Sero-prevalenceof *Plasmodiumfalciparum*Malaria in Rural Communities ofBassa, Plateau State, Nigeria.

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Abstract

Background*: Nigeria and Democratic Republic of Congo account for an estimated 40% of world malaria burden.Malaria parasite prevalence is one of the primary tools for estimating disease burden in a population.*

Aim*: To estimate rural sero-prevalence of Plasmodium falciparum malaria.*

Method*: This was a cross-sectional descriptive study of 564children and adults;312(55.3%) and 252(44.7%) from Kwall and Jengre communities respectively of Bassa Local Local Government Areas of Plateau Stateusing a multistage sampling technique between 1st and 4th May, 2017.Clinical evaluation, laboratory diagnosis and case management for malaria were carried out. Stata 14.1 software was used for data analysis. Results were presented in table and bar chart.*

Result*: One hundred and five (34.6%), 289(51.2%), and 80(14.2%) were aged 0 – 5, 5 – 17 and 18 – 80 years respectively. Fever was the commonest presenting complaint in 34 (6%) while 472 (83.7%) had no symptoms. P. falciparum sero-prevalence rates were 24.2%, 41.4% and 34.3% among under-five children, 6 – 17 years and 18 – 80 years respectively.*

Conclusion*. Plasmodium falciparum malaria transmission continues to occur with high sero- prevalence in rural communities of Bassa Local Government Areas of Plateau State. A slight decline was however, noted. Research on innovative models such as malaria vaccines, mosquito bionomics and environmental sanitation to compliment malaria therapeutics may need be employed in our rural communities so as to achieve the global goal for malaria eradication.*

Key word: *Malaria, sero-prevalence, Rapid diagnostic test, disease burden.*

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BACKGROUND

In 2015, the World Health Organization (WHO) reported that annual global clinical malaria has dropped substantially from staggering figures of 500 million prior to the year 2000 to 212 million. In addition, malaria attributable mortality has equally fellto about 429,000 cases annually between 2010 and 2015.[1]These significant gains are thought to be due partly to deployment of both preventive, diagnostics andtherapeutic interventions through the activities of Roll Back Malaria (RBM) program and other partners (President Malaria Initiatives, United Kingdom Agency for International Development (UKaid), Bill and Malinder Gates Foundation and PATH Malaria initiatives) in previously malaria endemic countries of the world.[2,3,4]However, coverage of malaria control activities varies between and within countries in Africa including Nigeria.[5,6,7]

To accurately estimate malaria burden, robustcontinuous active surveillance, monitoring and evaluation activities are key components. Malaria parasite prevalence is one of the primary tools for estimating disease burden in a population. This tool is used to determine the proportion of demonstrable peripheral blood parasitaemia from a given representative population estimates at a given

time. [8,9]

Sub-Saharan African is however, still bearing the highest burden of the disease with 90% of clinical malaria and 92% of these mortality in 2015 alone.Malaria, a preventable and treatable infection, is endemic in Nigeria. Nigeria and Democratic Republic of Congo account for an estimated 40% of world malaria burden.[10]The country wide Nigeria malaria sero-prevalence is 45.1% by rapid diagnostic test (RDT) and 27% by light microscopy.[11]These figures are disturbing in the lights of huge investments to curb this ancient scourge in our sub-region.

The WHO observes 25th April, every year as the world malaria day (WMD). This ambitious objective is intended to increase and sustain public awareness on the disease. "Malaria Prevention Works: Let's close the gap" is the theme for the year 2017.[12]This year, attention is focused on preventive strategies for the most vulnerable groups in Africa, vector control measures particularly mosquito resistance to insecticide (Long lasting insecticide treated nets and indoor residual spray) and needs for antimalarial medicines.

In this article, we seek to determine the rural sero-prevalence of *Plasmodium falciparum* malaria; a key component for disease burden estimation. Theoutcome of this study would be useful to policy makers and program implementers on the progress being made as we gear towards malaria eradication in Nigeria.

MATERIALS AND METHOD

Study locations and time of study – Kwall District and Jengre communities both in Bassa Local Government Areas of Plateau State, north-central Nigeria, situated at coordinates 9°56′00"N and 8°44′00"E. It has a landmass of 1,743 km^2 with an estimated population of 189,859 (2006 National Census).[13,14] It shares a woodland and tall grass savanna in which anopheline mosquito vector thrives substantially. The study was conducted between 1st and 4th May, 2017.

Study design – This was a cross-sectional study to allow us determine the sero-prevalence of *P.falciparum* malaria parasitaemia.

Study population This comprised of children and adults resident in these two rural communities

Sample size estimates Sample size was calculated to be 380 using the appropriate formula for a descriptive cross-sectional study.[15] where n≥ minimum sample size, Z≥ standard normal deviation and probability of 0.05 at 95% confidence interval, p≥0.05. p≥ prevalence (45% estimates from previous study),[11] d≥ tolerance limit, the minimum is 0.05 and q≥1-p.

ENROLMENT CRITERIA

Inclusion criteriaand exclusion criteria for the study Children and adults without age or gender consideration, resident in the two communities who visited the treatment facilities and were willing to participate in the study.

Sampling Technique A three stage cluster sampling technique was used in this study in which Bassa LGA was purposively. Following which Irigwe and Pengana Chiefdoms from the list of three chiefdoms in Bassa LGA were selected by simple balloting. Of the four administrative districts in these selected chiefdoms, two were further selected by simple balloting; Kwall and Jengre Districts respectively. In order that each subject would have an equal chance of being selected, one of every three was chosen for enrolment.

STUDY PROCEDURE

Community Mobilization – A collaborative meeting between the Roll Back Malaria Office, Plateau State Ministry of Health and the Malaria Drug Therapeutic Efficacy Testing and Surveillance Unit, North-Central Nigeria, was held in April, 2017 at the Jos University Teaching Hospital (JUTH) Paediatric Lounge to discuss the theme and activities to commemorate this year world malaria day (WMD). Highlights for the activities included a need to increase public awareness on malaria through the media houses, community screening, distribution of long lasting insecticide treated bed nets (LLITNs),malaria case management and advocacy visits to relevant stakeholders on the Plateau. Events also included live telephone questions and answers to the viewer/listener. It was deemed successful. In addition, other visits were made to the Bassa Local Government Council, community and opinion leaders.Public mobilization was done through letters to relevant groups inviting them to converge at the primary Healthcare centers (PHCs).

Study Procedure

Research team personnel comprising of Paediatricians, a community pharmacist and clinical medical students were grouped into four; a team for health education, on use and distribution of LLITNs, a team for initial clinical evaluation and

administration of semi-structured original questionnaires to study participants. Relevant medical information obtained included bio-data, history of symptoms, and recent use of antimalarial medications. Participants had general and systemic examinations including temperature, weight, respiratory rate, pulse rate, blood pressure. Relevant medical information obtained were entered into case report forms. The third team was responsible for malaria testing procedure.

Malaria testing

RDT kitts laboratory scientists used the SD Bioline Malaria Ag *P.f*(HRP-II) ™ RDT to determine whether children and adults had malaria; blood was obtained from the ball of the left thumb-prick samples. Those with positive RDT results were offered antimalarial treatment according to the Nigeria malaria treatment protocol which recommends the use of oral artemisinin-based combination therapy by weight bands for uncomplicated malaria or parenteral artesunate for severe malaria. The last team distributed LLITNs to participants.

Another team was concerned with dispensing of antimalarial medicines to those who tested positive to malaria.

Data collection A semi-structured interviewer administered questionnaire was used to collect relevant medical information. Information obtained included; biodata, presenting complaints, anthropometric measurements, temperature and relevant systemic examination. Malaria test results were also documented on the case record form. Verbal informed consent and or assent was obtained from the parents or guardians as applicable to age limits.

Methods of Data analysis

Data obtained from study participants were processed and analyzed using Stata 14.1 copyright 1985-2015 StataCorp, 4905 Lakeway Drive, College Station, Texas 77845 USA. Serial N0:301406310375. Demographic characteristics and nominal variables of study subjects were expressed on frequency table and percentages. Dichotomous variables were displayed in a bar chart.

Result

The age and sex distributions of population studied is as shown in **Table 1** below:

Table 1: Age and sex distribution of study participants.

Demographic characteristics	Number(N)	Percent (%)
Age (years)		
0 – 5	195	34.6
5 – 17	289	51.2
18 - 80	80	14.2
Age total	564	100
Sex		
0 - 5		
Male	102	18.1
Female	93	16.5
6 – 17		
Male	131	23.2
Female	158	28.0
18 – 80		
Male	29	5.1
Female	51	9.1
Sex total	**564**	**100**

Fever was the presenting complaint in 34 (6%) of study participants. One participant presented with febrile convulsion. Majority, 472 (83.7%) had nosymptomatic,**Table 2.**

Table 2: Presenting symptoms of study subjects

Baseline presenting symptoms	Number (n)	Percentage (%)
Fever	34	6.0
Headaches	14	2.5
Body weakness	13	2.3
Vomiting	12	2.1
Reduced appetite	10	1.8
Abdominal pain	8	1.4
Convulsions	1	0.2
No complaints	472	83.7
Total	**564**	**100**

The overall *Plasmodium falciparum* sero-prevalence was 17.6%. Sero-prevalence among children aged 0 – 5 years was 24.2% compared to 34.3% in the adult sub-population, Figure 1.

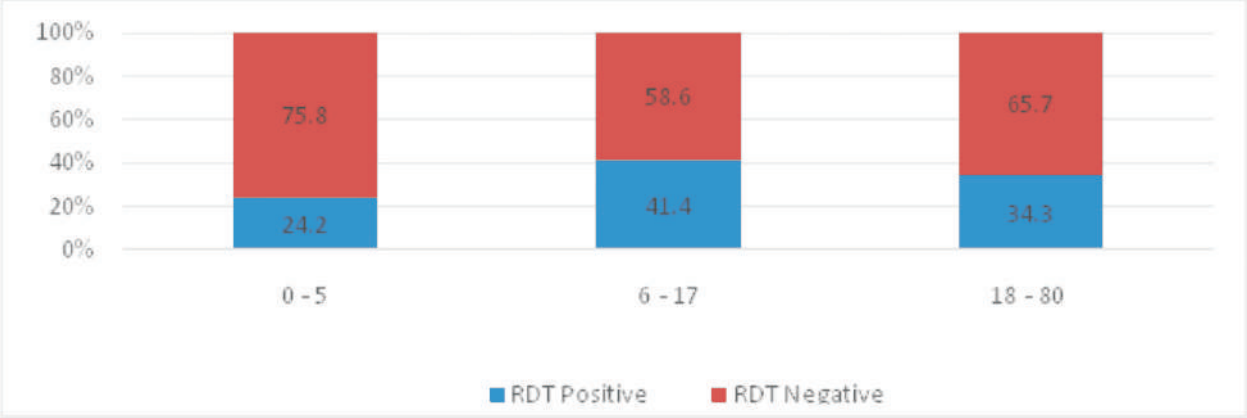

Figure 1: Percentage RDT test results by age category

Discussion

The *Plasmodium falciparum* malaria rural sero-prevalence of 24.2% among under-five children in the two communities studied was significantly lower than45.1% sero-prevalence in Plateau State reported in 2010.[11]This figure is similarly lower than 46.8%, 56.0%, 35.6%, 53.8% and 60.5% in the region-wide north-east, north-west, south-east, south-south and south-western Nigeria respectively from the same study cited above.*Plasmodium falciparum* malaria was the predominant specie (95.1%)[11]in the population studied. In a similar rural community sero-prevalence study in Anambra State, south-east Nigeria, Onyido *et al* reported a figure of 58.2% in 2011.[16]The find in our study is however, higher than 10.1% reportedby Adeoye *et al*[17]in 2011 among adult blood donors in Lagos, South-West Nigeria. The reason for the significantly lower prevalence rate in the current study may be because of the difference in two populations studied. Whereas, the study in Lagos was among apparently healthy adult blood donors in urban areas compared to the under-five children in a rural communities our study.

The rural sero-prevalence of 24.2% in our find is also significantly lower than 57.6% in Plateau State reported by the national malaria indicator survey (NMIS) 2015[11]. This current prevalence is comparable to 55.3% and 57.1% in neighboring rural communities of Benue and Nassarawa States, north-central Nigeria respectively and 54.4% in Osun State, south-south Nigeria[11]. Our find is however, significantly lower than 19.5%, 1.9%, 21.1% and 29.9% reported in 2015 from Rivers State, Lagos State, Abia State Yobe States respectively.[11]The variations in the community sero-prevalence rate may be due to the differences in

climatic andthus, mosquito bionomics including mosquito biting and inoculationrates, transmission intensity in the various geo-political zones of the country.Secondly, the large sample size from the NMIS report is way larger than the one in our study.

Malaria transmission in Nigeria is intense and stable but sub-perennial in dry Savannah ecotypology where its transmission is significantly low during the dry season (November/December to April/March). The malaria stability is supported by the presence of efficient malaria vectors particularly *Anopheline gambiae, Anopheline. arabiesis* and *Anopheline. funestus.*Unique environmental factors such as temperature (20^{O}C to 30^{O}C), rainfall in excess of 10cm, relative humidity greater than 60% are also known to be important epidemiologic determinants which coincided with the period of our study. Perhaps, the prevalence rates may be higher in the raining seasons.[18]

Compared to NMIS reports of 2010 and 2015, the difference of 12.5% is troubling. This trends perhaps suggest that, public access, ownership and utilization of malaria preventive, diagnostic and therapeutic measures may have dwindled overtime in our rural communities. For example, the NMIS clearly showed a decline in the levels of knowledge among pregnant women on ways to avoid exposure to mosquitoes. Compared to 33% and 13% in 2010, only 17% and 10% respectively sleep under LLITN and or keep doors/windows closed in 2015. Similarly, the trends in LLITNs ownership has dropped from 78% to staggering figures of 61%. In addition, in Plateau State, 38.4% households' surveyed slept under insecticide treated net the previous night. Only an average of 0.8% had access and utilize indoor residual spray in north-central zones of the country.[11]One will not therefore, be surprised with significant increase in the malaria sero-prevalence from 45.1% in 2010 to 57.6% in 2015.

Compared to the adult sub-population, the malaria sero-prevalence among the school aged children was low in the current study. The reason for this unexpected find is not immediately clear. But we speculate that, larger proportion of the school aged population in the current study may have accounted for the higher prevalence figure we found otherwise, it would have been surprising since malaria disease burden has traditionally been found to be higher among the under-five sup-population of children.[19,20]

This prevalence figure is however, nearly one-thirds lower than 63.3% and 69.0% reported using light microscopy by other researchers from Angiama community of Bayelsa State, South-South Nigeria[21]and Aguleri, Anambra State South-East, Nigeria [22] respectively.

In sharp contrast to rising rural malarial sero-prevalence in north-centralNigeria from 45.1% in 2010 to 58.6% in 2015, Papua New Guinea reported a steady decline in her national prevalence rate in which, its reported 11.1% (95 CI 8.5 - 14.3), 5.1% (95% CI 3.6 - 7.4), and 0.9% (95%CI 0.6 - 1.5) in 2008-2009, 2010-2011 and 2013-2014 respectively.[23] Similarly, recent works from Haiti and Dominican Republic clearly show sustained gains in malaria control activities raising hopes on malaria elimination in those regions of the world. [24,25]

As Nigeria gears up towards malaria elimination, measurement of time sensitive malaria burden, active disease surveillance, expansion of research on vector bionomics and deployment of effective vaccines are crucial to curb this ancient scourge in our rural settings. These are ambitious calls of the government of Nigeria to make.

Conclusions

Plasmodium falciparum malaria transmission continues to occur in rural communities of Bassa Local Government Area of Plateau State.A slight decline in sero-prevalence was however noted. Research on innovative models that work such as malaria vaccines, mosquito bionomics and environmental sanitation to compliment the current malaria therapeutics may need be employed in our setting to achieve the global goal of malaria eradication.

Potential conflict of interest disclosure

The authors have no potential conflicts of interest to disclose.

Funding

Financial assistance were received for consumables and logistics from the research team members and the Bassa Local Government Authorities.

Acknowledgments

We acknowledged the Roll Back Malaria for providing RDT testing cassettes and required number of LLITNs for distribution.

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POSTTRAUMATIC STRESS DISORDER AMONG INTERNALLY DISPLACED VICTIMS OF BOKO HARAM TERRORISM IN NORTH-EASTERN NIGERIA

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Key words: PTSD, IDPs, Boko Haram, North-Eastern Nigeria

ABSTRACT

Background: *A large number of youth are often directly involved in armed-conflict, and therefore are at greater risk of developing a wide range of mental disorders including posttraumatic stress disorder (PTSD). However little is known about the prevalence of PTSD among youth who constitute a large work force.*

Objective: *This study was carried out to assess the prevalence of posttraumatic stress disorder among Internally Displaced youth exposed to Boko Haram terrorism in North-Eastern Nigeria. It also assessed the socio-demographic factors associated with PTSD in this population.*

Method: *A cross-sectional study that employed a consecutive sampling technique to select eligible subjects undergoing a Citizenship and leadership training at Citizenship and Leadership training institute Jos, Plateau State. The posttraumatic stress disorder module of Mini International Neuropsychiatric Interview was used to assess for current symptoms of PTSD.*

Results: *The results show that more than two-third of the respondents were unemployed youth with secondary level of education and had low or no stable income. More than 63% of the respondents were diagnosed with PTSD. Educational status (p=0.002), marital status (p=0.001) and income before displacement (p=0.010) were the significant factors associated with PTSD.*

Conclusions: *The results point to the importance of screening and treatment for traumatic armed conflict victims, with particular attention to youth who had low education and low income levels as well as being never married or widowed.*

Key Words: *PTSD, sociodemographic factors, Bokoharam terrorism, North Eastern Nigeria.*

POSTTRAUMATIC STRESS DISORDER AMONG INTERNALLY DISPLACED YOUTH IN NORTH-EASTERN NIGERIA

Nigeria has had a long and unfortunate history of communal and ethno religious conflicts since its return to civilian rule in 1999, with the North-Central and North Eastern regions being the areas worst hit.[1, 2] For example, since the upsurge of the Boko Haram terrorism in 2009, the North-Eastern region which Adamawa, Borno and Yobe States belong, has continued to witness incessant hostility and violent confrontations by the terrorists, causing a large scale death and displacement of people.[2]

The term 'Internally Displaced Persons' (IDPs) has been used to describe 'persons or groups of people who have been forced or obliged to flee or leave their homes or places of habitual residence as a result of, or in order to avoid the effects of armed conflicts, situations of generalised violence, violations of human rights, natural or human-made disasters, and who have not crossed an internationally recognised state border.[3]

As at the end of 2016, the total number of IDPs in North East and North Central Nigeria is estimated at over 2 million people,[4] with approximately 1.7 persons who have been displaced as a result of the Boko Haram terrorism in the North Eastern States,[5] making Nigeria host to the sixth largest IDPs population in the world.[6]

The IDPs are often described as poly-traumatized population because they experience both the direct impact which is due to violence and injury and the indirect impact during mass movement due to physical exhaustion, hunger and snake and other animals' attack. Their conditions are further compounded by a variety of post conflict hardships such as adaptation to new environment, overcrowding, physical and sexual abuses as well as infectious diseases with increased mortality among other vulnerabilities, which are also extremely traumatic.[7]

Posttraumatic stress disorder (PTSD) is frequently reported among individuals who experience armed conflict related stressful events. This disorder is characterized by symptoms of re-experiencing, avoidance and increased arousal following exposure to a stressful event that threatens life or physical integrity to self or others.[8] If left untreated, the condition may become chronic with a huge health care costs and economic losses.[9]

The lifetime prevalence of PTSD in general peaceful population ranged between 0% in Swizerland[10] and 7.8% in United States of America,[11] while a disproportionately large number of people who have lived in war zones have been found to suffer from symptoms of PTSD,[12] with incredibly high rates of 42-80% noted among internally displaced persons in Nigeria,[13-14] Uganda,[15] South Sudan[16] and Kenya.[17] However, previous studies in Nigeria did not particularly evaluate the prevalence of PTSD among the youth who are often engaged in the conflict and therefore more likely to experience the greatest exposure to the primary traumatic events.

In Nigeria, citizens between ages 15 and 35 are often regarded as the youth, they also form more than 50 percent of the total population and constitute a large work force of the nation.[18] Thus, the onset of PTSD in youth has a particularly damaging impact on the environment and the Country's economy.

It was against this background that this study aimed at evaluating the prevalence and sociodemographic factors associated with PTSD among internally displaced youth affected by the Boko Haram terrorism in North-Eastern Nigeria.

METHODS

The study was conducted in November and December 2016. It was a cross-sectional survey that was conducted among internally displaced youth undergoing six weeks United Nations Development Programme (UNDP) sponsored training at the Citizenship & Leadership Training Institute in Jos, Plateau State, Nigeria. This centre admits citizens mostly from within the West African Sub-region, with a core mandate of *providing training for the development of citizenship and leadership for public benefit.*[19] The study population comprised all the 375 internally displaced youth, aged 15 to 35 years undergoing the training. Permission was granted by the UNDP officials and Participants were first of all given a 15 minute general health talk during which, it was made clear to them that those willing to access medical services can visit the medical outreach team stationed at the institute's clinic for medical check up and treatment.

Consecutive sampling method was employed to recruit participants who visited the centre's clinic. The aim of the study was first of all explained to them, after which they were assured of their confidentiality before verbal consent was obtained from those willing to be interviewed. It was made clear to all of them that the interviews were entirely

voluntary and that they can withdraw at any stage if they so wish and still benefit full training and medical care. Data were collected by Psychiatrists and Psychologists who are conversant with the use of the survey instruments. Those identified with any psychological disorders were commenced on treatment while the training lasted and thereafter referred to mental health facilities in their respective States. Their contact numbers were collected for a follow-up telephone interview.

A total of 302 people gave consent to participate in the study, but 10 withdrew after commencement of interview. The remaining 73(19.5%) did not visit the clinic and therefore they did not participate in the study.

Demographic variables were assessed using a Sociodemographic Questionnaire designed by the researchers. This sought information on socio-demographic data (age, gender, level of education, marital status, occupation, individual monthly income, religion and ethnicity.

The PTSD module of the Mini International Neuropsychiatric Interview (M.I.N.I)[20] was used to assess for PTSD symptoms. This is a brief structured interview for major axis-1 psychiatric disorders in DSM-IV and ICD-10. It specifically asks question about the past month symptoms of PTSD. The M.I.N.I-PTSD module has been used in Nigeria[21]

The statistical package for social sciences version 20 (SPSS-20) Software package was used to analyze the data. The results were presented using simple descriptive analysis. Chi-square test was used to investigate the difference between categorical variables and their associations. Values of $P<0.05$ were considered statistically significant.

RESULTS

Socio-demographic characteristics of respondents and prevalence of PTSD

A total of 302 participants gave consent to participate in the study, but 292 interviews comprising 202(69.2%) males and 90(30.8%) females, with mean age of 27.3±6.23 years and predominantly muslims (99.6%) of the Kanuri, Fulani and Hausa ethnic groups were used in the analyses. Majority of the participants belonged to occupational groups V; 70(24%) and VI; 172 (58.9%), with estimated monthly income below N20, 000.00; 198(67.8%) before displacement

More than half of the participants were never married 170(58.2%). The rest; 94(32.2%), 10(3.45) and 18(6.2%) were married, previously married and widowed respectively.

All the respondents were screened positive for trauma exposure related to the Boko Haram terrorist act in North-Eastern Nigeria, out of which 63.7% were diagnosed with PTSD (Table 1:).

OCCUPATIONAL CLASSIFICATION OF THE PARTICIPANTS

The occupational classification of participants was done using the the protocol designed by Boroffka and Olatawura.[22] This criterion classifies occupation into six (6) groups (I-VI) as follows:

Group I consists of professionals with university degrees (doctors, teachers, lawyers, scientists and high government officers).

Group II consists of professionals without university degrees (administrators, high clerical and supervisory personnel's, large scale farmers, entrepreneurs and armed forces officers).

Group III consists of clerks, motor vehicle drivers, mechanics, tailors, butchers, soldiers, police and small-scale entrepreneurs.

Group IV consists of barbers, goldsmiths, palm wine tapers and small- scale farmers.

Group V includes laborers and petty traders.

Group VI consists of full time house wives, unemployed educated youths and apprentices.

This system of classification has been previously used among Nigerians subject.

ASSOCIATION BETWEEN PTSD AND SOCIODEMOGRAPHIC CHARACTERISTICS OF RESPONDENTS

The sociodemographic factors associated with PTSD among the respondents include, level of education, income level and marital status; with having low level of education ($p<0.002$), low income ($p<0.010$) and being a widow ($p<0.001$) being more likely to develop PTSD (Table 2:)

Table1: Socio-demographic characteristics of respondents

Variables	Response	Freq.	%
Age	(mean± SD)	27.3±6.2	
Gender	Male	202	69.2
	Female	90	30.8
Level of education	No formal educ.	20	6.8
	Primary school	34	11.6
	Secondary	150	51.4
	Tertiary	88	30.1
Occupational groups I-VI	I&II (Teachers, high clericals , Scientist large scale farmers etc	4	1.4
	III (Small scale farmers, tailors drivers, butchers, herdsmen etc)	10	3.42
	IV (barbers, fuel stations attendants, goldsmiths etc)	36	12.3
	V (laborers and petty traders)	70	24.0
	VI (full time house wives, students, unemployed, apprentices etc)	172	58.9
Marital status	Never married	170	58.2
	Married	94	32.2
	Previously Married	10	3.4
	widow	18	6.2
Monthly Income	<N20,000.00	198	67.8
	N20,000-50,000	84	28.8
	>50,000	10	3.4
Religion	Islam	244	83.6
	Christianity	48	16.4
Ethnicity	Kanuri	101	34.6
	Fulani	71	24.3
	Hausa	65	22.3
	Others	55	18.8
PTSD	Yes	186	63.7
	No	106	36.3

Table2: Association between PTSD and Sociodemographic Characteristics of Respondents

Variables	PTSD		Statistics		
	Yes(186)	**No(106)**	X^2	**df**	**p**
Gender					
Male	132(65.3%)	70(34.7%)	0.770	1	0.380
Female	54(60%)	36(40%)			
education					
education	16(8.6%)	4(3.8%)	14.70	3	0.002
primary	30(16.1%)	4(3.8%)			
secondary	92(49.5%)	58(54.7%)			
tertiary	48(25.8%)	40(37.7%)			
Occupation group(I-VI)					
I & 11 (Teachers, lawyers, large scale farmers etc)	0(0.0%)	4(3.6%)	9.34	4	0.960
III (Small scale farmers, butchers, herdsmen etc)	8(4.3%)	2(1.95)			
IV (barbers, goldsmiths, small-scale intreprenuers etc)	24(12.9%)	12(11.3%)			
V (laborers and petty traders)	48(25.8%)	22(20.8%)			
VI (full time house wives, students, apprentices etc)	106(57%)	66(62.3%)			
Marital status					
Never married	114(61.3%)	56(52.8%)	24.01	3	0.001
Married	56(30.1%)	38(35.8%)			
Previously married	0(0%)	10(9.4%)			
Widow	16(8.6%)	2(1.9%)			
Religion					
Islam	158(64.8%)	86(35.2%)	0.715	1	0.398
Christianity	28(58.3%)	20(41.%)			
Ethnicity					
Kanuri	65(37.0%)	36(31.0%)	2.51	3	0.473
Fulani	44(25.0%)	27(23.3%)			
Hausa	34(19.3%	31(26.7%)			
Others	33(18.7%)	22(19.0%)			

DISCUSSION

We analyzed 292 of the 302 respondents (96.7% response rate), majority were males. This is in contrast to the previous samples drawn from IDPs in Nigeria, where females rather than males were found to be more in numbers.[13-14] Our finding is expected, giving that the training itself was designed to change the mindsets and behaviours of youth regarding violence and insurgency which are often perpetuated by a large number of male youth.[23] Moreover, the Demographic Health survey in Nigeria reveals that, males are traditionally given more preference in terms of education, employment and leadership positions,[23] which could also be another plausible explanation for the dominance of male over female youth in this sample.

We found a 63.7% prevalence of PTSD, which is similar to the rates reported among internally displaced victims of armed-conflict in Nigeria and other African countries. In Nigeria for instance, Agbir et al[13] and Sheikh et al[14]found a 42% and 57.8% prevalence of PTSD respectively, among total samples of IDPs exposed to armed conflict in North-Central and North-Western Nigeria. These high prevalence were also reflected among internally displaced victims of war in Northern Uganda (54%) [15], Kenya (80.2%)[17] and South Sudan (48%)[16] respectively. Thus, our findings, as well as previous findings in Nigeria and other studies suggest that exposure to traumatic conflict are associated with increased prevalence of PTSD. However, the difficulty in comparing studies of different populations exposed to armed-conflict has to be emphasized because of variability in factors such as level of trauma exposure; time elapsed between exposure and diagnosis, other methodological differences and cultural factors. For instance, we presumed that the higher prevalence of PTSD in our study and that of Kenya vis-a-vis previous surveys in Nigeria, Uganda and South-Sudan may be linked to the variations in nature of the population studied.

This study revealed that low levels of education and income, which are components of low socio-economic status, were significantly associated with PTSD. However, these associations has to be interpreted with caution, giving that the sample was drawn from young adults, majority were secondary school students who had little or no source of stable income. Nevertheless, low socio-economy itself has been found to play a major role in the development and persistence of PTSD symptoms.[25,26] Perhaps, the victims lacked the recourses to cushion the various effects of trauma and therefore continued to face daily stressors like over-crowding, diseases out-break, famine and rape among other vulnerabilities.

A **high** proportion of the widowed and those never married reported PTSD symptoms. Creamer and colleagues[27] and Kessler and colleagues,[28] in their respective studies found that the unmarried and previously married men and women were at greater risk of developing PTSD than those currently married. These factors may be associated with reduced level of social support, with consequent weakening of the person's defence against trauma-induced stressors, thereby increasing individual's risk of developing psychological disorders including PTSD.[29]

Surprisingly, gender was not found to exert any significant influence on PTSD, which is in contrast to previous findings that reported a significantly higher prevalence of PTSD among females than males.[13,15,17,30] It has been documented that, in settings that are chronically affected by war or violence, the gender influence on the risk for PTSD becomes less important.[31] This assertion was supported by Wolfe, et al who found that PTSD rates following Gulf War combat experience were even higher in men than women.[31]

Similarly, this study did not find a significant influence of ethnicity and religion on the development of PTSD. Perhaps the violence generated trauma related stress symptoms to everyone that was exposed, irrespective of religious or ethnic affiliations. In addition, the number of Christian youth compared to their Muslim counterparts in this sample was too few to make any valid comparison.

CONCLUSION

This study confirmed that PTSD is highly prevalent among youth displaced by the activities of Boko Haram terrorists in North Eastern Nigeria. It also highlights the socio-demographic factors such as education, income, and marital status that were significantly associated with PTSD.

RECOMMENDATION

It is recommended that an effective model for the prediction of the development of PTSD as well as immediate and long-term mental health support for trauma victims especially the youth need to be

developed. In addition, mental health awareness campaigns for trauma victims to seek for mental health care and that will also target some of the factors associated with PTSD, such as low level of education, low income, being never married and widowed, needs to be incorporated into the emergency response for trauma victims.

STRENGTH AND LIMITATION OF THE STUDY

The strength of this study lies in the fact that it is one of the few surveys to examine the socio-demographic factors associated with PTSD among internally displaced youth in North-Eastern Nigeria.
The study however, had limitations that also need to be acknowledged. Firstly, this study cannot be generalized across population in Nigeria; rather, it is limited to internally displaced youth exposed to Boko Haram terrorism in North-Eastern Nigeria. Secondly, we narrowed our findings to PTSD, while other mental disorders such as depression, sleep disorders and other anxiety disorders may be part of the responses to trauma in some respondents.
Furthermore, this study did not include information on previous history of PTSD or other mental illnesses before the terrorists attack. It is possible that PTSD diagnosed with some respondents may have occurred prior to this violence.

ACKNOWLEDGEMENT

The authors wish to thank the Resident Doctors of the Jos University_Teaching Hospital (JUTH) who assisted with data collection. We would also like to thank the UNDP officials and the respondents for their cooperation during the survey.

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ASCENDING AORTIC DISSECTION IN THE DEVELOPING WORLD; CASE REPORT

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ABSTRACT

Aortic dissection is frequently a life threatening condition and is the most common emergency of the acute aortic syndromes. Left untreated or poorly treated; the mortality rate has been reported to increase by 1-3% per hour after presentation and is approximately 36-72% within an hour of diagnosis and 62-91% within one week. Various contributory factors related to human resources, technical resources, socio-economic constraints and other utilities in poor income countries with poor health indices also worsen the prognosis of acute aortic dissection. We have made an attempt to remind ourselves of the continued existence and challenges in managing this disease.

KEYWORDS: *Aortic Dissection, Mortality, Outcome, Underdeveloped*

INTRODUCTION

Aortic dissection occurs when a tear in the aortic intima exposes the underlying media to the hydrodynamic forces of blood within the aortic lumen leading to dissection within the media which may propagate anterogradely or less commonly retrogradely [1]. A false lumen is created by blood filling the space within the media between the intimal flap and the adventitia.

Ascertaining the exact incidence of aortic dissection is difficult because many patients die before the condition is recognized. The early mortality rate in patients with acute aortic dissection is very high, with up to a 1% per hour death rate reported in the first several hours before surgery for type A dissection [2].

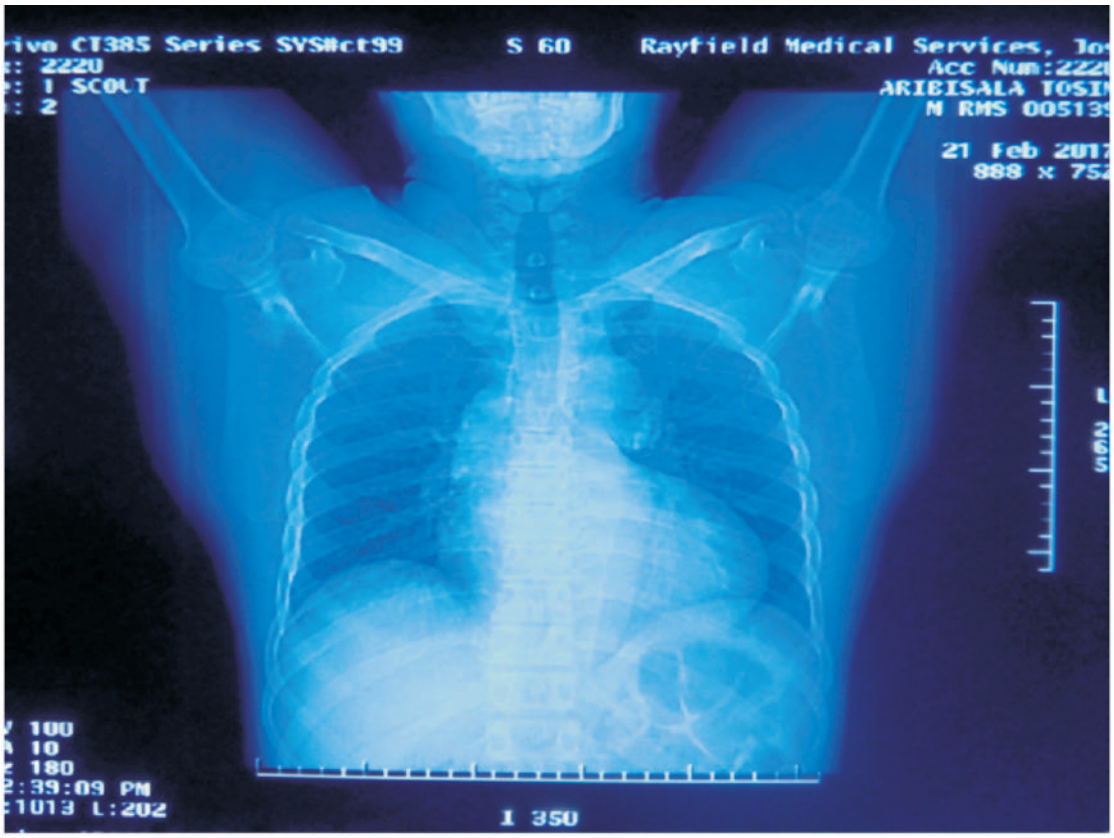
We report two cases of aortic dissection seen in the Jos university teaching hospital in February 2017.

CASE ONE

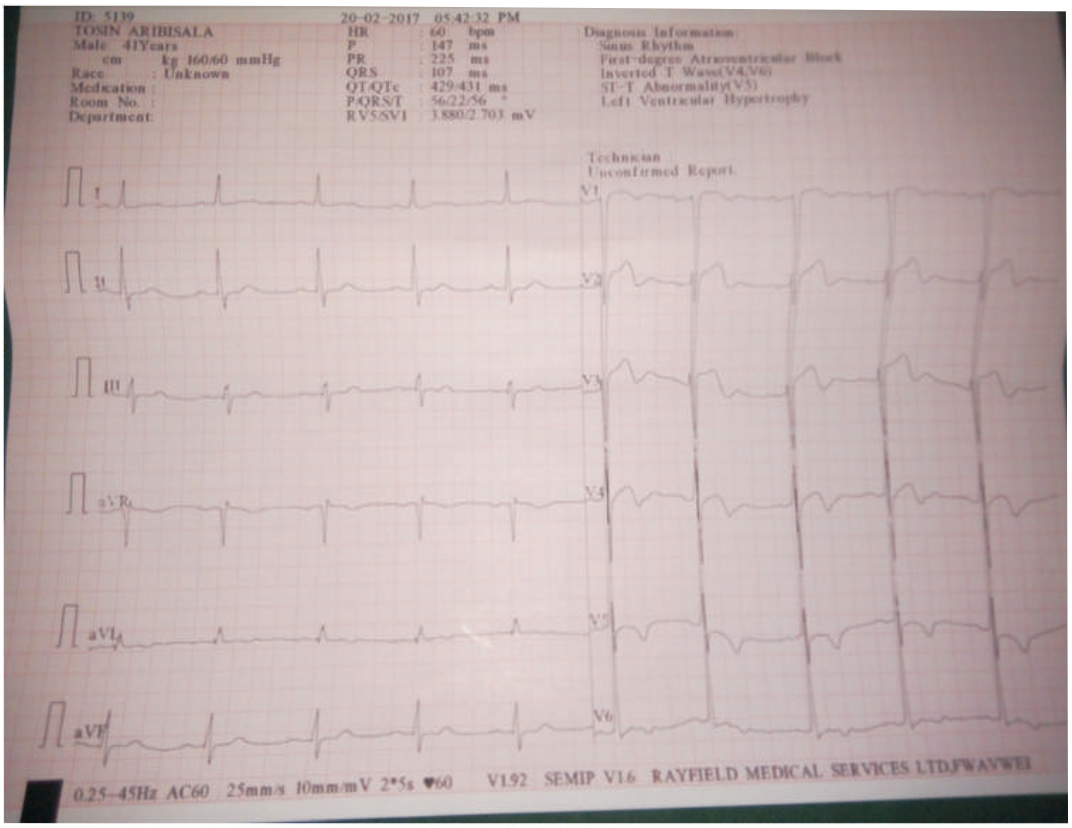
The first was Mr T.A, a 41 year old male Engineer and known hypertensive diagnosed eleven years prior to presentation but not compliant on medications, whopresented with a 4 hour history of sudden severe sharp retrosternal chest pain radiating to the back. There was associated breathlessness, a feeling of impending doom and electrical shocking sensation on the back and both lower limbs. No cough, diaphoresis, palpitation or intermittent claudication. He had an episode of severe sudden sharp retrosternal chest pain months before this episode. His mother is hypertensive but there was no family history of sudden death or stroke. He had 75mg of I.M diclofenac before presentation.

On examination, he was not in obvious painful distress, no cyanosis, no pedal oedema. Pulse rate was 60 bpm full volume and regular, the radial artery was thickened, BP was 160/60 mmHg on the right arm and 150/50 mmHg on the left arm. Apex beat was at the 6LICS, lateral to the midclavicular line and heaving. He had a normal S1, soft S2, 3/6 regurgitant murmur in the aortic area with an Austin Flint murmur at the apex. Fine crepitations were heard at the left middle and lower lung zones posteriorly.

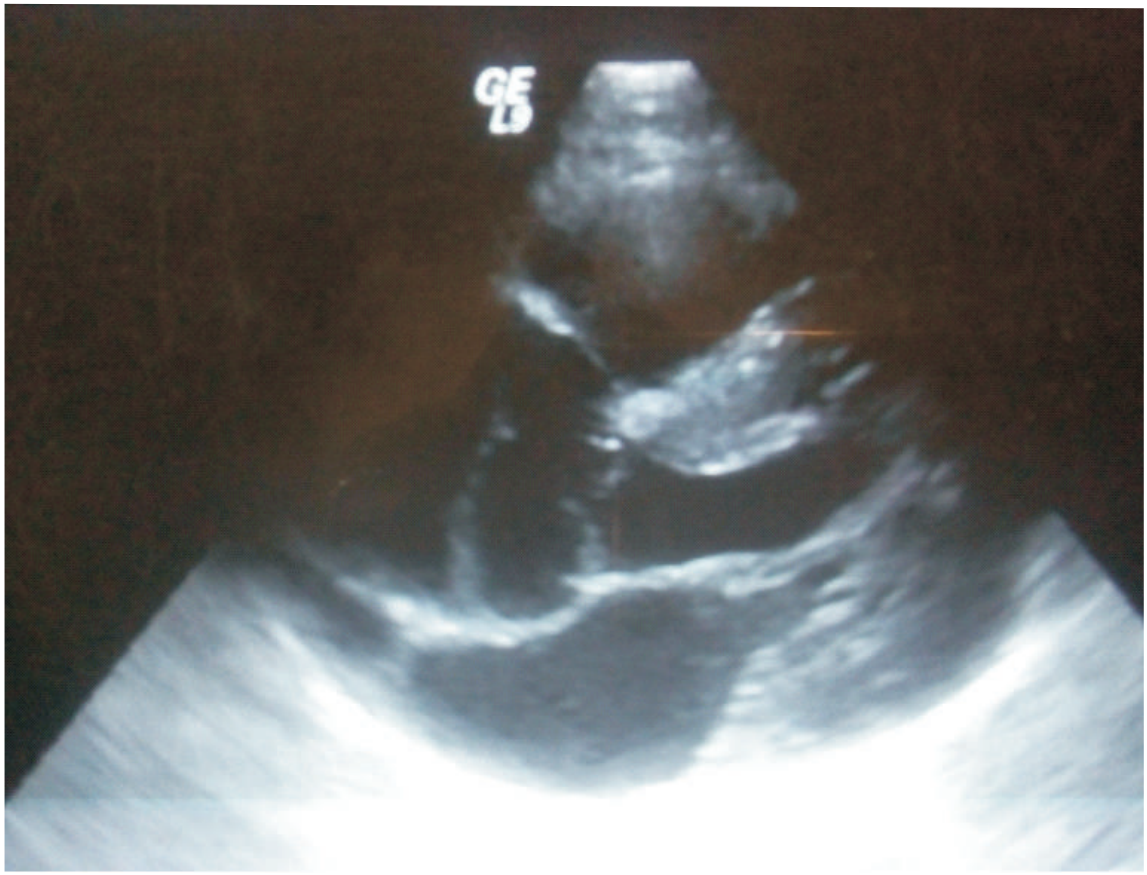
Chest X-ray (Fig 1) revealed cardiomegaly with CTR of 0.75 and widened/unfolded aortic silhouette.



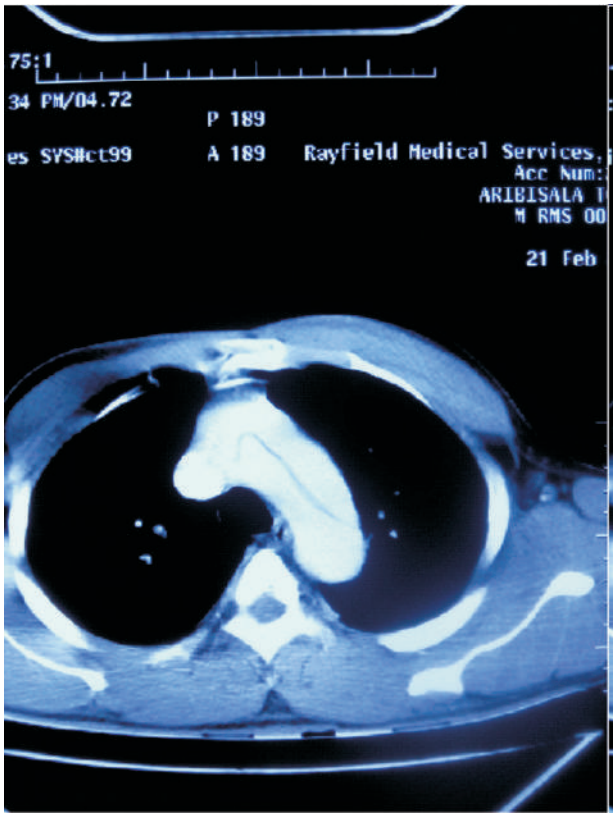
ECG (Fig 2) showed first degree AV block, left ventricular hypertrophy and T wave inversion in V4-V6.



Echo (Fig 3) revealed a dilated aortic root (Ao 48mm), severe aortic regurgitation, a mobile dissecting flap around the sinus of valsava and thickened interventricular septum and LV posterior wall.



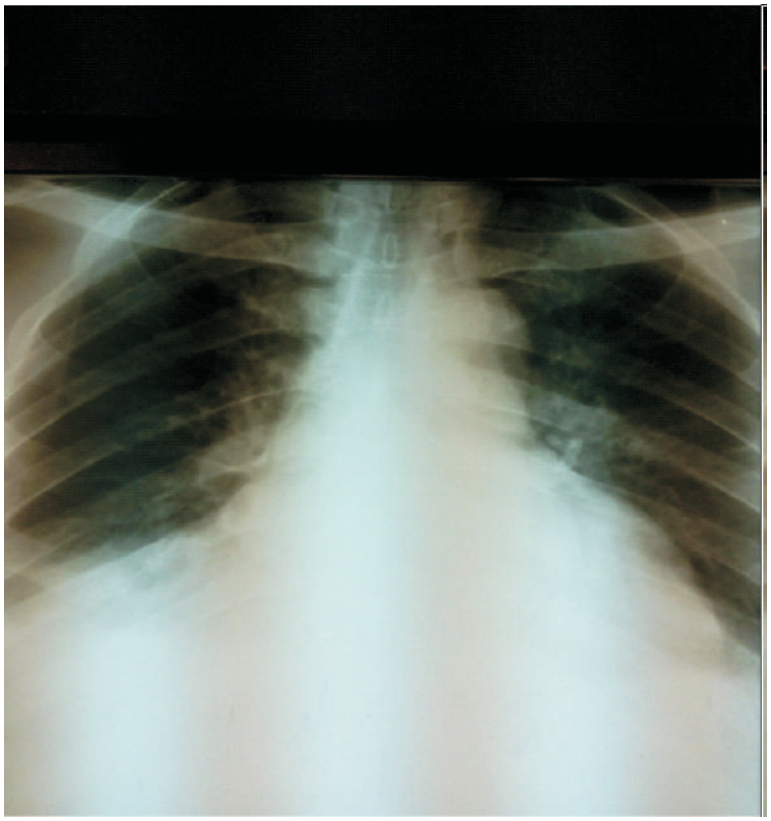
CT angiography (Fig 4,5,6,7) showed an extensive intimal flap in the ascending aorta up to the tip of the left subclavian artery.



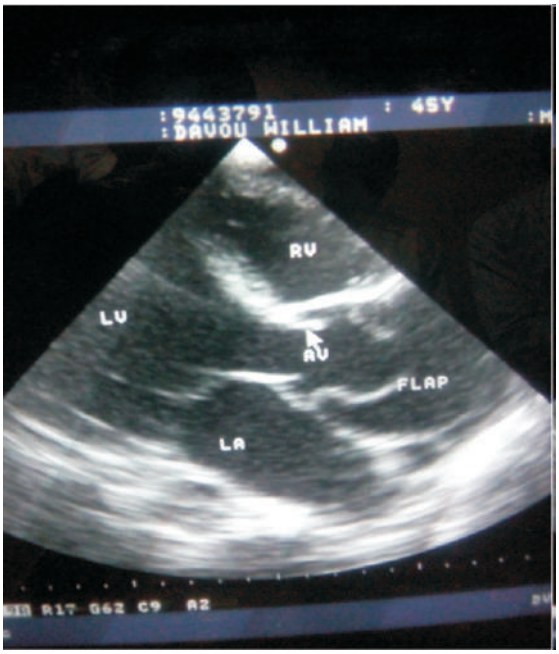
A diagnosis of Type Aortic dissection was made and he was placed on metoprolol, frusemide, lisinopril and referred to the cardiothoracic/vascular surgeon.

CASE TWO

Mr D.W, a 45 year old man who presented with abrupt sharp chest pain with breathlessness and cough. Chest X ray showed dilated aortic silhouette and increased CTR.



Echo revealed a dilated aorta (30mm at the root and 53mm at the bulb). There was a swinging intimal flap in the ascending aorta with prolapse of the aortic cusps into the LVOT. The left ventricle was dilated (LVIDD 69mm) and hypo contractile.



CT angiography could not be done due to financial constraints.

DISCUSSION

Population studies in the United States have estimated the incidence of aortic dissection to range from 2 to 3.5 cases per 100,000 person years [3]. In Sweden, the incidence of aortic dissection in men is reported to be 16 per 100,000 yearly [3]. In autopsy series, the prevalence of aortic dissection ranges from 0.2 to 0.8 % [4]. Aliyu and coworkers reported a case of intramural aortic haematoma in an 11 year old girl with Marfan's syndrome in Kano, Northwest Nigeria [5]. Sule AZ et al reported a case series of infrarenal abdominal aortic aneurysm (without dissection) in Jos, Nigeria [6].

Aortic dissection is rare in individuals younger than 40years of age [7]. Ascending aortic dissection occurs most commonly in individuals between 50 and 60 years of age while descending aortic dissections are more commonly encountered in older individuals with a peak at 60 to 70 years of age [8]. The typical aortic dissection patient is a male in his sixth decade of life. However, the presentation may be variable and a high index of suspicion should be entertained. It is an uncommon condition and several other conditions predispose the aorta to dissection. Most resulting from disruption of the normal architecture and integrity of the aortic wall.

The interplay of three factors are thought to be responsible for the pathogenesis of most cases of aortic dissection [9]. First is an abnormality or weakening of the aortic media which may occur with aging, in some congenital cardiovascular anormalies and with the fibrinillopathies. The second is an agent of intimal injury or tear as observed in atherosclerosis or hypertension. And the third is the systemic blood pressure that is responsible for a pressure head that drives blood to dissect the aortic wall [9]. Hypertension occurs in approximately 72% of all patients who suffer aortic dissection [10]. Hypertension causes alterations in the elastic properties of the arterial wall and increases stiffness thereby predisposing to aneurysm or dissection. However, hypertension alone is not usually associated with significant aortic root dilation [8]. Cystic medial degeneration commonly underlies aortic dissection and several genetically triggered disorders of connective tissue like Marfan's syndrome, Loeys-Dietz syndrome, familial Thoracic Aortic Aneurysm syndromes and vascular Ehlers-Danlos syndrome [11]. Apart from hypertension, the patient did not have features suggestive of these genetically triggered disorders like skeletal or craniofacial abnormalities. The complication of aortic dissection in Marfan's syndrome however, usually presents between 30-50 years of age [12] ,the age group into which these patients fall. Syphilitic aortitis can cause aortic dissection but the clinical features suggesting primary, secondary or tertiary syphilis were lacking in these patients and the short/acute/emergent presentation of the first case didn't give room for investigating syphilis as a probable cause of the dissection. None of the patients volunteered history of ingestion of cocaine of other psychosocial drugs. Cocaine abuse (particularly crack cocaine) accounts for less than 1% of cases of aortic dissection [8].

Other disorders associated with aneurysm and dissection include Bicuspid or unicuspid aortic valve, Noonan syndrome, supravalvular aortic stenosis, aneurysm-osteoarthritis syndrome, aberrant right subclavian artery (Komerrell diverticulum), right sided aortic arch, polycystic kidney disease and Alport's syndrome in males [3].

The presentation of aortic dissection is that of sudden onset chest or back pain that migrates as the dissection progresses [13]. Both cases had abrupt onset chest pain as reason for presentation. Although tearing is the classic description, the pain is often described as sharp. Aortic dissection can also be painless in about 10% of patients especially those with neurologic complications from the dissection, those with Marfan's syndrome, diabetes mellitus, previous aortic aneurysm or prior cardiac surgery [9,13]. Patients can present with hypertension or hypotension (due to cardiac tamponade or haemopericardium). The first case had hypertension but the second case did not have hypertension neither were there echo features suggestive of pericardial effusion. He however had a dilated heart that was hypo contractile and unlikely to sustain an elevated blood pressure. Acute congestive failure related to ascending aortic dissection generally results from acute severe aortic regurgitation which both cases had.

Despite our ability to recognize this life threatening condition, the absence of such facilities like transoesophageal echocardiography and lack of facilities for appropriate surgical intervention and the cost of such intervention if sourced abroad are severe limiting factors to the management of this condition in our setting.

There is the need to improve on the level of service delivery which will reduce the need for medical

tourism and the preventable death sentence(s) meted on most patients who come down with this condition in our setting.

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CORRELATION BETWEEN ULTRASOUND ESTIMATED FETAL WEIGHT IN TERM PREGNANCY AND ACTUAL BIRTH WEIGHT AMONGST PREGNANT WOMEN IN JOS

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Abstracts

Background: *High rate of perinatal mortality is still a major cause for concern in developing countries such as Nigeria. A large portion of this problem is related to birth-weight which remains the single most important parameter that determines neonatal survival. A simple and accurate method of estimating intrauterine fetal weight that can be easily applied to all pregnancies is thus an important means of reducing perinatal mortality and morbidity.*

Objective: *To determine the correlation between ultrasound estimated fetal weight in term pregnancy and actual birth weight amongst pregnant women in Jos, North-Central Nigeria*

Methods: *This research was a prospective cross-sectional hospital based study correlating sonographic estimated fetal weight at term with actual birth weight in Jos, North-Central Nigeria.* ***U****ltrasound estimated fetal weight was calculated using a combination of the biparietal diameter (BPD), abdominal circumference (AC), and femoral length (FL) usingHadlock formula, inbuilt in ALOKA SSD-4000 ultrasound machine fitted with 3.5MHz curvilinear transducer.*

Results: *A total of 400 women were recruited for the study. The mean maternal age was 29.35 years, and the mean gestational age at delivery was 38 weeks and 6 days. The mean actual birth weight was 3209.31 ± 497.52g while the mean ultrasound estimated fetal weight was 3177.85 ± 533.01g.There was an overall strong correlation between ultrasound estimated fetal weight and actual birth weight (r=0.835) and the difference was not statistically significant (p>0.001.). Also, 75% of the estimates were within 10% of the actual birth weight.*

CONCLUSION: *Ultrasound estimated fetal weight correlated strongly with actual birth weight especially for babies with normal birth weight. However, for babies at the extremes of birth weight, ultrasound estimated fetal weight would need to be correlated with physical examination (including clinical estimation) to avoid unnecessary obstetric intervention.*

KEYWORDS: *Correlation, ultrasound, fetal weight, actual weight, term pregnancy*

INTRODUCTION

Accurate estimation of fetal weight is of paramount importance in the management of labour and delivery. In the last decade, estimated fetal weight has been incorporated into the standard routine ante partum evaluation of high-risk pregnancies and deliveries. In instances like diabetes in pregnancy, vaginal birth after a previous caesarean section, and breech presentation, estimation of fetal weightwill greatly influence their management[1]. Also, when dealing with anticipated preterm delivery, perinatal counselling on likelihood of survival, the intervention undertaken to postpone preterm delivery, optimal route of delivery, or the level of

hospital where delivery should occur may be based wholly or in part on the estimation of expected birth weight. Categorization of fetal weight into either small or large for gestational age may lead to timed obstetric interventions that collectively represent significant departure from routine antenatal care[2,3].

High rate of perinatal mortality (39-130 per 1,000 births) is still a major cause for concern in developing countries such as Nigeria[4]. A large portion of this problem is related to birth-weight which remains the single most important parameter that determines neonatal survival[5]. Hence, simple and accurate method of estimating intrauterine fetal weight that can be easily applied to all pregnancies is an important means of reducing perinatal mortality and morbidity. Birth weight is a composite of fetal growth and length of gestation, each of which has different contributions and different sequelae. Removing the contribution of gestational age, birth weight remains the single most important parameter that determines neonatal survival[6].

Basically, there are three groups of birth weights that are important to the clinicians; thus, the low birth weight, the normal birth weight, and the macrosomic babies. It is estimated that 16% of live born infants have low birth weight, a condition associated with high perinatal morbidity and mortality. On the other hand, fetalmacrosomia is associated with maternal morbidity, shoulder dystocia, birth asphyxia, and birth trauma[7]. It has been suggested that accurate estimation of fetal weight would help in successful management of labour and care of the newborn in the neonatal period and help avoid the complications associated with fetalmacrosomia and low birth weight babies, thereby decreasing perinatal morbidity and mortality[8]. To assess the risk of macrosomia, other known risk factors such as diabetes, should also be taken into account. To determine the mode of delivery, clinical assessment of pelvic capacity should be added to the clinical and sonographicfetal weight estimation, with consideration of the risk factors for macrosomia[9].

Several requests by the Obstetricians to the Radiology Department are seen on every antenatal clinic day in Jos University Teaching Hospital, for estimation of fetal weight. This is known to guide in planning delivery. Consultation is also seen for estimation of fetal weight in a patient in labour in the labour room. This also helps in decision making on the mode of delivery. Establishing the exact correlation between ultrasound estimation of fetal weight and actual birth weight would help enhance decision making and the margin of error would help predict possible unwanted complications that may arise within the extremes of this error margin . It is this anticipated positive contribution that prompted the desire to conduct this study in Jos, North-Central Nigeria.

MATERIALS AND METHODS:

Women with singleton term pregnancy in early labour, or booked for labour induction, or elective caesarean section had ultrasound estimation of fetal weight using a combination of the biparietal diameter (BPD), abdominal circumference (AC), and femoral length (FL) i.eHadlock formula[10] inbuilt in the ALOKA SSD-4000 ultrasound machine fitted with 3.5MHz curvilinear transducer machine.

Before the examination, informed consent was obtained from the patients. Thereafter, the patients were asked to lie on their back on the examination couch. A gel was applied to the anterior abdomen and a transducer from the ultrasound machine was moved gently over the abdomen to enable the visualization of the fetal body parts.

The biparietal diameter, abdominal circumference and femoral length were then measured by the reseacher. The biparietal diameter (BPD) was measured at the level of both thalami and cavum septum pellucidum, from inner to outer table of the skull bones. Abdominal circumference (AC) was measured at the level of the bifurcation of the hepatic vein and gastric bubble. The abdominal imaging plane was a true transverse cut at the level of the fetal liver and stomach, including the left portal vein, at the umbilical region and ensuring that the aorta and IVC are circular. Femoral length (FL) was determined with the femur along the vertical axis seen transversely excluding the femoral head and epiphysis. The transducer was rotated until the longest possible image of the bone was achieved and both cartilaginous ends seen as blunt ends with a strong acoustic shadow posterior to the shaft. These measurements were taken in the appropriate, well-described fashion[11].

After delivery, the actual birth weight of each participant's neonate was measured within 30 minutes by trained assistants (midwives) at the labour ward using a desktop baby scale weighing machine and the weight recorded to the nearest 10g. The actual birth weight obtained was then compared

with ultrasound estimated fetal weight by the researcher.
Only neonates delivered within 72hrs of ultrasonic fetal weight estimation were used for this study. This is to ensure that the fetus does not add significant weight between the period of ultrasound fetal weight estimation and time of delivery. Calibration of the weighing scale was done each day to avoid zero error.

STUDY AREA: The study was carried out in the Department of Radiology, Jos University Teaching Hospital (JUTH), a tertiary health institution situated in the central part of Jos.

STUDY POPULATION: All pregnant women at term that came for antenatal clinic or are admitted into the maternity ward for elective delivery via induction of labour or caesarian section during the study period

STUDY DESIGN: This was a hospital based prospective cross-sectional study that spanned from march to september 2015 with additional samples taken between October and December 2016. Subjects were recruited based on the inclusion criteria stated below until the sample size was reached.

SAMPLE SIZE ESTIMATION

The sample size was calculated using the formula for

cross-sectional studies as shown[12];

$$\textbf{Sample size (n)} = \frac{P(1-P)Z^2}{d^2}$$

Therefore, $\mathbf{n} = \frac{0.50(0.50)\,3.8416}{0.0025}$

$\mathbf{n} = 384.2$

The sample size **n,** was then estimated to 400.

INCLUSION CRITERIA

1. Singleton pregnancies at term with intact membrane
2. Women being prepared for elective caeserean section or in early labour

EXCLUSION CRITERIA

1. Multiple gestations
2. Intrauterine fetal demise
3. Congenital anomalies (detected on ultrasound)
4. Unstable patients such as eclamptics
5. Delivery after 72hrs of ultrasonic fetal weight estimation
6. Severe medical conditions complicating pregnancy such as hypertensive disorders, HIV/AIDS, and sickle cell anaemia

ETHICAL CONSIDERATION: The study protocol was approved by the Research and Ethical Committee of Jos University Teaching Hospital.
STATISTICAL ANALYSIS: Computerized data base was obtained which was subsequently analysed and processed using SPSS software version 23.

RESULTS

A total of 400 pregnant women at term pregnancy were recruited for the study which lasted over a period of about 8 months. The mean maternal age was 29.35 years, and the mean gestational age at delivery was 38 weeks and 6 days. The maternal age range was 18 - 45 years. The mean actual birth weight was 3209.31 ± 497.52g while the mean ultrasound estimated fetal weight was 3177.85 ± 533.01g (Table1).
A total of 34 (8.5%) of the babies actually weighed less than 2500g while 38 (9.5 %) weighed ≥4000g as against 36 (9%) and 37(9.3%) respectively for sonographic weight estimation. Also, three hundred and twenty-eight (82.0%) actually weighed between 2500g and <4000g as against 327 (81.8%) on ultrasonography (Tables 2a and 3). Ultrasound estimated fetal weight correlated strongly with the actual birth weight with a linear relationship (Figure1).
The mean error in estimating large birth weight was 266.58±126.64g and low birth weight was 161.91 ±127.33g with an absolute error of 245.73±175.51g at 95% Confidence Interval (Table 4).
The overall mean absolute percentage error was 7.48 ± 5.35, and the percentage of estimate within 10% of actual birth weight (ABW) was 75.0%. The observed difference was not statistically significant ($p \geq 0.446$) with a correlation coefficient $r \geq 0.835$. However, a weak positive correlation with statistically insignificant difference was observed for both low birth weight ($r \geq 0.180$, $p \geq 0.309$), and high birth weight babies ($r \geq 0.155$, $p \geq 0.353$).Strong positive correlation ($r \geq 0.711$) exist in fetal weight estimation between 2500 - <4000g (Table5, Figure 2).

Table 1: Maternal and infant demographics

Characteristics	Mean ±SD
Maternal age (years)	29.35 ± 5.55
Gestational age at delivery (weeks)	38.91 ± 1.12
Actual birth weight (g)	3209.31 ± 497.52
USS weight (g)	3177.85 ± 533.01

Table 2a: Relationship between USS estimated fetal weight and actual birth weight

		Actual birth weight (g)			
		<2500	**2500-<4000**	...	**Total**
USS estimated fetal weight (g)	**<2500**	25(6.3)	11(2.8)	0(0.0)	36(9.0)
	2500-<4000	9(2.3)	308(77.0)	10(2.5)	327(81.8)
	≥4000	0(0.0)	9(2.3)	28(7.0)	37(9.3)
	Total	34(8.5)	328(82.0)	38(9.5)	400(100.0)

Table 2b: Pearson's correlation coefficient

		USS EFW (g)	Actual fetal weight
USS EFW	Pearson Correlation	1	0.835**
	P		0.000
	N	400	400
Actual fetal weight	Pearson Correlation	0.835**	1
	P	0.000	
	N	400	400

**. Correlation is significant at the 0.05 level

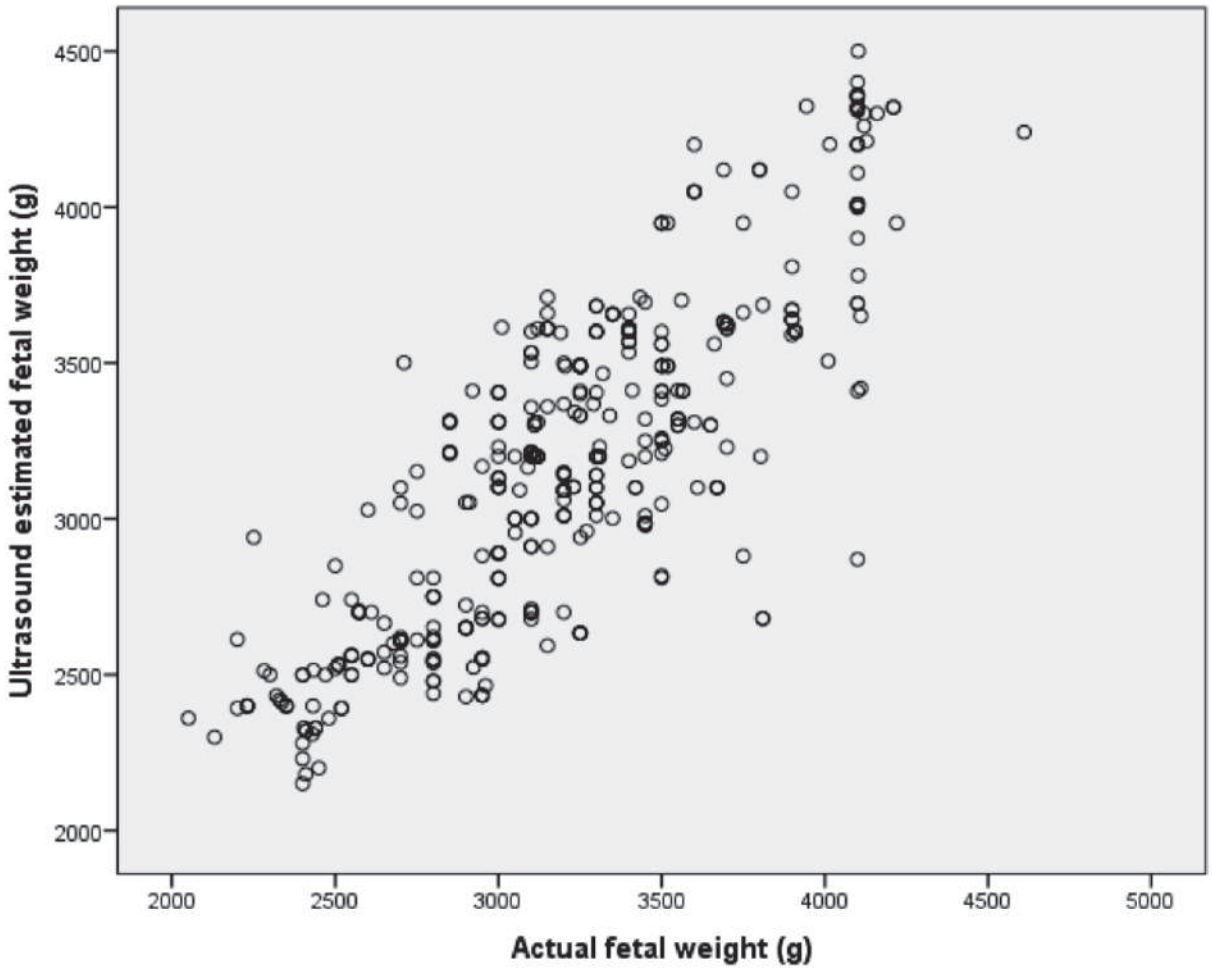

Figure 1: Scatter diagram showing the relationship between ultrasound estimated fetal weight (USS EFW) and actual birth weight (ABW)

Table 3: Relationship between the total number of sonographically predicted birth weight and actual birth weight

Birth weight classification	**Method**		χ^2	**P**
	Sonographic (%)	**Actual (%)**		
Low (<2500g)	36(51.4)	34(48.6)	0.057	0.811
Normal (2500-<4000g)	327(49.9)	328(50.1)	0.002	0.969
	37(49.3)	38(50.7)	0.013	0.908

Table 4: Mean error in birth weight prediction

Characteristics	Mean (g)	95% Confidence Interval (C. I.)
≥4000 g	266.58 ± 201.3	7 238.91 - 312.3 1
<2500 g	161.91 ± 127.3	3 244.13 - 297.2 2
Absolute erro r	245.73 ± 1755	1 167.47 - 929.4 8

Table 5: Accuracy and percentage difference between actual birth weight and USS EFW

Birth - weight stratum	USS EFW Mean ± SD	P value
Overall		
Mean percentage error	0.73 ± 9.18	
Mean absolute percentage error	7.48 ± 5.35	
Estimate within ABW ±10%	75.0%	
Pearson's correlation coefficient	0.835	0.446
<2,500g		
Mean percentage error	2.73 ± 8.72	
Mean absolute percentage error	7.02 ± 5.74	
Estimate within ABW ±10%	79.4%	
Pearson's correlation coefficient	0.180	0.309
2,500 - <4,000g		
Mean percentage error	1.03 ± 9.25	
Mean absolute percentage error	7.64 ± 5.29	
Estimate within ABW ±10%	240 (73.2%)	
Pearson's correlation coefficient	0.711	0.435
[illegible]		
Mean percentage error	1.21 ± 8.48	
Mean absolute percentage error	6.47 ± 5.52	
Estimate within ABW ±10%	86.8%	
Pearson's correlation coefficient	0.155	0.353

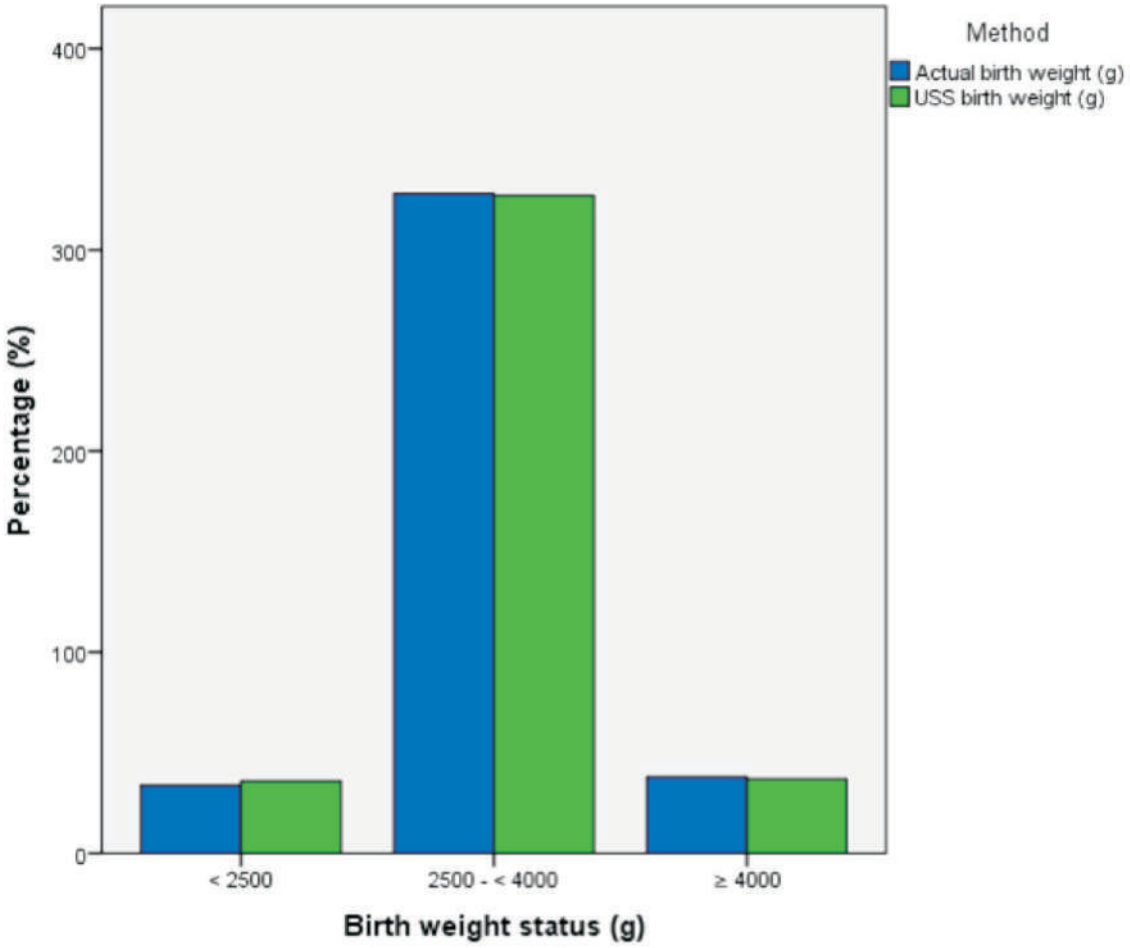

Figure 2: Bar chart of proportion of birth weight group as determined by USS and actual birth weight

DISCUSSION

Nigeria, and indeed, most countries in the sub-Saharan African region are currently having the world's worst maternal and infant mortality rates[13]. Prediction of pre-natal fetal weight is part of standard antenatal care which helps to reduce maternal risks associated with pregnancy such as prolonged labour, pelvic injuries, postpartum bleeding and pre- and peri-natal fetal risks such as shoulder dystocia and birth asphyxia[7].The tendency of ultrasound estimation of fetal weight to err towards normal when the infant was subsequently found to be either <2500 g or >4000 g is important because the estimation of fetal weight at these extremes is of relevance in clinical decision-making[15].

Accuracy of ultrasound estimated fetal weight was determined using absolute percentage error and weight within 10% of the actual birth weight (ABW). Themean absolute percentage error reflects the variability noted regardless of their direction and as such, is a much more accurate predictor of differences from actual birth weight than the mean percentage error[14]. Hence, the variation between predicted birth weight and actual birth weight was expressed in the form of mean absolute percentage error in this study. Overall, the correlation coefficient between ultrasound estimated fetal weight (USSEFW) and actual birth weight was +0.835, with mean percentage error of 0.73± 9.18, and mean absolute percentage error was 7.48± 5.33 and the difference was not statistically significant ($p \geq 0.446$).

Determination of weight within 10% of actual birth weight is considered acceptable accuracy[5]. In this study, 75.0% of fetal weight estimations were within 10% of actual birth weight. Although the accuracy of our estimations was comparatively good, one in fourfetal weight estimations was more than 10% different from the actual birth weight.This is consistent with findings of Eze*et al*[19] in lagos Nigeria,and Benacerraf *et al*[16] in Boston, who also obtained 75% of estimates within 10% of ABW.This finding is comparatively similar to that obtained by

Ugwu*et al*[17] in South-East Nigeria which shows 67.5% of estimates to be within 10% of ABW,andShittu*et al*[18]who obtained 68.0% in South-West. The findings may be attributed to the accuracy of USS in estimating birth weight at term in the studied population.

The mean actual birth weight in this study was 3209.31 ± 497.52g. This was similar to the mean actual birth weight of 3254 ± 622g reported by Shittu*et al*[20]in Ife, Nigeria, and 3080 ± 0.610 g by Swende[19] in Makurdi, Nigeria.However, it is significantly lower than 3,568 ± 496g documented in United Kingdom. This finding supports the report in literature which had suggested that birth weight of African babies is generally smaller than that of Caucasian babies[20]. The cause of the differences noted was not investigated in the study. However, technical limitations such as resolution power of our scanner and observer errors in measurements may have contributed. Socioeconomic status as well as racial differences may also have contributed as previously reported by Hadlock*etal*[21].

Ultrasound (USS) underestimated the low birth weights in 11 (30.6%) cases. That is, the proportion of low birth weights that were accurately estimated was 69.4% with **79.4%** of the cases within 10% of the ABW. However, a weak positive correlation exists between USS estimated fetal weight and the ABW and the difference was not statistically significant ($r \geq 0.18$, $p \geq 0.309$). A similar finding was reported by Shittu*etal*[18] in Ile Ife, Nigeria, who found out that ultrasound underestimated the low birth weights in only 33.3% of cases. Ugwu*et al*[17] obtained a lower value of 5.1%. The difference here may be due to the high operator dependence of the procedure.Moreover, there was no statistically significant difference ($p \geq 0.811$)in the number of sonographically predicted low birth weight fetuses and the actual number born with low birth weight.

The accuracy of the ultrasound estimation in this study was highest in birth weight range of 2500 - <4000g where 308(77%) of the fetuses fall within. Ultrasound underestimated the actual birth weight in only 10 (3.0%) cases and overestimated it in 9 (2.7%) cases. About 81.8% of cases were accurately estimated as normal birth weight. The correlation between USS estimated fetal weight and actual birth weight was +0.711 and the difference was not statistically significant ($p \geq 0.446$). This is similar to that obtained by Ugwu*et al*[17] who found out that babies with normal birth weights (2500 - <4000g) had significantly lower percentage error when compared with the clinical method, and showed positive correlation. A total of 361 (90.3%) of the fetuses were accurately estimated as low, normal or high birth weight.

Furthermore, ultrasound underestimated large birth weights in 24.3% of cases. This again means that the proportion of large birth weights (fetalmacrosomia) that were accurately estimated is 75.7% with 86.8% within 10% of the ABW. A weak positive correlation coefficient was obtained ($r \geq 0.155$) and the difference was not statistically significant ($p \geq 0.353$). Also, no significant difference was found ($p \geq 0.908$) in the number of sonographically predicted macrosomia and the actual number of macrosomic babies. A similar finding was also obtained by Eze*et al*[22] in Southwest Nigeria,where he found out that there was no statistically significant difference in the number of ultrasound EFW and ABW ($p > 0.05$).

The study have shown that overall, ultrasound slightly underestimated both low birth weight and high birth weight babies with a positive correlation between the estimated and actual birth weight, and the difference was not statistically significant ($p > 0.05$). Similar findings were also obtained by Kurmanavicius*et al*[23] who showed that USS tend to underestimate both low and high birth weight babies.

The relationship between birth weight and the direction of the estimation error was not due to a bias in the time interval between ultrasound and delivery as there was no significant relationship between infant birth weight and the time interval between ultrasound and delivery here. In this study, the ultrasound estimations were performed at most 3 days prior to delivery. This was similar to studies done elsewhere[17]. Although some authors studying reliability of ultrasound estimation of fetal weight have included estimations performed up to 14 days prior to delivery[17], others have restricted their data to estimations performed within 7 days for example Nzeh*et al*[25], or have attempted to correct for the time elapsed between the ultrasound and delivery by the addition of 25 -30g per day. These estimates were avoided in this study.

CONCLUSION

Ultrasound estimated fetal weight correlated strongly with actual birth weight. This implies that a high level of agreement exists between estimated fetal weight and actual birth weight. It can therefore

be assumed that sonographically estimated fetal weight appear to have truly predicted actual birth weights in the studied population. We also need to keep in mind that ultrasound measurements are operator dependent. Hence, care should be taken to ensure that sonologists with atleast minimum training, are involved in ultrasound measurements of fetal weight especially at theextremes of fetal birth weight.

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PRE-DEPOSIT AUTOLOGOUS BLOOD DONATION AS A TOOL FOR REDUCING RISKS ASSOCIATED WITH ALLOGENEIC BLOOD TRANSFUSION IN NIGERIA: IS IT WORTH NURTURING?

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Abstract:

Background: *Pre-deposit autologous blood donation (PAD) wherein patient's own blood is collected over a period of time in the lead up to a planned transfusion to the same patient may be a viable alternative to reducing the known and unknown risks often associated with allogeneic blood.*

Objectives: *To assess the practice of pre-deposit autologous blood donation at a hospital-based blood bank unit in north central Nigeria over a four year period.*

Materials and method : *This cross sectional study retrospectively assessed blood transfusion documents and records at the blood bank unit of Federal Medical Centre, Makurdi from 2009 to 2012.Information on pre-deposit autologous and allogeneic blood donations, types of blood donors and components or products utilized from the records and documents were analysed for proportions using Microsoft Excel and manual methods.*

Results: *Pre-deposit autologous blood donation was generally low (average 0.40%) and showed a gradual decline over the years; 0.79, 0.31, 0.27 and 0.21 percent in comparison with allogeneic blood donation (76.71, 78.21, 84.76 and 80.36%) average 80.02% and 22.50, 21.49, 14.95 and 19.44 average 19.60% for family replacement and VNRBDs respectively in the years 2009, 2010, 2011 and 2012 respectively. Whole blood and packed red cells transfusions were the predominant blood products utilized over the years with 96.64, 99.04, 97.83 and 98.18% (average 98.32)transfusedas whole blood while 2.57, 0.65, 1.90 and 1.61% (average 1.68%) was transfused as packed cells respectively. All the pre-deposit autologous donations and over 95% of all allogeneic blood donations were transfused as whole blood over the study period.*

Conclusion: *Pre-deposit autologous blood donation is hardly practiced in a setting of high risk and unsafe allogeneic blood due to inadequate implementation of practice guidelines by practitioners.*

Recommendation: *Further researches are needed to improve the overall safety of pre-deposit autologous blood donation especially in a weakened centrally controlled blood system existent in Nigeria.–It may be pertinent to provide adequate knowledge, reassess and develop existing guidelines for the practice of PAD in*

Nigeria

.***Key words:*** *Pre-deposit autologous donation; allogeneic blood donation; hospital blood bank; north-central Nigeria;*

Introduction.

The problems of blood transfusion safety are profound in many resource-limited settings and have culminated in increasing refusal to accept allogeneic blood transfusion in both religious and non-religious adherents. These concerns seem to be reinvigorating researches in autologous blood therapy in recent times. (1) Autologous blood donation (ABD) or "auto donation" describes the collection of blood from a particular individual for transfusion back to self. Allogeneic blood donation on the other hand is the collection of blood from another individual for the transfusion of another person. (2)

Earlier, clinical works and animal experiments by Dr. James Blundell pioneered ABD but, it was the later publications by William Highmore in 1874 that unveiled this largely unknown therapy. amidst the potential allogeneic blood risks like transfusion transmissible HIV infection(TT-HIV) with the HIV epidemic in the early 1980s (3)(4) following these early strides, ABD gradually started witnessing more research interests.

Many benefits of ABD have been advanced including; reduced risk of transfusion transmissible infections (TTIs) transfusion reactions, safer transfusion outcomes in patients with rare blood groups and multiple auto-antibodies, elimination of immunosuppression, red cell alloimmunization and immunization of HLA antigens.(3) Additional advantages include reduced risks of transmitting immunological diseases like asthma and urticaria as well as reduction in graft versus host disease.(3) Besides, some religious adherents like the patients who are Jehovah's Witness may accept this practice. Additionally, cross-matching is not usually required while allogeneic blood is conserved for those ineligible for ABD and those who need it, particularly for emergency interventions. (5) There are also reports suggesting that, ABD improves the safety and availability of blood and averts liabilities incident to healthcare practitioners and the hospitals arising from malpractice or negligence attributable to risks inherent in allogeneic blood transfusion.(3)(6) On the other hand, there are concerns of its limited applicability in clinical settings and not being sufficient in sustaining the overall blood needs of the hospital, high wastage rates, fear of bacterial contamination and fluid overload as well as clerical errors and increased overall possibility of needing a transfusion (allogeneic or autologous). (4) These concerns in addition to the fact that, many developed countries have adopted strict donor selection criteria, advanced screening technologies and appropriate clinical use of blood that have significantly scaled down the overall risks associated with allogeneic blood donation affected the expected growth of ABD globally.

Three basic techniques for ABD are recognized including; Cell salvage where blood shed at surgery or in similar circumstance is harvested from suction, surgical drains, or both and re-infused back to the patient immediately or after concentration and

purification.; acute normovolaemic haemodilution (ANH) where blood is collected immediately prior to surgery and blood volume replacement done by crystalloid or colloid and the blood re-infused towards the end of surgery once haemostasis is achieved-(1,3, 4, 7)

In hospital-based blood banks, the storage of PAD is the backbone of autologous blood donations and forms a majority of the technique of ABD in practice. Some unique advantages of pre-deposit autologous blood donation over other methods of autologous donation includes; stimulation of bone marrow cells proliferation by repeated phlebotomies,-erythrocyte regeneration, increase haematopoietic function in patients after surgery,– primary wound healing and reduced chances of infection caused by immunoreaction from allogeneic blood transfusion. Additionally, it has a favourable predisposition to reducing the adverse reactions of blood transfusion, maintaining normal blood indexes, improving abnormal blood rheology and alleviating the lack of blood supply. (1) However, its limitations in clinical practice includes; the method of storage, risk of anaemia in donors, its application mainly in elective surgery and the fact that it's best applied in the young patients but not the old. (1) Besides, it is also feared expensive, its benefits difficult to assess, and its increasing popularity raising many difficult ethical issues, such as whether the benefit of allogeneic transfusion supports its additional expense especially with the introduction of recombinant human erythropoietin to stimulate red blood cell production before autologous donation and helping to decrease the need for transfusion post donation. (8)(4) Birkmeyer et al (9) also lamented on its low cost-effectiveness in comparison with most accepted medical practices and advised on improvement by avoiding over collection and over transfusion. (9) In spite of these debates, PAD has been deployed in decreasing patient's exposure to allogeneic blood (10) and has successfully found application in patients undergoing elective cardiac surgery, (10)(11)(12) spinal and neurosurgery, (1)(13) orthopaedic surgery, (6)(9)(14)(15)(16) obstetrics (17)(18)(19) and paediatrics practice in different parts of the world. (20)

For hospital-based blood banks in resource-limited settings of Nigeria, there exist inherent challenges of safety necessitating research on viable approaches to practice improvement and in the development of viable less risk alternatives or interventions. This study therefore, sought to assess the practice of PAD with reference to allogeneic blood donations at the blood bank unit of Federal Medical Centre, Makurdi in north central Nigeria over a four year period.

Methodology:

This cross sectional study retrospectively assessed blood transfusion documents and records at the blood bank unit of Federal Medical Centre, Makurdi in north central Nigeria from 2009 to 2012. Federal Medical Centre Makurdi is a 400 bed hospital located in makudi metropolis of Benue State. It is a tertiary health care facility serving as a referral centre for other hospitals in Benue and parts of her neighboring states of Nassarawa, Kogi, Taraba and Cross River including. The Data inclusion criteria included – all blood donations and utilizations in the hospital over the period [those sourced from the NBTS regional blood transfusion centres in Jos and Lokoja or were donated at the unit as voluntary non remunerated blood donations (VNRBDs)], Pre-deposit autologous blood donations by patients prior to their surgeries or planed treatments within the hospital, Family donations by relations/ spouses or friends prior to particular patients' treatment or family replacements where donations were made to replace blood units earlier assessed by a patient as

"loan" without prior donation. In the absence of existing strict criteria applied to autologous donation at the time, all blood donors included (allogeneic and autologous) fulfilled the minimum criteria to donate blood in Nigeria. Paid blood donations and blood transfers from other hospitals were excluded. The study involved retrieving relevant information on autologous and allogeneic blood donations, types of blood donors and type of component or product utilized from the records and documents over the four year study period.

Data was entered into Microsoft Excel and analysed for simple proportions Ethical clearance for the study was obtained from the ethics review committee of Federal Medical Centre Makurdi.

Results: Results narrative

Table 1: Pre-deposit autologous and allogeneic blood donations at Federal Medical Centre Makurdi between 2009-2012.

TYPES OF BLOOD DONOR	**2009**	**2010**	**2011**	**2012**
AUTOLOGOUS	12 (0.79%)	8 (0.31%)	9 (0.27%)	6 (0.21%)
ALLOGENEIC				
1. VNRBDs	342 (22.50%)	558 (21.49%)	497 (14.95)	566 (19.44%)
2. FBD/FRD.	1166 (76.71%)	2031 (78.21%)	2818 (84.78%)	2340 (80.36%)
TOTAL	**1520 (100%)**	**2597 (100%)**	**3324 (100%)**	**2912 (100%)**

KEY: VNRBD= Voluntary Non Remunerated Blood Donors; FBD≥Family Blood Donors; FRD≥Family Replacement Blood Donors

Table 2: Types of blood componentstransfusedat the Federal Medical Centre Makurdi between 2009-2012.

Type of component donated	2009	2010	2011	2012
1) Whole Blood	12 (0.79%)	8 (0.31%)	9 (0.27%)	6 (0.21%)
a. Autologous	1469 (96.64%)	2572 (99.04%)	3252 (97.83%)	2859 (98.18%)
b. Allogeneic				
2) Packed Red cells	0	0	0	0
a. Autologous	39 (2.57%)	17 (0.65%)	63 (1.90%)	47 (1.61%)
b. Allogeneic				
3) Washed red cells	0.0 0	0.0 0	0.0 0	0.0 0
4) Platelet concentrates .	0.0 0	0.0 0	0.0 0	0.0 0
5) Other components/products	0.00	0.00	0.00	0.00
TOTAL	**1520 (100)%**	**2597 (100)%**	**3324 (100)%**	**2912 (100)%**

DISCUSSION

Pre-deposit autologous blood donation(PAD)in this study was low (average 0.40%) and showed a gradually decliningtrend over the years in comparison with allogeneic blood donations(average 80.02% and 19.60%) for family replacement and VNRBDs respectively and showing unpredictable distribution patterns over the yearsas indicated in table 1. This low practice of PAD is similar to that widely reported in many developed economies where allogeneic donations are continually made safer with the practice of PAD becoming increasingly unnecessary.Given thiscircumstance, some developed countries have either reduced the practice to cases of absolute necessity or have out rightly withdrawn from its practice as a national proclamation. (4)(13)(21)(22)(23)

While advancements of safe transfusion practices are appreciative in developed countries including the adoption of strict donor selection, successful screening for transfusion transmissible infections and using advanced technologies like NAAT, pathogens inactivation, effective clinical use of blood and rapidly evolving evidence-based best practices including screenings for many emerging TTIs, adoption of leuco-depleted and component specific transfusion practices in cost saving approaches, less developed countries like ours are still struggling to overcome inadequate donor recruitment and poor quality blood transfusion.

The hospital-based blood banking system in Nigeria is yet to adopt deeply rooted safe transfusion systems via allogeneic blood donations; blood is scarce, strict donor selection is not absolute and characterized by paucity of VNRBDs andwith heavy dependence on

family and replacement donors,weak potentials for intersecting TTIs (routine and emerging pathogens) and whole blood transfusion being used as the default rather than component-specific transfusions for only deserving patients. These high risk factors prevail in this study where majority of the blood donors were family and replacement donors(80.02%) rather than VNRBDs(19.60%) respectively over the study period as seen in table 1.

Relatedly, leuco-depletion and component specific therapy aimed at reducing sensitization, immunomodulation and immunoparesis as a risk of allogeneic blood transfusion is at the lowest ebb of practice as demonstrated in table 2. In this study, whole blood and packed red cells transfusions were 98.32% and 1.68% respectively with 100% autologous and 95% of and allogeneic donations transfused as whole blood.

Additionally, Nucleic Acid Amplification testing (NAAT), commonly deployed in securing allogeneic blood donations in developed countries is not universally available in Nigeria. Therefore, screening for TTIs at hospital-based blood banks (majority of which are resource constrained, autonomous and self-funding) is done deploying rapid antibody and rarely combined antigen-antibody based tests which often demonstrate high false negative results that culpably disseminate TTIs to allogeneic blood recipients. (24) These prevailing risks in our study negate that obtained in developed countries where the practice is reported low and suggest the likely transmission of pathogens in rapid kits screened false negative blood units.

Another consideration of possible causes of our low findings in this study may relate to existent knowledge gap of physicians who are expectedly drivers of the practice in hospital setting.The practice of PAD rests on a tripod; on one stand is the patient, on the second the referring physician and on the third a Haematologistwho evaluates the patient before his or her PAD sessions. It is often the responsibility of the physician or surgeon intending to utilize this practice to educate the potential pre-deposit autologous donor and then refer him or her to the blood bank unit where he or she is expected to interact with the transfusionist, beevaluated for safety to donate in line with hospital-based or hospital domesticated guidelines,gives informed consent and donates his pre-deposit autologous blood. (3) The physician as a major component in the clinical and laboratory aspects of PAD must be guided with sufficient knowledge on current practice domesticated in the hospital for PAD. Where gaps in knowledge exist arising most commonly from inadequate or non-availability of guidelines that precisely guide the practice, pre-deposit autologous blood donation may be lightly practiced as observed in this study. The absence of domestication of existing national guidelines on autologous blood donation practice warranted inappropriate adoption of the guidelines applied in allogeneic blood donation for all pre-deposit donors in our centre. (7)(25) To this effect, the non-adoption of practice guidelines for autologous blood donation in Nigeria's hospital based blood bank by physicians rather than a high level of safety of allogeneic blood seem to have contributed to the low record of PAD in this study.

While it is true that, PAD cannot be applicable to all patients especially those requiring blood in emergency it will however reduce the demand on allogeneic blood which should be aptly applied tomeet emergency transfusion needs. Additionally, PAD guidelines could be modified to allow donations not used for particular donors, deployed to improve the overall blood pool of the hospital in critical areas of need. The practice of PAD may also provide links between the hospital-based blood

bank, autologous donors and the national blood transfusion service. This link could be explored or targetedfor voluntary blood donor motivation, education, recruitment and retention.

Conclusion:

Pre-deposit autologous blood donation is undeveloped in our hospital-based blood bank. We also conclude that appropriate clinical use of blood is poorly practiced in our setting where donated blood is mainly from allogeneic replacement donors.

Recommendation: Further researches are needed to improve the overall safety of pre-deposit autologous blood donation especially in a weakened centrally controlled blood system existent in Nigeria. It may be pertinent to provide adequate knowledge, reassess and develop existing guidelines for the practice of PADin Nigeria

Acknowledgement: I greatly appreciate Drs Ndubisi, and Gomerep SS for their encouragements towards the production of this manuscript. I am also grateful to Mrs Monica Ugoh and Mr Godwin Udende for assisting in the data collection.

Conflict of interest: There is no conflict of interest involving the author in this work

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PREVALENCE AND PREDICTORS OF DELIRIUM AMONG MEDICAL INPATIENTS ADMITTED THROUGH ACCIDENT AND EMERGENCY UNIT OF JOS UNIVERSITY TEACHING HOSPITAL

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ABSTRACT

Background: *Delirium is a complex neuropsychiatric syndrome, commonly encountered across all healthcare settings. However, little is known about its magnitude and determining factors in medical inpatients especially at the Accident and Emergency (A&E) setting of tertiary institutions in low income countries.*

Objectives: *This study was conducted to evaluate the prevalence of delirium among medical inpatients admitted through the A&E unit as well as to assess its predictors.*

Method: *This was a cross-sectional study that employed a consecutive sampling technique to select 290 eligible subjects from medical inpatients that presented to A&E unit of Jos University Teaching Hospital (JUTH). Confusion Assessment Method (CAM) was used to assess for delirium.*

Results: *The results showed that 35.9% of the respondents had delirium. The predictive variables for delirium were: Age groups 18-34 years and 35-64 years (P=0.014 and P = 0.003), prior cognitive impairment (P = 0.020),having estimated monthly income belowN50,000 (P<0.001 and P=0.008) ,use of alcohol (P=0.026) and having rare/other medical diagnosis (P = 0.0016).*

Conclusion*: Delirium is very common in medical inpatients and highly predictable especially in high risk patients. Consultation-Liaison Psychiatry services need to be integrated into the A&E unit management team particularly in the areas of prevention and management of identified cases.*

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Key Words: *Delirium, Medical Inpatients, Prevalence, Predictors, Accident and Emergency Unit*

Introduction

Delirium is defined as an acute change in cognition that cannot be better accounted for by preexisting or evolving dementia[1]. This change in cognition is rapid, occurring over a period of hours or days with associated disturbance of consciousness and is classically described as fluctuating and reversible[1]. It is characterized by disturbances of memory, orientation, language skills, thinking, perception, motor-behavior, sleep-wake cycle, with impaired

attention as the core cognitive disturbance[1,2].

It is associated with several adverse outcomes which include more prolonged hospitalization, mortality and institutionalization that is even more worrisome in low income countries[3,4].

Despite its frequent occurrence and negative outcomes, delirium is missed by emergency physicians in 57%-83% of cases[5,6]. There is some evidence to suggest that missing delirium in the emergency unit portends higher risk compared to patient whose delirium is detected by the emergency physicians[5].

A meta-analysis of 42 studies reported delirium to be prevalent on emergency unit admission in 10-31% of medical inpatients, and to occur 3-29% in the medical wards[7]. Previous studies carried out among medical inpatients at A&E in USA[8], United Kingdom[9], Australia[10], Spain[11] and Sub- Saharan African Countries[12,13] found prevalence of delirium in the range of 9-35%. Studies have also documented older age, prior cognitive impairment, male gender, severe medical comorbidities, use of psychoactive substances and medications as predictors of delirium[14, 15].

In Nigeria, few studies have examined the prevalence and predictors of delirium in medical inpatients with virtually none carried out among them in the A&E setting[16-18].

In the light of the above, the study sought to determine the prevalence of delirium and its predictors among medical inpatients admitted through the Accident and Emergency (A&E) unit of JUTH. Investigating delirium in medical inpatients would therefore have advantage in identifying people who have the greatest need for early intervention thereby reducing the adverse consequences of this condition.

Methodology

This hospital based cross- sectional study was conducted at the A&E unit of JUTH between the months of July and November 2016. Ethical approval was obtained from the ethical committee of JUTH, while permissions were also granted by the heads of Internal Medicine and A&E unit. Data were collected by the researcher and research assistants who are fluent in both English and Hausa languages. Medical inpatients aged 18 years and above, admitted through the A&E unit and screened for delirium within 24 hours of admission were included for the study. Those considered too ill and patients with current diagnoses of mood disorders and schizophrenia were excluded.

The study employed a consecutive sampling of the prospective respondents aged 18years and above who presented within 24 hours to A&E unit of the hospital. The rationale for the 24 hour limit was to maximize the number of patients that could be enrolled, while minimizing the patients' exposure to multiple delirium precipitants such as immobilization, bladder catheter placement or any iatrogenic event[14].

The socio-demographic questionnaire was administered first and this sought information on socio-demographic data (age, gender, level of education,occupation,estimated monthly income and marital status) and clinical variables such as past year substance use, current medication, past history of mental illness, prior cognitive and physical impairments,illness duration before presentation and medical diagnosis.

The Confusion Assessment Method was thereafter administered. This consists of four features that were found to have the greatest ability to distinguish delirium or reversible confusion from other types of cognitive impairment[19].

Confusion Assessment Method evaluates the four key delirium features:

1. Acute onset and fluctuating course
2. Inattention
3. Disorganized thinking
4. Altered level of consciousness.

Delirium is considered present if features (1) and (2) were present in addition to either features (3) or (4)[20].

The Statistical Package for Social Sciences Version 21 (SPSS-21) software package was used to analyze the data.

Results

A total of 302 respondents were interviewed, but 290 comprising respondents between the age range of 22 and 100 years with mean age of 46.2±17.2 years, 164(56.6%) females and 126(43.4%) females and predominantly Christians (84.1%) of the several other ethnic minorities(Tarok,Magavul,Angas,Miango,Ibo,Yoruba,Irigwe,Jukun,Ijaw,Idoma and Tiv) with Berom being the dominant ethnic group, were used for the analysis.

Most of the respondents had below tertiary level of education; 208(71.7%), belonged to nonprofessional occupation group, 220(75.9%) and had their estimated monthly income below N50, 000; 269(92.7%). More than half were married, 165(56.9%).

Similarly, majority of the respondents had been medically ill for less than 2 weeks; 183(63.2%),had diagnosis of infectious diseases; 140(48.3%), were non users of psychoactive substances,(74.5%) and had equal proportions of antibiotics,(30.7%) and other medications such as steroids, cytotoxic, antiretroviral; (30.7%) administered on them.

Among the respondents, only 14(4.8%), 34(11.7%) and 24(8.3%) had previous history of mental illness, preexisting cognitive decline and physical impairment respectively. See Table 1, Figures1 and 2.

Table1: Socio-demographic and Clinical Characteristics of Respondents

Variable	Responses	Frequency(n)	Percentage (%)
Age (years)	18 - 34	118	40.7
	35 - 64	125	43.1
	65 - 100	47	16.2
Mean ± SD		46.22±17.24	
Gender	Male	126	43.4
	Female	164	56.6
Ethnicity	Berom	60	20.7
	Hausa /Fulani	35	12.1
	Others	195	67.2
Religion	Christianity	244	84.1
	Islam	46	15.9
Educational statuy	No formal education	22	7.6
	Primary education	94	32.4
	Secondary education	92	31.7
	Tertiary education	82	28.3
Occupational statuy	Professionals	70	24.1
	Nonprofessionals	123	42.4
	Unemployed	97	33.5
Estimated monthly income	<20,000.00	150	51.7
	20,000.00 - 49,000.00	119	41.0
	≥50,000.00	21	7.3
Marital statuy	Never married	71	24.5
	Married	165	56.9
	Previously married	7	2.4
	Widowed	47	16.2
Mental illness history(Past)	Yes	14	4.8
	No	276	95.2
Prior cognitive decline	Yes	34	11.7
	No	256	88.3
Preexisting physical impairment	Yes	24	8.3
	No	266	91.7
Illness duration before presentation	<2week	183	63.1
	2 - 4week	72	24.8
	>4week	35	12.1
Current Medicatiom	Regular antibiotic	89	30.7
	Antikock ‘s	54	18.6
	Oralhyoglyceamic/insulin	27	9.3
	Antihypertensive	31	10.7
	Othere	89	30.7

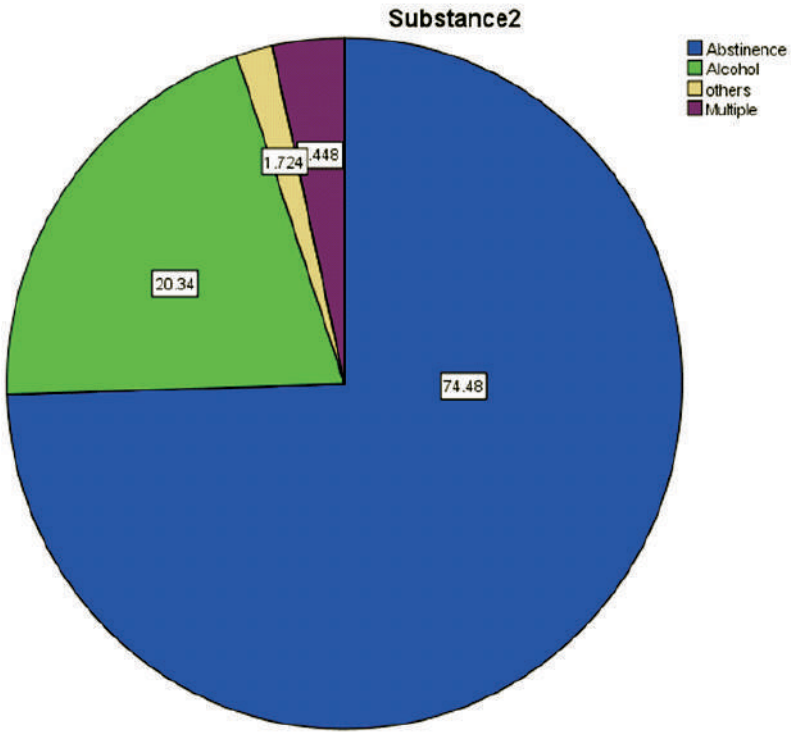

Figure 1:
Distribution
of respondents
according
to type of substance use

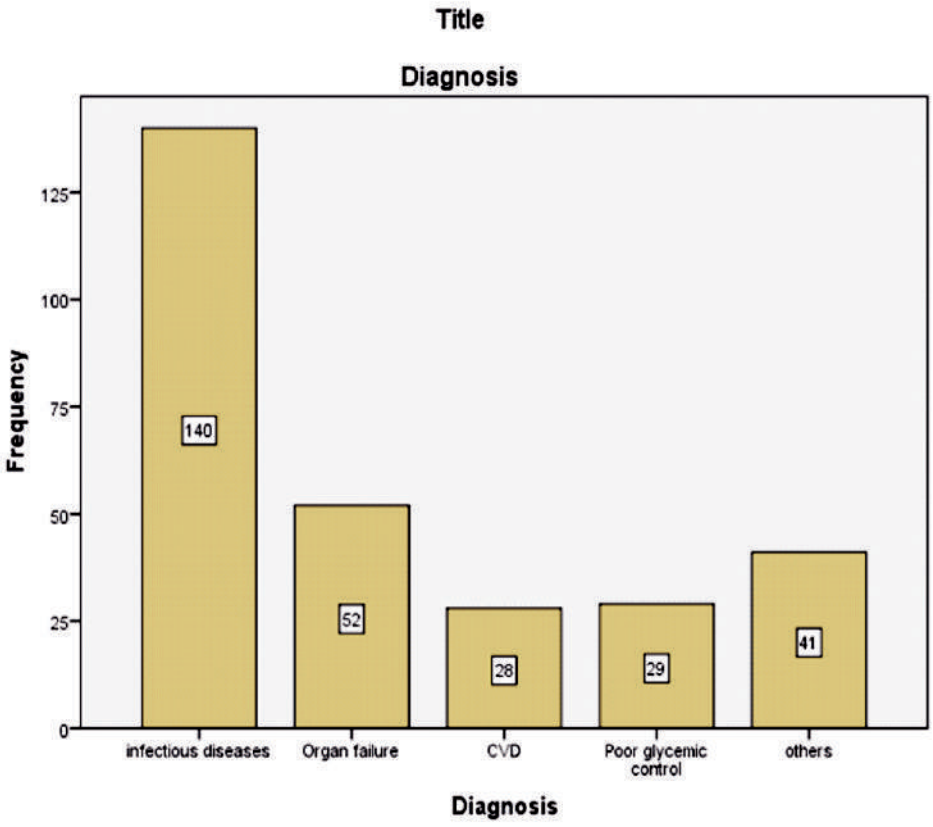

Figure 2:
Distribution
of Respondents
according to
Current
Medical
Diagnoses

Prevalence of Delirium in Medical Inpatients at Accident and Emergency Unit of JUTH

This study found that the proportion of 290 adult-respondents meeting the DSM 5 diagnostic criteriafor delirium was 104(35.9%)using Confusion Assessment Method. See Table2.

Table 2: Prevalence and Distribution of Delirium among the Respondents

Delirium	Frequency	Percentage
Yes	10 4	35. 9
No	18 6	64. 1
Total	29 0	10 0

Socio-demographic and Clinical Predictors of Delirium

Among the medical inpatients, being inthe age groups 18 – 34years and 35-64 was more than four times likely to predict delirium compared to those age group 65-100 years(P≥0.014 and P ≥ 0.003). In the same manner, having estimated monthly income less than 20,000 and 20-49,000.00 was 13 and 4 times more likely to predict the development of delirium compared to having income ≥ 50,000.00 respectively, (P<0.001 and P≥0.008).

On the other hand, the odds of having delirium were decreased by 0.241 among those without prior cognitive decline compared to those withand this decrease was statistically significant (P ≥ 0.020). Similarly, the odds of having delirium was significantly reduced by 0.236 among those having diagnosis of organ failure compared to those who were classified as having other medical diagnosis (P≥ 0.016). Those that were non users of substance were over 37.7 times more likely to have delirium compared to participants using multiple substances (P≥0.002), so also was the use of alcohol being 13.2 times more likely to predict delirium compared to

Table 3: Predictors of Delirium among Medical Inpatients

Variable	Odd Ratio	95%Confidence Intervall	P
Age in years			
18 - 34	4.24 9	0.01 4 — 13.51 6	**0.01 4**
35 - 64	4.67 7	0.00 3 — 12.74 8	**0.00 3**
65 - 100	1.00 0		
Gender			
Male	1.33 6	0.39 6 — 2.61 0	0.39 6
Female	1.00 0		
Occupation			
Professionals± degree	1.29 0	0.63 0 — 3.63 7	0.63 0
Non professionals	0.83 6	0.67 6 — 1.93 4	0.67 6
Unemployed	1.00 0		
Income			
N<20,000.0	13.82 7	0.00 0 — 51.54 7	**0.00 0**
N20 - 50,000.0	4.87 9	0.00 8 — 15.64 2	**0.00 8**
>50,000.0	1.00 0		
Prior cognitive decline			
N0	0.24 1	0.02 0 — 0.80 1	**0.02 0**
Yes	1.00 0		
Medical Diagnoses			
Infectious Disease	0.58 9	0.31 6 — 1.65 8	0.31 6
Organ Failure	0.23 6	0.01 6 — 0.76 2	**0.01 6**
CVD	0.57 8	0.41 6 — 2.16 9	0.41 6
Poor Glycemic Control	0.42 4	0.21 9 — 1.66 7	0.21 9
Others	1.00 0		
Past Year Substance Use/ Type			
Abstinence	37.65 5	0.00 2 — 362.35 8	**0.00 2**
Alcohol	13.24 1	0.02 6 — 128.29 5	**0.02 6**
Others	8.37 2	0.13 8 — 138.96 3	0.13 8
Multiple	1.00 0		

Discussion

This study found that the proportion of adult-respondents meeting the DSM 5 diagnostic criteria for delirium was 35.9% using CAM. This finding is similar to those of Ajiboye and Adelekan[16] from Nigeria, and Gonzalezet al[11] from Spain. Ajiboye and Adelekan[16] in a study conducted among inpatients in a Nigerian Teaching hospital reported 32% of their patients as having delirium using ICD-10. Gonzalez et al on the other hand was a study carried out in Spain among medical inpatients and found prevalence of 35.4% using CAM to diagnose delirium. In addition, a systematic review of some studies conducted in United Kingdom also documented prevalent rates of delirium ranging between 10-31%[7].

However, the prevalence found in this study was considerably higher than the rates found in similar studies conducted inUSA (9%)[8] and Australia (18%)[10].

The high rate of delirium prevalence (35.9%) found in this study is expected. This is because the study was conducted in A&E unit where broad spectrum of illnesses, some of which may be severe and life threatening that may require immediate attention to prevent acute complications such as delirium. This situation was reflected in this study which found that a high proportion of the respondents presented with life threatening illnesses and previous studies have documented a linear relationship between life threatening condition and the development of delirium[14,21].

Furthermore, the considerably higher prevalence of delirium found in this study vis a vis the lower rates recorded in USA and Australia is presumed to occur due to variability in factors such as differences in methodology, cultural factors, as well as respondents' Knowledge, Attitude and Practice (KAP) of diseases and poverty level[22,23]. Some of these factors may have largely contributed to late hospital presentation or presentation only when the condition became severe or after failed traditional/self-medications.

In addition, it is a well-known fact in Nigeria, and perhaps other low income Countries that most hospital and indeed emergency units are traditionally underserved in terms of manpower and facilities amidst large patient's volume. Bookings in the outpatient clinics are often as long as more than 3 to 6 months, this also meant that patients in A&E unit will have to wait a while before been attended to thereby increasing the risk of developing delirium. In support of this, most respondents complained of several hours of waiting before they were finally attended to.

Socio-demographic and Clinical Predictors of Delirium

In this study, the variables that were found to predict delirium among medicalinpatients admitted through A and E unit include: age, estimated monthly income, prior cognitive decline, medical diagnosis and the use of psychoactive substances.

Thus, being aged 18-64 years was found to be predictive of delirium compared to age group 65 years and above. This seems to contradict the findings from several studies which observed higher risk of delirium in the elderly[14,24].The current sample had more of the young and middle aged adults who had more of infectious diseases including HIV with associated wide range of other illnesses not specified in this study compared to the fewer elderly population who may have more of organ failures. This in turn may explain the protective effect of organ failure when compared to other conditions classified under medical diagnosis. This implies that having conditions classified as other medical diagnosis was rather predictive of delirium

compared to having organ failure. So also was not having prior cognitive decline protective of delirium as against those with cognitive decline who by implication had their odds of developing delirium increased by over four times. This finding is consistent with observations by Han et al[25] and Kennedy et al[8] who both found prior cognitive impairment to independently predict delirium at emergency unit. Fong et al[4]in their study, cited from previous research that cognitive decline is associated with decreased cerebral flow and metabolism, cholinergic deficiency and inflammation that may increase the risk of delirium generally.

Similarly, having income of at most N49, 000.00 as against having income of at leastN50, 000.00 was found to be associated with delirium. This is because people with higher income are more likely to go to private hospitals or travel abroad while more severe cases are the ones referred to JUTH. In addition, low income/education and being unemployed/low paid job are indicators of low socioeconomic status with consequent increased morbidity. This is because they are more vulnerable to communicable and infectious diseases such as meningitis, gastroenteritis, malaria etc., yet they do not have the resources to present early in the hospital coupled with malnutrition that further lowers their immunity. Hence, they may likely present with severe form of illness and therefore at risk of developing delirium.

This study also revealed that being abstained as well as alcohol use were predictive of delirium compared to multiple substance use. It has been well established that alcohol withdrawal if not attended to will progress to delirium and the prevalence of delirium among alcohol users have been reported to be variously high[15, 26,].

However, the predictive strength of delirium among the non-users should be interpreted with caution because a disproportionately high percentage of the subjects in this study were non-users, with substantial number of them having delirium.

Conclusion

This study established that delirium is highly prevalent among medical inpatients at A&E and similarly found that variables such as age, estimated monthly income, prior cognitive decline, medical diagnosis and the use of psychoactive substance to be predictive of delirium.The findings are comparable with previous studies and provide more robust evidence of how common delirium is, in a highly chaotic environment like A&E unit.

Recommendation

It is recommended that Screening instrument like CAM, which can be administered in less than 2minutes by the emergency physicians and nurses can be included in normal evaluation and assessment of high risk patients presenting to the A&E unit.

Conflict of Interest: None

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AUDIT OF DECISION TO DELIVERY INTERVAL IN A LOW RESOURCE SETTING

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ABSTRACT

Introduction: *Caesarean section (C-Section) is the delivery of an infant through the abdomen and it is one of the commonest surgeries performed in women of reproductive age. It is performed as an elective or emergency procedure. Emergency C-Section is carried out when an immediate decision is made to deliver the woman because if delivery is delayed, it may result in unwanted consequences which are maternal or perinatal morbidity and / or mortality. An elective C-Section is planned at a date convenient for both the patient and surgeon. The time interval from when the decision for operative delivery was made and when the delivery took place (decision-to-delivery interval) is important.*

Aim and Objective of Clinical Audit: *The aim of this clinical audit was to compare the decision to delivery interval with the standard set by professional associations of obstetrics, perinatology and obstetric anaesthesia which is thirty minutes.*

Research Methodology*: This was a retrospective clinical audit carried out at a Nigerian hospital over seven months. The sources of data were the Caesarean Section registers at the labour ward which included the C-section booking registrar, C-Section reception register and C-Section operating room register.*

Results*: Five hundred and twenty two emergencies C-Sections were studied. The mean decision-to-delivery interval was 218.03 minutes. Only 4.21% had emergency C-Section carried in less than 30 minutes after the decision to carry out a C-Section was made. 2.30% (12) had decision-to-delivery of less than 15 minutes. Most of the emergency C-Sections were carried out between 151-180 minutes 74(14.18%) after the decision of C-Section was taken.*

Conclusion: *There is a need to review and address the causes of delay in conducting a Caesarean section after a decision was made, to reduce maternal and perinatal morbidity and mortality.*

Key Words*: Caesarean Section, Decision, Delivery Time, Emergency.*

Introduction

Caesarean section (C-Section) represents a significant operative intervention in obstetrics. Its development and application has saved the lives of countless mothers and infants[1]. C-Section is one of the oldest operations, from ancient times. It is an essentialprocedure and is practiced widely[1-5]. The operation is usually carried out in cases where vaginal delivery would put the baby or mother's life or health at risk although in recent times it has been also been performed upon request for birth that would otherwise have been natural[6] and can be done either as elective or emergency[6-9]. C-Section performed appropriately and following an appropriate medical indication are potentially life-saving procedures both for the mother and the baby[10-11]. The estimated number of caesarean deliveries in 2012 was 22.9 million[12]. Every year in the world, there is an additional need for 0.8-3.2 million C-Section in low income countries where 60% of the world's births occur. Caesarean section is essential for reducing neonatal maternal morbidity and mortality[10,12].

The complications following caesarean delivery are maternal mortality, severe maternal morbidity, neonatal morbidity and mortality. Delays in seeking, accessing and receiving quality healthcare in facilities contribute to lower caesarean delivery rates and increase the risk of adverse outcomes following C-Section[13].

Professional associations of Obstetricians and Gynaecologists recommend that the decision-to-delivery for emergency C-Section should not exceed 30 minutes[14]. The "30 minutes rule" for a decision-to-delivery takes its origin from the guidelines to perinatal care developed jointly by the American Academy of Paediatricians and the American College of Obstetricians and Gynaecologists[15]. In 1995, the Royal College of Obstetrics and Gynaecology published the "organizational standards for maternity services" in which it was proposed that there be a maximum decision-to-delivery of 30 minutes for emergency C-Section[16].

Aim and Objective of the clinical Audit: Decision to delivery interval is important in any obstetric unit. The aim of this clinical audit is to compare the facility where the audit was conducted with the standard decision-to-delivery interval of thirty minutes.

Research Methodology

This was a retrospective study carried out at a Nigerian tertiary hospital. The decision to perform an emergency C-Section was made by the most senior obstetrician around who was the consultant on call or the senior registrar. When the decision for operative delivery was made it was recorded in the patients' folder, the labour ward operating theatre and the anaesthetist(s) posted to the labour ward are informed. The patient and patient's spouse werecounselled. Necessary investigations were done. Written informed consent was obtained. When both patient and obstetrician were ready, the patient was transferred to the labour ward operating room and surgery commenced. The nurses keep records of time and have registers that show the time of booking the labour ward operating theatre, time the patient arrived the labour operating theatre; and time surgery commences and ends. These registers were the source of data for this clinical audit.

Results

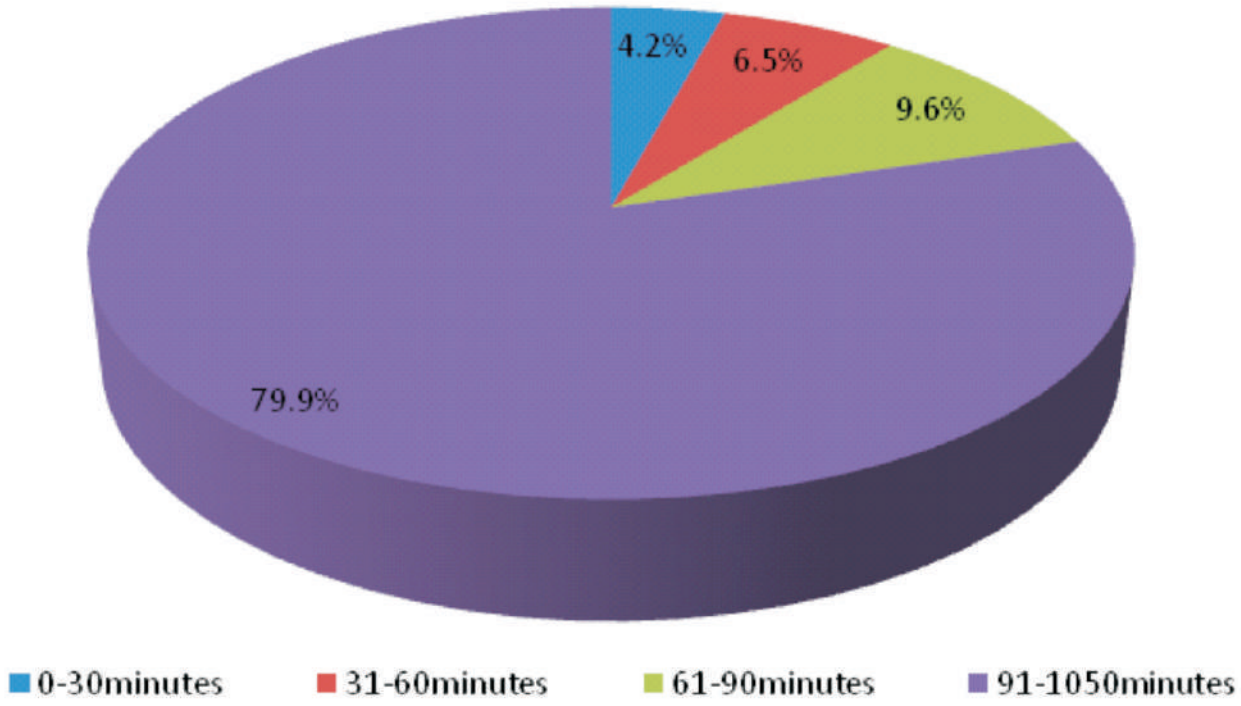
This clinical audit was conducted over seven months (November 2010 - May 2011),Fivehundred and twenty two women who had emergency C-Section during theperiod were included in the clinical audit, 155(29.7%) were unregistered while 367(70.3%)

were registeredclients. The decision-to-deliveryinterval for the 522 women is shown in Table I. The mean decision-to-delivery interval was 218.0 minutes. Most (mode) of the emergency C-Sections were carried between 151-180 minutes 74 (14.2%) after the decision of C-Section was made. Only 8(1.5%) had their emergency C-Section carried immediately the decision to deliver by C-Section was made and 12(2.3%) in less than 15 minutes once the decision of emergency C-Section was made. For anaesthesia 87.2%(455) had subarachnoid block, 10.5%(55) general anaesthesia, 1.0%(5) local infiltration with sedation, 1.0%(5) total intravenous anaesthesia, 0.2%(1) combined spinal anaesthesia and 0.2%(1) epidural anaesthesia.

Table I: Decision to Delivery Interval for Emergency Caesarean Section

Decision to Delivery Interval(min)	**N**	**%**
0 - 30	22	4.21
31 - 60	34	6.51
61 - 90	50	9.58
91 - 120	61	11.69
121 - 150	51	9.77
151 - 180	74	14.18
181 - 210	41	7.85
211 - 240	32	6.13
241 - 270	26	4.98
271 - 300	24	4.60
301 - 330	12	2.30
331 - 360	12	2.30
361 - 390	13	2.49
391 - 420	13	2.49
421 - 450	4	0.77
451 - 480	7	1.34
481 - 510	6	1.15
511 - 540	7	1.34
541 - 570	3	0.57
571 - 600	1	0.19
601 - 630	6	1.15
631 - 660	2	0.38
661 - 690	1	0.19
691 - 720	5	0.96
721 - 750	4	0.77
751 - 780	2	0.38
781 - 810	2	0.38
811 - 840	1	0.19
841 - 870	-	-
871 - 900	1	0.19
901 - 930	1	0.19
931 - 960	2	0.38
961 - 990	-	-
991 - 1020	-	-
1021 - 1050	2	0.38
Total	522	100

Figure 1: Decision To Delivery Interval



DISCUSSION

The use of C-Section is reduced in Africa[13]. C-Section is a complex multidisciplinary procedure[17]. Obstetric emergencies are the leading causes of maternal mortality worldwide and particularly developing countries where literacy, poverty, lack of antenatal care, poor transport facilities and inadequate equipment /staffing combine to magnify the problem[18]. Also thereare several myths and taboos surrounding C-Section and the woman may be ridiculed in many Nigerian communities. When emergency C-Section is performed, it is widely advocated that the interval between the decision to operate and delivery of the baby should be less than 30 minutes. The recommendation states that a unit should be able to be ready to perform C-Section within 30 minutes, implying that the interval between decision and delivery may be a little longer[17]. The Obstetric Anaesthetists Association recommended minimum standard in emergencies is that the time from informing the anaesthetist to start of surgery should not exceed 30 minutes[19]. In this clinical audit only 4.21% emergency C-Section were done within 30 minutes after making the decision. Some of the emergencies C-Section were carried out 10 hours after taking the decision to operate. Two(0.03%) emergency C-Section where carried out 1021-1050 (17hours-17hours 30 minutes) after the decision was made.

In the community where the hospital studied is located, women who had C-Section are often mocked by their fellow women as they are seen as infidel, not strong enough to bring forth a child. The extended family system is established such that in some cases the woman cannot give consent for the surgery until she has to obtained permission from her in-laws. Even the spouse sometimes has to obtain permission from his own parents and those influential in the family before giving consent for the surgery hence the delay in obtaining consent which increases the decision-to-delivery interval.

Most of the emergency C-Section had a decision-to-delivery interval of 151-180 minutes(14.18%) which is below the acceptable standard of 30 minutes[14]. Many previous studies have demonstrated that for grade 1 and 2 C-Section performed when there is an immediate threat to the life of the woman or foetus or when there is evidence of maternal or foetal compromise which is not immediately life threatening maternal and perinatal outcomes deteriorate measurably when the decision-to-delivery interval exceeds 75 minutes[20]. Emergency C-Section should be performed as quickly as possible in keeping with the capabilities of the institution. Decision-to-delivery interval is an important and integral part of critical conduct interval in acutely compromised foetus[15]. The 30 minutes decision-to-delivery interval for emergency C-Section, despite being a pragmatic rather than evidence-based rule is widely accepted[21]. Once a decision to deliver has been made, delivery should be carried out with urgency appropriate to the risk to the baby and the safety of the mother;the time taken for a patient to reach the operating theatre is a critical predictor of the decision-to-delivery interval[20].

A decision-to-delivery interval of 30 minutes has been accepted as a gold standardbut it seems that the time from the decision for C-Section is taken; transfer of the patient to the operating room, preparation of the team for the surgery and administration of anaesthesia lasts for more than 30 minutes[14]. Various teaching and general hospitals have carried out audits on their response time for emergency C-Section to assess if the proposed standards could be met in their institutions[16]. Though this audit did not compare the outcome following C-Section, emergency C-Section is associated with more neonatal mortality and morbidity probably due to prolonged labour, birth asphyxia and sepsis while elective C-Section is associated with fewer neonatal deaths[13].

CONCLUSION

Reduction in the decision-to-delivery interval will decrease maternal and perinatal morbidity and mortality rates. In most Nigerian cultures, woman that have undergone C-Section are ridiculed as they are seen as not strong enough to bring forth a child hence the delay sometimes in obtaining consent. Women education should be encouraged because in Nigeria, most women cannot give consent on their own except their husband or in-laws arepresent even at the detriment of the health of the woman and the unborn child. A second clinical audit (re-audit) cycle will be carried out to find out at what stage in the preparation for the emergency C-Section that the delay occurs, if it is from delay in obtaining consent, delay in transferring the patient from the labour ward to the operating room, delay in notifying the anaesthetist, delay in the arrival of the anaesthetist or surgeon to the theatre, delay of commencement of the surgery itself or other factors.Recommending and thenimplementing strategies to eliminate the causes of the delay.

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THE MENSTRUAL CHARACTERISTICS OF UNDERGRADUATE STUDENTS IN A GHANAIAN PUBLIC UNIVERSITY.

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Abstract

Introduction*: Menstrual disorders are common among females of reproductive age and are a major cause of gynaecological referrals. They result from various individual, family, socioeconomic and environmental factors. It is important to understand these variations in the menstrual cycle to help premenopausal women cope better with them and proffer treatment where necessary. However, in Ghana, there exist a paucity of literature on disturbance in the menstrual cycle, especially among University students.*

Objectives*: This study is an attempt to add to the body of knowledge on menstrual issues females experience.*

Methodology*: The study was a descriptive cross-sectional study involving two hundred female undergraduate students of the University of Cape Coast (UCC), Ghana. Data was analysed using standardized and acceptable statistical tools.*

Results*: Our results show that most of the females were in their early twenties (92.6%), with the average age of menarche being 12.7 $\pm$ 0.12 years. Most respondents (49.2%) attained menarche at ages 12 and 13. Furthermore, some females had irregular cycles (17.7%) and the most common symptoms experienced by these cohorts were menstrual pain, mood changes and tiredness, accounting for 74%, 52.5% and 33% respectively.*

Conclusion*: Our study has shown that Ghanaian undergraduate students are not left out of the disturbances in the menstrual cycle and can indeed be a source of worry and concern to them and their families. Primary healthcare physicians and Specialists should be aware of this so as to give appropriate therapy and care in order to improve their quality of life.*

Keywords: Ghana, Menstrual cycle, Menstrual Disturbances, Menarche

Introduction

The menstrual cycle consists of cyclic changes in the female reproductive system which begins about the ages of 9 to 16 years (menarche) and continues till menopause. Premenopausal women undergo an average 400 menstrual cycles in their life time[1-2].

The hallmark of the menstrual cycle is menstruation. This is defined as bleeding from the endometrium due to the shedding of the necrotic functional layer. Physiologically, it results from the interplay of hormones of the hypothalamic-pituitary-ovarian axis. It is known by many names – menses, period, or "that time of the month". Counted from the first day of one period to the first day of the next, the average menstrual cycle is 28 days. Cycles may vary from 21 to 35 days. The duration of bleeding is between 2 to 8 days and the volume of blood lost is usually from 30 ml to 80ml. The average menstrual flow lasts for about 5 days, which accounts to approximately 67 months of menstrual bleeding over a lifetime[2-4].

Menstrual disorders are common among females of reproductive age and are a major cause of gynecological referrals. Disorders of volume of menses include hypomenorrhoea (small volume of bleeding and/or bleeding < 3 days) and hypermenorrhoea (heavy bleeding and/or bleeding > 7days). Disorders of interval of menstruation include oligomenorrhoea(interval > 35 days), polymenorrhoea (interval < 21 days), metrorrhagia (irregular menses) and when menstruation is absent, it is termed amenorrhoea. These derangements reflect changes in ovarian steroid production[1,5]

Menstrual patterns are influenced by a number of host and environmental factors[2]. Knowledge about the common menstrual symptoms is important not only for management purposes but also for patient education. Studies have shown it helps female sadhere to physicians' treatment, making the menstrual period less troublesome and tolerable[2,6].

Despite these advantages, very few studies are available from Ghana concerning menstrual patterns. Our study is an attempt to bridge the knowledge gap with emphasis on University students as available studies focus on adolescent and secondary school females.

Methodology

The study was a descriptive cross-sectional study conducted in October 2010, using a three-page questionnaire which was administered to two hundred female undergraduate students of the University of Cape Coast (UCC). The questionnaire was designed to elicit the socio-demographic characteristics of the respondents (i.e. age, religion, educational level, occupation, marital status and student's level in the University) and the respondents' menstrual history. Ethical waiver was granted by the UCC Ethical Review Board before the study. The questionnaire also included a consent section in which the respondent appended her signature after the aims and objectives of the study were explained. Words or images that could depict or reveal the identity of the respondents were not included in the study.

The data we gathered was carefully coded and entered into Statistical Package for Social Sciences (SPSS) version 17. Data was expressed as frequencies, percentages, means and standard deviation. Microsoft excel was used to draw bar graphs.

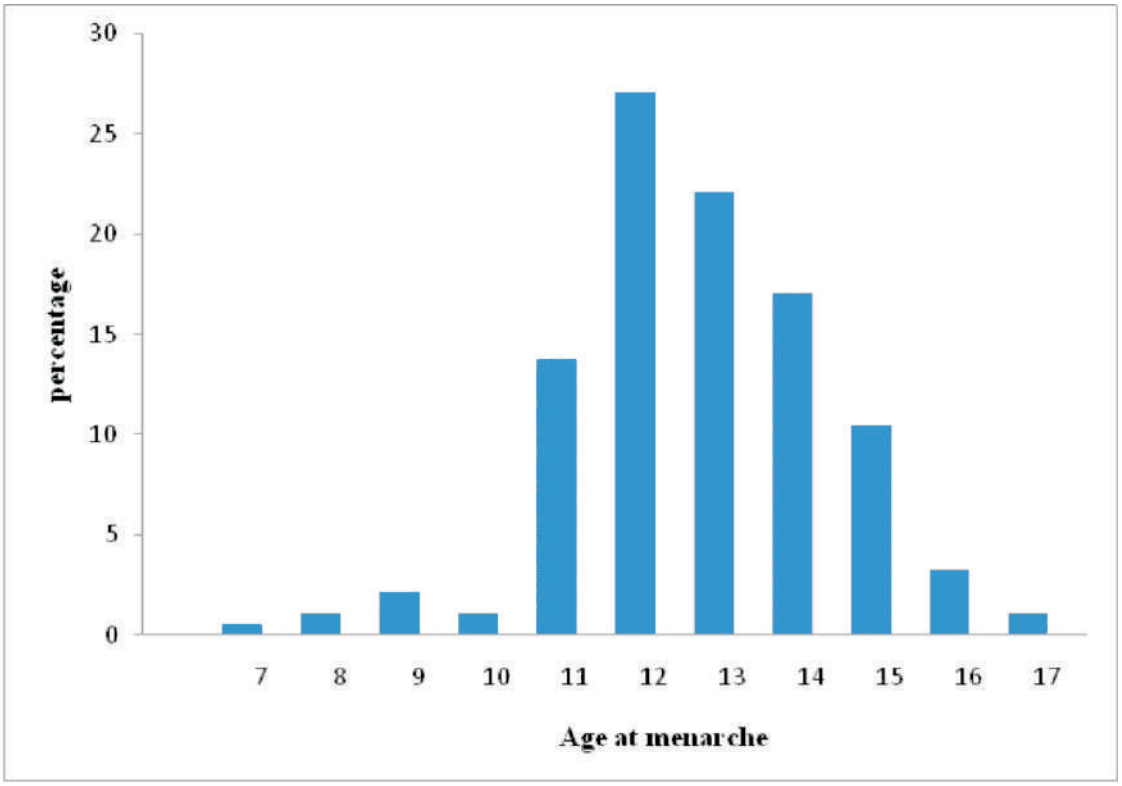
Results

Table 1: Demographic characteristics of respondents

	Frequency (N=200)	Percentage (%)
Age		
15-19	38	19.0
20-24	126	63.0
25-29	29	14.5
>29	7	3.5
Marital status		
Single	185	92.5
Married	15	7.5

Most of the respondents (92.5%) were unmarried and within ages 20-24 years' category

Figure 1: Age at Menarche of the respondents



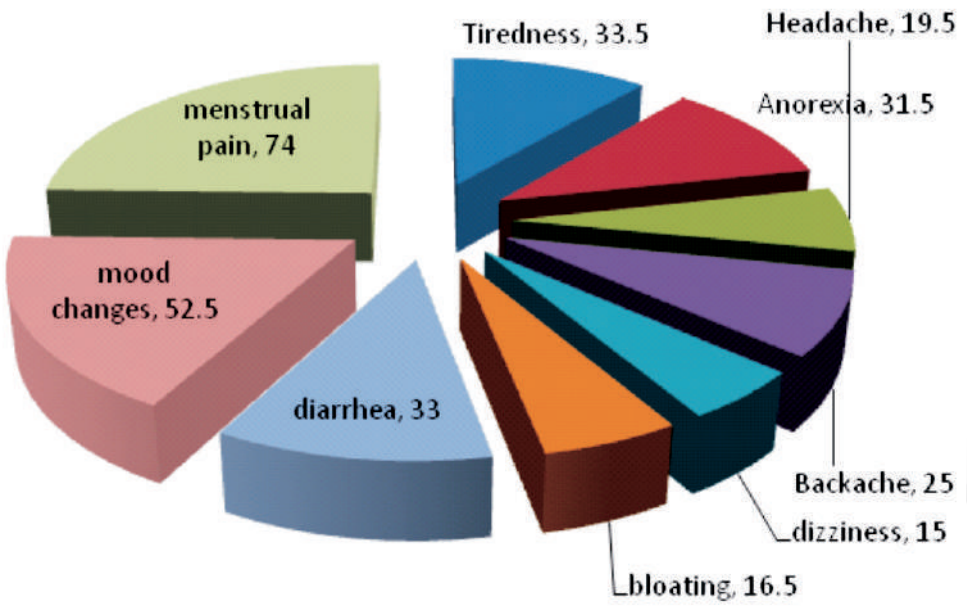
The mean age of menarche of the respondents was 12.7 $\pm$ 0.12 years. Most respondents (49.2%) attained menarche at ages 12 and 13.

Table 2: Menstrual characteristic of respondents

	Frequency	Percentage (%)
Length of menstrual cycle (days) (n=198)		
<21	5	2.5
21-35	146	73.7
>35	12	6.1
Irregular	35	17.7
Quantity of menstrual flow (n=198)		
Low	11	5.6
Moderate	140	70.7
Heavy	47	23.7
Duration of menstrual flow (days) (n=199)		
< 3	8	4.0
3-7	180	90.5
>7	11	5.5

Most respondents (82.3%) had regular cycles.
The quantity of menstrual flow was assessed based on number of soaked sanitary pad changes daily. 70.7% of respondents have moderate menstrual flow. 90.5% of respondents have a normal duration of menstrual flow (3-7 days).

Figure 2: Menstrual symptoms associated with menstruation (expressed as percentages)



The most common menstrual symptoms were menstrual pain (74%), mood changes (52.5%) and Tiredness (33%).

Discussion

This study was an attempt to determine the menstrual characteristics of Undergraduate females in a Ghanaian Public University. The mean age at menarche in this study was 12.7 ± 0.12 years very similar to 12.5±1.28years reported by Gumanga et al in Ghana[7]. Over two decades ago, Adadevoh et alreported menarcheal age of 13.98 ±1.42years in Ghanaian school girls[8]. Thisfalling trend in menarcheal age has been observed in other studies[9-11]. Historical records noted a gradual decline from 17 years in 1830 to about 14 years in 1900 to about 13 years in 1980 in the United States[11,12](rbej22, mum.org/menarche). A plateau in menarcheal age since the 1950s has been upheld by some authors while others suggested an upward trend [13-15] Genetic and non-genetic factors are responsible for this; ERa gene polymorphisms, single nucleotide polymorphism of rs314276 in intron 2 of LIN28B on chromosome 6, prenatal and immediate post-natal factors, attaining a critical weight at an early age (due to improved nutrition, urbanization and general health), heredity,parents' ethnic group, environmental conditions (e.g. high altitude), body stature, socioeconomic status, family size, level of education, and psychological wellbeingare some of the contributing factors advanced by previous workers[2,7,9,11]. The implications of this include risky sexual activity in adolescence with associated increase insexually transmitted infections, adolescent depression, unwanted pregnancy, unsafe abortion and adolescent motherhood[2, 7]. A rise in incidence of genital tract and breast cancer has also been associated with early menarche along with increased body mass index, insulin resistance, total number of metabolic syndrome components and hence increased cardiovascular risk and asthma[9,11].

Interestingly, two Ethiopian studies had a higher age at menarche (13.9 ± 1.2 years and 14.8 respectively)[9,16]. The high altitude was suggested as the reason for this. However, theresearchers agreed to a decline in menarcheal age in line with global trends. Variations existinmenstrual cycle duration and the duration of flow[2]. In the present study, the intermenstrual interval was reported to be 21-35 days by 73.7% females (see table 2). This is similar to reports of previous workers[7, 17-19]. Shorter and longer cycles represented 2.5% and 6.1% respectively (see table 2). Again this is consistent with previous reports[2, 10, 18]. Similar prevalence to 17.7%we observedfor metrorrhagia has been reported in literature[2,7]but sharply contrastswith the30.48% reported by Dambhare et al[17], 31% reported by Sulayman et al [20] and 42.8% by Zegeye et al [16]. This variation may be accounted for by the adolescent population recruited in these studies, as irregular cycles are common in adolescencedue toinitial anovulatory cycles[21,22]. Interestingly, a Ghanaian study among adolescent cohort puts the prevalence of metrorrhagia at about 13% [7]. This suggests that other factors like lifestyle, dietary habits, stress and hormonal imbalance or an underlying medical or gynecological pathology may be contribute to irregular menses. Other symptoms accompany menses in most premenopausal women. These vary from person to person. In our study, menstrual pain (dysmenorrhea) was the commonest symptom associated with menstruation (see figure 2). This is consistent with other reports[2, 10,18-22].However, the prevalence rates differ widely in literature based on individual and researcher factors[23,24]Our prevalence of 74 % (figure 2) is in agreement with other workers[7],[25]. Dysmenorrhea is thought to be due to Prostaglandin-induced increase in uterine activity[25]. The consequences of dysmenorrhea have been widely discussed in literature[23]. In one study, female respondents described menstruation as“a cluster of negative

symptoms", including a negative mood[22]. It results in despondency, psychomotor retardation and poor performance[26]. With more than half of our respondents having mood changes (figure 2) during menstruation; it indeed calls for attention.

Fatigue, anorexia, dizziness and headache could suggest anemia that resulted from menstrual flow. This, we implied from the moderate to heavy flow (menorrhagia) experienced by some of the females in this study (table 2). Furthermore, the study was conducted in sub Saharan Africa where anemia is common among females[27] One limitation of the study is recall bias. The recall method may be less valid and its accuracy is decreased with greater time elapsed between menarche and asking for the date, because it is fraud with poor memory.

Conclusion

Disturbance in the menstrual cycle and menstrual symptoms are common. It is important to educate females who present to their primary care physicians and gynecologist with these symptoms and proffer appropriate management strategies to reduce morbidity and improve quality of life of the patients.

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BLOOD COLLECTIONS FROM ORGANIZATIONS IN NORTH CENTRAL NIGERIA: A TEN YEAR REVIEW

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Abstract

Introduction: Voluntary blood donors in most developing sub Saharan countries are scarcely available with little or no safe donor retention strategies despite the rampant disease and man-made causes of anaemia frequently needing transfusion. The exploration of blood donor sourcing through effective collaboration with organised settings may create a break through.

Aims: *The study sought to determine the organisations and their contribution to blood collections at the blood service in North central Nigeria.*

Methods: *The records of blood collections in organizations within the North Central Nigeria from 2007 to 2017 were studied. The records of the blood donation clinics and units of blood collected in the organizations were collated. Data was analysed using epi info 2010 version.*

Results: *A total of 52,664 units were collected from volunteer donors at 756 blood donation clinics in three categories of organisations in North Central Nigeria from 2007 to 2017 with a ratio of 70 donations per clinic. 32,228 (61.20%) were from faith base organisations, 17,795 (33.79%) from educational institutions and 2,641 (5.01%) from work places. There were 478 (63.23%), 219 (28.97%) and 59 (7.80%) blood drive clinics with the mean donations rate of 67, 81 and 45 per clinics for the respective organisations.*

Conclusion: *Organizations in North Central Nigeria have contributed to voluntary blood donation. Collaboration between organizations and the blood service could lead to the attainment of national blood security.*

Key words: *Organizations, North Central Nigeria, Blood, Collection*

Introduction

Following the discovery of the circulatory system by William Harvey, a British physician in 1628, blood transfusion was contemplated and attempted soon afterward.1 The first successful blood transfusion occurred in England in 1665 when Richard Lower kept dogs alive by transfusing blood from other dogs. Transfusion from sheep to humans was separately reported by Jean-Baptiste in France, Richard Lower and Edmund King both in England in 1667.1 James Blundell, a British obstetrician took blood transfusion to the next level in 1818 when he performed the first human to human blood transfusion while treating postpartum

haemorrhage.1 Attempts at transfusion of milk from goats, cows and humans were made between 1873 and 1900. From 1901 to 1940, advances in blood transfusion led to red blood cell antigens typing and cross matching of blood for donor-recipient compatibility.2

The first national blood collection program was established in the United States in 1941. The Red Cross began the national blood service which collected blood for the United States soldiers, a social exercise which ended in 1945 with the World War II, having collected thirteen million pints. The Red Cross in 1948 began the first nationwide blood program for civilians by opening the first blood collection centre in Rochester, New York. By 1949, the blood system of the United States grew to comprise of 1500 hospital blood banks, 46 community blood centres and 31 American Red Cross regional blood centres.2 The gains in blood sourcing led the United States to open its national blood clearing house. The blood banks in the States initiated move towards an all-volunteer blood donor system in 1970 with the Red Cross calling for a National Blood Policy two years later, which the federal government set up in 1974, supporting standardized practice and an end to paid donations.1 The World Health Assembly a year later (1975) recommended all member countries to establish centralised blood service that would develop blood transfusion practice based on blood collection from volunteers.2

The current daily need of 7000 blood units at the National Blood Service of the United States, to keep healthy level of stock, is partly met by regular blood collections through drives at suitable venues within the campus of the university of Nottingham.3 The Australian Red Cross, by organizing blood challenge among student groups in a blood donation healthy competition, collected almost 3000 units of blood that saved a little less than 9000 lives in three months.4 In the medicine department of the university of Chicago, a facility is provided for the booking of appointment for blood donations, enabling safe committed donors to donate every 56 days.5

The requirements for the selection of suitable blood donors, lays emphasis on donor safety and protection of the recipient from transfusion related hazards, as outlined in details by WHO.6 Access to safe blood in low and middle income countries is characterized by short fall in adequate volume of supplies, safe protocol for donation, transfusion and appropriate regulation to ensure equitable and sustainable distribution.7 The blood service in Jos, North Central Region of Nigeria hosts one of the six zonal blood service centres, collecting blood from volunteer givers at both indoors and outdoors while converting family replacement donors to voluntary, and eliminating paid donations.8 Reports of works assessing the contribution of organisations to blood collection in our setting are not known to us.

Aims: This study sought to determine the contributions of organizations in sustaining successful blood donation campaign. It also sought to identify and outline modalities for adoption in effective blood sourcing in organizations.

Method: The records of activities that build up to blood collections in organizations within the north central Nigeria over a ten year period; from 2007 to 2017 were studied. The activities were securing blood drive appointments for donation clinics, sensitization of the organisations and its persons on altruistic blood donation. The records of the blood donation clinics and units of blood collected in the organizations were collated. The organisations were grouped into religious, educational and work place (military and paramilitary, Civil and others). Ethical

approval for this work was obtained from the ethical committee of the North Central Zonal Centre of the National Blood Transfusion Service in Jos, Nigeria. Data was analysed using epi info 2010 version and presented in table and charts.

Results:

A total of 52,664 blood units were collected successfully from volunteer donors at 756 blood donation clinics in three categories of organisations where blood donation clinic(s) were conducted in North Central Nigeria from 2007 to 2017 with a ratio of 70 donations per clinic. The highest collections, 32,228 (61.20%) were from religious organisations; the church in particular, 17,795 (33.79%) from educational institutions and 2,641 (5.01%) from work places. There were 478 (63.23), 219 (28.97%) and 59 (7.80%) blood drive clinics with the mean donations rate of 67, 81 and 45 per clinics for the respective organisations. All the heads of the institutions were sensitized and their permission obtained before the blood donation clinics were set up within the organisations, where only altruistic volunteers donated blood.

Religious organisations collaborating in blood donation with the regional blood service in north central Nigeria are entirely the church denominations, where 32,228 blood units were collected at 478 clinics. Over the study period, 438 (91.63%) blood donation clinics were set up in four denominations; Church of Christ in Nations [287(60.01%)], Catholic Church [62(12.97%)], Evangelical Church of West Africa [47(9.83%)] and Seventh Day Adventist [42(8.78%)]. 30,748 (95.41%) blood units were collected from the clinics with the highest mean donation per clinic ratio in the Catholic Church while the highest number of blood donation clinics was conducted in the COCIN denomination (table 1). Baptist and ten other church denominations were sites for the collection of 1,480 (4.59%) blood units at 40 (8.37%) clinics (figure 1).

Twenty-nine educational institutions accommodated a total of 217 blood donation clinics with the resultant collection of 17,795 blood units. Fifty clinics (22.37%) took place in the Universities where 4511 (25.35%) donations were made; 92 units per clinic event. Colleges and polytechnics constituted the bulk of the educational institutions in this study, with 130 clinics (59.91%) accounting for 10,218 (57.42%) of the education based blood collections; 79 donations per clinic. Theological education institutions hosted 24 (11.06%) clinics and yielded 1,958 (11.00%) units of blood at approximately 85 donations per clinic. Other educational centres were home for thirteen (6.00%) blood drive clinics that generated 1,108 (6.23%) blood units at the donation rate of 85 per clinic(figure 2).

Twelve work places provided sites for 59 blood donation clinics where 2,641 units were collected. 539 (21.90%) units were donated at 19 (32.03%) clinics in the military and paramilitary formations at 28 donations per clinic. Civilian work environments were used for 24 (40.68%) clinics that pulled in 1,227 (46.46%) blood units while other work places had sixteen (27.22%) clinics with blood donation output of 875 (33.13%) units at the donation rate of 51 and 55 per clinic respectively (table1)

Discussion

Blood collections in this study are from volunteers at organisation's volunteered sites in churches, schools and work places. This is a clear departure from the traditional hospital based blood donation from predominantly paid and family replacement donors, largely considered unsafe.8 The large number of blood units collected from organisations in the zone show an increased improvement in voluntary blood

donor recruitment over the observation in our earlier report.9 The overall high rate of blood donation in this study indicates that outdoor clinics may cost effectively yield more units of blood for transfusion in our setting. Sustained collaboration with organisations in blood sourcing through awareness creation and public acceptance of the social norm of blood donation may propel the entry of Nigeria into the committee of nations that have attained 100% voluntary blood donations.10 Continual expansion of the roles and number of organisations in blood sourcing in Nigeria could lead to sufficiency and safety of blood and blood products which would guarantee national blood security. The commitment of the Red Cross and the Red Crescent, like in other countries, would advance the blood service towards the desired provision of quality blood for transfusion in Nigeria.4

Faith base organisations presented veritable opportunities for blood sourcing in north central Nigeria. The church contributions to blood donor clinics and collections in this region are exemplary. Education and awareness among church leadership on blood and its donation could build confidence and trust, resulting in increased clinics and collections. The realization of appeals from various hospitals for blood in Ghana led the World Miracle Church International in collaboration with other partners, to organise a blood donation exercise in 2012 for its members in Accra.11 Several Muslims were at several set up locations in Egypt donating blood voluntarily to meet transfusion needs of, Coptic Christians, victims of 2017 Palm Sunday bomb blast.12 There is a need to deepen current collaboration with the existing faith based partners (table 1, figure 1) while extending awareness to the leadership of others churches and mosques for the overall sensitization of members towards optimal donor clinic set up, voluntary donor enrolments and donations.

The role of tertiary education institutions in successful blood service in the North Central region of Nigeria over the study period is as obvious as that of faith based organizations (table 1, figure 2). The high collection of blood in our tertiary institutions mimics the output of regular conducts of blood drives at suitable venues within the university of Nottingham which partly met the daily need of 7000 blood units at the National Blood Service of the United States, that kept its healthy level of stock.3 The collection of blood units in our educational institutions could increase by organizing inter and intra institution healthy blood donation challenge among student groups, a strategy used by the Australian Red Cross.4 There is need to collaborate with managements of tertiary institutions for the establishment of static clinics with facility for appointment bookings and blood donations.5 Static blood donation clinics in higher institutions of learning will create rapid awareness on blood donation, donor recruitment and retention, among a largely youthful population, and partly meet daily blood transfusion requirements. Creation of blood donor cubs will enhance smooth interactions with institutions management and orderly expose students and personnel to blood donation for informed enrolment.

Work places were also suitable sites and venues for blood collections in the geopolitical north central region of Nigeria. The low blood pool at work places in our study compared to faith and education based collections may be related to more people at older ages at the time of employment after education. The characteristics of prospective donors at higher education institutions and at church worship centres may have the similarity of age, pair group decision, and experimentation, unlike those at work places in their reproductive carrier or having medical and or

surgical indications for permanent deferral from blood donation.13

Conclusion

Blood collection from organizations in North Central Nigeria has substantially contributed to the local and national blood pool. Faith based and educational institutions like in developed countries with sustainable blood service could be collaborated with by the blood service in Nigeria for the attainment of national blood availability, sufficiency, affordability and safety.

Recommendations

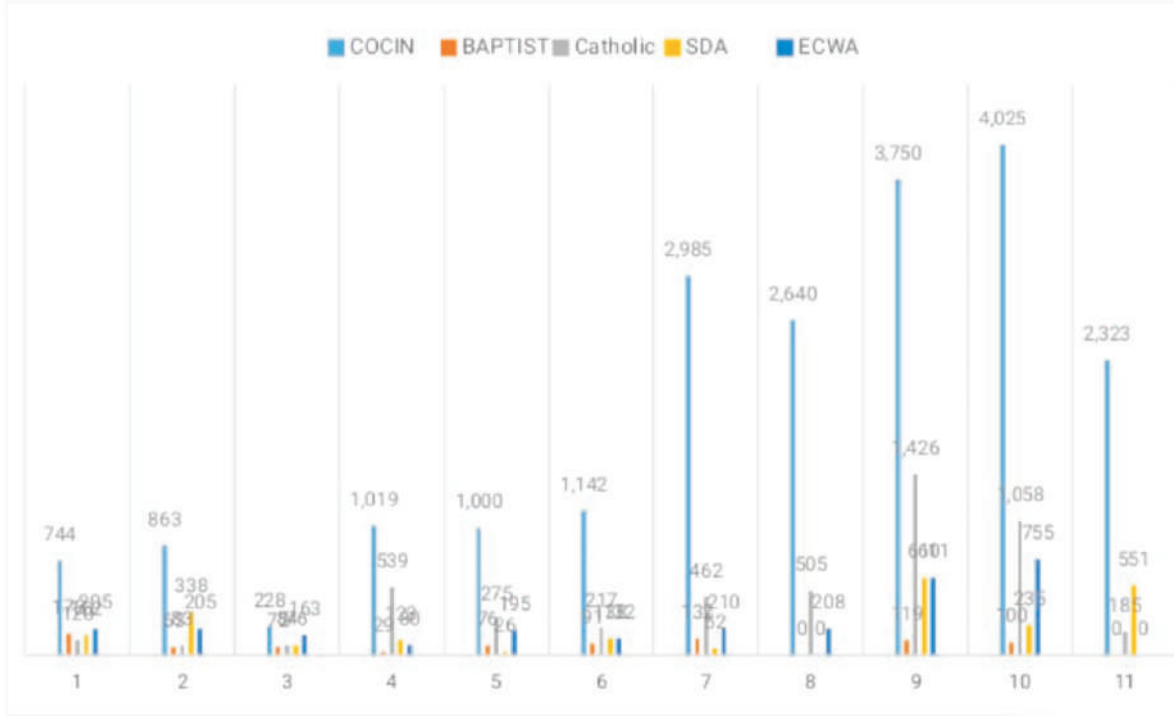
Blood and blood donation should be taught in secondary and Tertiary educational institutions to create the necessary awareness that will enshrine the habit of voluntary blood donation for national service and encourage early commitment among young people. Leadership of local and international organizations should welcome the blood service and encourage members to donate blood. Static donor clinics should be established in schools, worship centres, ministries, departments and agencies to demystify blood donation and bring the altruistic opportunity to the populace.

Table 1

Organizations	**No of Clinics (%)**	**No of Units**	**Donation Ratio**
Faith base	478 (63.23)	32228 (61.20)	67
Educational	219 (28.97)	17795 (33.79)	81
Work places	59 (7.80)	2641 (5.01)	45
Total	756 (100.00)	52664 (100.00)	70
Faith base			
COCIN	287 ()	20,719 ()	72
Catholic	62 ()	4954 ()	80
ECWA	47 ()	2764 ()	59
SDA	42 ()	2311 ()	55
Others	40 ()	1,880 (8.37)	47
Educational			
Universities	50 (22.37)	4511 (25.35)	92
Coll/Poly	130 (59.91)	10218 (57.42)	79
Theological	24 (11.06)	1958 (11.00)	85
Others	13 (6.00)	1108 (6.23)	85
Work places			
Barracks	19 (32.20)	539 (20.41)	28
Civilian	24 (40.68)	1227 (46.46)	51
Others	16 (27.12)	875 (33.13)	54

Distribution of organizations and blood collections in North Central Nigeria

Figure 1



Blood collections from five church denominations in North Central Nigeria
Key: 1-11≥ 2007 to 2017, COCIN≥ Church of Christ in Nations, ECWA≥ Evangelical Church of West Africa, SDA≥Seventh Day Adventist

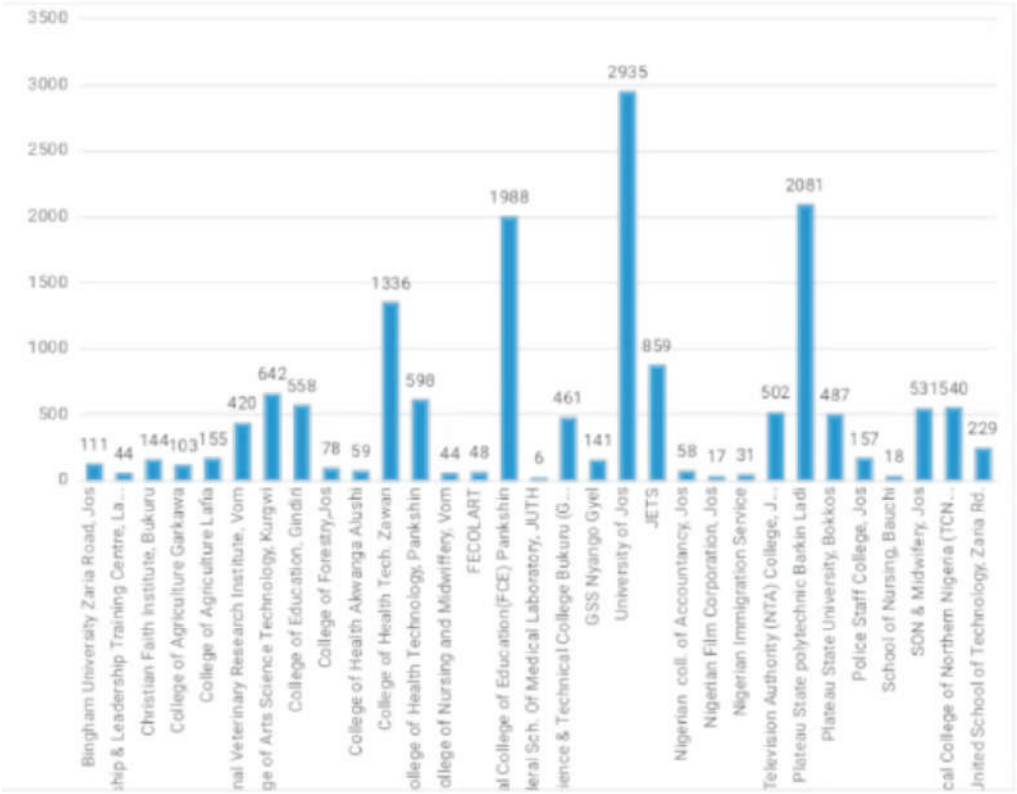


Figure 2

Blood units collected in educational institutions in North Central Nigeria

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NEONATAL TETANUS IN NIGERIA: A call to speed up elimination strategies.

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ABSTRACT

Neonatal tetanus (NNT) is a vaccine preventable disease that is associated with high mortality rate. It is endemic in majority of the developing countries including Nigeria and has since been targeted for elimination by World Health Organization. Hospital based studies have reported varying mortality rates of NNT. For more than two years, no case of NNT was managed in our facility, Lagos University Teaching Hospital (LUTH), Surulere, Lagos. However, within a period of two months, we managed three cases of NNT. We present the three cases of neonatal tetanus, collated the prevailing risk factors for NNT, highlighted challenges in their management and emphasized more efforts to sustain elimination of neonatal tetanus.

INTRODUCTION

Neonatal tetanus (NNT) remains one of the major preventable causes of mortality in the newborn period.[1] It is a vaccine preventable disease that is endemic in 90% of developing countries and accounts for 5-7% of neonatal deaths globally.[1,2]The World Health Organization in conjunction with United Nations Children's Fund and United Nations Population Fund[11](WHO/UNICEF/UNFPA) in 2005 re-launched the Maternal and Neonatal Elimination Initiative (MNTE) with a new target for elimination of tetanus by year 2015. Elimination was defined as less than 1 case of neonatal tetanus per 1000 live birth in every district. According to WHO MNTE statistics in October 2017, Nigeria is still one of the remaining 16 countries yet to achieve the Maternal and Neonatal Tetanus Elimination goal. Its incidence in Nigeria ranges from 14.6 to 20.0 per 1000 live births[4]and accounts for 20% of neonatal mortality.[2] In other parts of Africa, mortality rate varies from 0.3 / 1000 live births in Egypt to 15.0 / 1000 live births in Somalia.[5,6]Several hospital-based studies have documented differing mortality rates. Fetuga*et al.*[4] reported a mortality rate of 63.6%while Alhaji*et al.*[5] in Maiduguri, reported a mortality rate of 66.7% and also noted that 94.1% of deliveries were at home.A previous report from the Lagos University Teaching Hospital (LUTH) showed a mortality rate of 4.9% out of 15 neonatal patients managed in 2001.[8]

NNT is caused by an obligate, motilegram-positive bacillus, a ubiquitous spore forming,non-encapsulated anaerobe called *Clostridium tetani*. Neonatal infection commonly follows unhygienic delivery practices and poor newborn care practices such as poor cord care. It may also occur from unhygienic circumcision and ear piercing.[9]NNT is characterized by an acute onset of hypertonia, painful muscular contractions and generalized muscle spasms caused by the neurotoxin.

Table 1: Baseline characteristics of the patients

Serial No	Patient Initials	Gestational Age (weeks)	Age at Presentation (days)	Sex	Weight at presentation (g)	Cord care	Maternal age (years)	Socio-economic status	Parity	Received antenatal care	Mode of Delivery	Place of Delivery	Maternal Tetanus Immunization status
1	Baby M	38	7 days	Male	2980	Methylated spirit	25	Low	3	No	SVD	TBA place	Not immunized
2	Baby M	40	7 days	Female	2650	Hot fermentation and herbal application	24	Low	1	No	SVD	TBA place	Not immunized
3	Baby S	39	6 days	Female	2490	Application of hot stone	29	Low	-	No	SVD	Home	Not immunized

SVD – spontaneous vaginal delivery; TBA –Traditional birth attendant

All the babies presented within the first week of life, had fever at presentation with evidence of umbilical cord sepsis such as reddish and foul smelling cords; in addition to the muscular spasms (Figure 1).Table 2 shows the clinical features of the babies at presentation and the specific treatment and management outcome of the babies. Two of the cases were successfully managed and discharged home after both mother and babies received tetanus toxoid immunization with follow-up clinic schedule. Major challenges encountered included severe financial constraints in parents, unavailability of mechanical ventilators and Human Tetanus Immunoglobulin when needed.

Fig.1: Muscular rigidity/ spasms in a neonate

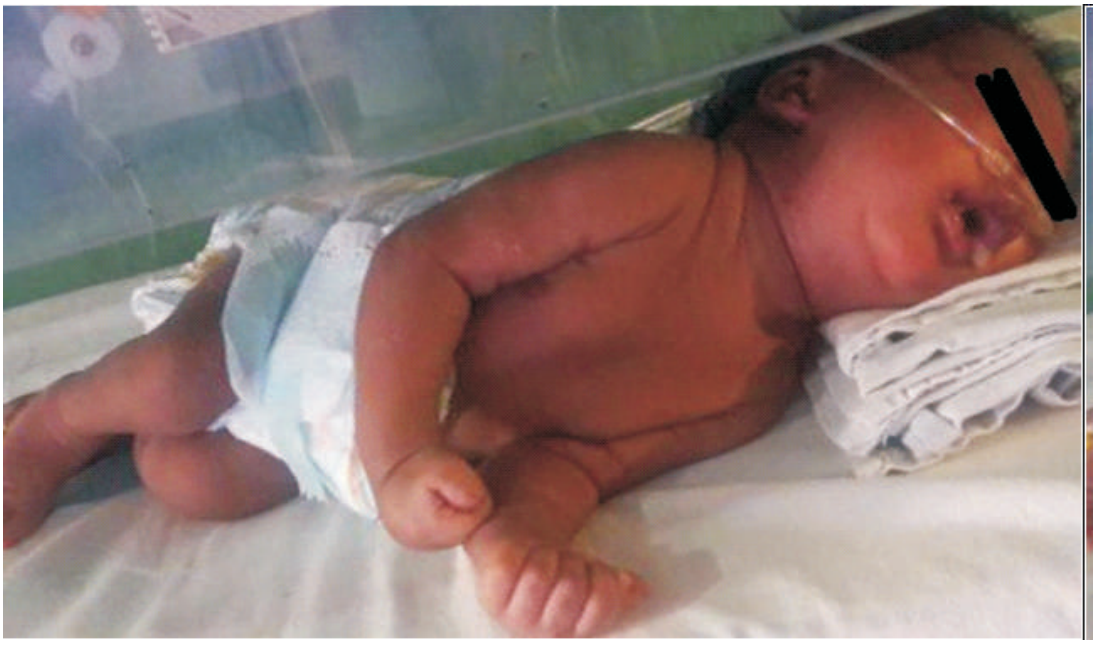

Table 2: Clinical features at presentation, treatmentand outcome

Characteristic	Patient 1	Patient 2	Patient 3
Patient's initials	Baby M	BM	Baby S
Age at presentation (days)	7	7	6
Period of onset (in hours)	<24	48	24
Frequency of spasms	Intermittent	Persistent	Intermittent
Fever (^{o}C)	38.8	40.3	38.7
Difficult breathing	Yes	Yes	Yes
Recurrent apneic episodes	No	Yes	No
Heart rate (beats/min)	154	50	148
Pneumonia	No	Suspected	No
Hendrickse[2] tetanus score (maximum score ≥ 15)	8	7	9
Complete blood count on admission	Not suggestive of sepsis	Suggestive of sepsis	Not suggestive of sepsis
E/U/Cr	Within normal values	Within normal values	Showed derangement with Na-133mmol/L, K-3.4mmol/L, Cl-103mmol/L, HCO_3-16mmol/L
Medications given	Intravenous Diazepam, Phenobarbitone and Chlopromazine. Also intravenous Metronidazole and Cefotaxime	Intravenous Diazepam, Phenobarbitone and Chlopromazine. Also intravenous Metronidazole and Cefotaxime	Intravenous Diazepam, Phenobarbitone and Chlopromazine. Also intravenous Metronidazole and Cefotaxime
Tetanus Ig / ATS given	3000IU of anti-tetanus serum	3000IU of anti-tetanus serum	3000IU of anti-tetanus serum
Required respiratory support	Yes	Yes	Yes
Duration of hospital stay (in days)	20	3	16
Outcome	Discharged	Died	Discharged

DISCUSSION

Neonatal tetanus is a common preventive cause of neonatal mortality.[9] It has neither sex nor racial predilection, though some studies in Nigeria have reported male predominance.[6,7]Neonatal tetanus remains a disease of low socioeconomic class as reported in other literature.[2-8] The three cases reported here were all from low socio-economic background and low level of education. A rise in poverty level, poor immunization coverage in Nigeria and a strong sociocultural belief in traditional birth attendants still make the disease highly prevalent in our society.[2-9] The global coverage of NNT with at least two doses of tetanus toxoid vaccine was reported to be 69% in 2015 compared to previous 44% in 2000.[10] The Nigerian national maternal tetanus toxoid vaccination coverage is documented to be 45% with regional variations (southwest 81.3%, northwest 20%).[11]

The cases in this report were similar; all the mothers had no antenatal care, no tetanus toxoid immunizations, were of low socioeconomic status, unhygienic deliveries and practiced poor cord care.It also highlights the difficulty in management of the complicated disease in a resource challenged health care facility with lack of pediatric ventilators. The risk factors noted are similar to Aliyu*et al*[6]whodocumented a case fatality of 56.7% with majority of pregnant mothers having home deliveries and no maternal immunization.

Neonatal tetanus typically presents with inability to suck, spasms and associated difficulty with breathing, fever or respiratory complications. Symptoms also vary from autonomic complications, laryngeal spams, and hypoglycemia to renal complications and death. Diagnosis of neonatal tetanus is essentially clinical and principles of management include; neutralization of circulating toxins with Human Tetanus immunoglobulin, Anti-tetanus serum, control of spasms and continued sedationonce the tetanospasmin is bound to the nerve terminals. Other measures include-elimination of residual Clostridial infection with cord care and use of antibiotics, general supportive care and adequate fluid and caloric intake. Critical care with use of mechanical ventilation is crucial for survival in babies with uncontrollable spasms as mechanical ventilation helps to control respiratory muscle spasm and prevents respiratory failure.

In the study center, some of the challenges encountered in the care of the babies were unavailability of neonatal ventilator, which was required for respiratory failure experienced by the second case presented and financial constraints, as caregivers were unable to procure human tetanus immunoglobulin that is more potent in neutralizing circulating toxins. It is pertinent to note that the current economic downturn in Nigeria, lack of health insurance for the mothers and their newborns, high out of pocket fees for mother and child health, and increased hospital delivery fees have further increased the number of women that resort to the use of TBAs, faith based birthing and home deliveries. [12] All these would further jeopardize the country's efforts towards achieving the Sustainable Development Goals (SDGs)and the 2015 Maternal and Neonatal Elimination goal by WHO/UNICEF/UNFPA.

CONCLUSION

Lack of maternal immunization during pregnancy coupled with unhygienic delivery practices were factors associated with NNT.

We advocate more community awareness on the importance of good ante-natal care and deliveries, strengthening of the routine immunization for pregnant women and women of child bearing age and replacement of traditional birth attendants with midwives who are well trained on recognizing high risk pregnancies and referral of all mothers to get immunized in health centers. We further recommend wider dissemination of effective newborn care practices and education of mothers on avoidance of harmful neonatal practices at every opportunity.

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