 ±2.57	0.530	0.042	S
TYP2 DM N=140	218.78 ±7.85	8.80 ±3.01	0.500	0.012	S

KEY: S= SIGNIFICANT; NS= NOT SIGNIFICANT; N=NUMBER OF SUBJECTS; r = CORRELATION COEFFICIENT

Table 5. Correlation of TSH with glucose among dm patients

DM CASES	GLUCOSE[mg/dl] MEAN±SD	TSH[miu/ml] MEAN±SD	r	P-VALUE	SIGNIFICANCE
DM N=164	218.05 ±7.31	1.11 ±0.94	-0.020	0.646	NS
TYPE1 DM N=24	213.65 ±20.34	0.93 ±0.76	-0.20	0.568	NS
TYPE2 DM N=140	218.78 ±7.85	1.14 ±0.97	-0.30	0.710	NS

KEY: S= SIGNIFICANT; NS= NOT SIGNIFICANT; N=NUMBER OF SUBJECTS; r = CORRELATION COEFFICIENT

Discussion

Out of 164 diabetic subjects studied, 51.8% shows abnormal thyroid functions (7.9% hypothyroid and 43.9% hyperthyroid) and 48.2% shows normal thyroid profile. And out of the 51.8% that shows abnormal thyroid functions, 45.1% were type 2DM while 6.7% were type 1 DM. The study revealed high incidence of abnormal thyroid hormone levels in diabetic mellitus especially type 2 DM. This observation is in line with the reports of Gurjeet *et al*, (2011) and Udiong *et al* (2007), who in separate studies found altered thyroid hormones levels of different magnitude in diabetic patients. Hyperthyroidism is present in 43.9% (primary hyperthyroidism 6.7%, secondary hyperthyroidism 29.9% and subclinical hyperthyroidism (7.3%); while hypothyroidism is present in 7.9% (all secondary hypothyroidism) of diabetic subjects. The thyroid disorders in this study is more of hyperthyroidism (43.9%) than hypothyroidism (7.9%). This contradict the report of Winker, (2000) who recorded higher percentage of hypothyroidism in diabetes mellitus. It does not also correlate with the report of Gurjeet *et al*, (2011) who recorded 23.75% hypothyroidism and 6.25% hyperthyroidism among diabetic subjects. These differences would be as a result of the various medications the diabetics were receiving. For example, it is known that insulin, an anabolic hormone enhances the level of free T4 while it suppresses the level of T3 by inhibiting hepatic conversion of T4 to T3 (Gurjeet *et al*, 2011). On the other hand, some of the oral hypoglycemic agent such as the phynylthioureas are known to suppress the level of free and total T4 while causing raised levels of TSH (smith *et al* 1998 Gurjeet *et al*, 2011). The thyroid disorders is more in type 2 DM (45.1%) than in type 1 DM (6.7%) with a ratio of 7 to 1 (7:1) and the associated thyroid disorder is almost exclusively hyperthyroidism for both type 1 DM and type 2 DM.

The thyroid profile observed in type 2 DM showed a significant ($p < 0.05$) decrease in TSH level, but significant ($p < 0.05$) increase in T3 and T4 levels when compared with the control group. This is a clear indication of **primary hyperthyroidism in Type 2 DM**. It is known that insulin is capable of raising the levels of TSH and suppressing the levels of T3 by inhibiting hepatic conversion of T4 to T3 (Boehringer, 1984 Gurjeet *et al*, 2011)). This could account for the significant decrease in TSH with significant increase in

the thyroid hormones because of the significant decrease in insulin level in DM as observed in this study. This finding is in line with the report of Canadian Diabetes Association (2006), that there appears to be a higher than normal occurrence of thyroid disorders in people with Type 2 DM. The thyroid profile observed in type 1 DM also showed a significant ($p < 0.05$) decrease in TSH level, but no significant differences ($p > 0.05$) in T3 and T4 levels when compared with the control group.

The study revealed that there were significant ($P < 0.05$) and positive correlations between T3 and Glucose levels among Type 1 DM and Type 2 DM. There were also strong positive correlations between T4 and Glucose levels among Type 1 DM and Type 2 DM and the correlations were statistically significant ($p < 0.05$); while there were weak negative correlations between TSH and Glucose levels among DM patients (Type 1 DM and Type 2 DM). The positive correlations of thyroid hormones (T3 and T4) with blood glucose level were in line with Ochei and Kolhatkar (2000), that thyroxine [T4] have been shown to increase the absorption of glucose from the gastrointestinal tract {GIT} and stimulate glycogenolysis. It also promotes an increase in blood glucose level by degrading insulin (Ochei and Kolhatkar, 2000). Therefore for effective management of diabetes mellitus and its complications, the assessment of thyroid functions is necessary.

Conclusion

This study confirms that Diabetes mellitus, both type 1 DM and type 2 DM are associated with thyroid disorders. It was observed that Type 1 Diabetes is mostly associated with secondary and sub-clinical hyperthyroidism while Type 2 diabetes is mostly associated with secondary and primary hyperthyroidism.

Near-perfect adherence was practiced by only a few HIV/AIDS patients. Adherence to antiretroviral therapy is closely tied to virology, immunologic, and clinical outcomes. Small increases in adherence can result in significant improvement in these outcomes. Near- perfect adherence, however, is required to maximize the likelihood of long- term clinical success. To help patient benefit fully from antiretroviral therapy, health care provider need to take time ask

about and support medication adherence. Finally, alterable factors that impact adherence should be attended to, if possible, prior to starting antiretroviral therapy, and in a proactive and ongoing way throughout therapy.

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Factors influencing treatment adherence and disease progression among people living with HIV/AIDS in a secondary health facility in Delta State, Nigeria

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Abstract

Introduction: This study was designed to investigate the factors influencing treatment adherence and disease progression among people living with HIV/AIDS in a secondary health facility in Delta State, Nigeria

Materials and methods: The study was a descriptive cross-sectional study carried out at a Government designated supervised therapy Centre in Central Hospital, Warri, Delta State. A total of 250 HIV positive patients were assessed using a structured questionnaire. Data was analysed using IBM SPSS v.21 statistical software.

Results: The mean age of respondents was 49.6 (15.4) years, majority of respondents were female 212 (84.8%), most were married 136 (54.4%). Most of the respondents 127 (50.8%) had other sexually transmitted infections in addition to HIV while malaria (21.2%) and tuberculosis (18%) were other co-morbid conditions were observed. Majority of the respondents 222 (88.8%) had skipped drugs at one time or the other however the largest proportion of respondents that skipped drugs did so for a few days 156 (70.3%). Reasons advanced for skipping drugs included headache (47.7%), proximity to accessing drugs (23.0%), dosage timing (18.0%) and hypersensitivity reactions (9.0%).

Conclusion: Near-perfect adherence was reported in just a few HIV/AIDS patients however continued adherence is required to maximize the likelihood of long-term clinical success. Health care providers should take time to ask about and support medication adherence in clients.

Key words: PLWHA, treatment adherence, secondary facility, Delta State

Introduction

HIV/AIDS has assumed a pandemic status since inception and the global cumulative death from the disease as of 2014 was put at 39 million¹. Estimate of world burden of HIV infection in 2014 showed that the high percentage (19 million) live in sub-Saharan Africa and about 1.2 million infected patients died from the global infected individuals of 36.9 million.

Nigeria trails South Africa and India as having highest number of people infected with and living with HIV/AIDS. Results of a survey published by UNAIDS² showed that in 2015, estimated adult HIV prevalence in Nigeria was 3.1% as at the year under study. In this age

bracket, 828, 867 individuals received antiretroviral therapy and an estimated 180, 000 deaths related to HIV was reported.

The lentivirus that is responsible for HIV has predilection for cells responsible for human immune response leading to a cascade of events which ultimately results in AIDS in the absence of therapeutic intervention³. Notably the virus infects cells responsible for immunity such as CD4⁺ cells (helper T cells), dendritic cells and macrophages resulting in a decline in the body's CD4⁺ cells titre⁴. A number mechanism has been proposed on how this feat is achieved by the virus. These include direct destruction of infected immunological cells by the virus, destruction of some infected cells via pyroptosis, triggering of apoptosis in bystander uninfected cells and recognition of infected cells by cytotoxic CD8 lymphocyte and subsequent

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destruction⁵. The massive destruction of CD4⁺ cells below the threshold culminates in disability of cellular immune response paving way for opportunistic infections.

Therapeutic interventions in the form of antiretrovirals increase life expectancy in HIV/AIDS patients from the average 9-11 years without intervention about 31 years^{6,7}. The success or otherwise of the intervention depend on factors that enhance reduction in the viral copies and elevate CD4⁺ count leading to improved host immunological response and general well being.

Host, viral and antiretroviral factors are some of the factors that determine to a large extent the progression of the disease. Others include prompt diagnosis, access to quality health care and institutional factors. Antiretroviral is central in the fight against this scourge which has taken a pandemic status⁷. For a start, it reduces the progression of HIV infection to full blown AIDS. Furthermore the risk of transmission and development of resistance strains of the virus is reduced. Patient adherence to prescribed antiretroviral cocktail stands as a major determining factor of disease remission and extension of life expectancy⁸. Report has showed a positive correlation between patient adherence on one hand, decline in viral load and rebound CD4⁺ titre⁷. Conversely, non-adherence has been attributed to development to resistance strains of the virus with attendant consequences.

This study was designed to investigate the factors influencing drug treatment adherence in HIV and AIDs patients in a low income nation. The indicator for non-adherence was set as drug skipping. It is expected that the outcome of this study will assist in policy formulation and development to improve HIV/AIDS control.

Materials and Methods

The study was carried out at a Government designated supervised antiretroviral therapy Centre in Central Hospital, Warri, Delta State, South-south, Nigeria. The study centre is central in the state and has a dedicated clinic for people living with HIV-AIDS. Ethical approval was obtained from the Institution's Ethical Board. Patients that have been previously diagnosed, undergoing therapy, presented at the facility and gave informed oral, individual consent were included in the

study. A total of 250 HIV positive patients were assessed within four consecutive visits to the Centre. Assessment of patients was done using a validated structured questionnaire. Where applicable, answers to questions were extracted from patients' file. Skipping of medication was regarded as non-adherence to chemotherapy or treatment. Data was presented as percentages using descriptive statistics.

Results

The socio-demographic pattern of respondents is presented in Table 1. Most respondents were within the age 16-45yrs 120 (48.0%), however the mean (SD) age of respondents was 49.6 (15.4) years. Majority of respondents were female 212 (84.8%), most respondents were married 136 (54.4%), most respondents had at least secondary education 137 (54.8%) followed by primary education 63 (25.2%) and most respondents were unemployed 123 (49.2%).

Table 1: Socio-demographic characteristics of respondents (N=250)

Characteristic	Frequency	Percent
Age		
5 years	5	2.0
6-15	21	8.4
16-45	120	48.0
46- 64	87	34.8
> 64	17	6.8
Mean (SD)	49.6 (15.4)	
Gender		
Female	212	84.8
Male	38	15.2
Marital status		
Single	63	25.2
Married	136	54.4
Divorced	21	8.4
Widow/widower	30	12.0
Educational level		
Primary	63	25.2
Secondary	137	54.8
Tertiary	16	6.4
Technical	34	13.6
Occupation		
Self employed	44	17.6
Politicians	25	10.0
State civil servant	51	20.4
Federal civil servant	7	2.8
Unemployed	123	49.2

It was observed that most 127 (50.8%) of the respondents had other sexually transmitted infections in addition to HIV. Malaria (21.2%) and tuberculosis (18%) were other co-morbid conditions observed (Table 2).

Table 2: Co-morbid conditions in respondents

Co-morbidity	Frequency	Percent
Tuberculosis	45	18.0
Malaria	53	21.2
Hepatitis B	15	06.0
Sexually transmitted infections	127	50.8
Others	10	04.0
Total	250	100.0

Table 3: Time of diagnosis, antiretroviral treatment and adherence characteristics of respondents

Characteristic	Frequency 250	Percent 100.0
Time of Diagnosis		
1-2years	66	26.4
2-5 years	122	48.8
5-10 years	59	23.6
Greater than 10 years	3	01.2
Time of commencement of therapy		
<3 Months	188	75.2
<6 Months	12	04.8
<9 Months	50	20.0
Regimen of antiretroviral		
Once daily (evening)	10	04.0
Twice daily (morning and evening)	240	96.0
Skipped drugs		
Yes	222	88.8
No	28	11.2
Reason for skipping drugs (n=222)		
Dosage timing	40	18.0
Hypersensitivity reaction	20	09.0
Headache	106	47.7
Proximity to access to drugs	51	23.0
Others	5	02.3
Length of time drug was skipped (n=222)		
A few days	156	70.3
A week	49	22.1
Two weeks	8	03.6
Three weeks	6	02.7
One month	3	01.4
Over one month	-	-

Table 3 is a composite table depicting time of diagnosis, antiretroviral treatment and adherence characteristics of respondents. Results showed that 122 (48.8%) of the respondents were diagnosed as HIV positive between 2-5 years as of the time of the study. Only a small percentage 3 (1.2%) was diagnosed above ten years while the rest were diagnosed between 1-5 years before the study. All the respondents commenced therapy within 9 months of diagnosis with the greatest percentage starting within the first 3 months. A large percentage of the respondents 222 (88.8%) had skipped drugs at one time or the other. Reasons advanced for skipping drugs include headache (47.7%), proximity to accessing drugs (23.0%), dosage timing (18.0%) and hypersensitivity reactions (9.0%). The largest percentage of respondents that skipped drugs did so for a few days 156 (70.3%).

Discussion

Since the advent of HIV/AIDS, landmark achievements have been made in discovery of drugs that target different stages of the virion life cycle in a bid to cure the infection. An understanding of the parasite-related factors has enhanced development of efficacious medications⁹. A major and complex factor that may also contribute to the therapeutic success is the host related factor along with other related web of factors like health care practitioners and health care facilities¹⁰. The present study sought to examine a number of host related factors that could impact on therapeutic success. These will ultimately affect disease progression at individual level and disease transmission at population level.

The highest population of respondents in the present study was within the sexually active age bracket. This age group also represents the active major work force in the society. By implication, the economy may be negatively affected in case of being invalid or incapacitated as a result of the disease condition¹¹. Also, there is the risk of rapid spread of the infectious agent by these sexually active individuals in this age bracket in the absence of proper counselling and adherence to chemotherapy¹². That this age bracket represents the highest population of people living with HIV/AIDS may not be a correct inference. It may be that the older population could not access the facility due to old age or financial constraints with the attendant implications.

The results of this study showing the greater percentage of patients being females could be a reflection of the

gender ratio in the society. It may also be inferred that males are more conservative and less responsive to the facility offered by the Government especially with the stigmatization associated with HIV/AIDS. Probably education status was responsible for presentation of patients at the Centre. The observation that all the respondents had formal education may not be interpreted that illiterates are not HIV positive. The educated people living with HIV/AIDS saw reason to access the best of available therapy. The percentage of unemployed people was the largest. It is not, however, clear whether they lost their job as a result of stigmatization/discrimination or whether they were unemployed as of the time of being diagnosed as HIV positive. It can be postulated that it would be difficult for an unemployed person living with HIV/AIDS to be engaged especially if the status is made known to the employers or co-employees.

Co-morbidity of plasmodiasis and tuberculosis with HIV infection observed highlights the impact of co-morbid infections on the overall well-being of HIV/AIDS patients. The burden of coping with polypharmacy, gold standard in chemotherapy, is further complicated with additional medications for the co-morbid infections¹³. The observation that a greater percentage of the respondents at the facility were diagnosed as HIV in less than ten years at the time of the study could be attributed to 'drop out' with time. The patients may have resorted to 'self-help' in sourcing and administration of medications¹⁴. The inherent danger is apparent in lack of full adherence to medication and lack of adequate monitoring of disease/treatment progression (viral load and CD4 count).

Non-adherence to antiretroviral therapy (drug skipping) by a high percentage of the respondents may be as a result of sociodemographic factors (younger or older age, gender, race/ethnicity, etc.) and patients' psychological health. Antiretroviral medications are offered to the patients without cost since they were made available by the government, however some health care providers could exhibit poor attitudes towards HIV/AIDS patients corroborating the findings of¹⁵. In their report, patient related, drug related and health care provider related factors were implicated in non-adherence to antiretroviral therapy. They opined that an understanding of these factors by health care providers may guide the development of holistic approach to intervention and improve patient adherence to chemotherapy.

Conclusion

Near-perfect adherence was practiced by only a few HIV/AIDS patients. Adherence to antiretroviral therapy is closely tied to virology, immunologic, and clinical outcomes. Small increases in adherence can result in significant improvement in these outcomes. Near- perfect adherence, however, is required to maximize the likelihood of long- term clinical success. To help patient benefit fully from antiretroviral therapy, health care provider need to take time ask about and support medication adherence. Finally, alterable factors that impact adherence should be attended to, if possible, prior to starting antiretroviral therapy, and in a proactive and ongoing way throughout therapy.

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Health manpower development and utilization: Perspectives and experience of Primary HealthCare workers in the North-Central State, Nigeria

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Abstract

Manpower otherwise referred to as human resources is cardinal to effective health service delivery. In rendering services of health care to the people, human resource is required to operate the equipment and utilize fund in rendering the services to the people. The quality of manpower is determined by the level of training and motivation of the workers. World-wide, the public health sector has been facing the problems of human resources, particularly in developing countries like Nigeria with high turnover rate of staff, brain-drain to greener pastures, frequent occurrences of strike actions among other challenges. This study assessed the manpower development and utilization in Ilorin West Local Government Area health facilities.

The study was descriptive cross sectional by design involving all consenting, consecutive the primary health care workers in Ilorin West Local Government Area of Kwara State, North-central, Nigeria. Ninety-four percent of the workers were working within their trained specialty. Many (43%), of the respondents have attended a form of training in the last three years. The majority (86%) of the health workers surveyed reported that the courses attended were relevant to their practice while 83% reported that they benefited from the courses they attended. A quarter of the health workers felt that the courses' content did not justify the cost of organizing the training. There is need to conduct regular training need assessment to identify learning gaps among the primary health care workers in the public sector.

Key words: Manpower, human resources, Training, development, health worker, PHC, local government

Introduction

Public health sector is the employer of larger number of the health workers in Nigeria. The public health sector workers render both preventive and curative health services to a large proportion of the population, particularly the poor citizens and the rural dwellers where the majority of Nigeria population resides. The public health sector render these services in the form of public utility and their clients pay little or no amount of money for the services rendered. The poor citizens and rural dwellers take advantage of this opportunity to promote their health, prevent disease and treat their ailments.

In rendering these services of health care to the people, the human resources is required to operate the equipment and utilize the fund in rendering the services to the people.¹ Therefore, manpower otherwise referred to as human resources is cardinal to effective health service delivery. The quality of manpower is determined by the level of training and motivation of the workers. This study assessed perspectives and experience of Primary HealthCare (PHC) workers on manpower development and utilization the North-central Nigeria.

World-wide, the public health sector has been facing the problems of human resources, particularly in developing country like Nigeria with high turnover rate of staff, Brain-drain to greener pastures, frequent occurrences of strike actions among other challenges.

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Some of the causes of the human resources problems are; poor remuneration of professionals; lack of motivation of staff; non-challant attitude of staff to work, and corruption.² All these problems lead to poor performance of the public health sector in rendering service to the people.

However, there are other factors apart from staff development that can enhance staff performance. Furthermore, it is not all areas of a human resources problem that will yield to a training solution. The main goal of any organization is the performance of job in line with the organization objectives and standards. Job performance can be seen as a function of capacity to perform, opportunity to perform and willingness to perform. The capacity to perform relates to the extent to which individual worker possess task relevant skills, abilities, knowledge and experience.³ The capacity to perform is enhanced through manpower training and development activities. This underscores the importance of the training, retraining, and capacity development of workers in order to ensure satisfactory job performance. Unless the workers know what is supposed to be done, and how the worker is supposed to do it, high level of job performance may not be possible. Manpower utilization involves appropriate placement of staff, provision of appropriate tools and materials to the workers. A well trained worker who is appropriately placed and equipped needs to be motivated to perform as expected (Figure 1).

Manpower development and utilization are two important determinant of job performance. Therefore, it is will be useful for the health managers to understand how manpower training, development and utilization affect job performance.

Training is an attempt by the organization to change the behaviour of its members through the learning process in order to increase effectiveness.⁴ In similar way, Stone defined training as any organizationally planned effort to change the behaviour or attitudes of workers so that they can perform to acceptable standards on the job.⁵ Therefore, manpower training involves conscious efforts to plan to teach, inform or educate personnel for the purpose of changing their learned behaviour and perception for the overall goal of job enhancement. Furthermore, training can be viewed as organizational effort at helping worker to

acquire basic skills required for the efficient execution of the functions for which he was hired.⁶

Training is management's reaction to change such as modifications in equipment, design, new tools and machines. Also, training induces changes such as procurement of new equipment, transfer and placement of staff. Hence, training is both a cause and effect of change.

Consequently, development can be defined as the activities undertaken to expose worker to perform additional duties and assume positions of importance in the organizations hierarchy.⁶ Also, development is form of training that serves to prepare workers for future positions in the organization. Furthermore, development activity prepares people to do better in existing jobs and prepares them for greater responsibility in the future.⁷

Development usually suggests a broad view of knowledge and skills acquisition than training; it is therefore less job oriented than career oriented; concerned more with worker potential than with immediate skill and sees workers as adaptable resources.⁸ This study assessed the perception of the health workers toward manpower development and utilization.

Materials and Methods

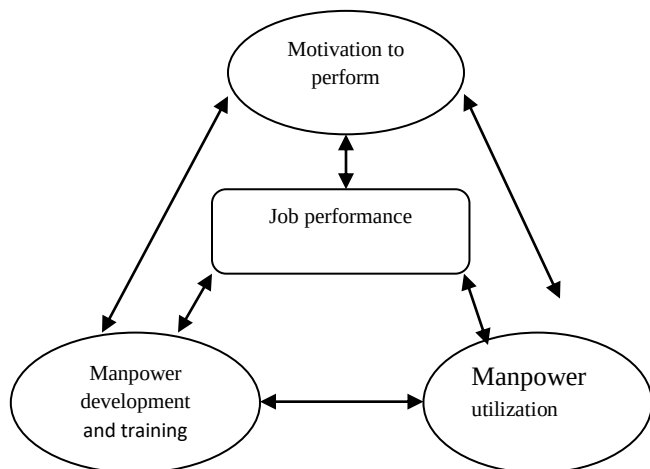
The study was descriptive cross sectional by design involving the primary health care workers. The study was carried out in Ilorin West Local Government Area of Kwara State, North-central, Nigeria. There were 37 Health facilities in the local Government; 20 private; 17 public out of which 14 are local government owned primary health care (PHC) facilities distributed across all the political wards, two state government owned health facilities and a federal government owned university teaching hospital. The study was carried out among the health workers in the local government owned PHC facilities. The local government area is divided into 11 political wards. Only Warrah/Osin/Egbejila ward was classified as rural area.⁹

All consenting consecutive health worker present at the time of the study were interviewed using pretested questionnaire. A total of 148 participants were

recruited into the study. The data collected were analyzed using SPSS version 16.

Results

The majority of the respondents, 77 (52.00%) belong to nursing profession followed by community health officers which accounted for 57 (38.5%) of the respondents. Laboratory technicians were eight (5.40%), pharmacy technicians accounted for four (2.7%), while others were two (1.4%). (Figure 2).



Source: Researcher (2008)

Figure 1: Determinants of job performance

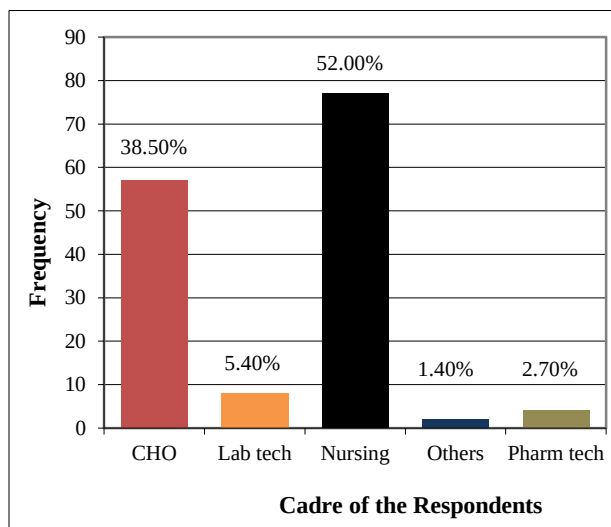


Figure 2: Cadre of the Respondents

The majority of the respondents, 136 (92.0%) were senior staff grade levels 8 to 15. (Figure 3). The majority of the health workers studied accepted that their job is related to their trained specialty accounting for 94 percent of the respondents while 6 percent of

the respondents are not working in their specialty. (Figure 4).

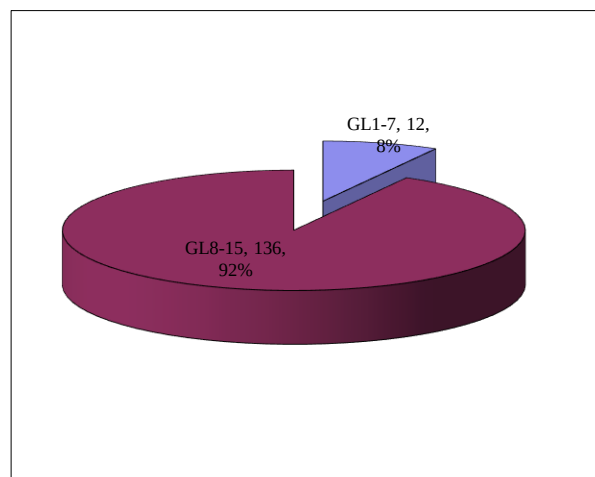


Figure 3: Distribution of the Respondents by the Grade level

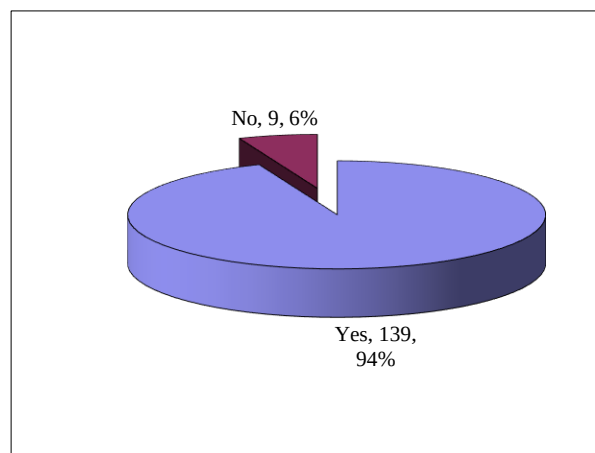


Figure 4: Health workers' Job related to the Specialty N=148

About 2 out of 5 health workers, 43%, have attended a form of training in the past three years. Less than half of the health workers surveyed have had the benefit of training and development in the past three years. Highest proportion of the worker, 43% attended a short course while long course, in-house workshop/seminar, out-door workshop/seminar and on the job training accounted for 41%, 40%, 39% and 37% respectively. Table1.

The majority (86%) of the health workers surveyed reported that the courses attended were relevant to their practice while 83% reported that they benefited

from the courses they attended. About 85% workers were able to apply the content of the course at work. Three quarters (76%) of the workers, reported that the application of the course has enhanced their job performance. However, the courses attended necessitated changing job schedule in nearly a third, 32% of the health workers surveyed. A quarter of the health workers felt that the courses' content did not justify the cost of organizing the training. Table 2

Table1: Health worker capacity development in the last 3 years

Course	Frequency	(%)
Short Course (≥ 2 weeks)	63	(43)
Long Course (≥ 3 Months)	61	(41)
In house Workshop/ Seminar	59	(40)
Outdoor Workshop/ Seminar	57	(39)
On the job Training	55	(37)

Table 2: Health workers' perception toward manpower development.

Perception	Frequency (%)
Course Relevant to Job	127 (86)
Benefited from Course	123 (83)
Able to apply the Course to Job	126 (85)
Course Enhanced the job	113 (76)
Necessitated Changing Job	48 (32)
Feel benefit of the Course justifies the cost	92 (62)

Discussion

Manpower otherwise referred to as human resources is cardinal to effective health service delivery. The quality of manpower is determined by the level of training and motivation of the workers. The majority of the workers are appropriately placed in their trained specialty. More than half of the workers have not been

trained in the past three years. This is in conformity with a reported non-adherence of government authorities to the recommendations of the 1988 and 1998 civil service reform which stipulate that ten percent (10%) of the total annual personnel emolument be set aside for staff training and development.¹⁰ However, the majority of workers trained accepted that the trainings were relevant to their job and they were able to apply the lessons learnt. The training necessitated changing job schedule in only about a third of the workers. The implication of this results in poor utilization of the trained employees due to bureaucratic rigidity of the system or unwillingness to change on the parts of both the employees and the employers as reported in a study.¹¹ Despite the relevance and the appropriateness of the trainings received by the workers, a quarter of the health workers felt that the courses' content did not justify the cost of organizing the training. This affirms that some level of corruption exist in organizing training for workers, as similar factor was reported elsewhere in Lagos.¹⁰

There is need to conduct regular training need assessment to identify learning gaps. There should be increase the proportion of the workers trained in the Public Health Sector so as to improve the capacity of the workers to perform their jobs as required of them. Also, there is need to evaluate the cost analysis of the training programmes so as to adopt more cost effective training methods and strategies.

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Knowledge of risk factors and safety measures of road crashes among inter-city commercial drivers in Kwara State, Nigeria.

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Abstract

Background: Nigeria is ranked second highest in the rate of Road Traffic Crashes(RTC) partly because of low level of knowledge and use of road safety rules and signs by road users, particularly inter-city commercial vehicle drivers. The objective of this study was to assess the knowledge of risk factors and safety measures of inter-city commercial drivers in Kwara State, Nigeria.

Methodology: This is a descriptive cross-sectional study in which interviewer administered questionnaire was used. Multi-stage sampling technique was adopted and a total of 410 respondents were involved. Data analysis was done by EPI INFO version 3.5.1 and the level of significance was < 0.05 .

Results: Many respondents 387 (94.4%) and 372 (90.7%) had good knowledge scores of risk factors and safety measures of RTC respectively. The higher the literacy level the more the knowledge of road safety among respondents. Majority of respondents 336 (81.9%) that had good knowledge of risk factors for RTC attended training compared with 51 (12.4%) who did not ($p = 0.027$). Many respondents who had good knowledge of risk factors were not involved in RTC.

Conclusions: The drivers demonstrated high level of knowledge of risk factors and safety measures for road crashes. Continuous education and re-orientation of drivers on road safety is required by the law enforcement agencies to stem the tide of road crashes in the State.

Keywords: Knowledge, Risk Factors, Safety Measures, Commercial Drivers

Introduction

Land transportation systems have become a crucial component of modernity. However, incorporating new technology has not come about without cost: environmental contamination and deteriorating air quality are directly linked to modern land transport systems. Above all, transportation is increasingly associated with the rise in road crashes and premature deaths, as well as physical and psychological handicaps.

In Nigeria, a study conducted in Ilorin, Kwara State revealed that over three-quarters of the victims of road traffic crashes (RTC) are young people¹. In many low-income and middle-income countries, the burden of

traffic-related injuries is such that they represent between 30% and 86% of all trauma admissions². According to the WHO, injuries to individuals in this age group, “tend to affect productivity severely, particularly among the lowest-income groups whose exposure to risk is greatest and whose earning capacity is most likely to rely on physical activity”³

Nigeria is ranked second highest in the rate of RTC among 193 countries of the world. It's been argued that $\frac{3}{4}$ of all accidents on Nigerian roads involve fatalities⁴. This finding corroborates WHO 2013 report which adjudged Nigeria the most dangerous country in Africa with 33.7 deaths per 100,000 populations every year⁵. According to the report, one in every four deaths in Africa occur in Nigeria with the remaining 64% in Democratic Republic of Congo, Ethiopia, Kenya, South Africa, Tanzania and Uganda⁵.

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Knowledge and use of road safety rules, signs and symbols by road users, particularly intercity commercial vehicle drivers, are very important in the prevention of RTC. Drivers who do not have the knowledge of the high-way codes will not be able to use roads well despite the availability and accuracy of the road signs and symbols. A Norwegian study of driver's knowledge of speed limit varied as older and experienced drivers had higher knowledge. However, in the case of Nigeria, it has been documented that commercial drivers do not obey traffic rules and regulations, observe speed limits or traffic signs on highways⁶.

In a study in Lagos, Nigeria the drivers had poor knowledge of road signs (59.0%) and poor knowledge of maximum speed limits (100%). The mean score for road sign test was $32.3\% \pm 12.4$ while for maximum speed limits it was $9.9\% \pm 16.7$. The highest proportion of drivers who had poor knowledge scores were among the oldest (97.1%), least educated, (91.9%) and least experienced (89.5%)⁷. A similar study showed that 59% of commercial drivers repeatedly disobey speed limit, 75% wrongfully overtake another vehicle, and 62.2% did not obey road signs where available⁸. The objective of this study was to assess the knowledge of risk factors and safety measures of inter-city commercial drivers in Kwara State.

Material and Methods

This is a descriptive cross-sectional study of knowledge of risk factors and safety measures for road traffic crash among inter-city commercial drivers in Kwara State, Nigeria. Quantitative data was collected using pre-tested interviewer administered questionnaire. Multi-stage sampling technique was used viz: A simple random sampling technique by balloting method was adopted to select four major parks in each of the three Kwara Senatorial districts in the first stage. In the second stage, for each of the parks selected, systematic sampling method was used to select desired number of respondents among commercial drivers based on proportional allocation. The list of the drivers in the selected parks served as the sampling frame. A total of 410 respondents were used for the study.

Data was collected was entered into the computer. Data analysis was done using EPI INFO version 3.5.1

software package. An appropriate test of significance (Chi-square, t test) were used and the level of significance was predetermined at less than 0.05 at 95% confidence level. Ethical approval for study was obtained from the Ethical Review Committee, University of Ilorin.

Results

The mean age of the respondents was 46.78 ± 11.27 years. Few 18 (4.4%) had tertiary, 103 (25.1%) secondary, 166 (40.5%) primary and 123 (30.0%) had no formal education. Two in every five respondents 164 (40.0%) knew that young age of drivers could predispose in RTC. More than half 236 (57.6%) did not know that very old persons constitute a significant risk for RTC if the person is a vehicular operator. Less than half, 190 (46.3%) of respondents mentioned that illiteracy predisposed to RTC while 97% identified use of mobile phone while driving. Almost all respondents 403 (98.3%) identified reckless driving as a risk factor for crashes.

Table 1: Knowledge scores of risk factors and safety measures for road traffic crashes(N = 410)

Variable	Frequency	Percent
Knowledge of risk factors		
Good	387	94.4
Fair	18	4.4
Poor	5	1.2
Knowledge of safety measures		
Good	372	90.7
Poor	38	9.3

About two-thirds of respondents 282 (68.8%) knew that driving for long hours could result in RTC. Majority, 390 (95.1%) and 388 (94.6%) also had the knowledge that poor vision and driving under the influence of alcohol could predispose to RTC respectively. Many respondents 387 (94.4%) and 372 (90.7%) had good knowledge scores of risk factors and safety measures of RTC respectively. More respondents 285 (69.5%) of middle age (26-55 years) had good knowledge of risk factors for RTC while none among < 25 years had poor knowledge scores. However, the observed relationship in knowledge of risk factors for RTC and age was not statistically significant $p = 0.804$.

Table 2: Relationship between knowledge of risk factors and socio-demographic variables

	Knowledge of risk factors					
Variable	Good n (%)	Fair n (%)	Poor n (%)	Total n (%)	χ^2	p value
Age group (years)						
≤ 25	14 (3.4)	2 (0.5)	0 (0.0)	16 (3.9)	1.624 ^y	0.804
26 – 55	285 (69.5)	13 (3.2)	4 (0.9)	302 (73.6)		
>55	88 (21.5)	3 (0.7)	1 (0.2)	92 (22.4)		
Education Level						
None	114 (27.8)	6 (1.5)	3 (0.7)	123 (30.0)	2.371 ^y	0.667
Primary	155 (37.8)	9 (2.2)	2 (0.5)	166 (40.5)		
Post-Primary	118 (28.8)	3 (0.7)	0 (0.0)	121 (29.5)		
Marital status						
Single	13 (3.2)	0 (0.0)	0 (0.0)	13 (3.2)	2.189 ^y	0.701
Married	365 (89.0)	18 (4.4)	5 (1.2)	388 (94.6)		
Widowed	9 (2.2)	0 (0.0)	0 (0.0)	9 (2.2)		

χ^2 : Chi square; *: p value <0.05

The higher the literacy level the more the knowledge of RTC among respondents. None had poor knowledge of RTC among those with post-primary education. The difference was however not statistically significant ($p = 0.667$). More respondents 218 (53.1%) who had spent 11-30 years and 112 (27.3%) of those who had more than 30 years' experience as a driver had good knowledge of risk factors for RTC. However, there was no statistical significance relationship between years of experience on the job and knowledge of RTC ($p = 0.660$).

Possession of driver's license has no statistical significant relationship with knowledge of risk factors for RTC ($p = 0.536$). Majority of respondents 336 (81.9%) that had good knowledge of risk factors for RTC attended training compared with 51 (12.4%) who did not. The observed relationship in training attendance and knowledge scores was statistically significant ($p = 0.027$). More than half of respondents 206 (58.7%) that had good knowledge scores of risk factors for RTC had last training less than 6 months prior to this study. Of the total respondents in this study, 118 (28.8%) were involved in RTC and had good knowledge of risk factors compared with 269 (65.6%) that had good knowledge scores but never involved ($p = 0.325$).

Table 3: Relationship between knowledge of risk factors and driving experience of the respondents

Knowledge of risk factors						
	Good	Fair	Poor	Total	χ^2	<i>p</i> value
Variable	n (%)	n (%)	n (%)	n (%)		
Duration driving						
≤10 years	57 (13.9)	5 (1.2)	2 (0.5)	64 (15.6)	2.410 ^y	0.6
11 – 30 years	218 (53.1)	10 (2.4)	2 (0.5)	230 (56.1)		60
>30 years	112 (27.3)	3 (0.7)	1 (0.2)	116 (28.3)		
Possession of driver's license						
Yes	372 (90.7)	16 (3.9)	5 (1.2)	393 (95.9)	1.244 ^y	0.5
No	15 (3.7)	2 (0.5)	0 (0.0)	17 (4.1)		36
Valid driver's license (n=385)						
Yes	275 (71.4)	10 (2.6)	4 (1.0)	289 (75.1)	0.854 ^y	0.6
No	89 (23.1)	6 (1.6)	1 (0.3)	96 (24.9)		52
Under went driving test before obtaining the license (n=393)						
Yes	301 (76.6)	14 (3.6)	5 (1.2)	320 (81.4)	0.370 ^y	0.8
No	71 (18.1)	2 (0.5)	0 (0.0)	73 (18.6)		31

χ^2 : Chi square; *: p value <0.05

Table 4: Relationship between knowledge of risk factors and training received

	Knowledge of risk factors					
	Good	Fair	Poor	Total	χ^2	p value
Variable	n (%)	n (%)	n (%)	n (%)		
Ever attended road safety training						
Yes	336 (81.9)	13 (3.2)	2 (0.5)	351 (85.6)	7.1 60 ^y	0.027
No	51 (12.4)	5 (1.2)	3 (0.7)	59 (14.4)		
No seminars attended (n=351)						
1 – 2	164 (46.7)	2 (0.6)	0 (0.0)	166 (47.3)	4.7 58 ^y	0.092
> 2	172 (49.0)	11 (3.1)	2 (0.6)	185 (52.7)		
Time of last training attended (months) (n=351)						
< 6	206 (58.7)	7 (2.0)	1 (0.3)	214 (61.0)	0.2 29 ^y	0.891
≥6	130(37.0)	6 (1.7)	1 (0.3)	137(39.0)		
Facilitator of the training						
FRSC	314 (89.5)	11 (3.1)	2 (0.6)	327 (93.1)	1.4 97 ^y	0.473
VIO + others	22 (6.3)	2 (0.6)	0 (0.0)	24 (6.9)		

χ^2 : Chi square; *: p value <0.05

Table 5: Relationship between knowledge of risk factors and road traffic crashes experience among respondents

	Knowledge of risk factors					
	Good	Fair	Poor	Total	χ^2	p value
Variable	n (%)	n (%)	n (%)	n (%)		
Ever had RTC as a driver						
Yes	118 (28.8)	2 (0.5)	1 (0.2)	121 (29.5)	2.2 47 ^Y	0.325
No	269 (65.6)	16 (3.9)	4 (1.0)	289 (70.5)		
Number of RTC had (n=121)						
1	93 (76.9)	2 (1.7)	0 (0.0)	95 (78.5)	0.4 98 ^Y	0.780
≥ 2	25 (20.7)	0 (0.0)	1 (0.8)	26 (21.5)		
Severity of RTC (n=121)						
No injury	83 (68.6)	2 (1.7)	0 (0.0)	85 (70.2)	6.0 57 ^Y	0.194
Mild to serious injury	29 (24.0)	0 (0.0)	1 (0.8)	30 (24.8)		
Fatal	6 (5.0)	0 (0.0)	0 (0.0)	6 (5.0)		
Last time RTC occurred (years) (n=121)						
< 1	16 (13.2)	2 (1.7)	0 (0.0)	18 (14.9)	9.7 42 ^Y	0.135
>1	102 (84.3)	0 (0.0)	1 (0.8)	103 (85.1)		

Discussion

Respondents in this study demonstrated good knowledge of road safety including risk factors involved in crashes. Two in every five respondents (40.0%) stated that under aged drivers could result in RTC. This is because this age group is associated with youthful ideas and exploration where risky driving are employed and often culminated in RTC. More than half, 57.6% did not know that older persons constitute a significant risk for RTC if they serve as vehicular operators. This is a reflection of gap in knowledge of some risk factors. It is obvious that at older age, special senses are diminished in activity and this will affect not only judgment but other aspect of body response coordination.

Less than half, 46.3% of the respondents mentioned that illiteracy predisposed to RTC. This is true because some level of education is required to understand road

signs and instructions for compliance. As expected, 97% identified use of mobile phone while driving as a factor in RTC. The diversion of attention and lack of concentration when on phone call while driving could predispose to crashes. Self-control, discipline and enforcement of laws are required to address the unpleasant behavior.

About two-thirds of respondents, 68.8% knew that driving for long hours could result in RTC. This is similar to a study in Nigeria in which 100% of commercial driver identified fatigue as a risk⁹. Fatigue and long hour of driving could lead to loss of concentration and poor judgment while on the road. Majority, 95.1% knew that poor vision could cause RTC. Inability to see clearly will affect movement and constitute significant risk for crashes. This level of knowledge demonstrated that respondents had some basic understanding of road safety measures.

Driving under the influence of alcohol was asserted by 94.6% of the respondents as a risk factor for RTC. Several psychotropic substances taken for recreational (alcohol and illicit drugs) or medical purposes can impair driving performance either by disturbing the information processing mental function, promoting risk taking behaviour, or by increasing response time². Among behavioural factors, alcohol plays an important role in car crashes, and accidents involving alcohol are more likely to result in injuries and deaths than crashes where alcohol is not a factor². A large proportion of crashes are attributable to alcohol mainly in young people².

Many respondents, 94.4% and 90.7% had good knowledge of risk factors and safety measures of RTC. Again, this demonstrated the experience gathered by respondents as commercial drivers over the years and also the level of capacity building and sensitization received. More respondents, 69.5% of middle age (26-55 years) had good knowledge of risk factors for RTC, however, the observed difference in knowledge of risk factors and age was not statistically significant $p = 0.804$. This observation differs from what is obtained in a study which established relationship between age of drivers and knowledge of speed limit; the older and experienced drivers had higher knowledge⁶. Also, in a study conducted in Lagos where 97.1% of the older drivers had poor knowledge⁷ as compared with this

study where many of the older drivers had good knowledge of the risk factors for RTC. This disparity could be associated to varying literacy level of the respondents involved in those studies.

The higher the literacy level the more the knowledge of RTC among respondents. The difference in education level was however not statistically significant ($p = 0.667$). Since more than half of the respondents had some level of education and driving work does not require higher education could explain the observed relationship. Majority of respondents, 81.9% that had good knowledge of risk factors for RTC attended seminar compared with 12.4% who did not. The observed difference in seminar attendance and knowledge scores was statistically significant ($p = 0.027$). The seminar has imparted significantly on capacity of drivers and ultimately road safety and crash reduction. This implied that seminar attendance should be encouraged and sustained. Training of drivers by law enforcement officers goes a long way in ensuring compliance with road traffic laws as seen in a study where education from the FRSC improved the road habits of commercial drivers¹⁰.

Of the respondents that had good knowledge scores of risk factors of RTC, 58.7% had last training less than 6 months prior to this study. This means that regular seminar should be organized to reinforce information given to the drivers. Of the total respondents in this study, 28.8% were involved in RTC and had good knowledge of risk factors compared with 65.6% that had good knowledge scores but never involved ($p = 0.325$). Although not significant, the implication of this is that more drivers used the knowledge acquired during seminar and thereby possibly reducing road crashes.

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Sexual assault amongst first year students in a Nigeria tertiary institution

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Abstract

Sexual assault among undergraduate students is a public health issue and the reproductive health of adolescents and young women is integral to the wellbeing of a society. This study was carried out to determine the prevalence of sexual assault and associated factors among first year undergraduate students of a tertiary institution.

Methods: A cross-sectional descriptive study using a close ended, self-administered questionnaire administered to first year students of a tertiary institution in Ekpoma, south- south, Nigeria, was used to survey 430 students in Ambrose Alli University.

Results: Among the 430 students sampled, 410 completed the questionnaire giving a response rate of 95.3%. The female to male ratio was approximately 2:1 and the mean age in the study was 19.90 years. The prevalence of sexual assault during the study was 38.8% and unwanted touch of private parts was the common form of sexual assault while majority of the cases of sexual assault occurred in parties. In 62.5% of cases, the assailants were known to the victims. Only 12.5% of the victims reported the incidence to security agencies and virtually all of them were not aware of any policy with regards to sexual assault.

Conclusion: Therate of sexual assault among first year undergraduate students in South-South Nigeria is high. More reproductive health education and promotion is necessary to safeguard their sexual health.

Keywords: Sexual assault, first year undergraduates, Nigeria

Introduction

Sexual assault is a violent crime against both the individual and society and it is largely underreported. It has assumed an important public health problem of growing concern all over the world and it is a common social disorder amongst students in our tertiary institutions. World Health Organization defines sexual violence as any sexual act, attempt to obtain a sexual act, unwanted sexual comments or advances, or acts of trafficking, or otherwise directed, against a person's sexuality using coercion, by any person regardless of their relationship to the victim in any setting, including but not limited to home and work ¹. The offender is referred to as sexual abuser, or molester². When the victim is younger than age of consent, it is referred to as child sexual abuse. It is a very traumatic experience and although it affects both sexes,

females are disproportionately affected. Furthermore in most instances victims and perpetrators know each other. The assailants usually range from family members to acquaintances and strangers³⁻⁶. Sexual assault includes a wide range of activities including rape, forced vaginal, anal or oral penetration, forced sexual intercourse, inappropriate touching, forced kissing, child sexual abuse, or the torture of the victim in a sexual manner ^{7, 8, 9}. Various types of injuries are seen as a result of physical force such as severe multiple bruises in uncommon sites, vaginal and anal lacerations and perforations have also been reported ^{10, 11}. The victim is also exposed to sexually-transmitted diseases, psychological trauma and risk of unwanted pregnancy¹². Although the trauma of the assault heals with time, it leaves long term psychological and medical problems behind ¹³.

The World Health Organization reports that one in every five women is a victim of sexual assault ¹⁴ and globally, 35% of women have experienced either physical and/or

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sexual intimate partner violence or non-partner sexual violence¹⁵. The reported figures are said to be inaccurate and often underestimated as most cases of sexual assault are under-reported by the victims because of the associated stigma¹⁶.

Recent estimates of sexual assault among undergraduates in the USA are as high as 20-25%^{17, 18} and freshman students have been reported to be more at risk¹⁹. The reported incidence of sexual assault in Nigeria ranged from 13.8% and 51.3% among female students in Maiduguri^{16,20} to 46.7% among young female undergraduates in port Harcourt²¹.

Similar findings were obtained in studies across Africa. In a study among female university students in Ethiopia, 14.3% reported having experienced rape since being admitted into the university²². Also, in a study in South Africa, 24.9% of young men reported having raped a female previously²³.

Common factors speculated to be associated with experiencing sexual assaults in tertiary institutions include young age, alcohol consumption, drug use, previous experience of rape or sexual abuse, multiple sexual partners and poverty²⁴.

If the issue of sexual violence in our tertiary institutions that houses many young people are left unattended to, such individuals would be prevented from attaining their maximum intellectual, emotional and educational potentials. It presents a big threat to a conducive learning environment. Sexual violence is gradually becoming a regular feature in Nigerian universities perpetrated by fellow students and lecturers and needs to be addressed urgently. The first year students just coming to the university may be so green and not be armed to face this dreaded social vice and moreover this may be an ample time to inculcate in them good values and virtues.

This study therefore sets out to determine prevalence of sexual assault amongst first year undergraduate students and factors associated with them. This could form the basis for universities to enhance or develop policies and program to prevent sexual assault in our institutions.

Material and Methods

Setting

The study was carried out at the Ambrose Alli University, Ekpoma, which is located in the Esan central

senatorial district of Edo State. It was established in 1981 by the then governor of Bendel State (now Edo and Delta States), Professor Ambrose Folorunsho Alli (1979–1983). First known as Bendel State University, then Edo State University, it was later changed to its present name in commemoration of Professor Ambrose Folorunso Alli. The University operates as a campus which is residential for students and some staff; although privately arranged off-campus accommodation is increasingly being sort after by many prospective candidates. The current student population is about 28,000.

Study design

This was a cross sectional study in which a pre-tested, close-ended, self-administered questionnaire was completed by first year undergraduate students who were the eligible participants. The questionnaire enquired about socio-demographic characteristics of the participants, previous sexually assault experience, type and number of assaults, relationship with assailant, and place and time of occurrence of assault. Questions pertaining to complications sustained and if any action was taken (such as seeking medical help) were also contained in the questionnaire. The sample size of 430 was determined with standard technique using a sexual assault rate of 50% at 95% confidence level, an attrition rate of 10% was also used. The questionnaire was pretested for content validity using 10 final year undergraduate students comprising of 5 males and 5 females. The Ethical and Research Committee of the Irrua Specialist Teaching Hospital approved the study and verbal consent was obtained from each participant before administration of the questionnaire.

Data analysis

The data collected was analyzed using SPSS version 20 (SPSS, Chicago, Ill USA) and presented using descriptive statistics (numbers and percentages).

Results

Four hundred and thirty (430) questionnaires were distributed, however only 410 properly filled were analyzed given a response rate of 95.3%.

The mean age of the respondents was 19.90+ 2.13 years with majority of them being in the age group of <20 years (Table 1). The female : male ratio in the study was approximated 2:1 with females accounting for 66.4% and the males 33.4 %. More than half of the students live off campus (59.9%).

Table 1: Sociodemographic characteristics

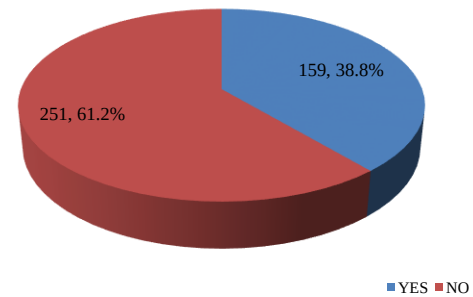
		Frequency (n)	Percentage (%)
Age	≤20	177	43.2
	>20	233	56.8
<i>Mean age = 19.90 ± 2.13</i>			
Sex	Male	138	33.6
	Female	272	66.4
Religion	Christianity	396	96.6
	Islam	14	3.4
Place of residence			
	On-campus	164	40.1
	Off-campus	246	59.9

Table 2: Profile of sexual assault

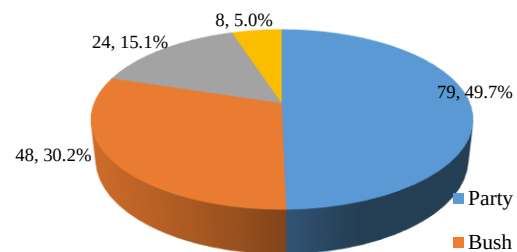
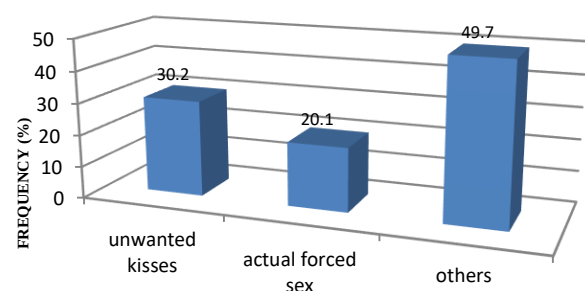
N=159		Frequency (n)	Percentage (%)
Assailant known by victim	Yes	99	62.5
	No	60	37.5
Sustained physical injury	Yes	30	18.7
	No	129	81.3
Presented for medical care	Yes	50	31.3
	No	109	68.7
Reported to security agencies	Yes	20	12.5
	No	139	87.5
Screened for STI	Yes	50	31.3
	No	109	68.7
Treated for STI	Yes	50	31.3
	No	109	68.7
Awareness of a Policy of sexual assault			
	Yes	5	3.0
	No	153	96.5
	Not sure	1	0.5

Prevalence rate of sexual assault in the study was 38.8 % (Fig 1) and majority of the sexual assaults (49.6%) occurred in parties, closely followed by occurrence in bushes around the University campus (30.2%) with the least occurrence in the classrooms (8.5%). (fig 2).

Figure 3 shows the type of sexual assault perpetrated against the victims. In 49.7% of the cases, the assault involved unwanted touch to private parts while actual forced penetrative sex occurred in 20.1% of the cases.

**Fig 1: a Pie chart showing the prevalence of sexual assault**

In 62.5% (Table 2) of the cases, the victims were previously acquainted with their assailants with some being boyfriends, classmates, teachers, and administrators. In about 37.5% of cases the assailants were not known. Physical injuries were sustained by 18.7% of the cases. The action taken by the victim after the assault are presented in Table 2. No medical help was sought in 68.7% of respondents compared with 31.3% that sought medical help. Only 12.5% of the victims reported to security agents (mostly the police) and virtually all the victims (96.5%) were not aware of any policy regarding sexual assault.

**Fig 2: a Pie chart showing the place of sexual assault****Fig 3: A bar chart showing type of sexual assault**

Discussion

The study revealed a prevalence of 38.8% amongst the first year undergraduate students under review. This compares favorably with a study from Port Harcourt which reported a prevalence of 46.7%. This study was conducted in the same geopolitical zones as the current study. A lower prevalence was reported by Kullima et al in Maiduguri. This may be due to cultural and religious differences. The high prevalence seen in this study could also be due to the fact that the first year students represents a period of heightened risk with freedom (no more under the watchful eyes of parents), new friends and new classes. This can be described as a ‘red zone’.

The study consists of male and female. Male like female are prone to different type of sexual assault although prevalence in females are far greater. The mean age of the study was less than 20 years. University student are younger these days due to better education systems and structures at early ages that prepare them for the university.

Majority of the perpetrators were known to the assailants (62.5%). This is similar to the study reported in Maiduguri by Geidam et al²⁰ and the study reported in Port Harcourt by Mezie-Okoye and Alamina²¹. Most of the cases of the sexual assault occurred in parties, closely followed by occurrences in bushes. Increased use of alcohol and drugs during parties can impair sense of judgment of both the assailants and their victims thereby resulting in sexual assaults. The relatively high occurrences in bushes around the university campus is worrisome as more than half of the students (59.9%) reside outside the campus and use motor bikes to commute in and out of school. Unpublished reports suggest that there has been a high incidence of motor bikers as assailants as most of them just drag the students to the bush.

Virtually all the participants (96.5%) did not know if the school had policies or regulations on sexual assault. This has grave consequences as victims would not know what to do when assaulted leaving them with a heightened risk of physical, psychological and emotional trauma.

In conclusion, this study found a high sexual assault rate among first year undergraduate students of Ambrose Alli University, also females were far more likely to be assaulted than males.

The study findings should be of particular interest to campus health centers, student services and university administrators. The continuing high rates of sexual assault indicate the need for effective services and interventions on campuses, including a requirement for primary care physicians and nurses to ask about sexual violence. Policies should also be enacted and put in place against sexual assault and also backed up by creation of awareness amongst the students upon entering into the school about such policies. It might also be worthwhile to create counseling units in our citadel of learning to deal with this monster of sexual assault.

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ABO/rhesus blood group systems are not clinical indicators of male baldness

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Abstract

Background: Several disease entities have been linked to the ABO/Rh blood group systems. Baldness or alopecia is the partial or complete lack of hair on the head and/or body. Major advances have been achieved in understanding principal elements of the androgen metabolism involved in the pathogenesis of alopecia, but not much preliminary work has been done in its relationship to blood types.

Aim: This study is aimed to determine if there is any association between blood types and male baldness.

Methods: 400 male subjects (25-60 years) at Sobi Specialist Hospital Alagbado, Ilorin, Kwara State, Nigeria were recruited into the study (200 for control and 200 for baldness). Blood sample was collected from each subject for blood grouping estimation, following the completion of a questionnaire containing information about baldness and haematological profile.

Result: The distribution of phenotypic frequencies of ABO group in the control samples were 26.0%, 28.0%, 4.0% and 42.0% for groups A, B, AB and O, respectively, while 92.0% of the subjects were Rh (D) positive and 8.0% Rh(d) negative. And for the baldness, they were 26.0%, 26.0%, 4.0% and 44% for A, B, AB, and O respectively; while Rh (D) positive were 94.0% and Rh (d) negative were 6.0%. The overall result is statistically insignificant ($P > 0.05$) using Pearson Chi-square.

Conclusion: The result reflects an absolute parallel relationship between baldness and ABO/Rhesus blood group systems. Thus, ordering for blood group assessment during routine hair clinic as part of ancillary investigation should be discouraged, except if other interests arise.

Keywords: ABO, rhesus, blood group, baldness

Introduction

Hair is considered an essential part of overall identity for an individual, especially for women, for whom it often represents femininity and attractiveness. Men typically associate a full head of hair with youth. Although they may be aware of pattern baldness in their family, many are uncomfortable talking about the issue. Androgenetic alopecia, also referred to as male-

pattern hair loss or common baldness in men¹, and as female-pattern hair loss (FPHL) in women, affects at least 50% of men by the age of 50 years, and up to 70% of all males in later life². The commonest form of which is androgenic alopecia which has a distribution of more than 95% in men with hair thinning³. Hair loss is therefore a sensitive issue for both sexes.

The International Society of Blood Transfusion has so far discovered 33 blood group systems. And apart from ABO and Rhesus systems, several other kinds of antigens have been found on the membranes of red cell^{4,5}. Since the discovery of the ABO blood groups by

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Landsteiner^{6,7}, several links have been established between ABO groups and some disease entities⁸. In the last few decades, studies have suggested that ABO blood groups, particularly the non-O blood groups, are associated risk factor of coronary artery disease⁹. Researchers have also shown a strong impact of gender on ABO effect, women with a non-O blood group having a 5-fold increased risk of developing vascular thromboembolism (VTE) recurrence, while B blood group raised this risk by nearly 3 times. Some form of infections have been found to be higher in Rh positive individuals of blood groups AB and A than that of Rh negative counterparts¹⁰. Recent studies have suggested ABO blood type locus as an inherited predictor of thrombosis, cardiovascular risk factors, and myocardial infarction¹¹. The association of non-O blood groups with cardiovascular diseases including myocardial infarction (MI) has also been shown in several studies¹². This study is aimed to determine the relationship of blood types to occurrence of male baldness.

Materials and Methods

Test subjects

Four hundred (400) male subjects between the ages of 25 and 60 years at Sobi Specialist Hospital Alagbado, Ilorin, kwara State, Nigeria were recruited into this study. The recruitment criteria are:

- i. All were males between the ages of 25 and 60 years.
- ii. All the subjects agreed to participate in the research following detailed explanation.
- iii. None had disease(s) that are related to hair loss (baldness).
- iv. None is on medication associated side effect of hair loss.
- v. Nil positive history of baldness in family for control subjects

The subjects were grouped into two, group 1 Control (non-bald males, n=200) and group 2 (bald males n=200). A questionnaire was given to each subject to complete. The contents of the questionnaire included: Age, religion, state, life style, family history of baldness, features of chronic illness, drug history etc.

Experimental process

The subjects were then made to sit comfortably in a relaxed atmosphere for about 10mins. A tourniquet was

then tied around the upper arm to make the veins at the cubital fossa more prominent. The skin above the targeted vein was cleansed with spirit swab to disinfect the spot, and a sterile needle connected to syringe was carefully inserted into the vein to draw 2ml of whole blood into the syringe. The tourniquet was released and the needle was removed. A dry cotton wool was then placed on the area with the arm held up to encourage haemostasis. Blood collected from each subject was drained immediately into the EDTA bottle and labelled accordingly for onward determination of blood group.

Blood group determination

Blood group was determined using Anti-serum A, Anti-serum B, and Anti-serum D reagent. One to two drops of each anti-serum were dropped on three different wide-spaced spots on a white tile, following which one to two drops of blood from the EDTA bottle were dropped on the different anti-sera; the blood and the reagents were then mixed together by rocking the tile gently. After a few minutes, blood coagulation was observed based on antigens-antibody reaction.

Statistical Analysis: The frequency values of the measured variables were determined and percentage calculated using SPSS version 20. Statistical comparison was done using Pearson Chi-Square, and level of statistical significance was considered as $p < 0.05$.

Results

The distribution of phenotypic frequencies of ABO group in the control samples were 26.0%, 28.0%, 4.0% and 42.0% for groups A, B, AB and O, respectively, while 92.0% of the subjects were Rh (D) positive and 8.0% Rh(d) negative. And for the baldness, they were 26.0%, 26.0%, 4.0% and 44% for A, B, AB, and O respectively; while Rh (D) positive were 94.0% and Rh (d) negative were 6.0%. From this result, it can be observed that blood group B of the control (28.0%) has a higher frequency than blood group B of the baldness (26.0%). In the same vein, blood group O of the baldness is higher than blood group O of the control subjects. It could also be observed that blood group AB (Rh) negative has no representation in all the subjects examined. This does not mean that AB negative is protective against male baldness, but rather a reflection of the usual ABO blood group frequency distribution.

It is of interest to also note that the overall frequency of blood group O was higher than any other blood group from control or baldness and that Rh positive was more preponderant than Rh negative blood groups. Above all, some borderline increase are noticed however, the overall result is statistically insignificant ($p > 0.05$).

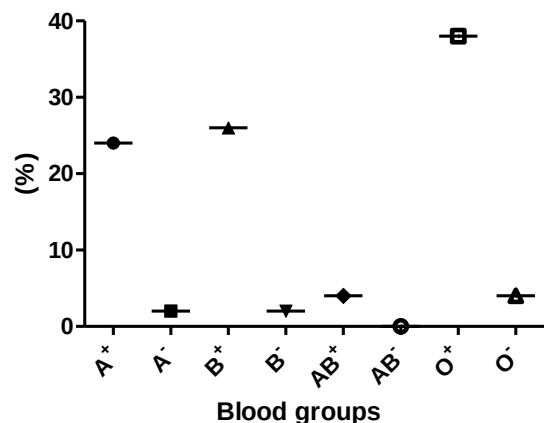


Figure 1: shows the frequency in percentage (%) of blood groups in non-bald men

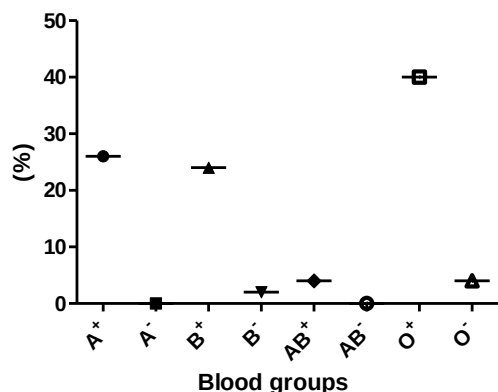


Figure 2: shows the frequency in percentage (%) of blood groups in bald men

Discussion

In the present study, there was 100% concordance in the frequencies of the blood groups (B-, AB+ and O-) of the baldness when compared with that of control. While slight differences were recorded in blood groups (A+, B+, and O+) of the baldness when compared with that of control. Our observations are in tandem with the previous available information on ABO blood group distribution among Nigerian populations with a reflection of ABO blood group O being highest and Rh(D) positive higher than the Rh (D) negative¹³.

The import of this result reflects an absolute parallel relationship between baldness and ABO/Rhesus blood group systems. Thus, ordering for blood group assessment during routine hair clinic as part of ancillary investigation should be discouraged, except if other interests arise. This is in contrast to the findings of Tejinder Bhatti in 2013 who reported that people with A Rh (D) positive blood group are prone to alopecia. To the best of our knowledge, no work has been reported that linked a particular blood group to baldness in Nigeria. However, the present evidence appears to be sufficiently suggestive to warrant further research on the matter, perhaps with larger population from various geographical distributions.

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Low Glycaemic Index Foods, a Better Option for Pre-exercise Meals.

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Abstract

Background: The glycaemic index (GI) of food ingested before exercise influences substrate utilization during exercise and may affect performance during exercise.

Aim: This study determined the impact of low(LGI) and high GI (HGI) foods on post exercise blood glucose and lactate levels.

Methods: 24 male subjects meeting defined requirements were recruited to participate in the experiment. Data from 17 individuals were finally analyzed following exclusion of ineligibility of 7 individuals. They were randomly selected into 3 groups; group 1- (Control n=5, distilled water), group 2 (n=6, 100 g of cooked brown beans), and group 3 (n=6, 100 g of white bread). Postprandial and post-exercise blood glucose level was measured by the glucose oxidase method and Blood lactate concentration was also determined. Data collected was analysed using statistical package for social sciences and results were expressed as mean and standard error of mean.

Results: A significant increase ($p<0.05$) in postprandial blood glucose level before exercise in both LGI and HGI fed groups was recorded when compared to control. After exercise, blood glucose level was significantly increased ($p<0.05$) in LGI fed group when compared to control, with a significant decrease ($p<0.05$) in blood glucose in the HGI fed group when compared to group 2. Postprandial and post-exercise lactate levels were significantly increased in both groups.

Conclusion: LGI food is capable of providing more energy (stored) which can later be utilised during later stage of a prolonged exercise, hence, consumption of such food is suggested to athletes involved in long duration exercises

Keywords: Low glycaemic index, blood glucose, lactate, exercise

Introduction

Glucose is the primary metabolite for the body source of energy in daily activities man engages in, such as walking, washing, eating, running and swimming¹. Ingestion of carbohydrate (CHO) before exercise may result in an improved exercise performance when compared with exercise in the fasting state^{2,3}.

Ingesting CHO before exercise increases the rate of utilization of this limited substrate store, and yet still delays the onset of fatigue and this increased rate of

CHO utilization is a consequence of a glucose-induced rise in plasma insulin concentration that, in turn, suppresses the rate of fatty acid oxidation^{2,4}.

The glycaemic index (GI) of food ingested before exercise influences substrate utilization during exercise and may affect performance during exercise^{5,6}. Based on glycaemic index, foods are classified into high glycaemic index food (HGI) and low glycaemic index food (LGI)⁷. It is suggested that carbohydrate feeding prior to exercise provides additional supplies for oxidation, results in increased muscle glucose uptake and reduced liver glucose output during exercise, and the enhanced blood glucose availability may preserve muscle glycogen stores^{8,9}. After taking a meal, digestion

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and absorption occurs and of the absorbed component is glucose. Glucose enters the glycolytic pathway; a series of enzymatic reaction occurs and is metabolized into pyruvate which enters the citric acid cycle for ATP (energy) generation¹⁰.

Carbohydrates (CHOs) in the form of muscle and liver glycogen, and plasma glucose are a limited source of energy in the body, while there are comparatively limitless amounts of stored fatty acids¹¹. Depletion of body CHO is associated with a lowering of blood glucose and the onset of fatigue.

Ingestion of food before exercise may result in an improved exercise performance when compared with exercise in the fasting state^{2,12}. Studies by Thomas *et al.*⁵, show that slow digesting carbohydrate food of low glycaemic index eaten before prolonged strenuous exercise increases the blood glucose concentration toward the end of the exercise

This study was therefore carried out to relate the effect of the consumption of high glycaemic index food (bread), and a low glycaemic index food (beans) on blood glucose and lactate level. Findings from this study can be used to identify which would better improve the performance of athletes during endurance exercise, especially in developing countries where CHO foods abound.

Material and Methods

Test Subjects

24 male subjects (all students of the University of Ilorin, Ilorin, Nigeria) aged between 19-23 years were recruited to participate in the experiment. Persons using insulin or other diabetic drugs were excluded to minimize potential confounding from hypoglycemic medications. All participants were physician-certified medically fit and had no history suggestive of any chronic illnesses or condition(s) that would influence their ability to complete the study as determined from medical record analysis. Persons with a history of diabetes mellitus, cardiorespiratory dysfunction or smoking and allergy to beans were also excluded during the screening process. This study was approved by the University Institutional Review Board, and all participants provided written, informed consent. Twenty-two successfully completed the experiment in its entirety. Three participants were excluded from final analysis. Two of the latter participants did not fully disclose medical conditions

until after they started the study and were ineligible. Data from 17 individuals were analyzed.

Preparation of Test Food

The two test foods, beans (brown beans) and white bread are obtained from Kulende, Market, Ilorin, Kwara State, Nigeria. The beans were picked to separate the shaft from the seeds. It was rinsed to separate it from other impurities. It was then cooked in a clean pot of water with an electric cooker for 40 minutes till almost all the water vaporized and the beans was soft and palatable.

Grouping

The 17 students used for the test were randomly selected into 3 groups; group 1- (Control n=5) were administered distilled water, group 2 (n=6) were administered 100 g of cooked brown beans, and group 3 (n=6) were administered 100 g of white bread. Prior to the test day, all subjects were fasted overnight

Experimental Procedure

The postprandial blood glucose level was measured 2 hours after the administration of the test foods, which was done under researcher supervision, and so also was blood collected for lactate analysis. After the collection of blood, the subjects waited for 3 minutes before proceeding to the exercise on the treadmill moving at 5km/hr and the bicycle ergometer for 20 minutes non-stop. After the exercise, blood glucose level was again measured and blood sample was again taken for lactate analysis.

Blood Sample Collection

All blood samples were collected into the heparinized tube. The blood was collected from a prominent dorsal vein of the palm with a 5mL syringe. Tourniquet was tight to the wrist to increase the pressure of blood flowing to the. Methylated spirit and cotton wool was used to clean the area in which the blood was collected from before the syringe needle was inserted and the blood was drawn into the syringe and ejected into the heparinized tube.

Determination of Blood Lactate and Glucose level

Postprandial and post-exercise blood glucose level was measured by the glucose oxidase method using a Accu check glucometer (Accu check, Roche, USA). Blood lactate concentration was determined using a Lactate Pro lactate analyzer (Arkray, Inc., Kyoto, Japan).

Statistical Analysis

Data collected were analysed using statistical package for social sciences (SPSS) version 21. The blood glucose and lactate level were expressed as a mean $\pm$ standard error of mean (SEM). Two-way ANOVA was used to compare the means among the groups, followed by a t-Test between individual groups. Differences were considered to be statistically significant at $p < 0.05$.

Results

The blood glucose level in control and experimental rats is shown in table 1. There was a significant increase in blood glucose level before exercise in LGI group (100 g brown beans) 6.450 ± 0.32 $p = 0.0043$ and HGI group (100 g white bread) 6.600 ± 0.29 $p = 0.0007$ when compared to control (distilled water) 3.950 ± 0.21 . After exercise, blood glucose level was significantly increased in LGI group (4.600 ± 0.36 $p = 0.003$) when compared to control (2.200 ± 0.12). A significant decrease was recorded when HGI group (2.400 ± 0.30 $p = 0.003$) was compared to LGI group.

Table 1: Blood glucose level in control and experimental rats before and after exercise

Groups	Control (distilled water)	100 g Brown beans	100 g White bread
Blood glucose (mMol/L) before exercise	3.950 ± 0.2 1	6.450 ± 0.3 2*	6.600 ± 0.2 9*
Blood glucose (mMol/L) after exercise	2.200 ± 0.1 2	4.600 ± 0.3 6*	2.400 ± 0.3 0**

* shows statistical significance at $p \leq 0.05$ when compared to Control group

** shows statistical significance at $p \leq 0.05$ when compared to group 2 (100 g brown beans)

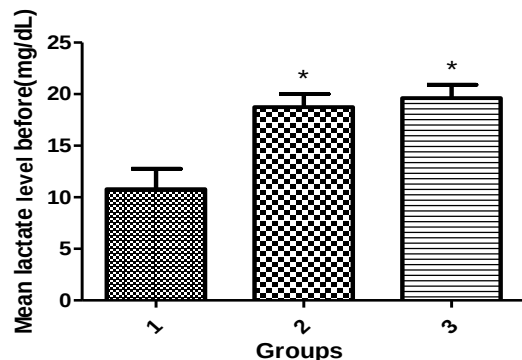


Figure 1: A graph showing the mean blood lactate level before exercise after the consumption of the test foods. *

shows statistical significance at $p \leq 0.05$ when compared to group 1

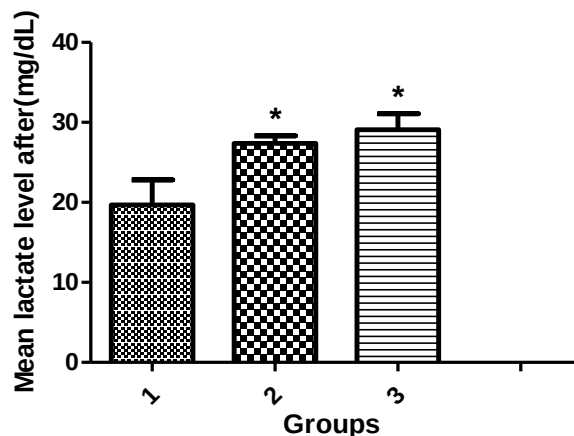


Figure 2: A graph showing the mean blood lactate level after exercise after the consumption of the test foods. * shows statistical significance at $p \leq 0.05$ when compared with group 1

Blood lactate level before exercise (figure 1) was 10.78 ± 1.980 , 18.735 ± 1.272 $p = 0.007$ and 19.610 ± 1.299 $p = 0.014$, in control group (distilled water), LGI group (100 g brown beans) and HGI group (100 g white bread), respectively. While after exercise (figure 2), it was 19.673 ± 3.156 in group 1 and 24.546 ± 2.026 $p = 0.008$ and 29.092 ± 1.987 $p = 0.005$ in the LGI and HGI groups, respectively.

Discussion

This study was carried out to determine the effect of pre-exercise LGI and HGI foods on blood glucose and lactase level with the aim of proposing which of the two would serve as a better meal before exercise/ sporting activities. A significant ($p < 0.05$) increase in the blood glucose level was recorded in the both experimental groups when compared to the control group. This corresponds to findings by Ching-Lin and Clyde², who demonstrated that plasma glucose concentrations increased sharply in human subjects following ingestion of HGI and LGI meals.

There was a significant ($p < 0.05$) increase in the blood glucose level of LGI fed group after exercise. Whereas, the increase in blood glucose level of the HGI fed group after exercise was insignificant ($p > 0.05$) when compared to the control group. Comparing the blood glucose

before and after exercise it was found that the blood glucose decreases after the completion of the exercise, with an observed significant decrease ($p < 0.05$) in the HGI fed group when compared to the LGI fed group. The observed reduction in the post exercise blood glucose level can be due to the huge amount of glucose absorbed from the HGI food whereas, the LGI food gives a steady glucose supply which can last long before exhaustion sets in. This suggests that consumption of LGI foods provides the body with a steady supply of glucose and still leaves the subjects with a considerably high amount of glucose after exercise.

The study also showed that consumption of both foods yielded a significant ($p < 0.05$) increase in lactic acid levels (pre-exercise and post exercise) in both LGI and HGI fed groups when compared to control. This corresponds to studies by Ching-Lin and Clyde² who reported that blood lactate concentrations increased significantly after ingestion of the LGI meal.

Conclusion

This study shows that LGI food is capable of providing more energy (stored) which can later be utilised during later stage of a prolonged exercise, hence, consumption of such food is suggested to athletes involved in long duration exercises. However, this should not be in contrary to medical prescriptions.

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***Adansonia digitata* aqueous extract effect on female reproductive hormones in carbon tetrachloride (CCL₄) induced toxicity on the pituitary gland of wistar rats**

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Abstract

Adansoniadigitatalinnis an important nutritional and medicinal plant known to have antioxidant capacity and ameliorative effect in the phytochemical extract of its leaf. This research is done to investigate the effect of Adansoniadigitata aqueous leaf extract on Carbon Tetrachloride (CCl₄) induced injury in the pituitary gland of adult female Wistar rats, to evaluate the hormonal effects of Adansoniadigitatalinn on the pituitary gland of adult female wistar rats. Twenty-four adult female wistar rats were divided into four groups of six rats in each group: A, B, C and D. Group A which served as control received 1 ml olive oil for two weeks through oral route of administration, group B were given 2.5ml/kg body weight of CCl₄ only (50% in olive oil) for two days via oral route, Group C were given 500mg/kg body weight of Adansoniadigitata leaf extract only for two weeks via oral route while group D were given 2.5ml/kg body weight of CCl₄ only (50% in olive oil) and 500mg/kg body weight of Adansoniadigitata leaf extract consecutively via oral route of administration. In the reproductive Hormone analysis, the Follicle stimulating hormone (FSH) level showed a decrease in group B as compared to groups C and D while Luteinizing hormone (LH) and progesterone values also showed decrease in group B as compared to group A. The results showed that the Adansoniadigitata aqueous leaf extract has the ability to ameliorate carbon-tetrachloride-induced pituitary toxicity suggesting it may have a therapeutic role in free radical mediated diseases.

Introduction

The medicinal properties of some plants used since time immemorial have significantly over the years been proven to be potent in curing the different diseases and ailment prevalent in our localities (Sofowa, 1987). Plants have the ability to synthesize a wide variety of chemical compounds that are used to perform important biological functions, and to defend against attack from predators such as insects, fungi and herbivorous mammals. Both internal and external stress factors disturb homeostasis and evoke activation of the

stress system which consist the vegetative nervous system, adrenals, pituitary gland and hypothalamus (Chrousos, 1998).

It is suggested that adaptogens acts to directs the recovery of biochemical changes evoked by stress. These adaptogens are natural substances that increase nonspecific resistance of the organism against action of various stressors and promote adaptation of the body to stressful conditions (Antoshechkin, 2005).

AdansoniadigitataL (baobab) is the most widespread of the *Adansonia* species on the African continent, found in the hot, dry savannahs of sub-Saharan Africa (Heuzé, 2013). *AdansoniaDigitataL* is commonly known as the “tree of life” due to its ability to sustain life owing to its water holding capacity, as well as its many traditional

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medicinal and nutritional uses (Wickens and Lowe, 2008).

Carbon tetrachloride is one of the most potent hepatotoxins, and is widely used in scientific research to evaluate hepatoprotective agents (Seifert *et al.*, 1994). Exposures higher than background levels can occur near certain industrial sites where carbon tetrachloride is still used or there has been previous industrial contamination with main route of exposure to carbon tetrachloride being inhalation or ingestion (ATSDR, 2005). Hormones are some of the most important chemicals that our bodies manufacture. They are the messengers that we use to regulate and control virtually all our physiological processes, from metabolism (Larsen *et al.*, 2002).

Materials and Methods

Animals:

Twenty-four (24) female Wistar rats weighing 110g – 140g were used. The rats were purchased at Animal holdings in Ogbomosho and fed standard rat pellets. The rats were kept in the animal house of the Department of Anatomy, Faculty of Basic Medical Sciences, and University of Ilorin. They were maintained under a 12 hour light/ 12 hour dark cycle. The animals would be grouped randomly into four (4) groups A, B, C and D.

GROUP A: Control group received 1 ml olive oil via oral route of administration.

GROUP B: Administration of 2.5ml/kg of CCl₄ only for 2 days (50% in olive oil, oral route).

GROUP C: Administration of 500mg/kg *Adansonia* aqueous leaves extract only for 2 weeks via oral route.

GROUP D: Administration of 2.5ml/kg of CCl₄ for 2 days and afterwards 500mg/kg of *Adansonia* aqueous leaves extract for 2 weeks via oral route.

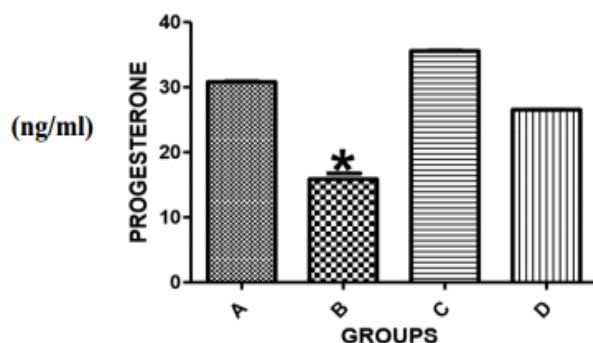
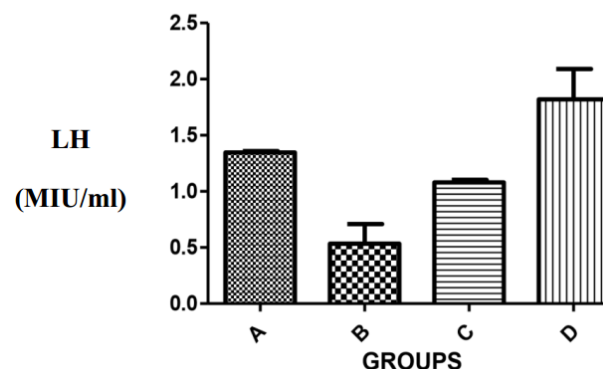
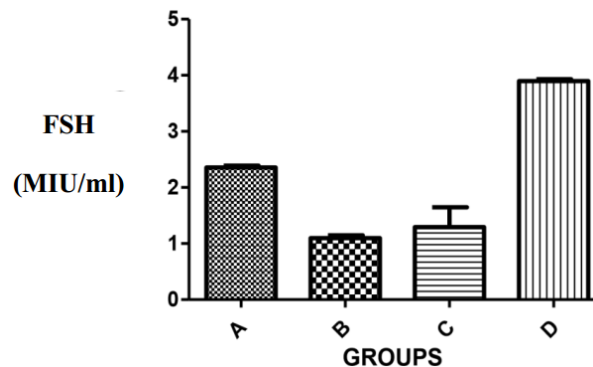
Plant material:

Young leaves of *Adansoniadigitata* leaves were washed, air dried and grounded into powdery form. The powdery form was subjected to aqueous extraction by dissolving 4.0g in 40mls of distilled water at room temperature. The solution was then filtered to remove the extract in liquid. The clear supernatant was carefully separated from the residue which was dried by use of oven at 40°C. The dried residue was weighed and the value was used to calculate the concentration as follows:

% Extract yield = weight of extract / weight of sample

Results

Hormonal assay



Bar Chart showing the changes in the level of FSH, LH and P₄. A = control, B = 2.5ml/kg body weight of CCl₄, C = 500mg/kg body weight of *adansoniadigitata*inn, and D = CCl₄ and 500mg/kg body weight of *adansoniadigitata*inn. * is level of significance $p < 0.05$ in comparison with control group A.

Discussion

The effect of *Adansoniadigitata* aqueous leaf extract and CCl₄ on the progesterone level of the female wistar rats in the CCl₄ only group showed significant decrease when compared to the control group. It also shows increased level of progesterone in the treated group D. The gonadotroph of pars distalis in adenohypophysis of the pituitary gland contains the FSH and LH. Hormone analysis of the FSH, LH and Progesterone showed statistical significant increase in group C and D with decrease levels in group B as compared to group A. It was also observed with significant increase in the LH level in group D as compared to the control group showing ameliorative effect of *Adansoniadigitata* leaf.

These histological changes seen in the testes of animals exposed to CCl₄ are in agreement with Khan and Ahmed (2009) who reported alterations in the seminiferous tubules and reduction in spermatogenic cells in rats following CCl₄ administration and the usefulness of *Adansonia* leaf in managing reproductive hormonal dysfunction in male (Oyewopo *et al.*, 2015).

Conclusion

Adansoniadigitata leaf is known to be highly regarded for its nutritional value and antioxidant properties. Hormonal observations showed decreased FSH and LH level in Group B with increase in Group D. It was concluded that exposure to CCl₄ induced a toxic effect on the pituitary gland. Administration of *Adansoniadigitata* leaf decreased the toxicity of CCl₄. *Adansoniadigitata* leaf therefore has an ameliorative and protective effect on the pituitary gland and may also play an important role in ameliorating oxidative stress. *Adansoniadigitata* extracts suggests the antioxidative properties of the plant. This indicates that *Adansoniadigitata* aqueous leaf extract is useful in managing reproductive hormonal dysfunction in female.

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Atypical chronic myeloid leukaemia in an adolescent Nigerian: a case report and review of the literature

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Abstract

Atypical chronic myeloid leukaemia (aCML) is a rare subtype of CML which is now regarded as a separate clinical entity and classified among the Myeloproliferative/myelodysplastic syndromes. It lacks the Philadelphia chromosome and BCR-ABL fusion gene found in the classical CML. We report a case of aCML which was diagnosed and managed at the Haematology Department of the University of Ilorin Teaching Hospital, Ilorin. Full blood count showed anaemia, leucocytosis and presence of various forms of myeloid cells with dysplastic features. Bone marrow aspiration done also showed myeloid hyperplasia with dysplastic changes in the myeloid cells. There was poor outcome in the patient. This case illustrates the importance of full haematological investigations of suspected CML cases so that the diagnosis of a CML will not be missed or passed for CML as this could influence choice of treatment and prognosis of patients. There is need for improved diagnostic facilities in tertiary health institutions in the country if we must achieve proper diagnosis and characterization of cases of aCML.

Keywords: Atypical, CML, Adolescent, Nigerian, Review

Introduction

Chronic myeloid leukaemia (CML) is a myeloproliferative disorder characterized by overproduction and accumulation of immature, intermediate and mature myeloid cells in peripheral blood and bone marrow^{1,2}. The hallmark for its diagnosis is the presence of the Philadelphia chromosome, t(9;22)(q34;p11), which is formed from a reciprocal translocation with juxtaposition of genetic materials between the long arms of chromosomes 9 and 22. The Abelson (Abl) oncogene on chromosome 9 becomes translocated to the Break point cluster (Bcr) region on chromosome 22 to form the Bcr/Abl chimeric gene. The BCR-ABL gene encodes a protein with

deregulated tyrosine kinase activity which then causes uncontrolled production of myeloid cells in the bone marrow and their accumulation in the peripheral blood^{2,3}.

Atypical chronic myeloid leukaemia (aCML) is a rare subtype of CML which is now classified among the Myeloproliferative /myelodysplastic syndromes according to the 2008 World Health Organization (WHO) classification of haematopoietic malignancies^{4,5}. It is regarded as an overlap syndrome showing both the myelodysplastic and myeloproliferative features in the peripheral blood and bone marrow, and lacks the Philadelphia chromosome as well as the BCR-ABL fusion gene found in the regular CML⁶.

Atypical CML is majorly a disease of the elderly with a median age of 65 years, but some cases have been reported in young adults and even in children⁷. The 2008 WHO classification defined the diagnostic

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criteria for aCML as: persistent leucocytosis $\geq 13 \times 10^9/L$ with immature circulating myeloid precursors ($\geq 10\%$ of leucocytes) with marked dysgranulopoiesis, and absent or minimal monocytosis, basophilia or eosinophilia. Dysplastic myeloid maturation is a prominent feature in aCML and differentiates it from the other myeloproliferative/myelodysplastic syndromes such as chronic myelomonocytic leukaemia (CMML) and chronic neutrophilic leukaemia (CNL) ^{5,6}.

In contrast to the usual CML, the Philadelphia chromosome and BCR-ABL fusion gene are absent in aCML, though some other non specific cytogenetic abnormalities including trisomy 8, trisomy 13, mutations in the CSF3R and SETBP 1 genes among others have been reported ^{8,9,10}. The actual incidence of aCML is unknown, however, the estimated incidence in the adults and elderly is said to be low, with only 1-2 cases diagnosed for every 100 cases of CML ¹¹. Unlike CML, aCML has been reported to progress more rapidly to acute leukaemias in up to 40% of cases with median survival time below 20 months which contrasts sharply with the median survival time of 5-10 years for the BCR-ABL positive CML ^{7,11}.

Due to the absence of the Philadelphia chromosome in aCML, the conventional tyrosine kinase inhibitors are of little value in the treatment of the disease, and poor response has also been reported for the other forms of cytoreductive treatment like hydroxyurea thereby suggesting a separate pathogenic mechanism from CML ¹². Two studies had reported the use of Decitabine and Ruxolitinib, which are hypomethylating agents, followed by haemopoietic stem cell transplantation in the treatment of their patients with variable results ^{13,14}.

There had been several studies and case reports of aCML from other parts of the world ^{7,8,9,10,11,14,15}. From literature search, there was no single case of aCML reported from Nigeria. The aim of this study, therefore, was to present a case report of a patient who was diagnosed and managed as aCML at the Haematology Department of the University of Ilorin Teaching Hospital, Ilorin. This is intended to increase awareness and encourage haematologists across the country to exercise a high index of suspicion and closely look into the diagnosis of CML such that cases of aCML will not be passed for CML.

Case Report

The patient, F.D. was a 21 year old Yoruba female student of the Kwara State Polytechnic, Ilorin, Nigeria. She presented at the Haematology Clinic of the Department of Haematology, University of Ilorin Teaching Hospital (U.I.T.H.), Ilorin on 2nd March 2012 with 2 days history of headaches and abdominal pain. The patient was first seen in a private hospital in town 2 weeks prior to presentation where she complained of fever and abdominal pains and a full blood count (FBC) done showed increased white blood cell (WBC) count. She was prescribed some antibiotics and antimalarial drugs and then referred to the haematologist on account of the observed leucocytosis. At presentation in the Haematology clinic, patient still complained of slight fever, body weakness, headaches and abdominal pain. Full history taking and physical examination was carried out. The abdominal pain was said to be sharp and colicky in nature and associated with a progressive swelling of the abdomen. Abdominal pain was localized to the left side of the abdomen, aggravated by walking or prolonged standing but is relieved by lying supine or analgesic use. The pain did not radiate to the back and was not associated with diarrhea, constipation or vomiting. Headaches was said to be dull, felt more in the fore head and was not associated with dizziness, blurring of vision or photophobia. There was history of slight fever at onset of illness which responded to analgesic ingestion. There was no history of jaundice, bleeding or passage of dark coloured urine.

Physical examination revealed a young lady, slightly febrile to touch (body temperature was 36.8°C), pale, anicteric, acyanosed and there were no subconjunctival or petechial haemorrhages seen. There was palpable splenic enlargement of 10cm below the left coastal margin, but no significantly palpable hepatomegaly or lymphadenopathy. Patient was admitted to the ward for investigations and management.

A full blood count was done which showed packed cell volume (PCV) 21%, total white blood cell count $29.1 \times 10^9/L$ with the following differentials – Myeloblast 8%, Promyelocytes 10%, Myelocytes 20%, Metamyelocytes 20%, Neutrophils 25%, Lymphocytes 5%, Eosinophils 10%, Basophils 1% and Monocytes 1%. Peripheral blood film examination showed leucocytosis with presence of blasts, promyelocytes,

myelocytes, metamyelocytes, neutrophils, basophils, monocytes and lymphocytes. Dysplastic changes were observed in the immature myeloid cells. A bone marrow aspiration study was also done which showed myeloid hyperplasia with dysplastic changes in the myeloid and erythroid precursor cells.

Patient's blood sample was sent to Obafemi Awolowo University Teaching Hospital (OAUTH), Ile-Ife, Nigeria, for cytogenetic analysis (Karyotyping) which was reported as negative for the Philadelphia chromosome. Patient's blood sample was also sent to Safety Molecular Pathology Laboratory in Enugu, Enugu State, Nigeria for quantification of bcr-abl transcripts. The result showed low levels of Bcr-Abl transcripts ($<10^4$). Other investigations carried out in the patient included serum urea and electrolytes, liver function tests, blood culture and abdominal ultrasound.

She was transfused with 2 units of fresh whole blood (due to non availability of Cold centrifuge for preparation of blood products) administered with Frusemide 40mg stat intravenously. Patient was then commenced on Allopurinol 100mg thrice daily orally, Hydroxycarbamide (Hydroxyurea) 500mg twice daily p.o., and oral liquid morphine 5mg 4 hourly. She also had Augmentin 625mg p.o. twice daily and Ciprofloxacin 500mg p.o. twice daily. Her full blood count (FBC) was monitored twice weekly during admission and following good response to the Hydroxycarbamidetherapy with reduction in WBC count to $12.0 \times 10^9/L$, PCV increase to 35% and platelet count of $125.0 \times 10^9/L$. She was discharged 6 weeks later to be followed up subsequently in the Haematology Clinic of the Hospital.

However, she was readmitted 2 weeks after discharge in the Accident and Emergency (A&E) Unit of the U.I.T.H. Ilorin with fever, severe anaemia and bleeding from the gum and nostrils. A full blood count was done which showed PCV of 10%, WBC count of $54.7 \times 10^9/L$, platelet count of $33.0 \times 10^9/L$ with presence of Myeloblasts $> 20\%$ and other myeloid cells in circulation all showing dysplastic features. An assessment of aCML in blastic transformation was made and patient was transfused with 3 units of fresh whole blood and commenced on AML- type induction chemotherapy regimen with I.V Cyclophosphamide, Ara-C, Vincristine and oral Prednisolone with allopurinol added to the treatment regimen. The

patient's condition deteriorated despite chemotherapy and she died on the third day of admission.

Results

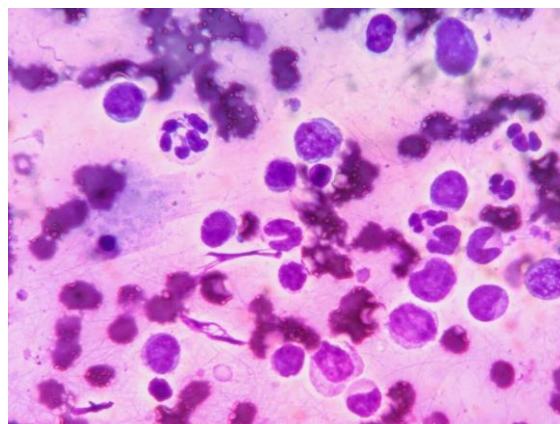


Figure 1: Peripheral blood film of patient at diagnosis (x100 magnification). Showed Myeloid cells at various stages of maturation with features of dysgranulopoiesis

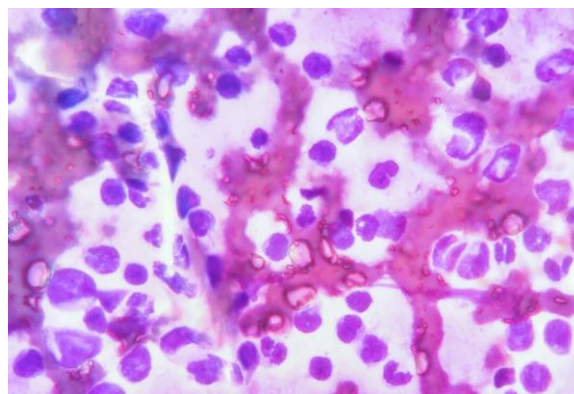


Figure 2: Bone marrow aspiration slide at diagnosis (x100 magnification). Shows myeloid hyperplasia with dysgranulopoiesis

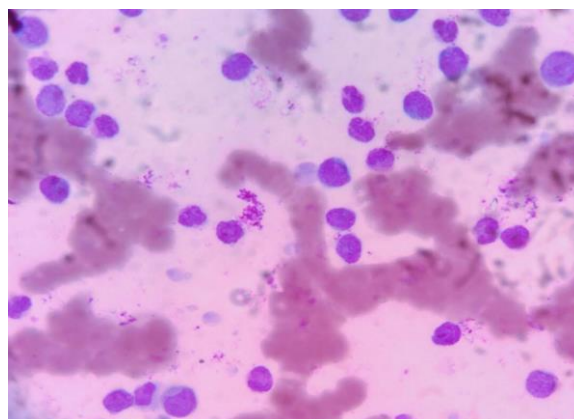


Figure 3: Peripheral blood film of patient when readmitted in blastic transformation (x100 magnification). Shows leucocytosis, increased blasts and thrombocytopenia

Discussion

Atypical CML was first described as a subtype of CML, but the 1994 FAB classification of the Myeloproliferative disorders recognized aCML as a separate clinical entity⁴. The aCML lacks the classical Philadelphia chromosome, t(9;22)(q34,p11), which is found in the regular CML. Although, other chromosomal abnormalities have been described in aCML, these are non specific and are not pathognomonic of the disease^{8,9,10}.

The hallmark for the diagnosis of aCML is the granulocytic hyperplasia with dysplastic features in the bone marrow, and the obvious dysplastic changes in the circulating immature granulocytes of about 10-20%, little or no monocytosis and basophilia. There could also be dysplastic changes in the erythroid precursors in the bone marrow^{4,5}. Our findings of increased number of circulating myeloid cells at various stages of differentiation showing dysplastic changes in the peripheral blood and bone marrow films of the patient was in agreement with the previous studies which reported dysplastic granulopoiesis as a major feature in their aCML patients^{4,6,11}.

The cytogenetic analysis for the Philadelphia chromosome which was done for this patient was negative and the molecular analysis for the Bcr/Abl transcripts were very low. The lack of Philadelphia chromosome in this patient with the low Bcr/Abl transcripts recorded in our study in addition to the peripheral blood and marrow findings above supported our diagnosis of aCML and corroborated other studies which found absence of Ph chromosome and BCR-ABL gene in their aCML patients^{7,8,11}. Several other chromosomal abnormalities such as trisomy 8, trisomy 13, deletion of 12q or 20q11, t(5;10) translocation with expression of PDGFR-B/H4 gene have been reported to be associated with aCML by previous studies among others^{8,11,16,17}. In the present study, there was no screening for any other chromosomal abnormalities which had been reported due to lack of facility for such in the country.

Patients with aCML lack the Ph chromosome and as such do not show good response to the available Tyrosine kinase inhibitors like Imatinib and Dasatinib

which are targeted therapeutic drugs for the Ph + CML. Some studies which tried the Tyrosine kinase inhibitors in their aCML patients reported very poor response and outcome^{13, 14,18}, so conventional cytoreductive chemotherapy with Hydroxyurea or Busulphan had been used for treatment. In our study, Hydroxycarbamide was used for treating the patient who showed significant response to the drug initially but later became refractory with increased blasts, severe anaemia, increasing WBC count and thrombocytopenia which were indicative of a blastic transformation to acute leukaemia within 2 weeks of discharge from hospital. The outcome in aCML patients had been reported to be poor when compared with the Ph + CML. aCML was reported to progress more rapidly to acute leukaemia in up to 40% of patients with a median survival of less than 20 months when compared with median survival time of 5-10 years in the Ph + CML^{7,11}. The survival time from diagnosis to death in our patient was about 8 weeks which was in agreement with other previous studies. Hernandez et al¹⁹ in their study of 11 patients with aCML reported poor response to therapy and a short survival outcome. In younger patients who are diagnosed in early disease, aggressive chemotherapy followed by Bone marrow transplantation has been recommended to improve the survival outcome in such patients^{13,20}. There was no facility in our centre for bone marrow transplantation; otherwise she could have been a good candidate for the procedure. This may have given the patient a better survival outcome.

Conclusion

aCML is an uncommon disease without a recognized cytogenetic marker. It exhibits a mixture of myeloproliferative and myelodysplastic features with a poor outcome. Although it is said to be rare, in our environment where there is paucity of diagnostic tools and limited resources, many cases may have been missed and diagnosed as CML. Thus, there is need for vigilance and thorough screening of perceived CML patients so as not to pass cases of aCML as CML, more so in the face of obvious limitations in carrying out cytogenetic analysis for the Philadelphia chromosome and other chromosomal abnormalities in many centres across the country. Also, the need for improved diagnostic facilities in our tertiary health institutions in the country cannot be overemphasized if we must

achieve proper diagnosis and characterization of cases of aCML as these will to a large extent influence the treatment and prognosis of such cases.

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Firecracker misadventure: A report of 6 consecutive cases in a Nigerian hospital

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Abstract

Firecrackers are small explosive devices presently widely used in worldwide for crowd entertainment. Numerous studies internationally highlight the devastating effects of firecracker and the need for legislative laws to regulate its use. There has, however, been a paucity of research studies in Nigeria that highlights the devastating effects of firecrackers especially in children.

Injuries emanating from the use of firecrackers are well documented with several leading to the death of the users and passersby. We report 6 consecutive cases of such injuries that came into Irrua Specialist Teaching Hospital (ISTH) during Christmas and New Year celebrations of 2015.

Six patients presented in ISTH during and after the Christmas and New year celebration of 2015 with varying degrees of injury from the use of firecrackers during the celebration. There were five males and a female. The mean age of patients was 16.0 years. The injuries affected mainly the upper limbs. The patients were managed surgically with debridement and amputations. Five patients recovered but with loss of finger digits. One male died due to late presentation, multiple referrals, financial constraint and sepsis.

This paper aims at discussing possible causes and prevention of such injuries, and potential dangers, including terrorism, of continued "free-for-all" use of fire crackers. These dangers may be associated with unregulated production, importation and use of firecrackers.

Keywords: Firecracker, misadventure, Nigerian hospital

Introduction

A firecracker is a small explosive device primarily produced to make a large amount of noise, especially in the form of a loud bang.¹ In the process visual light effects may be emitted. It is a small container filled with explosive chemicals that produce bright coloured patterns or loud noises when they explode.² Being explosives, their use over the years has been associated with different degrees of bodily injuries, from contusions to loss of body parts, blindness, and even death.⁴⁻⁸

In 2006, The National Council on Fireworks Safety of

United States estimated that there were over 9,200 fireworks related injuries that year.⁴ Boxing day 2012 witnessed a massive Firecracker explosion in a popular market on Lagos Island, Nigeria, where they were stored. Many properties and an 11 year old child were lost in the ensuing inferno.⁹ It becomes clear that as gorgeous as firecrackers may be, they are explosives and therefore, very dangerous.

Several cases of fire-crackers misadventure have been reported also in India with several mortalities.^{6,7} These are mainly related to the Deepawali festival(Festival of light) which is a very important and well celebrated festival in India. These include the death of 32 people in 2009 in Pallipatu in Tiruvallur District of India, the death of 38 people in September 2012 and 8 people in 2016 in Swakase, Indian firework capital.⁶ Fireworks was also reported to be a cause of preventable

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blindness in India, with advocacy for mandatory legislative laws to regulate manufacture, sale and use of fire works.⁷ In South Africa, cases of firework injured hands have also been reported as in the cases in the present work.⁸

Around the world certain social events attract boom in the use of firecrackers.^{6,7} In Nigeria the Christmas and New Year celebrations are events associated with peak uses of these materials. Before now, incidences of injuries resulting from use of firecrackers had been very few and far in-between in ISTH. This trend has suddenly changed as unusual numbers of such injuries were recorded in our hospital during 2015 yuletide period. As a result, a significant number of hitherto able-bodied, young people were maimed, and possibly rendered destitute.

This report aims to draw attention of practitioners, parents, the society and relevant government agencies to an emerging health and social danger that could attain terrorist dimension if not checked. Reasons for this unusual surge of firecracker misadventures are suggested, and preventive measures proffered.

Cases

Six isolated cases of blast injuries resulting from firecracker use presented to the accident and emergency room of ISTH, in Mid-Western Nigeria, between the 24th December, 2015 and 4th January, 2016. The injuries were in the upper limbs, and varied in severity (Figures 1-4). Five of the victims were under 18 years of age, with ages 11, 13, 15, 15 and 16, while 1 was 26 years old. Only 1 of them was female. The 11 and 13 year old were in primary school, the 15 and 16 year old were in secondary school and the 26-year old was a trader.

All the patients except one 15 year old male were from Edo state and presented to the hospital within the first 48 hours of the injury. The 15 year old male who was resident in a neighbouring state, Delta, presented seven days after the injury occurred. His injuries were extensive, septic, with 3rd degree burns involving both upper limbs (Fig 4). At presentation he was edematous, and in renal failure. He had gone to two tertiary institutions before ISTH in search of a dialysis machine due to renal shut down. He died after 24 days.

All the firecrackers used in these instances were made in China, and purchased from regular (unlicensed) provision/grocery shops in the open markets. The firecrackers were basically the triple bang type. They are said to have two initial small explosions with beautiful colour display, at which time the child must still hold unto the device, then it must be released before the third and biggest explosion. In these cases the patients reported that the devices malfunctioned by exploding without the initial two small explosions or were not released on time before the 3rd explosion.

Following different degrees of debridement and repair surgeries, 5 of them survived, while 1 died on the 24th day post injury. Those that survived were left with varied degrees of hand deformity, which included loss of multiple fingers and amputation in one case. The death of the 15 year old male child was attributed to complications of the injury, financial constraint and delay in instituting appropriate management. Request for autopsy on his body could not be processed.



Figure 1: 13 year old female with traumatic amputation of digits and lacerations



Figure 2: 11 year old male with amputation of 4 digits in the right hand (small finger is preserved)



Figure 3: 16 year old male with fireworks injury to the right hand



Figure 4: 15 year old male with septic right hand following amputation and burns injury from firecracker. He died after 24 days



Figure 5: Healing of right hand injury of figure 3 above

Discussion

Firecrackers originated in China, as *baozhu*, which means, “exploding bamboo,” since as early as 200 BC.^{2,3} They were then used with the belief that they kept away evil spirits.^{2,3} Originally they were made

using a type of bamboo that exploded when continuously heated. Over the years they have been modified and refined. Plastics or cardboards, with gun powders or lighter fluids as propellant, are now used, depending on the desired loudness.² Here in our locality firecrackers are popularly called “knock-out”, probably in recognition of the exploding and deafening sounds they produce when set off.

The use of firecrackers has since gone beyond its original intent of chasing evil spirits in China.² They have been used as instruments of intimidation, harassment and robbery, since the sounds they produce simulate gun shots.¹⁰ All over the world, they are now commonly used to mark special sporting activities, holidays and festivals, such as the Olympics games, Mundial, India’s Diwali, America’s Halloween and Independence Day, Israel’s Purim, and Christmas and New Year’s eve in many parts of the world^{1,3,5} This has translated to wider demands and markets for these products, and consequent proliferation of companies manufacturing them. With widespread production and distribution it has become more challenging to monitor and standardize productions and storage. This inadequate regulation ultimately leads to production and release of lots of fake and sub-standard products into the markets.

The economic recessions ravaging many developing economies have not been helpful, as they become ready recipients of these cheap and un-standardized firecrackers. This appears to be the case in Nigeria. On 26th December 2012 in Nigeria an explosion in Lagos Nigeria caused by firecrackers destroyed many stores and caused one death, despite the ban on unauthorised importation and sale of firecrackers.⁸ There is poor regulation of products, and widespread poverty, hence the leaning of most buyers towards the cheapest brands, which are readily available.^{5,9} The situation is helped by widespread illiteracy amongst users, because of which usage guidelines are not read.

New types of firecrackers continue to be introduced into the markets every year.^{9,11} The noise and colorful display make them too attractive to avoid, especially amongst children, who were the most victims in this report. A new triple-banger firecracker was recently introduced into the Nigerian market.¹¹ Users are encouraged to hold the fireworks until the third blast. This was the type implicated in all our cases. Due to

the excitement of the moment and malfunction of the devices these victims held the firecrackers a second too late.

Several accidents, injuries (including blindness, loss of body parts) and deaths related to fireworks have been documented in international literature, and talked about in the local media.⁶⁻⁹ The cases being reported here are in tandem with such previous reports. Injuries sustained in our series ranged from fatal to disabling wounds. Victims lost hands or fingers. Most of the victims were young and of school age. These injuries have grave economic and psycho-social implications, in a country already battling with heavy loads of internally displaced and indigent people, occasioned by terrorist activities.

Beyond these personalized accidental misadventures is the danger of using these materials as weapons of mass terrorism, especially in our kind of environment where the Boko Haram terrorist group is out to maim and kill by any and every means. Terrorist groups can indeed hijack, modify and push more dangerous explosive devices into the markets at even cheaper costs, in the name of firecrackers, to achieve mass casualties. This can well happen in our clime unless proper regulation of production, distribution and sales is put in place. Instead of outright ban, which has persistently failed to achieve desired results, public awareness campaigns on correct storage & usage, and dangers of abuse of these products may be more useful.⁹ This can be achieved using print, electronic and social media.

The death of one of the victims was preventable. He was 15 years old and in senior secondary school class 2. Prompt emergency response would have made the difference. We have reasons to believe that there were more victims than those who presented to our facility, a further pointer to the enormity of the challenge. Many of those, out of financial handicap, would have ended up with traditional medicine men and poorly equipped health facilities. These usually lead to very poor outcomes. Continued improvements in health care delivery remain crucial, backed by a good health insurance scheme.

Conclusion

Firecracker use can be associated with death and severe bodily harm. Poverty, ignorance, inefficient

monitoring of quality of products, their importation and sale may be some of the reasons for the rising trend of firecracker injuries in our society. We recommend stricter control of production, sale and use, public awareness on explosives handling and product standardization as measures to reduce the incidence of these accidents. In addition, children should be discouraged from using firecrackers unless under direct adult supervision.

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