ORIGINAL ARTICLE

ABSOLUTE LYMPHOCYTE COUNT AS A SURROGATE OF CD4+ T LYMPHOCYTE CELL COUNT IN INITIATING ANTIRETROVIRAL THERAPY IN HIV-INFECTED NIGERIANS.

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ABSTRACT

Background: Most laboratories in resource-constrained countries, cannot routinely use standard methods to measure markers of disease progression useful in staging and initiation of antiretroviral therapy due to high cost more so with the ongoing reduction of support by the implementing partners. The objective of this study is to determine whether Absolute Lymphocyte Count (ALC) can serve as a surrogate for CD4+ T-Lymphocyte Cell Count (CCC) for initiating highly active antiretroviral therapy (HAART) in HIV-infected treatment naïve patients in our setting. **Methods:** A total of 400 adult Nigerians infected with HIV-1 and who were previously antiretroviral naïve, were recruited into the study at Ahmadu Bello University Teaching Hospital, HIV subspecialty clinic. They were assessed clinically and immunologically and categorized into three clinical stages; A, B, and C according to CDC criteria. Absolute Lymphocyte Count and CCC values were tested for correlation and their validity determined using SPSS version 20 and Chi square statistics. **Results:** The patients comprised of 187 males (46.8%) and 213 (53.2%) females. One hundred and eight (27%) of the study subjects were in stage A, 153 (38.5%) in stage B, and 139 (34.8%) in stage C. The mean ALC of stage C subjects is significantly lower than that of stage A subject's $p < 0.05$. The mean CCC values declines significantly from stage A through B to C $p \approx 0$. There was a positive and significantly correlation coefficient between ALC and CCC in stage C; r 0.28, $P < 0.05$. In all the subjects and in the stages, sensitivity and specificity of a low ALC value to predict a low CCC value were low. **Conclusion:** Absolute Lymphocyte Count is not a reliable and sensitive surrogate of CCC in all HIV infected patients however it is only useful in immunocompromised patients to determine the optimal time to initiate HAART.

KEYWORDS: Lymphocyte; count; surrogate; CD4+ cell count; initiation of antiretroviral therapy.

INTRODUCTION

Fundamental in understanding HIV/AIDS related opportunistic infections (OIs), is the appreciation of the relationship between the level of the underlying immune dysfunction as measured by the CCC, and the incidence of AIDS defining Ois.[1] CD4+ T-Lymphocyte Cell Count is presently considered as one of the best markers of HIV induced immune impairment.[2,3,4] The degree of immune deterioration correlates with the likelihood of development of OIs, which typically occurs when the CCC drops to critical levels as occurs in HIV infection.[1,3,5]

The CD4 antigen has a high affinity receptor for the HIV and this explains the selective tropism of the virus for CD4+ T cells and other CD4+ cells, [1,2,6] With successful infection, the viral particle enters the CD4+ cell replicates and destroys it predominantly by direct cytolysis. [6,7,8] Approximately 100 billion new viral particles are produced everyday, and 1-2 billion CD4+ T cells die everyday.[9] Other mechanisms of CD4+ T cell loss include;

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Apoptosis of uninfected CD4+ T cells, Fusion of infected and uninfected cells, (syncytia [giant cells] formation), with subsequent ballooning and death, direct infection of thymic progenitor cells and infection of accessory cells that secret cytokines essential for CD4+ T cells differentiation. [1, 8] CD4+ T cell plays a vital role in regulating the immune response, hence loss of this master cell has ripple effects on virtually every other cell of the immune system.[1, 8] Loss of CD4+ T cells is the hallmark of AIDS. [6,7, 8, 9] Therefore enumeration of CD4+ lymphocytes serve as an important tool in the classification, initiation of antiretroviral therapy, monitoring of treatment and prognosis of HIV/AIDS.[1,3,5]

At present there is no definitive cure for HIV/AIDS. The benefit of Highly Active Antiretroviral Therapy (HAART) lies in the timely and sustained suppression of viral replication, alongside the reversal of the progressive immune deficiency that is characteristic of HIV infection.10 The reported benefits of antiretroviral therapy (ART) have encouraged its use in the clinical management of people living with HIV/AIDS (PLWHA) in several countries.[6, 11] Studies has shown that HAART has remarkably reduced HIV related morbidity and mortality, thereby improving the quality of life of PLWHA.[12,13]

In most laboratories particularly in developing countries, CCC are not measured routinely due to high cost of the equipments, reagents and lack of technical skill both in terms of usage and maintenance .[1,3, 5] Although test methods based on the use of light and ELISA techniques are now available instead of the gold standard which involves flow cytometry, all forms of measurement requires the use of monoclonal antibodies (this makes the cost of the test unaffordable).[12] Thus the need for a possible surrogate for CCC in our environment as is being documented by WHO and in other studies. [7,14,15,16,17]

The peripheral blood of man contains about 3000 lymphocytes per mm^3, of this number, 70 to 80 % are T lymphocytes and 15 to 20% are B-lymphocytes.15 Of the T lymphocytes, about 65% express CD4 antigens.[16] Thus it is believed that if the CD4+ LC falls significantly as occurs in HIV infected persons, there should be a concomitant and proportionate decline in the ALC in the peripheral blood. Therefore ALC may be a useful surrogate marker of disease progression and have been recommended as a substitute in the management of HIV-infected individuals living in resource limited areas.[7], 17 In this study we have explored absolute lymphocyte count, as a possible surrogate test for CD4 cell count.

PATIENTS AND METHODS

Four hundred adult patients who were HIV-1 repeatedly reactive and who were previously antiretroviral naive were recruited into the study. They were assessed clinically and immunologically and categorized into three clinical stages; A, B, and C in accordance with CDC Clinical/Immunological categorization of HIV/AIDS.

The study was carried out at Ahmadu Bello University Teaching Hospital, Zaria-Haematology HIV Subspecialty clinic, one of the designated centre for the Federal Government of Nigeria's assisted antiretroviral treatment programme. Blood specimens were taken at enrolment, between 10am and 12 noon for full blood count (FBC) and CCC (10 mls was collected into plain sample bottles and 5 mls into EDTA anticoagulated bottle. Blood samples were analyzed within six hours of collection. Total white cell count and differential counts were determined according to standard methods.[18] Absolute lymphocyte count (ALC) was derived from the product of total white count and percentage differential count. CD4+ cell count was determined using monoclonal antibody labeled microspheres manual methods developed by Dynal Biotech SA,

Norway France. The following were computed.

1. All ALC and CCC values in each of the groups were tested for correlation (r)
2. Validity testing: Sensitivity and Specificity of low ALC value, as a predictor of low CCC Value was also determined. This was tested for significance using the Chi Square test where applicable.
3. Sensitivity was defined as the proportion obtained when number of measurements out of total number were ALC < 2000 /mm3 that have CD4 cell count below 200 /l (nominator) was divided by the total number of measurements with CCC < 200 /l (denominator).
4. Specificity was defined as the proportion obtained when number of measurements out of total number were ALC > 2000 /mm3 that have CCC > 200 /l (nominator) was divided by the total number of measurements with ALC > 2000 /mm3 (Denominator).

Approval was obtained from the Research and ethics committee of Ahmadu Bello University Teaching Hospital, Zaria. Data processing was performed by the Statistical Program (SPSS version 20). Data were tested by the student t-test for two means and the hypothesis test for two proportions. Coefficient of correlation (r) was determined between the two methods used. All tests were applied at a level of significance (α=0.05). P-values of $\leq$0.05 were considered as statistically significant.

RESULTS

A total of 400 patients comprising 187 (46.8%) males and 213 (53.2%) females. Their ages ranged from 15 to 64 years, with a mean age of 34.75 years 8.93. They were predominantly in the working age group of 25 to 44 years with only 6 in the age group of 15 to 24 years. Considering CDC clinical/immunological stage distribution, one hundred and eight (27%) of the 400 patients had stage A disease, 153 (38.5%) stage B, and 139 (34.8%) had stage C disease. The mean weight of the patients was 58.13 kg 12.25 and a range of 27 to 100 kg.

Table 1: Pattern of ALC, CCC and correlation coefficient (r) by stage and gender stratification

Variable		**Stage**		**Gender**		
	A	**B**	**C**	**Male**	**Female**	**General**
	n = 108	**n = 153**	**N = 139**	**n = 187**	**n = 213**	**n = 400**
	Mean	**Mean**	**Mean**	**Mean**	**Mean**	**Mean**
	SD ±	**SD ±**	**SD ±**	**SD ±**	**SD ±**	**SD ±**
ALC	2.6	2.3	1.9	2.2	2.3	2.2
$x10^9/l$	2.9	1.5	1.0	1.3	2.2	1.3 ``
CCC cells/l	506.1	256.6	134.5	277.9	284.8	282.4
	260.2	128.0	80.4	211.4	226.3	219.0
r	- 0.11	+ 0.054	+ 0.280	+ 0.23	0.006	0.074
P value						
	0.255.	0.504	0.001	0.002	0.92	0.141
	P > 0.05	P > 0.05	P < 0.05	P < 0.05	P > 0.05	P > 0.05

Where n is number of sample in the study group.

Table 2: Sensitivity and specificity of low ALC value as a predictor of low CCC value

Variable	Stage			Gender		
	A n = 108	B N = 153	C n = 139	Male n = 187	Female n = 213	General group n = 400
Sensitivity %	3.7	37.3	84.4	52.1	68.5	48.1
Specificity %	98.2	78.2	21.3	65.6	57.9	68.2
P value (x^2)	*	< 0.05	> 0.05	< 0.05	< 0.05	< 0.05

n Where n is number of sample in the sub group
* cannot be subjected to a test of statistical significance due to single observation in one of the sub group.
P value statistical significance by Chi Square (x^2)

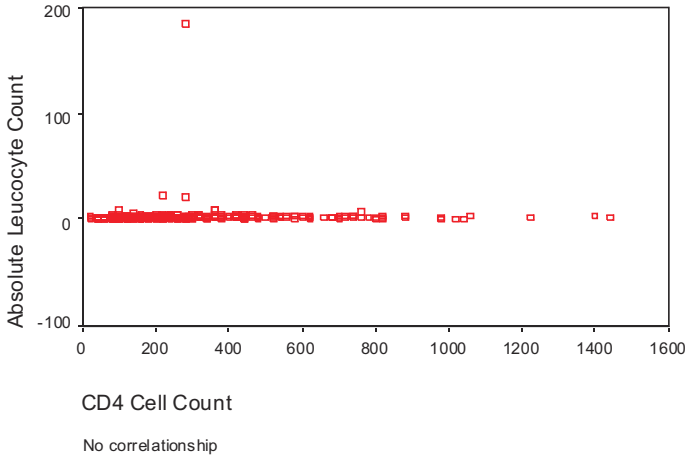

Figure 1: Scattered diagram of ALC and CCC (General group)

Figure 2: Scattered diagram of ALC and CCC (Stage A)

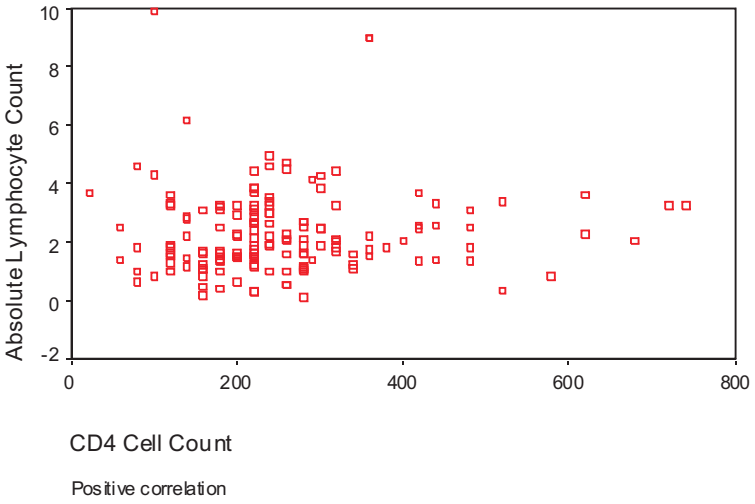

Figure 3: Scattered diagram of ALC and CCC (Stage B)

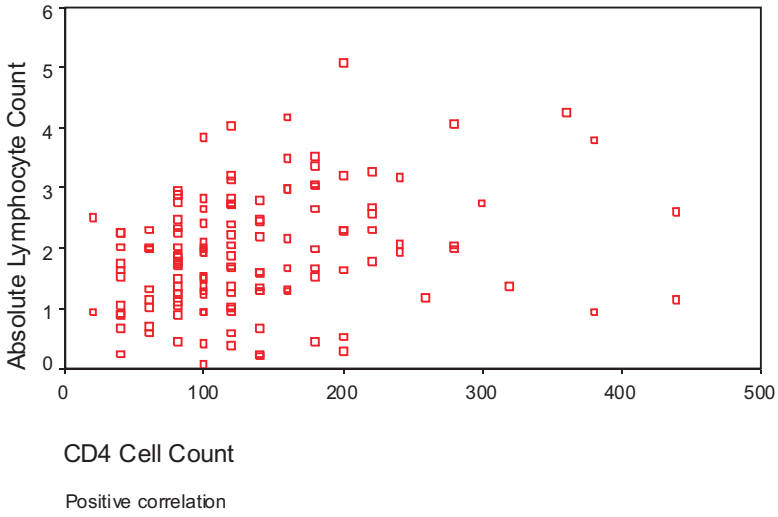

Figure 4: Scattered diagram of ALC and CCC (Stage C)

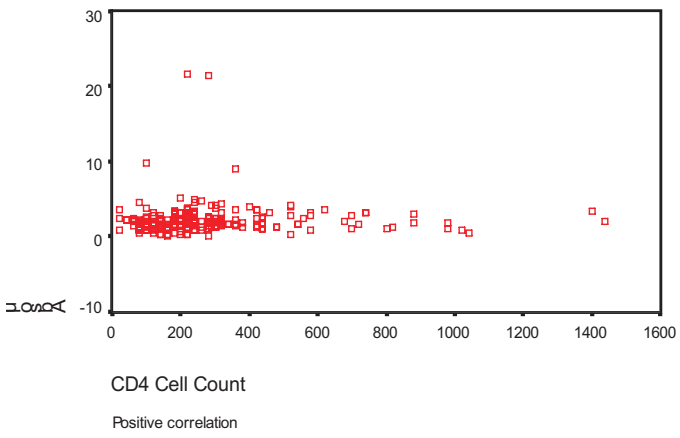

Figure 5: Scattered diagram of ALC and CCC (Female group)

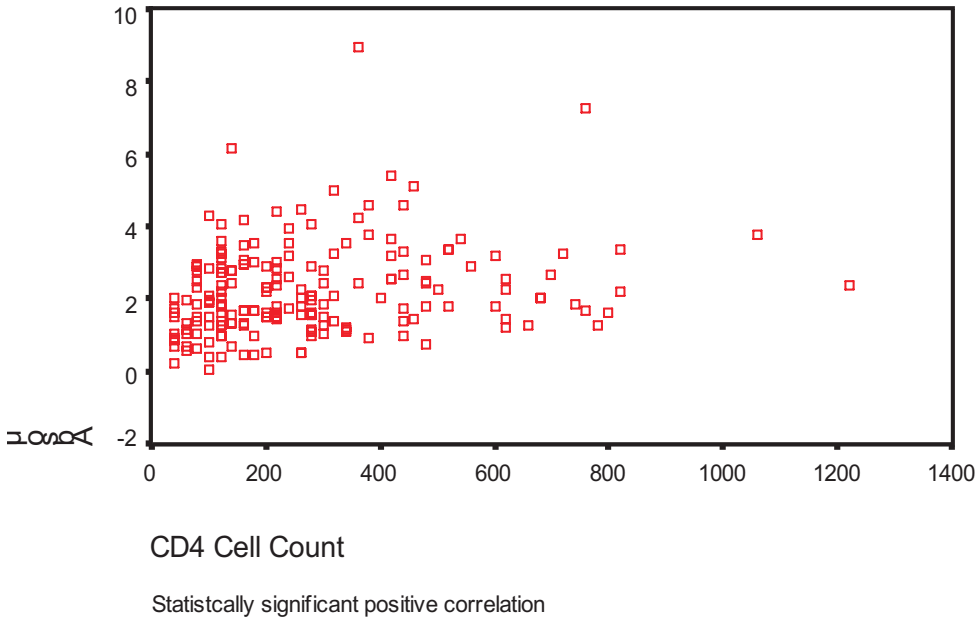

Figure 6: Scattered diagram of ALC and CCC (Female group)

DISCUSSION

The mean CD4 counts of the general group declines significantly between the stages see table 1, this study thus confirms several 'old' findings that have been previously reported in several studies and in textbooks where CD4 are said to decline with increasing clinical severity of the infection.[1, 8, 19, 20, 21] Although a decline was noted in the ALC values between the stages see table 1, however this was statistically significantly only between stage A and C, P < 0.05. Neither the mean ALC between the sexes nor in the general group were significantly different P > 0.05.

In the general group the correlation coefficient between ALC and CCC was very weak r 0.074 but this was statistically not significant P > 0.05 see figure 1 for scattered diagram. Following CDC/Immunological stratification r - values became weaker in stage A where it was negatively correlated r - 0.11 and statistically not significant P > 0.05; figure 2 shows the scattered diagram. Although it still remained weak in stage B, it became positively correlated r 0.054 but remained statistically not significant p > 0.05; figure 3 shows the scattered diagram. However a stronger association was seen in stage C r 0.28, which was statistically significant P < 0.05; figure 4 shows the scattered diagram.

When gender influences were tested a very weak association was obtained in the female gender r = 0.006 but was statistically not significant P > 0.05, figure 5 shows the scattered diagram. However a statistically significant and positive correlation was noted in the male gender r = 0.23 p < 0.05; figure 6 shows the scattered diagram.

Our findings thus contradicts earlier Nigerian studies where an association was reported in stage A and in the female gender.[22,23] Akinola et al reported a correlation of r = 0.49 p < 0.001, which was stronger in the females r = 0.55 than males r = 0.42.22 Beck et al also reported higher correlation than was obtained in this study.[16, 24] Although the sensitivity (48%) and specificity (68%) of low ALC to predict a low CCC was low in the general subjects, statistically significant numbers of subjects with low ALC have low CCC by chi square statistics, p < 0.05, table 2. Sensitivity and specificity remained

low even after gender influences and disease stratification effects were considered see table 2, except in stage C were the sensitivity was high (84%), but this was of no statistical significance P >0.05 table 2. This result is in line with the low sensitivity of 58% and specificity of 75.6% reported by Akanmu et al in Nigeria, [23] and differs markedly from the high sensitivity of 96% and specificity of 60% obtained by Blatt et al. [25] which was statistically significant p < 0.05. Contradicting results have also been reported from other studies in other parts of the world where high validity were obtained. [26]

The differences observed in this study as compared to others may be largely due to methods of cells enumeration. Akinola et al used automated methods for all cell counts. Akanmu et al used manual methods for blood cell counts, and Coulter manual methods, while in this study manual cell count and Dynabeads method was used for CD4 + T cell enumeration. Studies from other parts of the world (Blatt, Beck, Kumarasany) used automated cell count and flow cytometers. The inherent errors associated with manual method is large, coefficient of variation for leucocytes for manual method is 16% and for automated analytical method is 1.5%. Dynabeads correlates well with the flow cytometric methods with a coefficient of correlation between the two techniques of between 0.89 to 0.97 for low counts in overseas studies [27, 28] while in Nigerian studies r value of > 0.75 was obtained.[29] Flow cytometry is the standard technique used in determining CD4+ T lymphocyte subset. However, the possibility of using this technique for routine monitoring of the immunological profiles of patients in developing countries are limited because of the sophisticated technology and high cost involved.

Secondly in our study a large sample size was used as opposed to the other Nigerian studies, where smaller sample size was used. Akinola used sixty-six patients while Akanmu used thirty-two patients. [23, 23]

The main draw back in our study was while other studies monitor the changes with therapy this study only considers the values at first presentation or prior to commencement of any form of drug (antiretroviral naïve). The presence of co-infections (Hepatitis B, C, HTLV – 1 and Syphilis) will also influence the CD4+ LC. 7, 20 Hepatitis B and C could not be screened for in all the study subjects due to finance.

Other reasons for the variations in results may be due to seasonal variation, diurnal variation, exercise, and drug use such as tobacco or snuff.[7] Heterogeneity of the CD4 epitopes molecules and cell loss during lysis of blood in CCC estimation is another factor. Problems of lysing African blood due to unknown reasons, probably due to the presence of a high proportion of nucleated cells, as a response to heightened erythropoiesis in an environment with a high prevalence of multiple infectious agents has been reported.[27] The high prevalence of sickle cell gene in Nigeria that is estimated to be between 23-30% and sickle cell anaemia of between 1-3% may also account for this.[30,31] So also is the undocumented prevalence of thalassaemic gene in the country may be responsible for this high erythropoietic drive.

CONCLUSION

Absolute lymphocyte count is correlated with CD4 + lymphocyte count in severely immunocompromised patients however it is an insensitive surrogate of CD4+ lymphocyte count in all HIV infected patients. Very accurate prediction cannot be made of CD4+ lymphocyte count from Absolute lymphocyte count in our under resource laboratories, more modern less cumbersome and more reliable analytical methods need to be put in place for this to be accomplished. Hence it cannot be absolutely and reliably used for the initiation of treatment or prophylaxis at all times in our setting. Thus Government intervention for a uniform global use of CD4+ lymphocyte count is advocated to initiate antiretroviral therapy.

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ORIGINAL ARTICLE

SONOGRAPHIC EVALUATION OF CAROTID INTIMA MEDIA THICKNESS (cIMT) IN ADULT DIABETIC PATIENTS IN UNIVERSITY OF MAIDUGURI TEACHING HOSPITAL, NORTH EASTERN NIGERIA

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ABSTRACT

Background: Intima media thickness of the carotid arteries has been used as a subclinical index of atherosclerosis in patients with diabetes mellitus and has also been used in epidemiological and interventional studies as a surrogate index of atherosclerosis. However, to date, there is paucity of data on sonographic carotid artery intima media thickness (IMT) measurements and the prevalence of carotid atherosclerosis and stenosis among adult diabetic patients in our environment. **Objective:** The objective of this study was to evaluate carotid artery intima media thickness among adult diabetic patients using carotid duplex ultrasonography (CDUS). **Methods:** This was a cross-sectional study carried out at the University of Maiduguri Teaching Hospital, Nigeria. One hundred and twenty adult diabetic patients aged 20 - 78 years had CDUS for measurements of carotid artery intima media thickness. Measurements were taken at 1cm below and 1cm above the carotid bulb for the common carotid (CCA) and internal carotid arteries (ICA) respectively. Pearson's correlation and Student t-test were used to compare the means between the variables. **Results:** There were 72(60%) male and 48(40%) female diabetic patients aged 20 to 78 years **(**mean = 50.03±11.4 years). Mean intima-media thickness, in millimeters (mm), for normal (non-stenotic) carotid arteries on the right and left were (CCA=0.71±0.09 and 0.70±0.08; ICA=0.71±0.08 and 0.69±0.09) and abnormal (stenotic) on the right and left were (CCA=0.84±0.17 and 0.83±0.19; ICA=0.98±0.10 and 1.03±0.10) respectively. A total of 75 patients (62.5% of study population) had no carotid artery stenosis; 38 patients (31.7%) had <50% carotid stenosis; 6 patients (5.0%) had 50-69% carotid stenosis; and 1 patient (0.8%) had 72% carotid stenosis. The prevalence of carotid stenosis in diabetic patients was 37.5% in this study. There was positive and significant correlation between percentage degree of stenosis with IMT ($r=\geq+0.5$; $p=<0.05$). **Conclusion:** The findings of this study have indicated the presence of atherosclerotic and haemodynamic changes in the carotid arteries of adult diabetic patients in this environment who are at risk of developing stroke from carotid stenosis. CDUS has proved to be a valuable diagnostic and screening tool in the evaluation of these patients because of its safety, low cost, wide availability, and accuracy in detecting carotid artery disease.

KEYWORDS: Carotid arteries; diabetes mellitus; intima-media thickness; atherosclerosis; Doppler Ultrasound scan.

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INTRODUCTION

Diabetes Mellitus (DM) is a well known modifiable risk factor for cardiovascular diseases[1,2] and ischaemic stroke[3]. Diabetic patients have 2 to 5-fold increased risk for stroke compared with those without diabetes[2-4], and the main underlying cause of stroke is carotid atherosclerosis[2,5,6] leading to carotid stenosis1 with most changes affecting the carotid bifurcation[7].

The ability to predict future strokes in asymptomatic patients with carotid stenosis is currently limited; therefore, identification and treatment of risk factors for stroke have become necessary over the past decade[8]. Although there is paucity of data on prevalence of diabetes in Nigeria and other African countries, available data suggest that diabetes is emerging as a major health problem in Africa, including Nigeria[9]. A study by Gezawa[10] reported a 7% prevalence of diabetes in Maiduguri.

Carotid arteries are the major vessels that transport oxygenated blood to the brain. Carotid duplex ultrasound (CDUS) is a non-invasive, safe and relatively inexpensive technique for evaluating the carotid arteries11. CDUS uses B-mode ultrasound imaging and Doppler ultrasound to detect carotid intima media thickness (cIMT)[11-13]. Complementary to ultrasound scan are other imaging modalities[14,15]; including conventional angiography, magnetic resonance angiography (MRA), and contrast enhanced dynamic computed tomography which provide an assessment of carotid luminal size but are unable to characterize the vessel wall or associated plaques[16]. Angiography though considered as the gold standard is an invasive procedure[17,18]. In addition, conventional angiography and computed tomography angiography (CTA) uses ionizing radiation. Moreover, CDUS can detect both early and advanced atherosclerotic disease, in addition to its central role in many recent epidemiological studies targeted at atherosclerotic prevention trials[19]. Although angiography, CTA and MRA are complementary to ultrasound their usefulness is limited by the need for sophisticated equipment and accompanying radiation exposure involved in CT and angiography. They are also expensive and may not be readily available for it to be applied to large populations in a developing country.

Husni[20] reported that diabetes mellitus (DM) promotes atherosclerosis of the carotid arteries and may increase hypertension, hyperlipidaemia and coronary heart disease, which are also risk factors for developing stroke. Studies among Nigerians and other populations in developed countries have confirmed diabetes[4,21] hypertension[22,23] increasing age[24] dyslipidaemia[25,26] cigarette smoking, heavy alcohol consumption, obesity, anaemia, HIV infection and congestive cardiac failure[21,23,27] as the most dominant risk factors for stroke. The identification and understanding of the magnitude of these stroke risk factors will go a long way in stroke prevention[28]. Diabetes mellitus has been reported to significantly increase risk of stroke following atherosclerosis of the carotid arteries[4] and up to 20-37% of patients with stroke have been documented as diabetic[22].

Olson[29] described a technique in 1974 depicting ultrasonography as an imaging modality to monitor the instantaneous diameter, wall thickness, and blood flow of the human carotid arteries. The feasibility of using carotid ultrasonography in a large multicentre study with excellent reproducibility for CCA and acceptable reproducibility for the ICA IMT measurements have also been reported[30]. Carotid ultrasonography, measuring both the presence of stenosis and IMT, has provided a powerful non-invasive technique to determine atherosclerosis[31] and carotid IMT (cIMT) has been extensively used as an outcome measure in clinical trials[32-34].

Pignoli[35] defined IMT as the distance from the leading edge of the first echogenic line to the leading edge of the second echogenic line with the first line representing the lumen-intimal interface; the collagen-containing upper layer. The minimum measured IMT in the CCA and ICA was 0.2mm and the maximum was 0.9mm and IMT was noted to be significantly lower in women than in men[36]. Handa et al[6] evaluated healthy Japanese subjects and found a maximum IMT complex of < 1.0mm and, therefore, defined carotid atherosclerosis as an IMT complex of > 1.0mm. The normal thickness of the intima-media complex measured in the B-mode is 0.5–0.6 mm[37]. However, the 2003 consensus conference of the society of Radiologist in ultrasound recommends that, the IMT in CCA and ICA in adults are as follows: normal CCA IMT <0.87mm; normal ICA IMT <0.90mm[38]. These values for IMT were noted to be higher in men than women[15,37].

Brian[39] stated that CCA IMT greater than 0.87mm and ICA IMT greater than 0.90mm were associated with progressively increased risk of cardiovascular events, and that for each 0.20mm increase in CCA IMT, the risk increased by approximately 27% and for each 0.55mm increase in ICA IMT, the risk increased approximately 30%.

The increasing frequency of diabetes mellitus in our environment and the absence of data on CCA and ICA intima media thickness necessitated this study. The results of this study may be used for detecting early atherosclerosis in the CCA and ICA and possibly predict clinical complications in adult diabetic patients.

MATERIALS AND METHODS

Study design: This was a hospital based cross-sectional study. Subjects were recruited consecutively from the Endocrinology Unit of the Department of Internal Medicine University of Maiduguri Teaching Hospital (UMTH) based on the inclusion criteria stated below using simple random sampling until the sample size was reached.

Study area: The study was carried out at the Department of Radiology UMTH Maiduguri, Nigeria.

Sample size estimation: This was done using Tailor's formula[40].

$n = z^2 pq/d^2$

Where:

n = the desired sample size (when the population is greater than 10,000)

z = the standard normal deviate, usually set at 1.96 (or more simply 2.0), which corresponds to 95 percent confidence level.

p = the proportion in the target population estimated to have a particular characteristic. The prevalence of diabetes in Maiduguri (2009) 10 stands at 7% (i.e. 0.07)

q = 1.0-p (i.e. 1-0.07)

d = degree of accuracy desired, usually set at 0.05

Therefore: $n = z^2 pq/d^2$

$= (2.0)^2 (0.07) (1-0.07) / (0.05)^2$

$= (4.0) (0.07) (0.93) / (0.0025)$

$= 0.26 / 0.0025$

$= 104$

However, the sample size was increased to 120 to further increase the sensitivity of the study.

Study population: This study was conducted on adult male and female patients with type-2 diabetes mellitus, aged 20 years and above who met the inclusion criteria and volunteered to participate in the study. The subjects were recruited consecutively at random from the Endocrinology Unit of the Department of Internal Medicine UMTH.

Inclusion criteria

1. Consenting adult diabetic patients aged 20 years and above.
2. Diabetic patients with fasting blood glucose (FBG) level of ≥7.0mmol/L

Exclusion criteria

1. Subject below 20 years of age.
2. Pregnant women because of physiological

changes and accompanying dilatation of the CCA.
3. Patients with known systemic vascular disease other than diabetes mellitus.
4. Patients with stroke or past history of cerebrovascular disease.

The study was carried out on 120 adult type-2 diabetic patients aged 20 years and above who voluntarily participated in the study. After explaining the examination/procedure to the patient he/she was asked to wear comfortable loose fitting clothing and remove all jewellery around the area to be examined. A brief history to include previous cardiovascular disease was taken.

The examination was performed using a high-resolution real-time Doppler ultrasound scanner (Aloka, SSD-3500) equipped with 7.5 and 10MHz linear-array transducer. The high frequency transducer provides greater resolution for superficial structures such as the carotid artery.

With the patient in a supine position, the shoulder was placed on pillow with the neck extended and turned slightly away from the side being scanned. After applying ultrasound gel to the neck, the transducer was placed above the clavicle in a transverse position initially for the grey-scale examination.

The CCA was located and followed proximally as far as the clavicle permitted. The transducer was moved cephalad following the CCA to the level of the carotid bifurcation (thyroid cartilage). The internal carotid artery was then followed distally to the angle of the mandible.

The IMT measurements were obtained at 1cm below the carotid bulb for CCA and 1cm above the carotid bulb for ICA (Figure 1). Longitudinal and transverse views were done in colour Doppler (Figure 2). A single measurement was recorded at each location for intima media thickness which was taken as the distance between the leading edges of the lumen-intima interface and the media-adventitia interface of the far wall (Figures 3).

The degree of stenosis was determined using the NASCET methodology[41,42] where the measured maximum flow velocity and the local narrowing in percent diameter reduction at the maximum of the stenosis were calculated according to the formula [1-(s/n)] x 100%, where s represents the tightest diameter of stenosis and n the suspected former vessel diameter (Figure 4). For the purpose of this study, the classification for degree of stenosis in CCA and ICA of the Society for Radiologists in Ultrasound (SRU) as reported by Grant et al[38] was used.

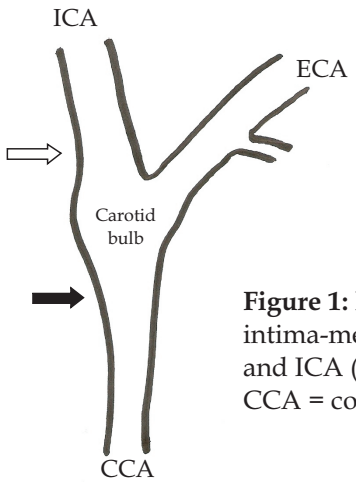

Figure 1: Points of measurements for diameter, intima-media thickness (IMT) in the CCA (black arrow) and ICA (grey arrow). ECA = External carotid artery; CCA = common carotid artery; ICA = Internal carotid artery.

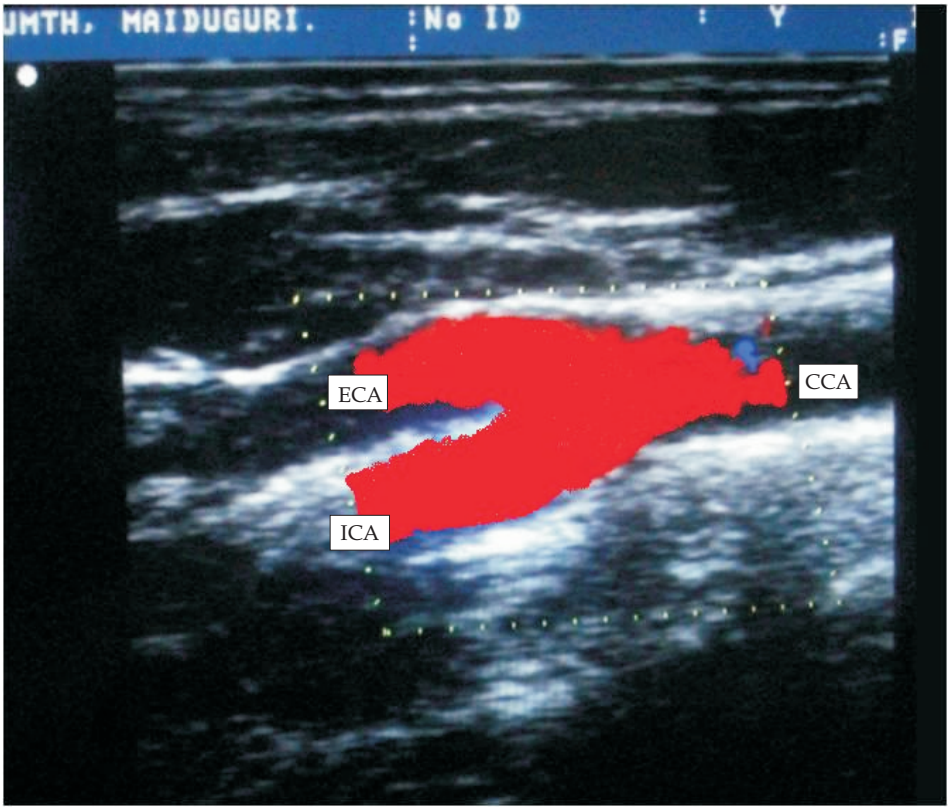

Figure 2: Colour Doppler image (longitudinal view) of the common carotid artery (CCA) and bifurcation into the internal carotid artery (ICA) and external carotid artery (ECA).

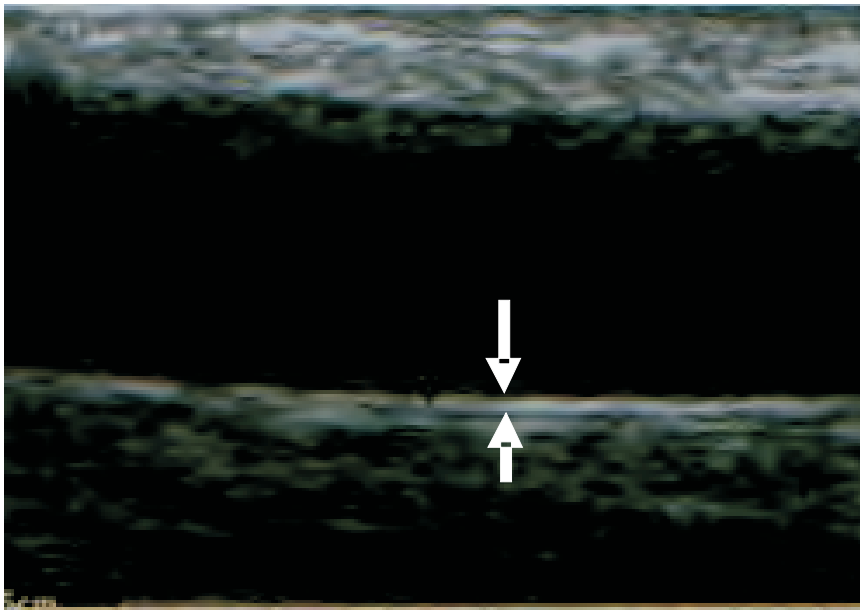

Figure 3: Gray-scale ultrasonography of CCA (longitudinal view) showing point of measurement for IMT.

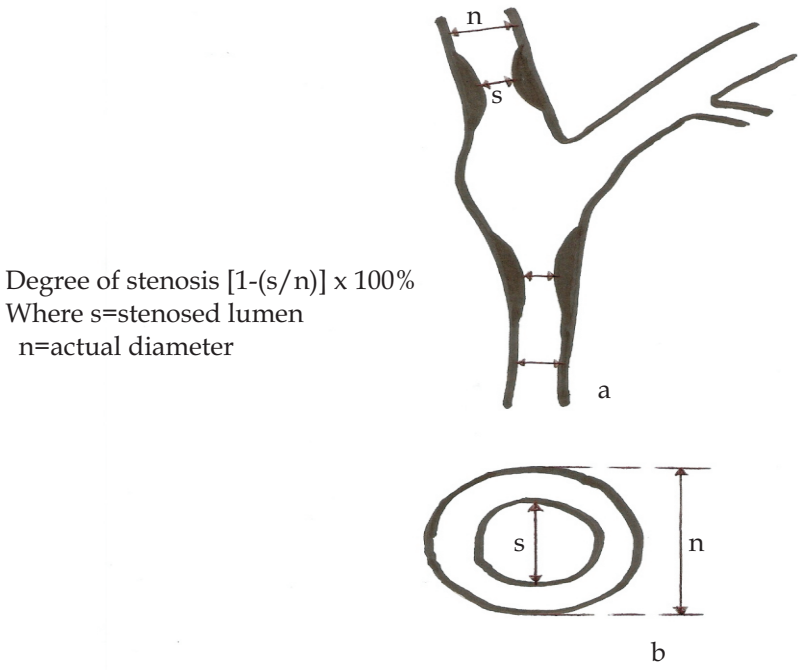

Figure 4: Method for calculating the degree of stenosis in the carotid arteries adapted from Tola *et al*[41] and NASCET[42].

Statistical analysis: The data obtained from the structured data sheet were processed and analysed using the Statistical Package for the Social Sciences (SPSS) for Windows® version 16.0 (SPSS Inc; IL, USA). The results were summarized and expressed as mean ± standard deviation (SD) and presented in the form of tables, graphs and charts as appropriate.

Statistical significance was assessed using Students t-test (2-tailed) to compare the mean carotid artery intima-media thickness between the genders in the population studied. Correlation between percentage degrees of stenosis with intima-media thickness (IMT) was evaluated using Pearson's correlation test. P-value of ≤ 0.05 was considered statistically significant.

Ethical consideration: This study was conducted with adherence to ethical standards. Informed written consent was obtained from the subjects before enlistment into the study. Approval to carry out the study was obtained from the Ethical Committee of the University of Maiduguri Teaching Hospital. The subjects were informed of the safety of ultrasound scan and could withdraw from the study at any stage without consequences. The data collected from the participants were recorded serially and kept with utmost confidentiality according to medical practice.

RESULTS

A total of 120 adult diabetic patients aged 20 years and above were enrolled into this prospective cross-sectional hospital based study. Seventy two (60%) were males and forty eight (40%) were females (Figure 5).

The age range was 20 - 78 years with a mean (±SD) of 50.03±11.4 years. The mean age for males was 51.97±10.39 years, while for females was 47.10±11.70 years. The predominant age group in both sexes was 40 – 49 years (35% of the total sample size) with the males having the highest frequency of 24 patients in that age group (20% of the study population). The modal age group for the study was also 40 – 49 years totalling 42 patients (35% of the total sample population) as shown in table 1.

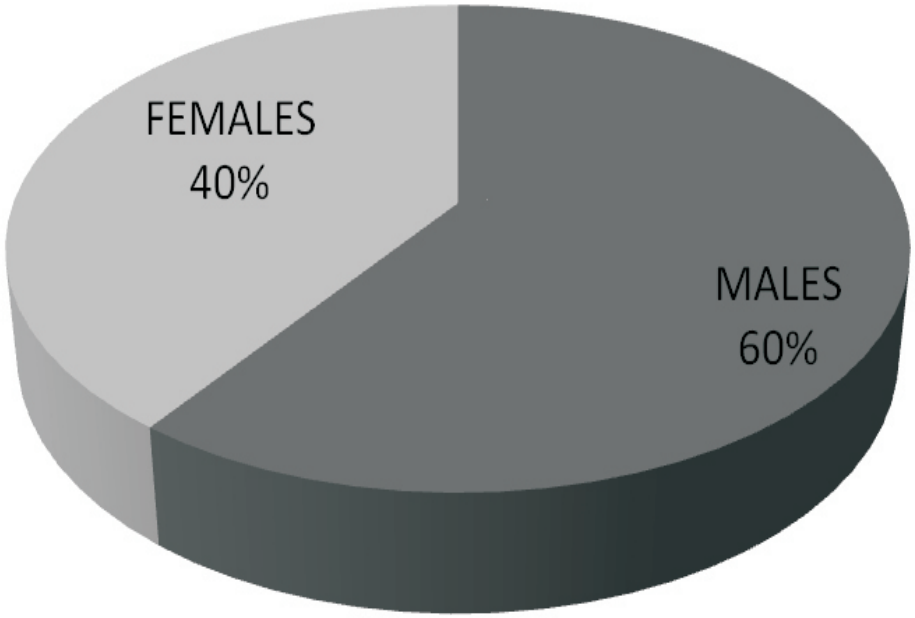

Figure 5: Pie-chart showing sex distribution of the study population

Table 1: Age-Sex Distribution pattern of study population

Age group (Years)	Males n (%)	Females n (%)	Total N (%)
20-29	2 (1.7)	4 (3.3)	6 (5.0)
30-39	9 (7.5)	9 (7.5)	19 (15.0)
40-49	24 (20.0)	18 (15.0)	42 (35.0)
50-59	19 (15.8)	10 (8.3)	29 (24.1)
60-69	14 (11.7)	5 (4.2)	19 (15.9)
70-79	4 (3.3)	2 (1.7)	6 (5.0)
Total	**72 (60)**	**48 (40)**	**120 (100)**

N = Sample population

The mean intima-media thickness (IMT), in millimeters (mm) of carotid arteries in the different age groups of males and females studied is shown in table 2. Forty-two diabetic patients (35% of the study population) in their 5th decade were observed to have the highest mean IMT; RCCA (0.95±0.24mm), LCCA (0.91±0.20mm), RICA (0.92±0.19mm), LICA (0.89±0.19mm) for the males, and RCCA (0.92±0.85mm), LCCA (0.90±0.77mm), RICA (0.90±0.66mm), LICA (0.89±0.58) for the female patients in that age group.

Observed mean IMT values in males were higher than their female counterparts in the same age group. Right carotid arteries had higher mean IMT than the left, although these differences in mean IMT between the right and left were not statistically significant (p=0.07).

Table 2: Age distribution pattern of intima-media thickness (IMT) in carotid arteries of diabetic patients

IMT mean±SD (mm)	20-29 yrs.	30-39 yrs.	40-49 yrs.	50-59 yrs.	60-69 yrs.	70-79 yrs.	Total
RCCA	0.77±0.09	0.75±0.07	0.95±0.24	0.90±0.16	0.88±0.17	0.86±0.06	0.85±0.13
Males	0.65±0.03	0.73±0.07	0.92±0.85	0.80±0.06	0.81±0.01	0.85±0.28	0.79±0.22
Females							
LCCA	0.75±0.10	0.73±0.11	0.91±0.20	0.89±0.18	0.88±0.20	0.84±0.09	0.83±0.15
Males	0.64±0.05	0.72±0.09	0.90±0.77	0.80±0.10	0.80±0.12	0.84±0.25	0.78±0.23
Females							
Total (N)	6	18	42	29	19	6	120
RICA	0.73±0.03	0.73±0.12	0.92±0.19	0.87±0.21	0.88±0.30	0.89±0.05	0.84±0.15
Males	0.60±0.04	0.70±0.12	0.90±0.66	0.72±0.14	0.80±0.21	0.81±0.13	0.76±0.22
Females							
LICA	0.65±0.07	0.72±0.11	0.89±0.17	0.85±0.18	0.88±0.26	0.89±0.08	0.81±0.15
Males	0.60±0.12	0.65±0.33	0.89±0.58	0.71±0.20	0.79±0.50	0.80±0.38	0.74±.035
Females							
Total (N)	6	18	42	29	19	6	120

SD = Standard deviation; **RCCA=** Right common carotid artery; **LCCA=** Left common carotid artery; **RICA=** Right internal carotid artery; **LICA=** Left internal carotid artery; **N=** Sample population.

Tables 3 show that a total of 480 carotid arteries belonging to 120 diabetic patients were studied (120 arteries each for RCCA, LCCA, RICA, and LICA) out of which 301 carotid arteries (62.7%) were normal (0% stenosis) and 179 (37.3%) were stenotic. The males had 110 (22.9%) stenotic carotid arteries while the females had 69 (14.4%) stenotic carotid arteries. The highest percentage stenosis was observed in LICA of a male patient. The observed range of percentage stenosis in common carotid arteries was 0 – 36% and 0 – 72% in the internal carotid arteries.

In total, 75 patients (62.5% of study population) had no stenosis in their carotid arteries; 38 (31.7%) had <50% stenosis in their carotid arteries; 6 (5.0%) had 50-69% stenosis of carotid arteries; and 1 (0.8%) had >70% stenosis in his carotid artery (LICA). Hence, the total number of diabetic patients with varying degrees of carotid artery stenosis observed in the present study was 45 (37.5% of total study population).

Table 3: Frequency pattern of degree of stenosis in the carotid arteries of diabetic patients

Percentage degree of stenosis	Normal (0%)	<50%	50-69%	≥70%
RCCA Males	45 (37.5%)	27 (22.5%)	-	-
Females	31 (25.8%)	17 (14.2%)	-	-
LCCA Males	44 (36.7%)	28 (23.3%)	-	-
Females	30 (25%)	18 (15%)	-	-
RICA Males	44 (36.7%)	18 (15%)	10 (8.3%)	-
Females	30 (25%)	10 (8.3%)	8 (6.7%)	-
LICA Males	45 (37.5%)	15 (12.5%)	11 (9.2%)	1 (0.8%)
Females	32 (26.7%)	13 (10.8%)	3 (2.5%)	-

RCCA= Right common carotid artery; **LCCA=** Left common carotid artery;
RICA= Right internal carotid artery; **LICA=** Left internal carotid artery

Table 4 and figures 6 and 7 show the relationship between percentage degree of carotid artery stenosis with intima-media thickness (IMT) of the patients studied.

Positive and significant correlations were observed between the percentages degree of stenosis of carotid arteries with IMT (r=≥+0.5; p=<0.05) and flow velocities (r=≥ +0.5; p=<0.05) of carotid arteries with <50% and 50-69% stenosis. However, no significant correlations were noted in carotid arteries with no stenosis (normal) and ≥70% stenosis.

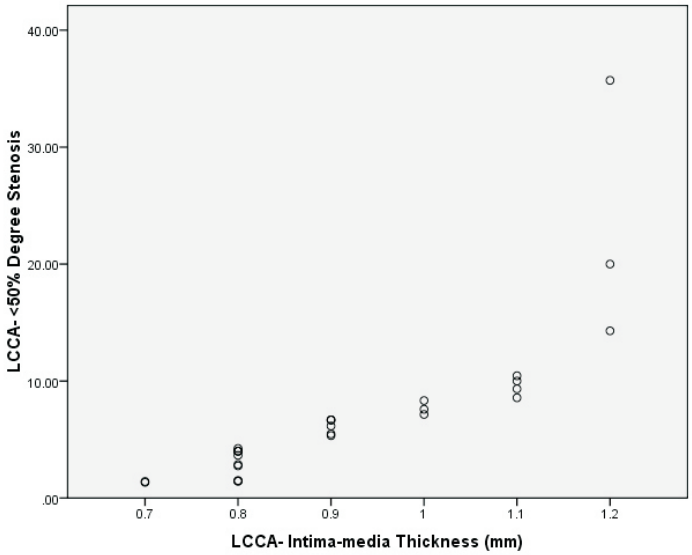

Figure 6: Scatter diagram showing a positive correlation between degree of stenosis and intima-media thickness in LCCA of diabetic patients with <50% degree stenosis.

Table 4: Correlation between intima-media thickness (IMT) and percentage degree stenosis in the carotid arteries of diabetic patients

IMT mean±SD (mm)	Normal (0%)	<50%	50-69%	≥70%
RCCA Males	0.76±0.08	0.92±0.18	-	-
Females	0.66±0.09	0.76±0.16	-	-
	r= -/-	*r= +0.773 / +0.885*	-	-
	p= -/-	*p= 0.000 / 0.000*		
LCCA Males	0.75±0.07	0.92±0.25	-	-
Females	0.64±0.08	0.73±0.12		
Males / Females	*r= -/-*	*r= +0.804 / +0.877*	-	-
Males / Females	*p= -/-*	*p= 0.000 / 0.000*		
Total (RCCA+LCCA)	76 + 74 = 150	44 + 46 = 90	-	-
RICA Males	0.76±0.08	0.84±0.10	1.17±0.11	-
Females	0.66±0.07	0.77±0.12	1.14±0.08	
Males / Females	*r= -/-*	*r= +0.952 / +0.811*	*r= +0.898 / +0.903*	-
Males / Females	*p= -/-*	*p=0.000 / 0.004*	*p=0.000 / 0.002*	
LICA Males	0.73±0.07	0.82±0.09	1.12±0.17	1.40±0.00
Females	0.65±0.10	0.76±0.14	1.07±0.12	-
Males / Females	*r= -/-*	*r= +0.931 / +0.813*	*r= +0.903 / +0.939*	*r= -/-*
Males / Females	*p= -/-*	*p= 0.000 / 0.001*	*p= 0.000 / 0.02*	*p= -/-*
Total (RICA+LICA)	74 + 77 = 151	28 +28 = 56	18 + 14 = 32	0 + 1 = 1

SD= Standard deviation; **RCCA=** Right common carotid artery; **LCCA=** Left common carotid artery; **RICA=** Right internal carotid artery; **LICA=** Left internal carotid artery; *r*= Correlation factor; *p*=P value

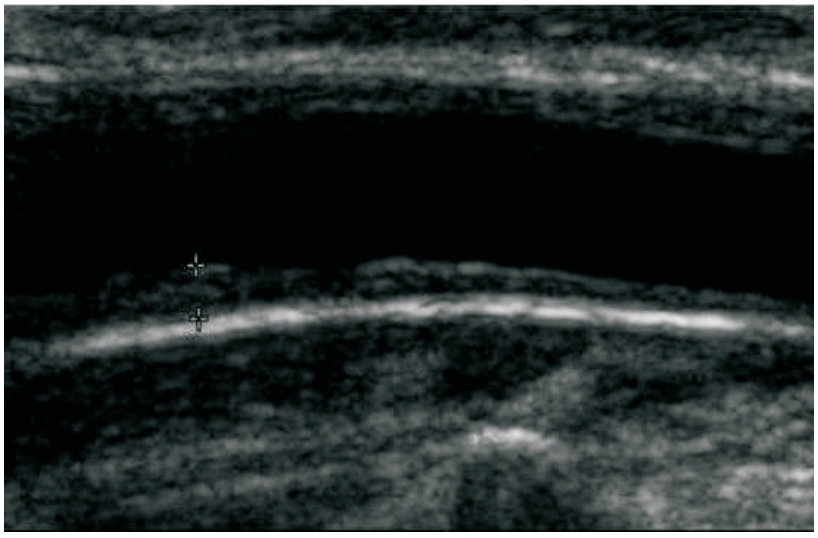

Figure 7: B-mode gray scale longitudinal sonogram showing thickened intima-media complex measuring 1.2mm in the common carotid artery.

DISCUSSION

Carotid arteries have been observed to be among the vessels that are prone to develop overt atherosclerotic lesions in the presence of risk factors such as diabetes mellitus and hypertension[43]. The findings of the present study have shown that diabetes mellitus is associated with carotid artery stenosis and that ultrasonography is a useful tool in the evaluation of these arteries in diabetic patients. Adekanmi *et al*[44] have also observed that the diagnostic value of CDUS in detecting early carotid artery lesions that may progress to CVD is important when it comes to determining the degree of carotid artery stenosis and the approach to managing such cases.

This study revealed that of the 120 diabetic patients studied aged 20 years and above with a mean age of 50.02±11.4 years, a large proportion was found in the age range of 40-49 years (35% of study population). The preponderance of middle aged population in this study was because of the fact that majority of people with type 2 diabetes in developing countries are in that age group range. Moreover, most of the diabetic patients attending the endocrinology clinic in the study centre fall within that age group. In addition to this fact, Sara *et al*[45] in their study on the global prevalence of diabetes have also documented the increasing incidence of diabetes in these age groups due to population growth, urbanization, increasing prevalence of obesity and physical inactivity. They also reported that data on diabetes in the younger age group is limited.

Although there is paucity of literature regarding the normal values for intima-media thickness (IMT) in Nigerians and Africans in general, this study has observed that the overall mean carotid IMT in diabetic patients in the non-stenotic right and left carotid arteries were (CCA=0.71±0.09mm and 0.70±0.08mm; ICA=0.71±0.08mm and 0.69±0.09mm) respectively.

The stenotic carotid arteries mean IMT on the right and left were (CCA=0.84±0.17mm and 0.83±0.12mm; ICA=0.98±0.10mm and 1.03±0.10mm). The IMT means from the present study were higher when compared with previous studies in normal subjects where the range of carotid IMT was found to be from 0.2mm to 0.7mm[36,43,46-48]. The present study found the range of IMT for the carotid arteries to fall between 0.5mm to 1.3mm. In a related study amongst type-2 diabetic patients in Japan by Naomi *et al*[49], it was also reported that carotid artery IMT was significantly greater in diabetic patients than non-diabetic patients. Handa *et al*[6] have also defined carotid atherosclerosis as an IMT measurement of >1.0mm. Mean IMT of >1.0mm was also observed in the present study. Brian[39] also stated that CCA IMT of >0.87mm and ICA IMT >0.90mm are associated with progressively increased risk of cardiovascular events.

It was also observed, in the present study, that the overall non-stenotic (normal) IMT values in males (CCA=0.76±0.09mm; ICA=0.75±0.10mm) were higher than the ones found in females (=0.61±0.15mm; ICA=0.65±0.10mm). This difference in IMT between the sexes studied was statistically significant. These observations were in conformity with the findings in previous studies[36,49]. However, Huseyin *et al*[50] stated that there was no significant difference between the sexes with respect to IMT.

The present study has also observed that percentage degree of stenosis correlated positively and significantly with IMT ($r=\geq 0.5$; $p=<0.05$) of carotid arteries in both males and females. These findings corroborated with those of other workers who reported on carotid atherosclerosis[1-3,11,13,19,28,51].

The report by the Society of Radiologists in Ultrasound (SRU) Consensus Conference in 2003[38,39] regarding the grading of degree of carotid artery stenosis has made the following statements: the degree of stenosis determined

at gray scale and Doppler ultrasonography should be stratified into the categories of normal (no stenosis), <50% stenosis, 50-69% stenosis, ≥70% stenosis to near occlusion, near occlusion, and total occlusion. The SRU also added that ICA is normal when its peak systolic velocity (PSV) is less than 125cm/sec and no plaque or IMT thickening is visible; (ii) <50% stenosis when ICA PSV is less than 125 cm/sec and plaque or intimal thickening is visible; (iii) 50%–69% stenosis when ICA PSV is 125–230 cm/sec and plaque is visible; (iv) ≥ 70% stenosis to near occlusion when ICA PSV is greater than 230 cm/sec and visible plaque and lumen narrowing are seen; (v) near occlusion when there is a markedly narrowed lumen at colour Doppler US; and (vi) total occlusion when there is no detectable patent lumen at gray-scale US and no flow at spectral, power, and colour Doppler ultrasonography.

Doppler spectral observations made in the present study were unremarkable as majority (62.5%) of the patients with stenotic carotid arteries clustered around <50% stenosis and few (5.0%) had 50-69% carotid stenosis. Flow velocity findings were more sensitive for displaying carotid stenosis on the Doppler waveforms. In addition, some studies have shown that spectral broadening and filling of the window under the spectrum are subjective especially in carotid stenosis of <50%[7,11,13,16,42,52]. Moreover, carotid stenosis usually begins to show remarkable spectral waveform changes from turbulent blood flow when the stenosis exceed 70%.[13, 16]. This was evident in this study as only the male patient with 72% degree stenosis of the LICA had moderate spectral broadening in his Doppler waveform with evidence of increased flow velocities (PSV=390.0cm/sec; end diastolic velocity; EDV=115.0cm/sec).

The present study adopted the stratification of carotid artery stenosis given by SRU because of its simplicity and suitability to the present study. It was observed that a total of 75 patients (62.5% of study population) had no stenosis in their carotid arteries; 38 (31.7%) had <50% stenosis in their carotid arteries; 6 (5.0%) had 50-69% stenosis of carotid arteries; and 1 (0.8%) had >70% stenosis in his carotid artery (LICA).

The observed prevalence of carotid stenosis in the present study was found to be 37.5% of the total study population. In a retrospective study using CDUS by Razzaq *et al*[53] in 45 diabetic patients diagnosed of stroke, they found carotid artery stenosis >50% in 31% of their study population. Noor *et al*[54] in their study of 100 patients with ischaemic infarction found 44% of the patient to be diabetic and that 56% of the diabetic patients in their study had carotid artery stenosis as detected by CDUS.

The present study and those of previous researchers[27,53] have, therefore, shown that diabetic patients are prone to develop carotid artery atherosclerosis that may be a cause of stenosis in these arteries. Hence, the clinical value of DUS as an imaging modality in the management and prevention of cerebrovascular diseases, especially in diabetics, is indispensable. Therefore, the ability to quickly and efficiently identify carotid stenosis in patients at risk, using DUS is of clinical importance. Identification of potentially treatable carotid stenosis enables selection and appropriate placement of patients for stent implantation or carotid endarterectomy.

CONCLUSION

This study has shown that carotid duplex ultrasonography (CDUS) is an important imaging modality for early detection of carotid artery stenosis in diabetic patients who are at risk for developing carotid atherosclerosis. CDUS has established its role in screening and diagnosis of carotid artery disease because of its safety, low cost, and accuracy in detecting carotid artery disease. The findings of this study have substantial implications for clinical

practice and public health especially with regards to cerebrovascular disease prevention in diabetic patients. The study has, therefore, provided useful baseline data on which subsequent radiological and clinical interventions may be based.

RECOMMENDATIONS

1. Multi-centred approach to the study is essential to validate the values and to help in establishing standard reference values for carotid artery dimensions in this environment.
2. Carotid Duplex ultrasonography is a norm for patients with diabetes, hypertension, and other diseases considered to be risk factors for cerebrovascular disease (CVD) in other centres. It should, therefore, be made mandatory as a screening tool in diabetic patients especially in those suspected of having features of CVD.
3. Carotid Duplex ultrasonographic studies should be considered in the future in other patients with risk factors for stroke especially hypertensive and sickle cell disease patients in this environment.

LIMITATIONS OF THE STUDY

1. Physical challenges such as a short muscular neck and high carotid bifurcation. This was minimized by asking such patients to extend their neck as high as comfortably possible.
2. Occasionally there was difficulty in adequate visualization of the carotid arteries in obese patients. Improved visualization was made possible by use of higher frequency transducer.
3. Because of the long duration of examining each carotid artery, some of the patients tend to be uncooperative while being scanned or as they wait for their turn to be scanned. In such cases adequate counselling as regards the importance of the outcome of the study to the management of diabetics was highlighted to such patients.
4. There was no previous study for validating the measurements of the carotid arteries in this environment.

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ORIGINAL ARTICLE

ANALYSIS OF MATERNAL DEATHS IN SOUTHERN N'DJAMENA DISTRICT HOSPITAL (CHAD)

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ABSTRACT

Background: The maternal mortality ratio in Chad is 1099 per 100,000 live births. According to the WHO, 80% of the maternal deaths are preventable if appropriate measures were taken. **Objective:** to determine the proportion of preventable deaths and to identify the elements linked to maternal death in N'Djamena south District Hospital. **Materials and Methods:** This was a retrospective, descriptive study spanning over two years, from January, 1st 2013 to December, 31th 2014 carried out in N'Djamena South District Hospital concerning analysis of maternal deaths in southern N'Djamena district. All patients that died during the pregnancy or within 42 days post-partum in N'Djamena south district hospital during this survey were included. **Results:** During this survey, we recorded 52 maternal deaths for 7439 deliveries giving a maternal death rate of 699 per 100,000 deliveries.The age group between 25-29 years was the most represented with 34.6%.The majority of patients (73.1%) were referred and 48 patients (92.3%) had less than 4 prenatal consultations. The causes of maternal deaths were dominated by: delay seeking medical care, delay in accessing health facilities, and the delay in accessing efficient care .Obstetrical pathologies (direct causes) were responsible for 92.3% of deaths, these pathologies were: hemorrhage, eclampsia, abortion and infections. In 07.7% indirect causes were noted. Twenty five patients (48.2%) received medical care within 30min-1h after diagnosis. **Conclusion:** The maternal death remains a public health problem that persists in Chad. Its reduction requires the removal of delays.

KEYWORDS: Maternal, Deaths, Southern N'Djamena.

INTRODUCTION

More than 90% of maternal deaths worldwide occur in sub-Saharan Africa (SSA) and south Asia. These high maternal and associated neonatal mortality rates persist despite considerable efforts from the World Health Organization, governments, development partners, and others[1,2,3]. The majority of these deaths are related to pregnancy complications that are inadequately managed because of lack of access to emergency health care. The maternal mortality ratios (MMRs) of Sweden, the United Kingdom, and the United States are 4, 12, and 21 per 100,000 live births, respectively, whereas those of Chad, Nigeria, and Congo are 1099, 630, and 540 respectively. In SSA, the major direct causes of maternal mortality are haemorrhage, pre-eclampsia/eclampsia, obstructed labour, and sepsis[4, 5]. Maternal death is the death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management but not from accidental or incidental cause[6]. According to the WHO, 80% of the maternal deaths are preventable if appropriate measures were taken[7]. Nowadays, the concept of preventability of maternal death is in the front burner, since it allows establishing a link between the population health and the functioning of the health system [7]. The objective of this study was to determine the proportion of preventable deaths and to identify the elements linked to maternal death in N'Djamena south District Hospital.

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MATERIALS AND METHODS

Place and period of study: This was a retrospective, descriptive study for two years, from January, 1st 2013 to December, 31th 2014 carried out in N'Djamena South District Hospital concerning analysis of maternal deaths in southern N'Djamena district hospital.

The South district hospital in N'Djamena is a level II hospital located in N'Djamena city, which is surrounded by 13 health centers. These health centers often refer patients to N'Djamena south district hospital for better care.

All patients that died during the pregnancy or within 42 days post-partum in N'Djamena south district hospital during this survey period were included.

Variables studied: epidemiological variables (maternal age, mode of admission, parity, and prenatal care), clinical variables (time between diagnosis and treatment, causes of maternal death, type of care, and cause of delay. The data were analyzed by the software SPSS.18 (SPSS, Inc, IL, and Chicago). P value < 0.05 is considered significant.

RESULTS

Frequency

Between January, 1st 2013 to December, 31st 2014 , there were 52 maternal deaths among the 7439 deliveries, giving an overall maternal mortality ratios (MMRs) of 699 per 100,000 deliveries. Among the cases of maternal deaths, 43 were preventable giving a rate of 82.5%.

Table 1 shows the age and parity of the patients studied. The age group between 25-29 years was the most represented with 34.6%. The average age was 28.6 years, with the extremes ranging from 16 to 45 years.

The majority of patients (73.1%) were referred. This difference was statistically significant (p = 0.008). These patients were referred from health centers. The prenatal consultations were not adequate with 48 patients (92.3%) that had less than 4 prenatal consultations (PNC). More than the half of patients (57.7%) hadn't had PNC. Only four patients (07.7%) had made at least 4 PNC (p = 0. 001).

Table 1: Age and Parity

Patient characteristics	**Number**	**%**
Age (years)		
< 20	04	07.7
20-24	10	19.2
25-29	18	34.6
30-34	11	21.2
35-39	07	13.5
≥40	02	03.8
Parity		
primiparous	21	40.4
Pauci para	27	51.9
multiparous	04	07.7
Admission mode		
Referreed	38	73.1
Non referred	14	26.9
Number of prenatal consultation		
0	30	57.7
1-3	18	34.6
≥4	04	07.7

Table 2 shows the obstetrical causes of maternal death. For the majority of deaths (n = 48/52, i.e. 92.3%), the direct causes had been incriminated. But in four cases (07.7%) the indirect caused had been found.

The direct causes found in this survey were: hemorrhage, eclampsia, abortion and infections. Among the direct causes of the maternal death, hemorrhage was the leading cause of death with 34 cases / 52 (65.4%). The eclampsia was incriminated in 13.5% of deaths. Three cases (05.8%) of death due to the malaria were encountered in this study (indirect cause).

Except cardiopathy (01.9%), other maternal deaths were preventable if efficient measures have been taken during antenatal consultation or labour.

Table 2: Obstetrical causes of maternal death

causes of maternal death Number	**Number**	**%**
Hemorrhage of the first trimester		
Abortion	05	09.7
Ruptured ectopic pregnancy	03	05.8
Hemorrhage of the third trimester		
Placenta prævia	03	05.8
Abruption placenta	05	09.7
Uterine rupture	02	03.8
Hypertension and complications		
Eclampsia	07	13.5
Hypertension	02	03.8
HELLP	02	03.8
Post-partum hemorrhage		
third stage bleeding	13	25
Cervical tear	01	01.9
Clot disorder	02	03.8
Other causes		
Infection	02	03.8
Pulmonary embolism	01	01.9
Malaria	03	05.8
Cardiopathy	01	01.9

Table 3: Time for seeking care

time for seeking care	Number	%
≤30mn	05	09.6
30mn-1h	25	48.2
1h-1h30mn	10	19.2
1h30mn-2h	06	11.5
>2h	06	11.5
Total	52	100

Table 3 shows the time for seeking care. Twenty five patients (48.2%) received medical care within 30mn-1h after diagnosis. Six patients (11.5%) were cared > 2 h after diagnosis. This difference was statistically significant (p = 0. 006). Thirty minutes is considered acceptable time interval between diagnosis and treatment.

Table 4 shows the reason for delays in care. The causes of maternal death in African countries are dominated by three delays: delay for deciding to resort for medical care, delay for accessing health facilities, and the delay for accessing efficient care. These 3 delays were encountered in this survey with 18 cases of death (34.6%) due to the lack of blood product and 12 cases of death (23.1%) due to a late reference. The lack of medicine and the family refusal had represented respectively 15.4% and 13.5%.

Table 4: Reasons for delays in care

Reasons for delays in care	Number	%
Lack of medicines	08	15.4
Accessibility to health facilities	02	03.8
Family refusal	07	13.5
Lack of blood product	18	34.6
Late reference	12	23.1
Delay in decision to resort to medical care	05	09.6
Total	52	100

Table 5: Treatment instituted before maternal death

Treatment	**Number**	**Percentage**
Medical		
Blood transfusion	10	19.2
Colloid/crystalloid	18	34.6
Uterotonic	13	25
Antibiotic	14	26.9
steroid	02	03.8
Héparine	01	01.9
Anti malaria drug	03	05.7
Anti hypertension	05	09.6
Obstetrical/surgical		
Suture of tear	01	01.9
Manual vacuum aspiration	05	09.6
Caesarean section	1	01.9
Laparotomy	1	01.9

Table 5 shows the treatment instituted before maternal death. In our health facilities, the management of patients often focuses on the treatment of bleeding, those of hypertension and its complications, abortions and infections. Thus, for the management of hemorrhage, the infusion of colloid / crystalloid was administered in 18 cases (34.6%) associated with 19.2% of the blood transfusion.

In order to ensure the uterine contraction 25% of patients had received utero tonic agents. Antibiotics were instituted in 26.9%

DISCUSSION

The preventable maternal deaths designate the premature deaths that should not occur if effective and preventive care is instituted. In this survey 82.5% of maternal deaths due to obstetric complications were preventable. Lansac [8] in 2006 in France had reported 80%, in Benin Zaisonou[7] had observed 74% of preventable maternal death .According to WHO, the majority of maternal deaths are preventable because medical solutions to prevent or manage the complications are known[9]

Our rate could be explained by the fact that the N'Djamena South District Hospital receives patients referred from health centers. These patients mostly coming from rural areas, poor and don't attend prenatal consultation. WHO reports that the factors which prevent women from receiving or soliciting care during pregnancy and childbirth are: poverty, long distance, lack of information, inadequate services, and cultural practices[9]. These findings are collobarated by our study.

The main obstetrical complications responsible for maternal mortality in this survey were dominated by bleeding 65.4%, followed by 13.5% eclampsia. Our proportions contrast with those reported previously by Kaimba[10] and Bukar[11] that noted that Preeclampsia/eclampsia.

was the leading cause of the maternal death with respectively 31.2% and 32.1%Through literature, many authors such as Alihonou[12] Dellagi[13] and Memadji[14] reported that bleedings are the leading cause of maternal death.

The high rate of maternal deaths due to the hemorrhage noted in this survey can be explained on one hand by the poor monitoring of pregnancy and on the other had by the important number of referred patients. The prenatal consultations are an opportunity to screen the complications of pregnancy, the lack of which expose women to obstetrical complications.

The delay in accessing health facilities or access to efficient care had represented 48 cases (73.07%). Among these cases, the lack of blood product and the delay of reference encountered respectively in 18 cases, (34.6%) and 12 cases (23.1%). the unavailability of blood product occurred is due to lack of the stock of the blood product in N'Djamena south district hospital. This situation is experienced by all health structures in N'Djamena city. The one functional blood bank located at the General Hospital National reference does not often answer at all requests for blood products.

The care of patients was prevented by family refusal in 07 cases (13.5%). This behavior of the families to refuse the gestures provided by health workers aiming to save their parents is variously experienced worldwide. Thus Djanhan [15] in Ivory Coast and Mukendi[16] Congo DRC had reported respectively 41.4% and 34.4% of family refusal. Lansac [8] noted a similar rate than ours with 13.7%.

In Chad family refusal for medical care can be explained by lack of information. For many persons, the surgical treatment and the blood transfusion are synonymous of fatal situation. Thus some families prefer to resort to traditional medicine.

The care given was mainly concerned with the treatment of bleeding. The infusions of colloid / crystalloid were performed in 18 cases (34.6%). In order to ensure uterine contraction, 25% of patients had received uterotonics. Ten patients, 19.2% were transfused. Our practice is similar to that recommended by the National College of French Gynecologist and obstetrician[17,18].

Despite the emergency and some cases of family refusal, the time for caring had varied from ≤ 30 minutes to > 2 hours. Thus, 25 patients (48.2%) were cared within 1h 30mn-after diagnosis and 6 patients 11.5% were cared within> 2 h. The rapid care or the decisions to accept medical care seem to be elements improving that could improve maternal prognosis. WHO in 2008 had reported that in cases of hemorrhage, the maternal death can occur within 2 hours.

Conclusion

Maternal death remains a public health problem that persists in Chad and in other developing countries, despite the preventability of some contributing factors incriminated. The reduction of its rate requires the removal of the three delays, the improvement of medical staff skills to prevent or manage the obstetrical complications.

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ORIGINAL ARTICLE

MALARIA PARASITAEMIA AMONG HIV POSITIVE PREGNANT WOMEN ON INTERMITTENT PREVENTIVE THERAPY ATTENDING A TERTIARY HEALTH CARE CENTRE IN KANO

TAKAI IU, RAHILA G, IBRAHIM AS

ABSTRACT

Background: The use of 3 doses of intermittent preventive therapy (IPT) for malaria among HIV positive pregnant women is an ante-natal preventive measure for malaria. **Objectives:** The study is aimed at determining the prevalence of malaria parasitaemia and clinical malaria among HIV positive antenatal clinic attendees who had intermittent preventive therapy for malaria. **Materials and Methods:** This was a one year retrospective study of HIV positive pregnant women in Aminu Kano Teaching Hospital, Kano, who had antenatal care between 2nd January and 31st December, 2013. Information such as parity, gestational age at booking, number of IPT given, previous malarial treatment and results of blood smear for malarial parasites, were obtained and analysed. **Results:** A total of 1800 women had antenatal care over the study period, out of which 110 were HIV positive, giving a sero-prevalence rate of 6.1%. Up to 55.5% of them booked at gestational age of 16-20weeks. Ninety women (81.8%) had 3 doses of sulphadoxine-pyrimethamine (SP) for IPT. Thirty eight women (34.5%) had positive smear for malarial parasites, with 68.4% occurring among the primigravidae at 16-20 weeks of gestation in 60.5%. Thirty four (30.9%) women were treated for clinical malaria. Thirteen of them (38.2%) had recurrence with 9 (60.2%) occurring in primigravidae. **Conclusion:** The prevalence of malarial parasitaemia is high despite the use of 3 doses of SP for IPT. The prevalence and recurrence was higher in primigravidae. Other means to support drug preventive measures should be stressed.

KEYWORDS: Malarial parasitaemia, HIV positive, Pregnant women

INTRODUCTION

Malaria occurs mostly in poor, tropical and subtropical areas of the world including Nigeria and imposes substantial costs to both individuals and governments.[1] It is one of the most severe public health problems worldwide and a leading cause of death and disease in many developing countries, where young children and pregnant women are the groups most affected.[1] Because of the changes in women's immune systems during pregnancy and the presence of a new organ (the placenta) with new places for parasites to bind, pregnant women lose some of their immunity to malaria infection.[1,2] In addition to acute disease and deaths,[1] malaria also contributes significantly to maternal anaemia during pregnancy and adverse birth outcomes such as spontaneous abortion, stillbirth, premature delivery, and low birthweight.[2]

Each year, 25 to 30 million pregnancies in the sub-Saharan region are at high risk of these adverse consequences of malaria, with the highest risks among women in their first and second pregnancies and in women who are HIV-positive.[2,3] Although both malaria and HIV/AIDS have distinct risk factors for transmission, the two diseases are associated

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with poverty and share similar determinants of vulnerability to infection. Many of these determinants are present in sub-Saharan Africa. Malaria and HIV/AIDS therefore overlap geographically and target the same vulnerable populations in this region.[1,4,5] Because of the high prevalence of malaria and HIV infection in the region, co-infection and interaction between the two diseases are very common.[1-4] In pregnant women, HIV infection has also been shown to impair the ability of pregnant women to control infection with Plasmodium falciparum. HIV-positive pregnant women are more likely to have detectable parasitaemia, higher malaria parasite densities, and develop clinical or placental malaria and malarial anaemia than HIV-negative pregnant women[1,3,6] Reports also suggest that antimalarial treatment failure may be more common in HIV-infected adults with low CD4-cell counts compared to those not infected with HIV.[2,6,7]

To prevent malaria in pregnancy, the World Health Organization (WHO) recommends that all women living in sub-Saharan Africa should promptly treat malaria using effective antimalarial, receive intermittent preventive treatment during pregnancy (IPTp) and use long lasting insecticide-treated nets (LLINs) every night.[5] IPTp entails administration of a dose of an effective antimalarial drug (currently sulfadoxine-pyrimethamine) to all pregnant women whether or not they are infected with the malaria parasite.[1,5] The high and deadly interaction between malaria and HIV makes the prevention of malaria in HIV-positive pregnant women a public health priority in our environment with high transmission levels. Since HIV increases the severity of malaria in pregnant women, it is important to evaluate the impact of IPTp. The aim of this study therefore is to determine the prevalence of malaria parasitaemia and clinical malaria among HIV positive antenatal clinic attendees who had IPTp for malaria. This will give an insight to the impact of IPTp in HIV-positive pregnant women in the context of the currently available IPTp packages in our centre with a view to proffering suggestions as appropriate.

MATERIALS AND METHODS

This was a one year retrospective study conducted in the Obstetrics and Gynaecology Department of Aminu Kano Teaching Hospital, Kano, among HIV positive pregnant women who had antenatal care in our centre and had IPTp with sulphadoxine-pyrimethamine (SP) from 2nd January to 31st December, 2013. The institutional ethics and research committee approved the study. The lists of all HIV positive pregnant women during the study period were compiled from the ANC central register and their folders retrieved from the central record office. Necessary information for the study such as age, parity, gestational age at booking, number of SP given, previous treatment for malaria and result of malarial parasite tests were obtained and recorded in a proforma for the study. Similarly, the total number of women that had antenatal care during the same period was obtained from the statistics office of the hospital. Two doses of IPTp with SP combination are routinely given to pregnant women at booking usually after 16weeks or after quickening and repeated 4 weeks from the 1st dose but before 36 weeks of pregnancy. HIV positive mothers however were given 3 doses of the IPTp.

Determine® and Uni-Gold® rapid diagnostic tests kits were used to determine HIV status[3]. Routine microscopic examination for malaria parasite testing is done for all HIV positive pregnant women at booking and during their subsequent follow ups and the women who are HIV negative but are symptomatic. A blood specimen is usually collected from the patient and sent to the microbiology/parasitology laboratory of the hospital for processing. Both thick and thin smears are usually done and field staining techniques with a Romanovsky stain or Leishmans stain (but most often Giemsa)[1], is performed and then examined

visually with a 100X oil immersion objective for malaria parasites and to differentiate (when possible) the various species. HIV positive pregnant women who had malarial parasite smear test were included in this study and those without malarial parasite smear test were excluded. The data collected were analyzed by simple statistical methods and results were presented in tabular form as frequencies and percentages.

RESULTS

A total of one thousand, eight hundred (1800) pregnant women booked for antenatal care over the study period, and one hundred and ten (110) women were HIV positive, giving a sero-prevalence rate of 6.1%. Table I describes the socio-demographic and reproductive characteristics of the women. All of them were married. The women were within the age range of 18- 43 years with more than half (50.9%) of them between the ages of 21-30years. Majority (67.3%) were multiparous. Sixty one women (55.5%) were Christians and 49(44.5%) were Muslims. Up to 34.7% of the women had tertiary education, 32.7% secondary school education, 14.5% with primary school education and 7.2% with Qur'anic education. Twelve (10.9%) women had no any form of education. Ninety one (82.7%) of the women booked in the second trimester, fifteen (13.7%) booked in the third trimester and only four (3.6%) booked in the first trimester.

Thirty eight (34.5%) of the women were smear positive for malaria parasites, out of which twenty six were in primigravidae accounting for 68.4%, and the remaining twelve were in multigravidae accounting for 31.6%, as depicted in table II.

Table III shows the number of women treated for clinical malaria. Thirty four (30.9%) women were treated for clinical malaria using artemesinin based combination therapy. Fifteen were primigravidae accounting for 44.1%, those with second to fourth pregnancy (11) accounted for 32.4%, and 8 (23.5%) were grand multipara. Thirteen women (38.2%) were treated for clinical malaria more than once with 9 (69.2%) occurring in primigravidae while 4(30.8) in multiparae.

The number of women who had three doses of sulphadoxine-pyrimethamine is shown on table IV. Ninety (81.8%) of the women had 3 doses of sulphadoxine-pyrimethamine for intermittent preventive therapy. Primigravidae accounted for the highest (40%) number of women who had the 3 doses.

Table 1: Socio-demographic and Reproductive Characteristics of the Women

Variables		Number	Percentage (%)
Age (years)	≤20	12	11.0
	21-30	56	50.9
	31-40	22	20.0
	≥41	20	18.1
Total		**110**	**100**
Booking Trimester	1	4	3.6
	2	91	82.7
	3	15	13.7
Total		**110**	**100**
Education	Primary	16	14.5
	Secondary	36	32.7
	Tertiary	38	34.7
	Qur'anic	8	7.2
	None	12	10.9
Total		**110**	**100**
Parity	1	36	32.7
	2-4	50	45.5
	≥5	24	21.8
Total		**110**	**100**
Religion	Islam	49	45.5
	Christianity	61	55.5
Total		**110**	**100**

Table 2: Number of women with malaria positive smear

GRAVIDITY	No. OF POSITIVE SMEAR	PERCENTAGE (%)
1	26	68.4
2-4	7	18.4
5 and above	5	13.2
TOTAL	**38**	**100**

Table 3: Number of women treated for clinical malaria

GRAVIDITY	No. OF WOMEN TREATED FOR CLINICAL MALARIA	PERCENTAGE (%)
1	15	44.1
2-4	11	32.4
5 and above	8	23.5
TOTAL	**34**	**100**

Table 4: Number of women who had 3 doses of Intermittent Preventive Therapy

GRAVIDITY	3 DOSES OF SULPHADOXINE-PYRIMETHAMINE	PERCENTAGE
1	36	40
2-4	30	33.3
5 and above	24	26.7
TOTAL	**90**	**100**

DISCUSSION

The seroprevalence of HIV was found to be 6.1%, and the prevalence of malaria parasitaemia was found to be 34.6% among the HIV positive women in this study despite using three doses of SP for IPTp in 81.8% during their antenatal period. This prevalence is in agreement with 33% found in a study conducted in Ibadan, south western Nigeria[8]. Our finding was however higher than the 11.4%[9], 8%[10], and 15.3%[11] reported from previous studies. The differences may probably be due to the fact that late booking for antenatal care in this study was high. The high low parity group and lower educational status recorded in this study might have also contributed to these differences. Similarly since pregnant women are routinely given folic acid supplementation to prevent neural tube defects in their infants[1], high doses of folic acid counteract the effect of SP.[1] Therefore, it is preferred that women take only the recommended 0.4 mg daily dose of folic acid.[1] In our centre, 5 mg of folic acid are used, which may affect optimal efficacy of SP for IPTp. It is recommended to withhold folic acid supplementation for two weeks after taking IPTp with SP.[1]

This information may not have been passed to all the pregnant women by their physicians during consultations. The endemic nature of malaria in our region[12], might have also accounted for the differences. Our result was however lower than a prevalence of 53.5% found in a study from Ogun state Nigeria.[13] This difference may be accounted in part by the rain forest nature of the zone which favours mosquito breeding area.

HIV infection in pregnancy appears to impair a pregnant woman's ability to resist malaria infection. The protection expressed by gravid women to malaria disappears when HIV co-exist with malaria.[14] This result in HIV positive pregnant women being more likely to develop malaria than HIV negative pregnant women, and also have rapid progression of their HIV infection during pregnancy[15]. Interaction between malaria and HIV in pregnancy is a possibility in increasing the risk of vertical transmission of HIV.[15] Dual infection, therefore, has detrimental effect on maternal and child survival. Thirty four (30.9%) women came up with clinical malaria and were treated. Twenty (18.1%) had recurrence and were treated more than once. The prevalence of clinical malaria was higher among HIV infected primigravidae accounting for 44.1%. This may be due to the fact that primigravidae are first exposed to pregnancy and their immunity is not well developed compared to

the multigravidae. This is in keeping with reports from the literature that the highest risks of clinical malaria and adverse consequences are higher among women in their first and second pregnancies and in women who are HIV-positive.[2,3,16]

Our value is however 2-times higher than the value reported from a similar study in Kano[17], and a randomized control study in Malawi.[18] This could probably be due to the fact that many pregnant women accept the practice of HIV screening antenatally over the years and the HIV positive pregnant ones accept the use of anti-retroviral therapy and PMTCT. This calls for a review of their malarial preventive measures, in order to control the high prevalence of malarial parasitaemia and clinical malaria recorded in this study. This therefore further strengthened the need to intensify antenatal health preventive talk and community awareness campaigns on these diseases in order to ensure compliance and to reduce feto-maternal morbidity and mortality.

The prevalence of malarial parasitaemia is high despite the use of 3 doses of SP for IPT. The prevalence of clinical malaria was higher in primigravidae. Strategies to reduce the malaria morbidity during pregnancy should be reinforced in our locality with high HIV sero-prevalence. This could probably be achieved by Directly Observed Treatment (DOT) for the doses since some patients may not take it at home, which will improve IPTp delivery and impact. Other means to support and strengthen drug preventive measures should also be stressed.

Our study is limited by its retrospective nature where some data may not be available for analysis and also we did not determine the pregnancy outcomes since HIV infection and parasitemia are important independent risk factors for pregnancy adverse outcomes. Further research in these regards is recommended.

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FACTORS THAT COULD INFLUENCE MEDICAL STUDENTS' CHOICE OF PSYCHIATRY AS A CAREER: A POTENTIAL OPPORTUNITY FOR IMPROVING MENTAL HEALTH CARE ACCESS IN NIGERIA.

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ABSTRACT

Background: Mental disorders are quite prevalent and cause significant burden and disabilities. The access of much of the world's population, especially in low and middle- income countries (LMICs), to mental health services is inadequate despite the enormous needs for those services. There is a potential opportunity in recruiting medical students to take up psychiatry as a career to ensure the future of mental health services delivery in Nigeria. This study examines the factors that determine the choice of specialty, especially psychiatry, with the aim of improving mental health care delivery. **Materials And Methods**: A cross-sectional study of medical students from the University of Maiduguri to determine factors that affect their career choices with special emphasis on psychiatry. **Results**: Participants in the study were 117 students mean age of 26years ± 2.9 SD. Majority were males (66.7%). Most were fifth year students (83.8%). All participants said they would specialize and some of the factors they would consider were "sheer interest" and clinical man-hours required in 41.9% and 23.1% respectively. Obstetrics and gynecology (O&G) had the highest number of prospective specialists followed by Surgery, Internal medicine, and Pediatrics in 27.4%, 22.2%, 15.4%, and 12.8% respectively. Laboratory medicine and Psychiatry, respectively, trailed with 6.0% and 5.1%. Most (54.7%) would consider Psychiatry as a second option while 45.3% wouldn't. "Longer duration of Psychiatric clinical posting" as well as "more mentoring" will make them consider psychiatry (60.6% and 68.3% respectively). Only 29.1% of the respondents were discouraged by Stigma from considering Psychiatry. There was association between potential specialty and sex of the students (χ^2 =23, p=0.028). There was also significant association between being Muslim and considering psychiatry as second option (χ^2= 6.2, p= 0.013) with odds ratio of 2.74 and (95% CI, 1.23- 6.12). **Conclusion**: Medical students could be encouraged to take up psychiatry as a specialty by paying attention to the factors that determine how they choose a specialty and the factors that may encourage or dissuade them from taking up psychiatry. This will have far reaching positive consequences towards improving the population access to mental health services.

KEYWORDS: Medical students, Career, Choice, Factors, Access, Mental health

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INTRODUCTION

Mental disorders are quite prevalent with significant burden contributing more than 10% of the global burden of disease[1]. This dismal picture would only worsen as mental disorders are projected to become one of the leading causes of disability by 2030[2]. Most people with mental disorders, however, do not receive treatment for the illnesses they suffer from. This has resulted in the adoption of the mental health global action programme (mhGAP)[3] by the world health organization (WHO) in order to close the wide gulf that exists between the persons with mental

disorders who receive treatment and those who do not, and the actions needed to close the gap. The discrepancy is even wider in LMICs. In Nigeria, for instance, only about 8% of patients with mental disorders get treatment. Up to 80% of people with serious common mental disorders in Nigeria did not get treatment in the preceding 12 months and even those that received treatment it was sub-optimal in quality[5].

The world health organization (WHO) in response to the wide treatment gap has championed the mental health global action programme(mhGAP) which is essentially a number of initiatives that aim to ultimately close the gap in mental health especially in LMICs of the world[3]. One of those initiatives includes integrating mental health into primary health care. This has the potential promise of bringing mental health services to most people who live with mental disorders. This is necessary given the relative dearth of mental health professionals in sub-Saharan Africa[6,7]. The northeastern part of Nigeria with a population of over 18 million has only one mental health hospital, the neuropsychiatric hospital Maiduguri[8].

The effort by the WHO of integrating mental health into primary health care (PHC), while very necessary and timely at the moment considering the dearth of mental health professionals especially in low and middle income countries, should at best be considered an interim measure in the ultimate quest for providing equitable, readily available and accessible mental health services to the whole population of the globe. There is therefore the need to look for longer lasting solutions to the problem. This is very urgently needed considering the fact that even when mental health is successfully integrated into primary health care, it would take professionals to oversee the success of the whole process regardless of the integration model employed whether linkage or enhancement. Psychiatrists would be needed to educate the PHC workers or to treat those patients that they refer to tertiary centers for more expert management[9].

This study examined factors that determine medical students' choice of psychiatry as a career. The world psychiatric association (WPA)[10], as part of its 2008-2011 action plan, had indeed issued a call for research into the factors that facilitate or hamper the choice of psychiatry as a career by medical students. It is sad no note that as yet not much has been done towards achieving that goal. Most of the studies concerning medical students and psychiatry in Nigeria have been centered on medical attitudes towards mental illness[11-13].

MATERIALS AND METHODS

The study is cross-sectional in design and surveyed medical students of the University of Maiduguri medical school. Informed consent was obtained for all participants. None of the study participants was referred to by any identifying names or codes and same was explained to them. The study uses a questionnaire designed by the first author (YMM) which captured demographic information as well as information on potential field of specialization, whether they would consider psychiatry as a career and whether factors like: duration of psychiatric clinical rotation; improved mentoring; stigma etc would facilitate or hamper their choice of psychiatry as a career. Each of the factors had a Likert scale-like responses that ranged from "strongly disagree" through "neither agree nor disagree" to "strongly agree".

The data were analyzed using the statistical package for social science (SPSS) version 20.0. Categorical data were summarized using frequencies and percentages while mean and standard deviation was used for continuous data. Chi-square (χ^2) was used to test for statistically significant differences or lack thereof between categorical data. The study protocol was approved by the Research ethics committee of the Federal Neuro-psychiatric Hospital Maiduguri.

RESULTS

In all, 117 medical students took part in the study with mean age of 26 years (SD =2.9). Males made up 78 (66.7%) of the sample while Muslims constituted 80 (68.4%) and the remaining 31.6% were Christians. An overwhelming majority (83.8%) of the students were in their fifth year while the rest were in first, fourth and sixth years in medical school as depicted in table 1

Table 1: Socio-demographic characteristics

Socio-demographic characteristics		Frequency (N)	Percentage
Gender	Male	78	66.7
	Female	39	33.3
Religion	Islam	80	68.4
	Christianity	37	31.6
Tribe	Hausa	22	18.8
	Kanuri	22	18.8
	Fulani	21	17.9
	Babur	13	11.1
	Yoruba	5	4.3
	Igbo	5	4.3
	Others	12	10.3
Level of study	First Year	4	3.4
	Fourth Year	11	9.4
	Fifth Year	98	83.8
	Sixth Year	4	3.4

One hundred percent of the participants invariably reported that they would undertake Postgraduate studies to specialize, what varies is their choice of specialty. The most popular specialty was Obstetrics and Gynecology (O&G) followed by Surgery, Internal medicine and Pediatrics making up respectively 27.4%, 22.2%, 15.4%, and 12.8%. Only 5.1% would consider psychiatry as a potential field of specialization but when asked whether they would consider specializing in psychiatry as a second option majority (54.7%) said yes.

Table 2: Distribution by intended fields of specialization

Specialty of choice	Frequency(n)	Percentage (%)
Internal Medicine	18	15.4
Surgery	26	22.2
Pediatrics	15	12.8
Obstetrics and Gynecology	32	27.4
Ophthalmology	2	1.7
Laboratory Medicine	7	6.0
Psychiatry	6	5.1
Anesthesiology	1	0.9
Community Medicine	1	0.9
Family Medicine	3	2.6
Other	2	1.7
Radiology	3	2.6
Nuclear Medicine	1	0.9
Total	117	100

Table 3 shows the factors that will influence choice of field of specialization by participants and these include: "sheer interest" (42.9%) and "clinical man-hour requirements" (23.1%). Other factors considered were perceived "prestige" of the specialty (17.9%), whether the specialty was perceived as being a "rare specialty" (12.0%).

Table 3: Factors that determine choice of specialty

Factors	Frequency (n)	Percentage (%)
Perceived prestige	21	17.9
clinical man-hour requirements	27	23.1
Rare specialty	14	12.0
Sheer interest	49	41.9
Other	6	5.1

Fifty three (45.3%) of the students reported that they were not at all likely to do psychiatry. There was only one (0.9%) student who was extremely likely to choose psychiatry as a career. The rest of the participants are slightly likely 19 (16.2%), moderately likely 29 (24.8%), and considerably 15 (12.8%) likely to take up psychiatry as career choices.

Improved mentoring was agreed to be important in choosing psychiatry by 53.8% and strongly agreed by 14.5% of the students. More than half of the students (53.8%) agreed that when exclusive allowances were given to psychiatrists it would make them consider psychiatry, 21.4% neither agreed nor disagreed. The rest of the students disagreed that exclusive allowance would encourage them to consider psychiatry as a career option. Stigma was also reported to be a factor that students would consider in choosing psychiatry as a career and 29.1% of the students would be discouraged from taking up psychiatry, 53.9% disagreed and 17.1% neither agreed nor disagreed.

Table 4: Factors that may determine the choice of psychiatry as career

Factors		Frequency (n)	Percentage (%)
Duration of psychiatry rotations	Don't know	13	11.1
	Strongly disagree	10	8.5
	Disagree	23	19.7
	Agree	50	42.7
	Strongly agree	21	17.9
Improved Mentoring	Don't know	14	12.0
	Strongly disagree	8	6.8
	Disagree	15	12.8
	Agree	63	53.8
	Strongly disagree	17	14.5
Exclusive allowances	Don't know	25	21.4
	Strongly disagree	15	12.8
	Disagree	42	35.9
	Agree	21	17.9
	Strongly agree	14	12.0
Stigma in psychiatry	Don't know	20	17.1
	Strongly disagree	16	13.7
	Disagree	47	40.2
	Agree	25	21.4
	Strongly agree	9	7.7

Table 5 shows the attitudes of the medical students towards the role of psychiatrists in management of mental illness.

Table 5: students' attitude towards psychiatric treatment

Factors		Frequency (n)	Percentage (%)
Mentally ill do not need doctors to treat mentally ill patients	Don't know	1	0.9
	Strongly disagree	59	50.4
	Disagree	53	45.3
	Agree	3	2.6
	Strongly agree	1	0.9
Mental disorders are best treated by traditional or religious healers	Don't know	15	12.8
	Strongly disagree	43	36.8
	Disagree	53	45.3
	Agree	4	3.4
	Strongly agree	2	1.7

Socio-demographic correlates of the factors involved in choosing psychiatry

Gender was significantly associated with the factors that are considered in the choice of psychiatry (χ^2= 10.6, *df* = 4, *p*= 0.031). There was no statistically significant association between gender and whether medical student would ever consider psychiatry as second choice (χ^2= 0.017, p= 0.896). There was no gender difference in considering whether the longer duration of psychiatry clinical rotation was important in making them choose psychiatry as a career (χ2= 3.7, p= 0.454), nor was different age groups associated with considering longer duration of clinical rotation (χ^2 = 4.7, p= 0.321). Being a Muslim was found to be significantly associated with whether students would consider psychiatry as a second career option (χ^2= 6.2, p= 0.013) with odds ratio of 2.74 and (95% CI, 1.23- 6.12).

DISCUSSION

In this study, all participants indicated intention and interest in postgraduate training to specialize in different chosen fields of medicine. This is important considering the relative dearth of specialists especially in fields like psychiatry in Nigeria. In the north-eastern part of the country there is only one specialist mental health hospital with less than 10 psychiatrists that cater for mental health needs of close to 19 million people[8].

Despite this increased interest in postgraduate training among medical students, mental health did not form one of the three most chosen specialties. The top three specialties of choice for the students were: Obstetrics and gynecology (O&G), Surgery and Internal medicine in that order. These three most chosen specialties together with Pediatrics form the four major specialties and minimum requirement for internship in Medicine and subsequent full registration as a medical practitioner in Nigeria. This may explain the reason why they were the most commonly preferred. The choice of psychiatry as a career option was indicated by only 5.1% of the participants. Indeed a survey of UK medical school graduates showed that 4-5% of the students chose psychiatry and trend didn't change much more than two decades later[14]. Similar results were reported of psychiatry[15] being one of the least popular clinical specialty with associated misperceptions about psychiatry. This would appear discouraging considering the current dearth of psychiatrists and the disproportionately high prevalence of mental disorders globally and in Nigeria.

The most commonly reported factor considered in the choice of a career was the interest that they had in the specialty. Time commitment as well as perceived prestige was also an important factor. It appears therefore that psychiatry would be considered by more students if it was made to be interesting as well as made to appear prestigious. Medical students in Australia reported that the least attractive part of psychiatry was its low prestige among the medical community[16]. It is rather paradoxical that while students considered clinical man-hour requirements in a particular field as important if they were to choose the specialty were also considering O &G as the most frequent field of choice. This probably suggests that the students may likely consider psychiatry as a career option in place of those specialties that require a lot of time commitment such as surgery or O&G during their compulsory one year houseman-ship when they would be exposed to the rigors and realities of their earlier career choices.

More students agreed that longer duration of exposure to clinical psychiatry would be important in helping them consider psychiatry. This perhaps would play the dual roles of affording the medical students more knowledge of mental disorders which would engender positive attitude towards psychiatry, as well as making the specialty interesting therefore improving their overall positive rating of psychiatry. This suggestion is at variance with a study that found no statistically significant effect of psychiatry

clerkship on medical students' attitude towards psychiatry[17]. Other studies however showed a positive impact of psychiatry clinical rotations on attitude towards mental illness and psychiatry among medical students[18]. This may have implication in the design or revision of the medical students' curriculum to allow for optimal exposure to behavioral sciences generally.

Improved mentoring was identified as important factor as most of the students agreed that better mentoring in psychiatry would make it more likely for them to choose to specialize in psychiatry. Improved mentorship would no doubt play a vital role in the career of medical students and young doctors. Indeed evidence suggests that optimal mentorship improves personal development, career guidance as well as career choice of young doctors and medical students[19].

Stigma has been an issue in the field of psychiatry where people in the community are readily willing to stigmatize against the mentally ill[20-23]. This stigma however does not stop on the mentally ill alone as people including doctors tend to stigmatize against psychiatrists[24-26], perhaps, due to poor knowledge of behavioral sciences. The students in this study were also affected by this factor, but luckily less than a third of them agreed that they could be hampered by stigma from taking up psychiatry. Medical students were particularly negatively influenced by the 'anti-psychiatry' views of non-psychiatric doctors and peers in a study in America[27].

It is impressive to note that less than 5% of the study sample agreed or were undecided to the statement: 'mentally ill persons do not need doctors to treat them'. Considering some of the study participants were first year medical students who have had no contact with clinical medicine generally let alone clinical psychiatry, this proportion is, therefore, likely to be even lower if all the students have had contact with psychiatry.

What is rather discouraging is the fact that some of the respondents, slightly above 5%, believed that mental illnesses are better treated by traditional or religious healers than by psychiatrists. This may also be amenable to change with better exposure to clinical psychiatry.

An interesting finding was the association between religion and likelihood of choosing psychiatry as a second option. This finding is as interesting as it is unusual. There were no other socio-demographic associations with the studied factors.

The factors that determine the choice of psychiatry among medical students such as the influence of stigma, effect of mentoring, duration of clinical psychiatry rotations should be considered with a view to improving the number of students taking up psychiatry as a career option. Medical students could be encouraged to take up psychiatry as a specialty by paying attention to the factors that determine how they choose a specialty and the factors that may encourage or dissuade them from taking up psychiatry. This could have far reaching positive consequences towards improving the population access to mental health services.

LIMITATIONS OF THE STUDY

1. The study uses convenience non-random sampling of the study participants. This may have introduced some selection bias as most of the participants were in their fifth year after having completed their psychiatry clinical rotations.
2. Other factors may be important in deciding which career option to take after medical school which may not have been considered in a study like this.

RECOMMENDATIONS

1. A more randomized study of the factors that influence career choices and importantly the choice of psychiatry would be relevant.

2. A qualitative inquiry in the form of focused-group discussions or key informant interviews would be more revealing of other factors that may have been overlooked. Young doctors especially house officers should also be considered in a study like this as they may be preparing for specialization.
3. The factors identified as important in determining the choice of psychiatry should be paid attention to in order to improve the number of doctors going in to psychiatry with the ultimate aim of closing the mental health care gap, most of which may be attributed to paucity of mental health workforce.

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ORIGINAL ARTICLE

PATTERN OF OTORHINOLARYNGEAL, HEAD AND NECK DISEASES IN THE IN-PATIENT UNIT OF A TERTIARY HEALTH INSTITUTION IN SOKOTO, NORTH WESTERN NIGERIA.

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ABSTRACT

Background:
The pattern of ear, nose, throat, head and neck diseases varies from one geographical location to another and hospital admission usually required for optimum management. **Objective:** The aim of this study is to assess the pattern of Ear, Nose and Throat in-patient diseases and make recommendations to improve health care services. **Methods:** This was a six year retrospective study of ear, nose, throat, head and neck in-patients. Data analysed include demographic data, religion and diagnosis. **Results:** A total of Eighteen thousand and ninety three (18,093) patients were managed in the Ear, Nose and Throat department from January 2006 to December 2012. One thousand two hundred and twenty six (1,226) patients were managed in the in-patient unit comprising male708 (57.8%) and female 518 (42.3%) with male: female ratio 1.4:1. Hospitalisation rate was 6.8%. The six most frequent reasons for the hospital admission were tonsillitis 224 (18.3%) patients, followed by epistaxis 105 (8.6%), nasal masses 100 (8.2%), neck and laryngeal trauma 91 (7.4%), chronic suppurative otitis media 74 (6.0%), nasal and facial trauma accounted for 74 (6.0%). **Conclusion:** The pattern of otorhinolaryngeal, head and neck diseases among the in-patients in this study varied with age and site of the lesion. Tonsillitis and Epistaxis being the most common reasons for admission, they can be handled by the general practitioners, hence, the need to create awareness on the management of these lesions to provide the Otorhinolaryngologist ample time to attend to complicated diseases.

KEYWORDS: ENT diseases, in-patient, Sokoto, awareness.

INTRODUCTION

The pattern of Otorhinolaryngeal, Head and Neck diseases varies with age, sex, socioeconomic status and from one region to another[1-4]. Hospitalization for ENT diseases is indispensable especially for life threatening conditions. The hospital admission is required for diagnosis, reassurance and treatment[3].

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Hospitalization in a developing country like Nigeria may negatively affects the patients or family meagre resources, loss of productivity because of absence from work and school. In addition, there are limited hospital resources and trained Otorhinolaryngologist, thus, only complicated and complex ENT diseases deserve hospitalization in tertiary health institution.

The aim of this study was to assess the pattern of otorhinolaryngeal, head and neck surgical diseases hospitalized in a tertiary institution in Sokoto, North-Western Nigeria and make recommendations for improved diagnosis, medical and surgical treatment.

MATERIALS AND METHODS

This was a retrospective study carried out in the Ear, nose and throat (ENT) department of

the Usmanu Danfodiyo University Teaching Hospital (UDUTH), Sokoto, North-western Nigeria. UDUTH is a tertiary hospital that provides health care services to Sokoto, and the catchment populations in Kebbi, Zamfara and Niger states. The hospital numbers of the in-patients from January 2006 to December 2012 were retrieved from the admission register and their case notes collected from the hospital medical record department. Information gathered from the case notes included age, sex, religion, diagnosis and duration of hospital stay. The diseases were categorized into ear, nose and nasopharynx, throat, head and neck. Inclusion criteria were only patients admitted in the ENT ward and their medical records were available. Exclusion criteria were patients admitted in the ENT ward with missing hospital records and those with ENT diseases admitted in other departments in the hospital. Analysis was done by descriptive statistic using SPSS version 16.0

RESULTS

A total of Eighteen thousand and ninety three (18,093) patients were managed in both the out-patient and in-patient units during the period under review at the ENT Department of the Usmanu Danfodiyo University Teaching Hospital, Sokoto, Nigeria. Of the 18,093 patients, 8,659 (47.9%) were new cases while 9,434 (52.1%) were follow-up cases.

One thousand two hundred and twenty six (1,226) patients were managed in the in-patient unit comprising male 708 (57.7%) and female 518 (42.3%) with male: female ratio 1.4:1. Children were considered as those age 15 years and below and they constitute 434 (35.4%) in-patient while Adults aged 16 years and above and were 792 (64.6%). Hospitalisation rate was 6.8%. Muslim 1,091(89%) patients predominate, this was followed by the Christians 133(10.8%) and traditional religion 2 (0.5%). The age range was 6 months to 90 years. Mean age was 29.7 years. The average number of patient admission per month was 11 and the duration of the hospital stay was 10 days.

Diseases of the nose and nasopharynx were 441 (36.1%), followed by neck with 430 (35.1%), throat 258 (21.1%) and ear 92 (7.4%). The site distribution of the diseases and the prevalence for the age groups are shown in tables 1-4.

The six most frequent reasons for the hospital admission were tonsillitis with 224 (18.3%) patients, followed by epistaxis 105 (8.6%), nasal masses 100 (8.2%), neck and laryngeal trauma 91 (7.4%). Nasal and facial trauma and chronic suppurative otitis media accounted for 74 (6.0%) each.

Admissions due to tonsil related conditions were were acute exacerbation of recurrent tonsillitis in 126 (10.3%) patients, quinsy 21 (1.7%) and those admitted for tonsillectomy 77 (6.3%).

The aetiologic distribution of epistaxis was idiopathic 63 (5.2%), trauma 27 (2.2%), systemic hypertension 11 (0.9%) and thrombocytopenia 4 (0.3%)-fig.1.

Of the 100 (8.2%) nasal masses malignant sinonasal tumours were 56 (56%) in-patients, others were inflammatory nasal polyps 25 (25%), inverted papilloma 12 (12%) and antrochoanal polyps 7 (7%).

DISCUSSION

In this study the hospitalization rate was 6.8%. Comparatively, a similar hospital based study in Greece[3] reported 5.2% hospitalization rate. In contrast, the Greece study was in the ENT emergency department and the study period was only one year. Tonsillitis had the highest frequency among the in-patients during the period under review. It was most common among children and young adult. Similarly, tonsillitis was the most common throat complaint among paediatric age group in India[5] and one of the top ten otorhinolaryngological, head and neck disorders in Greece[3]. Furthermore, tonsillitis was the fourth of the five common ENT diseases in the ENT outpatient in Malaysia[4].

Our findings concur with the studies mentioned above. Those patients admitted with tonsillitis can be effectively managed by general practitioners[3,5] and those requiring tonsillectomy can be safely referred to the Otorhinolaryngologist. Therefore, creating awareness on the clinical presentation, diagnosis and effective medical treatment to the general practitioners at the primary and secondary health institution will reduce the in-patient burden of tonsillitis on tertiary health institution. In addition, it is generally accepted that many ENT surgery including tonsillectomy are suitable for day case approach[6], thus, introduction of day case tonsillectomy to those who fulfil the criteria will equally reduces the in-patient load. This will provide the Otorhinolaryngologist ample time to attend to complicated and complex ENT diseases.

Epistaxis was the most frequent nasal disease among the in-patients and ranked second disorder in the top six disorders in this study. Individual below 30 years of age were more affected, constituting 21.5%. This is in agreement with earlier study on the pattern of epistaxis in Sokoto[7]. Moreover, the aetiological factors of the epistaxis in this study support the earlier report from Sokoto[7] and similar to the report on paediatric patients in India[5]. In contrast, the study from Ibadan[1] reported low prevalence of epistaxis, but it was the second cause of emergency ENT admission in Ghana[8].

In another study on ENT emergency in India epistaxis accounted for 4% of the cases[9]. This difference in the frequency of epistaxis from one place or region to another is probably due to the variation of ENT diseases from one geographical location to another. Sokoto has a prevailing hot dry climate from the months of February to June and cold dry harmattan from November to January. This harsh weather is a known predisposing factor to epistaxis[7] and may account for the variation from one place to another.

Majority of the cases of sinonasal masses managed as in-patient were malignant lesions (56%). The reason for the relatively high rate of sinonasal malignancy in this environment is not clear; however this opens a window for further probe by interested researchers. The inflammatory nasal polyps were the consequence of chronic rhinosinusitis.

Facial trauma encountered in this study was more in adult than the paediatric in-patients. This difference may be due to involvement of adults in activities associated with trauma such as road traffic accident, assault, sport and fall from a height[10].

In this study adenoid enlargement was almost exclusively seen in children aged 15 years and below. This finding buttress the fact that adenoid is predominantly a childhood disease[11,12]. The frequency in this study was 4.9% in contrast to 9.2% reported in children less than 15 years of age from the study in the ENT out-patient in Ibadan.[1] The possible cause of this difference could be due to the larger sample size in the study from Ibadan, furthermore the adenoid in this study were those booked for adenoidectomy.

In this study the prevalence of CSOM was high and children 15 years and below were more affected than adult. In addition, the prevalence could be higher in a community based study. The reasons for the high CSOM prevalence among the in-patients were not illustrated in this study.

In contrast, a community based study of identifiable risk factors for CSOM in North-central Nigeria, the prevalence rate was 7.4% among school children age 2-22 years[13]. Moreover, low socioeconomic status, malnutrition and overcrowding had significant statistical association with the CSOM[13]. True reflection of the prevalence of CSOM in this environment can be more accurately defined by a cross sectional community study.

Table 1: Distribution of ear diseases by age group

Age range in years/disease	0-15	16-30	31-45	46-60	61-75	76-90	Total/%
CSOM	52	14	8	-	-	-	74(6.0)
Hearing loss	1	5	1	1	1	-	9(0.7)
Otitis externa	1	2	1	-	-	-	4(0.3)
Ear foreign bodies	1	1	1	-	-	-	3(0.2)
Vertigo	1	-	-	-	-	1	2(0.2)
Total	**56**	**22**	**11**	**1**	**1**	**1**	**92(7.4)**

CSOM = chronic Suppurative otitis media.

Table 2: Distribution of nasal and nasopharyngeal diseases by age group

Age range in years/disease	0-15	16-30	31-45	46-60	61-75	76-90	Total/%
Epistaxis	31	28	15	25	4	2	105(8.6)
Sinonasal Tumour	8	41	20	16	8	7	100(8.2)
Facial trauma	15	31	15	9	4	0	74(6.0)
Rhinosinusitis	5	27	19	11	4	0	66(5.4)
Adenoid	60	1	0	0	0	0	61(5.0)
NPC	4	7	7	9	1	0	28(2.3)
Nasal foreign body	3	2	1	1	0	0	7(0.6)
Total	**126**	**137**	**77**	**71**	**21**	**9**	**441(36.1)**

NPC= nasopharyngeal carcinoma.

Table 3: Distribution of throat diseases by age group

Age range in years/disease	0-15	16-30	31-45	46-60	61-75	76-90	Total/%
Tonsillitis	108	89	23	3	1	-	224(18.3)
Lymphoma	2	5	2	4	0	-	13(1.1)
OSA	2	-	-	-	-	-	2(0.2)
Throat foreign body	9	2	4	3	1	-	19(1.5)
Total	**121**	**96**	**29**	**10**	**2**	**-**	**258(21.1)**

Table 4: Distribution of head and neck diseases by age group.

Age range in years/disease	0-15	16-30	31-45	46-60	61-75	76-90	Total/%
Laryngeal trauma	7	14	15	38	14	3	91(7.4)
Goitre	3	6	36	12	-	-	57(4.6)
Salivary tumour	11	16	23	18	3	-	71(5.8)
Airway foreign bodies	50	2	4	2	-	-	58(4.7)
Oesophageal foreign bodies	22	2	4	4	2	1	35(2.9)
Airway obstruction	4	4	2	3	1	-	14(1.1)
RRP	12	-	-	-	-	-	12(1.1)
Other diseases	22	23	16	24	6	1	92(7.5)
Total	**131**	**67**	**100**	**101**	**26**	**5**	**430(35.1)**

RRP = recurrent respiratory papilloma.

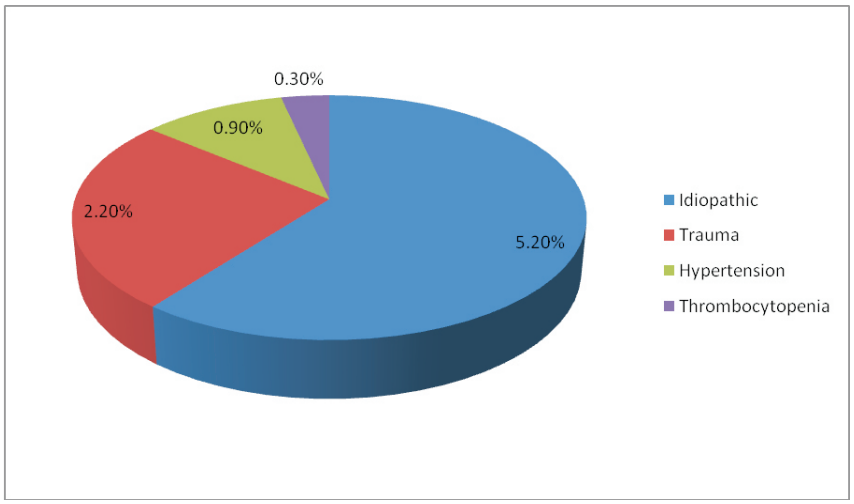

Figure 1: Aetiological distribution of patients with epistaxis.

CONCLUSION

The pattern of otorhinolaryngeal, head and neck diseases among the in-patients in this study varied with age, and decrease frequency in the nose, neck and throat and in descending order. The six most frequent reasons for the hospital admission were tonsillitis, epistaxis, nasal masses, neck and laryngeal trauma, nasal and facial trauma and chronic suppurative otitis media.

Creating awareness on the management of these diseases to the general practitioners at the primary and secondary health institution will reduce the burden of these diseases on tertiary institution.

Limitation of this study

There was limitation in the comparison of data because the population in this study was the in-patients, which has a dearth of literature. Secondly, being a retrospective study and hospital based, it serves as a guide and not a true reflection of the diseases in the community. A prospective study is needed to determine the prevalent otorhinologological, head and neck diseases in a community, which may also involve multi-institutional studies.

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IMPACT OF JOB STRESS ON WELLBEING OF EMPLOYEES AND ITS IMPLICATION FOR COUNSELLING

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ABSTRACT

Job Stress comes as a result of incongruity between an employee and his job. This brings about psychological and physiological changes in the life of the worker, thus it, affects his/her general wellbeing and productivity. This article focused on the impact of job-related stress on the wellbeing of employees and the role of counselling in its prevention and management. The paper talked about the concepts of stress, job stress, causes, signs and symptoms, adverse effects and prevalence rate of job-related stress on employees. Lastly, the article presented empirical findings, such as counselling employees on how to cope with psychological distress and adverse effect of psychological trauma, which improve wellbeing of workers.

KEYWORDS : Stress, Job Stress, Employees, Counselling.

INTRODUCTION

The dictionary of behavioural sciences defines stress as the reaction to physical injury, violence, severe losses, danger and separation, among others. [1]Stress is a response of an individual to a perceived or encountered threat or demand, which is beyond his/her ability to handle. Stress causes unpleasant emotional and physiological changes in a person, thus resulting in mental and physical illness. However, stress is not entirely negative, (it demoralizes and reduces the performance of a person, to the extent that the person becomes depressed and aggressive), it also has a positive impact on a person; (it alerts him/her on danger and prepares him to face it squarely). Stress is caused by inevitable events (hassles and tussles) in the environment that are called stressors. These stressors are found in many places like homes, schools, working places, hospitals, prisons and others[2]. This paper focused on the impact of job-related stress on the psychological wellbeing of employees, and it also looked at the role of counsellors in the prevention and management of job-related stress.

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CONCEPT OF STRESS

Etymologically, the word stress was derived from the Latin word "stingere", which means to draw tight; it is regarded as a force that pushes physical or psychological factors beyond the range of stability, therefore, producing strain in an individual.[3] The concept of stress is new, but widely found in every place. However, the definition of stress among scholars varies and it depends on how they perceived it. That is to say, the wider the usage of the term 'stress', the more elusive is its meaning.

Modern definitions of stress recognised that, it is a personal experience caused by pressure or demands on an individual and impacts on the individual's ability to cope or his/her perception of that ability.[4]

Snerberg,[5] cited that "stress is a physiological unitary response of all organisms to environmental agents." Twinning, [6] defines stress as a force (stressor) applied to a system or structure that causes changes.

It implies a situation or circumstance that threatens or believed to threaten a person's functions or ability to cope.

According to Dhawan,[7] stress is the reaction of mind and body to environmental changes, in other words, it is the bad feelings that an individual will experience because of difficulties beyond his control. Stress has been defined by Cox in Cope, [8] as a complex psychological state that arises from the person's cognitive appraisal of adaptation to demands or threats. He further, highlighted four processes of cognitive appraisal, which are:

1. Demands on a person
2. Individual characteristic, skills, and ability to meet up with the demands (Personal Resources).
3. Constraints when coping with the demands of stress.
4. Supports received from others.

However, Coetzee & Rothmann[9] found conflicts on the views of many scholars about the definition of stress, and these can be categorized by into three: stimulus, response, and interactional definitions. Stimulus-based definition views stress as a situational- or environmental-based stimulus that causes harm on a person, response-based definition defines it as an individual's psychological or physiological response to environmental forces, and the interactional definition, asserts that, stress is both a stimulus (stressors) and a response (outcome of manifestation of stress and strain) to particular situation or events.

CAUSES OF STRESS

Stress is caused by unavoidable events in the (hassles and tussles) environment that are called stressors, they vary from one person to another and the circumstances differ, for instance, some people find horse riding or travelling to be stressful, but others find it as joyful. For an event to be a stressor the person has to appraise it as a threat or something beyond his/her control.

The causes of stress can be categorised into three:

1. Disasters: These are natural calamities that cause death and loss of property in the affect area, and claim lives and property. The victims often suffer serious emotional anguish. Examples of these disasters include earthquakes, fire, tsunami tornadoes and flood etc.
2. Life changes: As life goes on, we experience many changes (be it positive or negative), and these changes are stressful and they pose serious challenges to human life, for instance marriage, losing a job, divorce, death of a spouse, et cetera, are the typical examples of life changes.
3. Daily Struggle: In our daily routine we face many hindering factors that are in the real sense stressful, among these are, insecurity, competition, hostility, frustration impatience etc.[10]

SIGNS AND SYMPTOMS OF STRESS

The signs and symptoms are divided into two: emotional (anger, crying, shouting depression restlessness etc) and physical (alcohol and substance abuse, poor sleep loss of appetite, nail biting, dizziness and stomach upset etc).[10]

PREVALENCE OF STRESS

In a study conducted by North-Western National life at United State of America, 40% of the workers reported that their jobs were very extremely stressful (National Institute of Occupational Safety and Health, NIOSH).[10] However, in Nigeria, studies conducted on job stress and satisfaction among employees in different settings reported high relationships between prevalence of job stress and job satisfaction[11-14]

CONCEPT OF JOB STRESS

The term "Job Stress" used interchangeably with "Work Stress" and "Occupational Stress" is often used to describe an area of study focusing on psycho-social aspects of work that are detrimental to workers' health. In other words, job stress refers to the harmful physical

and emotional responses that occur when the requirement of the job fails to match the capabilities, resources and needs of a worker or employee. [15] Lazarus & Folkman's cognitive/transactional model cited by Workcover, [16] described job stress as a process that involves transaction between an individual and his or her work environment. Job stress can be described as a dynamic and reciprocal relationship between the person and the environment that is appraised by the person as being taxing or exceeding his or her resources and endanger his or her well-being [17]

In USA, National Institute of Occupational Safety and Health, defined job related stress as the harmful physical and emotional responses that occur when job requirements do not match the worker's capabilities, resources, and needs [18]. Another definition by Ibem, Anosike, and Azuh & Mosaku, [19] emphasized that job stress is a physical and emotional response that occurs when workers perceived an imbalance between job demands and capacity to meet such demands. Kyriacou cited by Arokoyo, [20] also defined job-related stress as the experience of negative emotional states, attributed to work-related factors, in which the outcomes are costly to the individual and the organization.

RISK FACTORS ASSOCIATED WITH JOB RELATED STRESS

Health Safety Executive,[21] identified seven broad categories of risk factors for job-related stress;

1. Cultural Issues, which include lack of positive response to stress or health concerns, lack of staff involvement, poor communication, lack of consultation and participation in decision making, and long work hours or lack of rest/breaks.
2. Demands, such as challenge and pressure, exposure to violence or aggression, work overload, poor physical environment, lack of training, lone working, and fast pace of work.
3. Control Issues, which presents as low level or lack of control over task design, or non-participation in decision making.
4. Relationships with co-workers which include; bullying and harassment, lack of support for the employee and physical violence.
5. Change, in the last few years many people recognize change as a stressful factor. These changes include changing market demands, new technology, and organizational restructuring.
6. Conflicts and ambiguity roles of individuals in an organization.
7. Support, training and individual factors, these include lack of adequate training, mismatch between a person and his/her job, lack of support or feedback, and lack of constructive advice.

IMPACT OF JOB STRESS ON EMPLOYEE

Job stress has various impacts on the individual employees; Butt [22] classified them into physical, psychological and behavioural impacts. These impacts could be detrimental to both employees and the organization they work for, cause ailments to the employees and bankruptcy to the organization [8]

PHYSIOLOGICAL EFFECTS OF STRESS

Employees who report that they are stressed incur healthcare costs that are 46 % higher than those that were non-stressed employees, [23] and 60 to 90 % of Visits to doctors were attributed to stress-related illnesses and symptoms. If it is left untreated, prolonged stress raises the risk for developing chronic and costly-diseases. The chronic and costly diseases include heart disease, diabetes and cancers, which collectively account for high cost of healthcare in USA. Diabetes alone cost business $58 billion in 2007 in just indirect medical expenses such as 15 million work days lost to absenteeism and 120 million work days with reduced productivity. Stress can also lower the immune system and play a role in a person's susceptibility to more colds, flu and other infectious diseases. Additionally, people who are stressed are more likely to experience pain-related conditions, and a host of other ailments, from teeth grinding and chest tightness to fatigue [24]

Similarly, Lluminari Landmark Study, cited by health advocates,[24] found that people who work under stressful conditions such as work/life conflicts or lack of social support, autonomy and control, are about twice as likely to experience the following physical and mental effects as other workers not stressed:
1. Heart and cardiovascular problems
2. Anxiety, depression and demoralization
3. Substance abuse
4. Certain cancers
5. Infectious diseases
6. Conflicts/ Injuries
7. Back pain

Osipow and Davis, cited in Teye, [25] added that the physical effects of stress include physical illness or poor self-care habits, which the individual may exhibit. Physical stress may include the manifestation of psychogenic-based disorders, which may have cardiovascular and other health implications. Other indications of physical effects of job stress include sleep and eating disorders and substance abuse. Objective indices have been used to measure physiological stresses thought to be precursors of diseases, such as, cardiovascular symptoms (elevated blood pressure and high cholesterol level) and biochemical symptoms (e.g. increased uric acid and cortisol levels).

PSYCHOLOGICAL IMPACTS OF JOB STRESS

Butt,[22] described job stress as a daily encounter, and the stress comes and goes without leaving any enduring imprints, but when stress is severe and piles up it affects the person's psychological functions. Stress has an obvious effect on an individual's psychological wellbeing. There is evidence that stress has unenthusiastic implications for organizations and individual workers. According to Maslach, Schaufeli, & Leiter, in Butt, [22] workers are more likely to experience a range of negative endings (health problems, mental complaints and physical problems) after stress. In addition, Cope,[8] identified four symptoms l of psychological effects of job stress on an individual employee:
1. Subjective symptoms (such as anxiety, depression, irritation, anger and loss of temper, frustration, low self-esteem, nervousness and apathy)
2. Cognitive symptoms (e.g., inability to make decisions, poor concentration, short Attention span, hypersensitivity and thought block)
3. Worrying and neurosis about work (continuity of organisation, relations with others and an individual's level of competence)
4. Behavioural symptoms of psychological strain, which can cause detrimental physical effects, (e.g., alcoholism, drug abuse, emotional outbursts, excessive eating, excessive smoking and impulsive behaviour).

BEHAVIOURAL IMPACTS OF JOB STRESS

Butt,[22] cited by Tucker-Ladd, explained the common behavioural-effects of occupational or job stress, include hyperactivity, eruption of emotions, worry in specific situation, compulsive thoughts, holding a complaint, excessive perturbing, touchiness, excessive sleeping, poor reminiscence, feeling frightened and impatience. Some workers face problems such as lack of social hold up, scepticism, exposure to life threatening risks. These people take safety and security measures to protect themselves, which add to their increased levels of stress.

JOB STRESS AND ITS IMPLICATIONS FOR COUNSELLING

Counselling is a professional relationship between a trained counsellor and a client; the relationship is usually between two persons or sometimes between a person and a group. It is aimed at helping clients understand and clarify views about their lives, that will help them achieve their self-determined goals, through meaningful well-informed choices and resolutions of emotional or inter-personal problems. Burks & Stafflre, [26] noted that when the performance and productivity of an organization or its employees decline, the thought of providing formal counselling for

both employer and the employees begins, it helps them resolve job-related stress, job dissatisfaction, which in turn improves their wellbeing and productivity. Counselling at a working place is provided in two ways; internally and externally, it is internal when the organization hires a trained person to provide such an important Employee Assistant Service (EAS) or external when the service is contracted out to a consultant.

However, the results of a study, [2] found the following implications for counselling in the management of job related stress:

1. Counsellors in working places should channel their counselling programs to help the managers understand the importance of motivating employees through salaries, bonuses, awards and promotions for career development.
2. Counsellors should educate employees on how to cope with psychological distress and the adverse effect of psychological trauma.
3. Counsellors should sensitize employees to appreciate the value and dignity of labour, and understand and adapt to their work and working environment.
4. Counsellors should instil in the mind of employees, the importance of putting a career in a specific job.
5. Counsellors should steer the counselling, in such a way that it will instil ethical principles in the minds of the employees.

CONCLUSION

Job-related stress comes because of incongruity between workers and their jobs. This in turn has adverse effects on the physical and psychological wellbeing of the workers. However, counselling plays a great role in its prevention and management, such that, workers are motivated and educated to cope with the stressors. ■

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CASE REPORT

A RARE PATHOLOGICAL TRIAD UNMASKED BY TYPHOID ENTERITIS: REPORT OF A CASE OF ACUTE APPENDICITIS, APPENDICEAL SCHISTOSOMIASIS AND VILLOUS ADENOMA OF THE APPENDIX.

PINDIGA UH[1], MALAMI SA[1], ADOGU IA[1], KEFAS JB[2] , EMUAN TO[2]

ABSTRACT

A villous adenoma of the appendix is an extremely rare tumour of the appendix even rarer is its occurrence on schistosomal granulomatous appendicitis. It is therefore usually an incidental finding during appendicectomy. Most series on appendiceal tumours accounts for less than 7% as villous adenomas. The index case histologically shows acute appendicitis, schistosomal granulomata and a villous adenoma. There may be an aetiological relationship between schistosomiasis and the villous adenoma of the appendix in this case since schistosoma related colonic squamous cell carcinomas have been observed in endemic arrears. Treatment is limited to appendicectomy and praziquantel therapy but post-operative colonoscopy is recommended due to the risk of colonic schistosomiasis and malignancy in patients with appendiceal neoplasms. We therefore report this rare pathological triad.

KEYWORDS : Appendicitis, Schistosomiasis, Villous Adenoma, Typhoid Enteritis.

INTRODUCTION

The appendix in humans is a rudimentary structure with no known function arising from the medial wall of the caecum and its mucosal lining is similar to that of the large bowel[1]. Acute appendicitis is predominantly a disease of the western world while chronic inflammation secondary to parasitic infestations is commoner in the third world[1]. Schistosomal appendicitis forms about 2% to 3% of appendectomies in some studies[2]. Tumours of the appendix are rare and are usually found incidentally during surgery for acute appendicitis[3]. Connor *et al* found 74 appendiceal tumours in 7,970 appendectomies and only 7% were villous adenomas[4]. Villous adenoma progressing to adenocarcinoma of the appendix has been reported previously[5]. Association of schistosomal colitis with colonic carcinoma has also been previously described[6]. However, schistosomal appendicitis associated with appendiceal villous adenoma has not been reported to the best of our knowledge. We present here a rare case of acute appendicitis on chronic schistosomiasis and appendiceal villous adenoma unmasked by typhoid enteritis.

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CASE REPORT

A 13 year old boy was referred to our teaching hospital by a private clinic with two weeks history of fever and colicky abdominal pain and subsequently abdominal distension and melena stool two days prior to presentation. He was pale and received two units of blood at the referral clinic. Examination revealed a male teenager in painful distress and generalized abdominal tenderness. Ultrasound scan revealed distended bowel loops with intraluminal fluid.

There was a small collection of fluid in the recto-vesical pouch but no significant ascites. Blood chemistry revealed a creatinine level of 132µmol/L with all other parameters remaining within normal limits. The PCV was 22%. Blood culture was not done. An impression of typhoid enteritis with perforation was made. The patient had laparotomy that revealed a 0.4 cm ileal perforation at the anti-mesenteric border and 30 cm from the ileo-caecal valve which was refreshed and closed. Further examination revealed an inflamed appendix which was also removed. The patient was given antibiotic cover and did very well post-operatively.

Histological examination of the appendix revealed transmural acute appendicitis, transmural deposits of embryonated and calcified schistosome ova and sessile villous adenoma (Figure 1, Figure 2 and Figure 3 respectively).

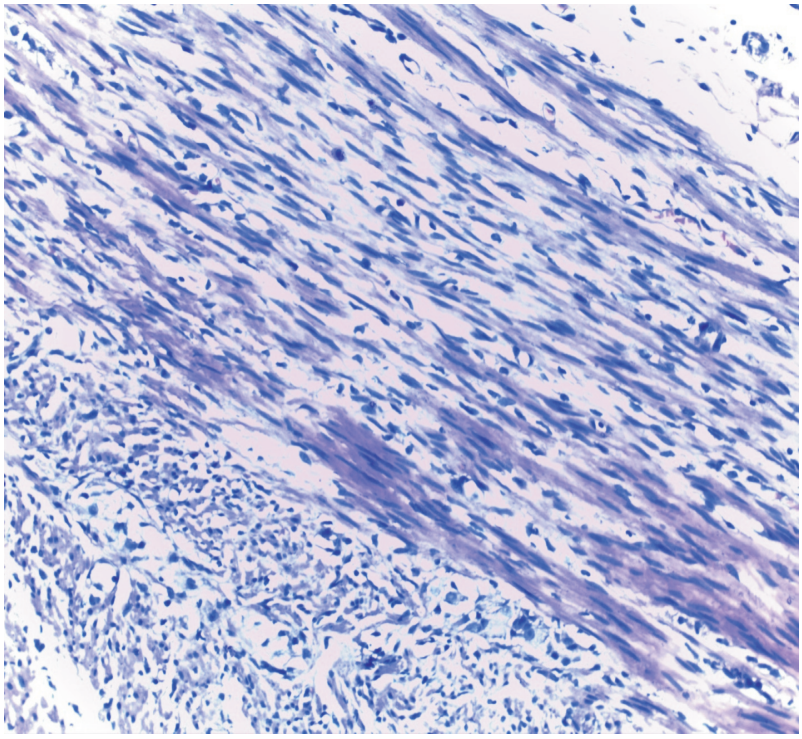

Figure 1: Transmural acute inflammation composed of polymorphonuclear leukocytes and eosinophils (H&E x 40)

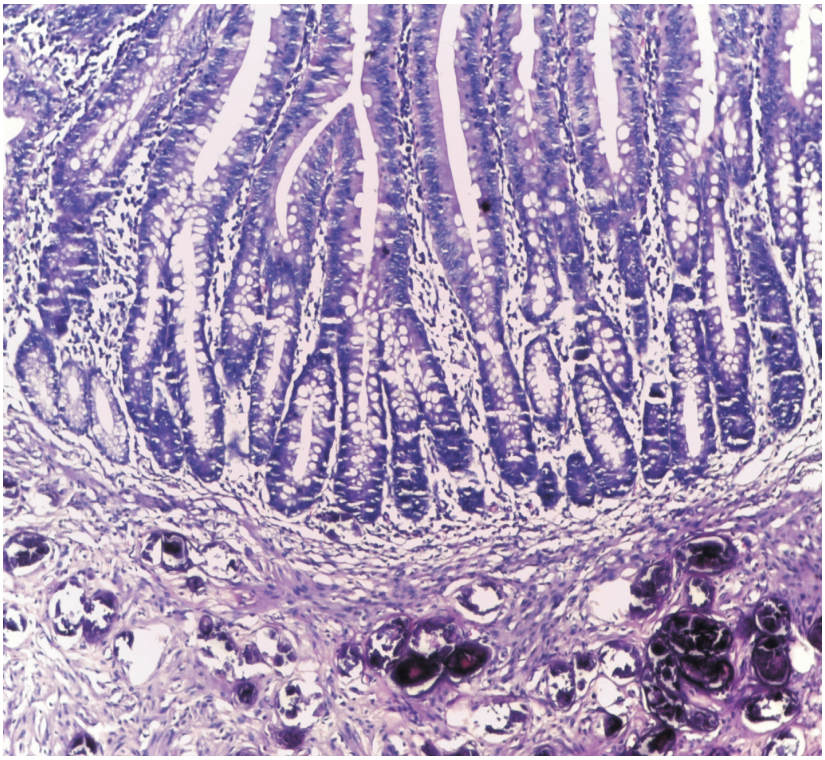

Figure 2: Sessile villous adenoma directly overlying embryonated and calcified schistosome ova (H&E x 40).

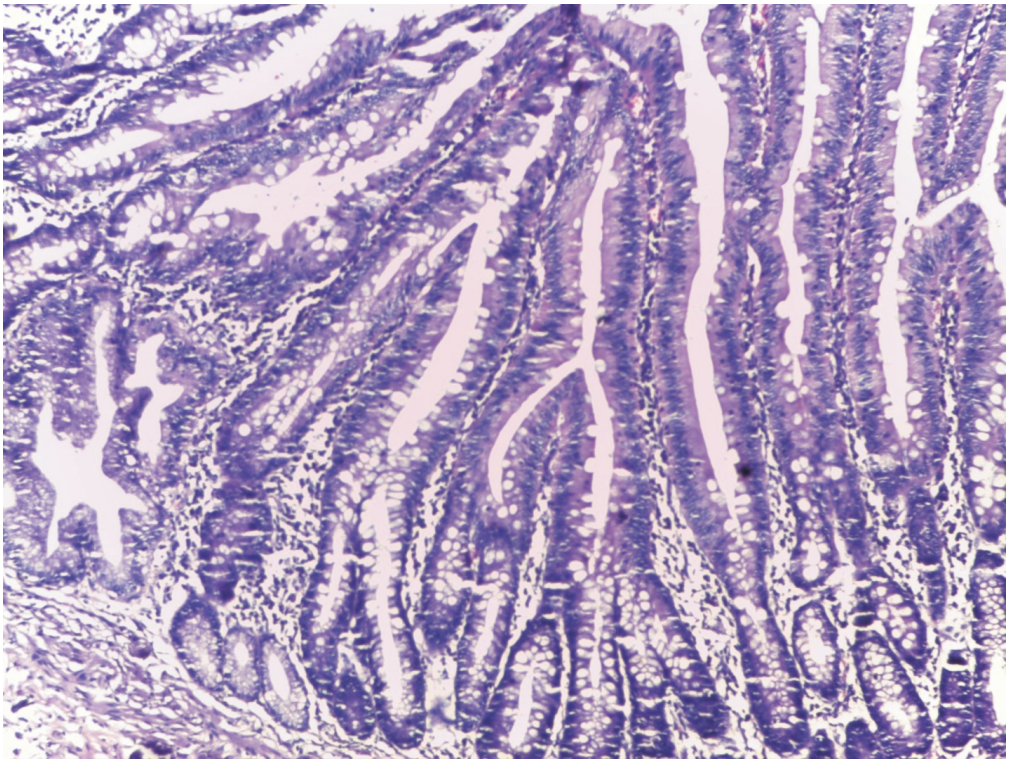

Figure 3: Sessile villous adenoma (H&E x 40)

DISCUSSION

Acute appendicitis is said to be predominantly a disease of the western world especially USA and Great Britain and is less common amongst Asians and Africans[1]. Acute appendicitis results from luminal obstruction usually from a faecolith or lymphoid hyperplasia[7]. About 4.2% of all cases of acute appendicitis show involvement of the appendix by schistosomiasis characterized by oviposition in some schistosomiasis endemic areas[8]. This leads to sub-mucosal fibrosis, narrowing of the lumen, obstruction and subsequent inflammation[8]. Schistosomiasis is known to be associated with the development of carcinoma of the bladder but gastrointestinal cancers associated with schistosomiasis have been found to be far less common[9]. The International Agency for Research on Cancer (1994) considered Schistosoma haematobium as carcinogenic to humans (group 1 carcinogen) and Schistosoma Japonicum as possibly carcinogenic to humans (group 2B carcinogen)[9]. Association has been established between goblet cell carcinoid tumour of the appendix and schistosomiasis of the appendix[9] while another study shows colorectal carcinomas in 32 patients associated with schistosomiasis[6]. Cases of appendicitis associated with villous adenoma so far reported did not include schistosomiasis. Our patient although presenting because of typhoid enteritis/perforation had appendicitis associated with schistosomiasis and villous adenoma either of which could have led to acute appendicitis. The typhoid perforation was closed surgically and the appendix was removed. The most important point to be noted in this association is the possible aetiological link between schistosomiasis and villous adenoma. This is because of the colorectal cancer cases observed in some schistosome-related enteropathies[6]. However, a cause and effect relationship has not been fully established between the two conditions. This possibility is high in our patient as the deposited ova are directly below the adenoma of the appendix. Since the appendiceal oviposition is likely to have come from the recto-sigmoid colon further monitoring with recto-sigmoidoscopy becomes mandatory while treating the patient with praziquantel. The possibility of synchronous colonic adenoma exists in these types of patients as villous adenomas are known pre-cursors of colorectal cancers and carcinogenesis associated with helminthes infections such as schistosomiasis is a complex process but chronic inflammation amongst other mechanisms appears to play a central role[6]. Chronic inflammation can generate nitrogen species and free radicals which can damage and oxidize DNA and lead to genetic instabilities which may subsequently evolve into atypical epithelial hyperplasia through proliferative polyps and finally neoplastic transfortion[6]. This is a feared complication in our patient however, removal of the appendix may have cured our patient as the adenoma was away from the resection margin and close follow-up since surgery did not reveal new complaints. Other studies on appendiceal adenomas made similar observations post-operatively[7].

CONCLUSION

This is the first case report to the best of our knowledge of this triad of acute appendicitis on appendiceal schistomiasis and villous adenoma of the appendix and provides a brief review of the literature. There is need for every appendix removed to be examined histologically. There is need to do colonoscopy on these type of patients to exclude synchronous or metachronous colonic adenomas to avoid the danger of malignant transformation.

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