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ORIGINAL ARTICLE

Asymptomatic Bacteriuria and Foetomaternal Outcome at the University of Maiduguri Teaching Hospital

Kwari SD[1], Chama CM[2], Gadzama GB[3]

ABSTRACT

Background: Asymptomatic bacteriuria (ASB) is a common medical complication of pregnancy and may be associated with acute pyelonephritis, preterm labour and delivery, intrauterine growth restriction (IUGR), low birth weight (LBW), anaemia, hypertension and long-term renal dysfunction. Routine screening and treatment of ASB in pregnancy are recommended. **Objective:** This study determined the prevalence, common organisms implicated, their antibiotic sensitivity pattern and the foetomaternal outcome of pregnant women with ASB. **Methods:** We conducted a prospective study at the Department of Obstetrics and Gynaecology, University of Maiduguri Teaching Hospital (UMTH), Maiduguri, Nigeria. One hundred and fifty pregnant women attending antenatal booking were consecutively recruited. We collected demographic and clinical information. A clean catch midstream urine specimen was collected for culture and sensitivity. The women were followed up to delivery and foetomaternal outcome were obtained. **Results:** The prevalence of ASB was 22%. Escherichia Coli was the most predominant organism isolated in 45.4%. Nitrofurantoin (90.9%), Ceftriaxone (87.8%) and Co-Amoxiclav (84.8%) showed the highest activity against the isolated microbes and were resistant to Ampicillin (87.9%) and Cloxacillin (79.7%). ASB is associated with an increased risk for UTI (P-value = 0.001), pyelonephritis (0.002), anaemia later in pregnancy (<0.001), preterm delivery (<0.001), low birth weight (<0.001) and admission to SCBU (0.023). **Conclusion:** The prevalence of ASB is high and associated with significant maternal and perinatal morbidity. We recommend screening all pregnant women attending antenatal clinics for ASB and appropriate treatment given.

Key words: Asymptomatic bacteriuria, pregnancy, foetomaternal outcome, urine culture, Nigeria.

[1]Department of Obstetrics and Gynaecology Asokoro District Hospital Abuja, Nigeria, Nile University of Nigeria Abuja, Nigeria. [2]Department of Obstetrics and Gynaecology Abubakar Tafawa Balewa University Teaching Hospital Bauchi, Nigeria. [3]Department of Microbiology University of Maiduguri Teaching Hospital Maiduguri, Borno State.

Corresponding Author:

Dr Kwari Shiktira Danladi
Department of O & G, Asokoro District Hospital and Nile University of Nigeria, Abuja.
Email: kwarydan@yahoo.com
Phone number: +2348023611010

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Introduction

Asymptomatic bacteriuria (ASB) is the persistent bacterial colonisation of the urinary tract without urinary tract symptoms.[1] The presence of more than 100,000 colony-forming units of a potential pathogen per ml of urine is diagnostic of ASB.[1,2]

Urinary tract infection (UTI) is a relatively common medical pregnancy complication, and ASB is the most prevalent of these infections.[3,4,5] The incidence of ASB ranges between 2% and 10%.[2,6]

Though asymptomatic, ASB has the potential to cause maternal and foetal morbidity. Without treatment, 20-40% of ASB cases will progress to acute pyelonephritis, a leading cause of antepartum hospitalization.[7,8,9] Pregnant women with ASB are also at risk of developing anaemia in pregnancy, hypertensive disease in pregnancy, postpartum urinary tract infection and chronic renal disease.[5,9,10] Bacteriuria increases the risk of preterm delivery, low birth weight and foetal and neonatal mortality.

The risk of preterm delivery is said to be twice as high among women who had ASB at some point during pregnancy compared to those who did not.[2,7,11]

Many complications of pregnancy have been attributed to UTIs such as preterm labour and delivery, intrauterine growth restriction, LBW, anaemia, hypertension and long-term renal function impairment, therefore the beneficial effect of treatment of pregnant women with ASB cannot be overemphasized.[2,5,7]

Preventing cases of mild and serious pyelonephritis is not only economically beneficial, but it also produces a significant improvement in the quality of life of pregnant women.[12,13]

Routine screening and treatment of ASB help reduce the risk of development of pyelonephritis, preterm delivery and LBW infants.[1,2,7,14] It is therefore not surprising that a strategy for routine screening for ASB is currently recommended by the World Health Organization and other bodies.[1,3,7] The culture of midstream urine specimens remains the gold standard for detecting ASB in pregnancy, with the main advantage of being able to identify the causative organism and determine antibiotic sensitivities.[1,3] Research has shown that screening is cost-effective when the prevalence of ASB is >2%.[15,16] The few studies done in northern Nigeria reported a high prevalence of 8%[17,18] and thus the need for a similar study in Maiduguri. This study determined the prevalence of ASB among pregnant women at booking, the common offending organisms and the foetomaternal outcome. The findings from this study should inform regular screening for ASB in our antenatal clinics.

Methods

We conducted a prospective study at the Department of Obstetrics and Gynaecology UMTH, Maiduguri, Nigeria. Approximately 4,000 women book and attend the antenatal clinic annually. Subjects were recruited consecutively from the population of pregnant women attending the booking clinic over ten weeks. Women with symptoms suggestive of urinary tract infection and current use or use of antibiotics within the preceding two weeks were excluded.

Over ten weeks, we recruited 150 women based on the Tailors sample size formula and applied a 20% attrition rate.[19] We recorded demographic and clinical variables such as age, parity, gestational age, and educational level. Maternal complications and perinatal outcomes were also recorded. The study was conducted from 3rd October to 13th December 2010.

Clean catch midstream urine specimens were collected in sterile containers and taken to the microbiology laboratory within 1 hour. In case of delay, the samples were refrigerated at 4°C. A loopful of well-mixed uncentrifuged urine was inoculated on the surface of blood, MacConkey and nutrient agar and incubated for 48 hours at 37°C. Asymptomatic bacteriuria was defined as cultures showing at least 100,000 cfu/ml of single species in a woman without symptoms suggestive of urinary tract infection. Culture was defined as contaminated if there was a mixed culture of any density or insignificant if there was a pure culture of < 100,000cfu/ml of urine.[4,5] Cultures in which there was no growth were classified as negative. Antimicrobial sensitivity was determined using the disc diffusion method.

Apgar score of less than 7 at 5 minutes was defined as birth asphyxia. Preterm birth was defined as birth before 37 completed weeks of gestation and low birth weight was defined as a birth weight of less than 2500g.[20] Urinary tract infection was defined as a history of frequency, dysuria and lower abdominal pain with a positive urine culture. Findings of fever, nausea, vomiting and flank tenderness in addition to symptoms suggestive of cystitis was defined as pyelonephritis[5,16]. Anaemia was defined as PCV < 30% and prelabour rupture of membranes as rupture of membrane before the onset of labour.[5,21]

Ethical Issues

All aspects of the study were reviewed and approved by the Ethics Committee of UMTH. Informed consent was obtained from all subjects after the study was thoroughly explained to them, stating that they could withdraw at any time without penalty. Women who became symptomatic with positive urine cultures were treated according to the antibiotic sensitivity pattern.

Data Analysis

Data were analysed using the statistical package for social science (SPSS.14 Inc, Illinois.). Prevalence (with a 95% Confidence interval) was calculated using Epitools (epitools.ausvet.com.au). The risk was

estimated using the odds ratio and the Chi-square test was used to test for significance at a 95% confidence interval. Tables were used to illustrate a pattern in the variables.

Results

One hundred and fifty pregnant women were recruited for the study, out of whom 33 yielded significant growth (100,000cfu/ml of urine) giving a prevalence of 22% (95% CI 15.4 - 28.6).

The majority of the study population were within 25-34 years (64%), para1 to 4 (52.7%), in the second trimester of pregnancy (52%) and had tertiary level education (44.1%) as shown in Table 1.

Escherichia coli (E. Coli) was the most predominant organism isolated (45.4%), followed by Staphylococcus aureus (30.3%). This is illustrated in Table 2.

Nitrofurantoin (90.9%), Ciprofloxacin (84.8%), Ceftriaxone (87.8%) and Co Amoxiclav (84.8%) showed the highest activity against the isolated microbes. Ampicillin (87.9%) and Cloxacillin (79.7%) showed the highest resistance as illustrated in table 3.

Table 4 illustrates the association between ASB and foetomaternal outcomes. ASB was associated with an increased risk for UTI (p= 0.001), pyelonephritis (p= 0.002), anaemia later in pregnancy (p<0.001), preterm delivery (p<0.001), low birth weight (p<0.001) and admission to SCBU (p=0.023). The risk for birth asphyxia (p=0.393), Perinatal mortality (p=0.051), PROM (p=0.178), and hypertension (p=0.152) were not significant.

Table 1: Sociodemographic characteristics of the study population

AGE GROUP	*N*	*(%)*
15 – 24	45	30
25 - 34	96	64
35 - 44	9	6
TOTAL	**150**	**100**
PARITY GROUP		
0	51	34
1 – 4	79	52.7
≥5	20	13.3
TOTAL	**150**	**100**
GESTATIONAL AGE		
First trimester	4	2.7
Second Trimester	78	52
Third Trimester	68	45.3
TOTAL	**150**	**100**
EDUCATIONAL STATUS		
None	44	29.3
Primary	11	7.3
Secondary	29	19.3
Tertiary	66	44.1
Total	**150**	**100**

Table 2: Organisms isolated in patients with ASB

ORGANISM	*N (%)*
Escherichia Coli	15 (45.4)
Staphylococcus Aureus	10(30.3)
Klebsiella Pneumonieae	5 (15.2)
Proteus Mirabilis	2 (6.1)
Pseudomonas Aeruginosa	1 (3.0)
TOTAL	**33 (100)**

Table 3: Sensitivity pattern of isolated organisms

ANTIBIOTIC	SENSITIVE N (%)	RESISTANT N (%)
Nitrofurantoin	30(90.9)	3(9.1)
Ampicillin	4(12.1)	29(87.9)
Cotrimoxazole	26(79.0)	7(21.0)
Ciprofloxacin	28(84.8)	4(12.1)
Gentamycin	25(75.7)	8(24.2)
Ceftriaxone	29(87.8)	4(12.1)
Co-amoxiclav	28(84.8)	5(15.1)
Erythromycin	23(69.7)	10(30.3)
Cloxacillin	7(21.1)	26(79.7)
Amoxicillin	20(60.6)	13(39.4)

Table 4: Foetomaternal outcome of patients with ASB

OUTCOME	OR (95%CI)	p – VALUE
Lower UTI	0.148(0.027-0.799)	0.001
Pyelonephritis	0.059(0.007-0.513)	0.002
Hypertension	0.310(0.079- 1.223)	0.152
Anaemia	0.204(0.087-0.480)	0.000
PROM	0.244(0.042-1.438)	0.178
Preterm birth	0.071(0.014-0.360)	0.000
Low birth weight	0.041(0.005-0.049)	0.000
Asphyxia	0.0276(0.017-4.533)	0.393
SCBU admission	0.345(0.143-0.836)	0.023
Perinatal mortality	0.120(0.0013-1.134)	0.051

Key:
UTI; urinary tract infection
PROM; premature rupture of membranes
SCBU; special care baby unit

Discussion

This study shows that the prevalence of ASB is high and it is associated with an increased risk for UTI, pyelonephritis, anaemia later in pregnancy, preterm delivery, low birth weight and admission to SCBU. The prevalence of asymptomatic bacteriuria in pregnant women in this study was 22% similar to 23.9% from the study in Sagamu, Nigeria[22]. This is however higher than the 8% reported in Sokoto[17] and Kano[18] northern Nigeria and lower than the 86.6% and 78.7% earlier reported in Benin City and Abakaliki, Nigeria respectively.[23,24] In this study, it is observed that pregnant women in the age group 25-34 years (54.50%), para 1-4(42.40%), and in the second trimester (54.50%) had the highest percentage of infection. These results correlate with findings at Sokoto[17], Abakaliki[24], Benin City[25] and India.[26] These findings, however, did not reach statistical significance probably due to the difference in sample size. The sample size was larger in those studies.

The most prevalent organism observed in this study was E. coli (45.4%) which agrees with earlier reports.[4,9,17,23,25] This could be due to the anatomical proximity of the urethra to the anal orifice which allows easy contamination and infection. Pregnant women may also find cleaning their anus properly after defecating difficult. This coupled with the urinary stasis in pregnancy allows E. coli strains to adhere to uroepithelial cells and replicate causing UTI.[5]

The prevalence of *Staphylococcus aureus* was also high (30.3%) in this study. This agrees with previous studies [23, 24,25] which observed an increasing trend in the prevalence of *Staphylococcus aureus* infection among asymptomatic pregnant women. The other isolated organisms included *Klebsiella* species, *Proteus* species, and *Pseudomonas aeruginosa*, in keeping with previous studies.[23,25,26]

The antimicrobial sensitivity and resistance pattern varies from one community to the other, from hospital to hospital and from one point in time to another. This is because of the emergence of resistant strains as a result of the indiscriminate use of antibiotics.[12,13] This study revealed that most of the isolated organisms were most sensitive to Nitrofurantoin, Ciprofloxacin, Ceftriaxone and Co-Amoxiclav. Gentamicin, Erythromycin and Cotrimoxazole were moderately effective against the urinary isolates. The isolates were however highly resistant to Ampicillin and Cloxacillin.

The relationship between asymptomatic bacteriuria in pregnancy with symptomatic urinary tract infections and adverse pregnancy outcomes has been well documented in the literature. This has led to the recommendation that screening for and treatment of ASB should be standard obstetric care in all antenatal units.[1,3,7] It is therefore not surprising that this study found an increased risk of symptomatic UTI, pyelonephritis and anaemia in women diagnosed to have ASB by culture further confirming earlier studies.[3,4,7,27] Although some studies have reported an increased risk for hypertension and premature rupture of the membrane in women with ASB, this study did not find such an increased risk.[2,5,7,27] The risk for preterm delivery, low birth weight and admission to a special baby care unit were also increased confirming earlier reports.[3,7,8,14,27,28] The increased risk for preterm delivery and low birth weight may explain the increased risk of admission to the special baby care unit. There was also no increased risk for perinatal mortality and birth asphyxia in keeping with earlier reports.[27,28]

The limitation of this study is that foetal and maternal outcomes were observed in only 73 patients which is 49% of the sample size, who came to the hospital for delivery. This is however not surprising as only 39% of live births in Nigeria took place in a health facility in the 5 years preceding the last demographic and health survey.[29]

Conclusion

The prevalence of ASB at 22% is significant and there is a need for routine screening of all our antenatal patients. The increased risk for maternal and foetal morbidity observed in this study further buttresses the need to screen and treat appropriately all cases of ASB detected.

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Conflict of interest: None

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Elective Gynaecological Surgeries in Aminu Kano Teaching Hospital, Kano, Nigeria: a 5-year review

Usman AU, Natalia A, Ibrahim DM

ABSTRACT

Background: Elective surgeries include procedures done to correct non-life-threatening medical problems as well as to alleviate conditions causing psychological stress or other potential risks to patients. This study described the pattern of elective Gynaecologic surgeries conducted in Obstetrics and Gynaecology department of Aminu Kano Teaching hospital, over a five-year period**. Objective:** To describe the pattern of elective gynaecologic surgeries conducted in Obstetrics and Gynaecology Department of our hospital over a five-year period. **Methods:** A retrospective study of all elective surgical procedures conducted at the Obstetrics and Gynaecology department of Aminu Kano Teaching hospital from 1st September, 2012 to 31st August, 2017 was conducted. Theatre operation register and gynaecological ward admission records were retrieved and reviewed. Information extracted include: age of patient, indication for the surgery, type of surgery conducted, nature of procedure (minor, intermediate and major), the cadre of surgeon and assistant(s) performing the surgery and the type of anaesthesia used for the surgery. **Results:** The total number of elective gynaecologic surgeries conducted over the study period was eight hundred and two (802) accounting for 19.4% of all surgical procedures. Uterine fibroid was the commonest indication for surgery with myomectomy being the commonest surgical procedure performed constituting 181(30%) of all gynaecologic operations. Hysterectomy was the second commonest procedure 115 (19%) indicated most commonly by uterine fibroids 53(46%). **Conclusion:** This study demonstrated 19.4% prevalence of elective gynaecological procedures in our centre. Consultants are the leading surgeons in most of the procedures and a significant association was found between the nature of the procedure and the cadre of surgeon. There is need to strengthen the postgraduate training of Resident doctors by exposing them to more hands-on training on major procedures.

Key words: Elective, gynaecological surgery, procedure

[1] Department of Obstetrics and Gynaecology, Aminu Kano Teaching Hospital

Corresponding Author:

Usman Aliyu Umar, Department of Obstetrics and Gynaecology, Aminu Kano Teaching Hospital, PMB 3452, Kano, Nigeria. Email: drusmanaliyu@yahoo.com

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Introduction

Gynaecologic surgeries are one of the commonest surgical procedures performed worldwide. In 2006, six of the top ten surgical procedures in United States were Obstetrics and Gynaecologic in nature.[1] In Nigeria, commonly performed procedures include myomectomy, hysterectomy (abdominal and vaginal routes), ovarian cystectomy and vesicovaginal fistula repairs among others.[2] Uterine fibroids were reported to constitute about 21 – 24% of all gynaecological operations in Nigeria.[3,4,5]

Elective surgeries include procedures done to correct nonlife-threatening medical problems as well as to alleviate conditions causing psychological stress or other potential risks to patients. These surgeries are normally scheduled. The patient is prepared well prior to the operation day and the surgery could be postponed without immediate danger to the patient. Elective operations have been shown to have better outcomes in terms of morbidity and mortality than emergency operations.[6]

Our hospital, being a tertiary institution is involved in post graduate surgical training. Effectiveness of training could sometimes be deducted from the

number of surgeries performed by various cadres of trainee doctors.

An audit of gynaecological procedures in our hospital was first conducted in 2015 by IU Takai *et al*.[2] It was a one year retrospective study that looked at gynaecological procedures in general. Such audit of all gynaecological surgeries may hinder appropriate extrapolations and deductions as the nature and preparedness of elective and emergency procedures differ. We therefore felt it is necessary to conduct an individual review of only elective gynaecological procedures. This study looked at elective gynaecological procedures over a 5 year period so as to detect changes in progress and performance. This may also help in identifying gaps in services and training.

Objectives

The aim of this study was to describe the pattern of elective gynaecologic surgeries conducted in Obstetrics and Gynaecology Department of Aminu Kano Teaching hospital from 1st September, 2012 to 31st August 2017. The specific objectives were to describe the age distribution of the patients, the prevalence of the various elective gynaecologic procedures over the given period, to describe the various indications and cadre of surgeons that performed the procedure and to describe the type of anaesthesia used.

Methods

A retrospective study of all elective surgical procedures performed at the Obstetrics and Gynaecology department of Aminu Kano Teaching hospital from 1st September, 2012 to 31st August, 2017 was conducted. A total of 802 patients had elective gynaecological surgeries during the study period. Theatre operation register and gynaecological ward admission records of 604 patients were retrieved and analyzed, given a retrieval rate of 75.3%.

A proforma was used to extract the following data: age of the patient, indication for the surgery, type of surgery conducted, nature of the procedure (minor, intermediate and major), the cadre of surgeon and assistant(s) performing the surgery and the type of anaesthesia used for the surgery. Patients with incomplete data in the registers were excluded. The total number of all gynaecological surgeries as well as the total number of procedures conducted in the department over that given period was obtained. The data was collated and analysed using SPSS version 21. Descriptive statistics were presented using tables.

Results

There were 4,131 surgical procedures conducted in the department during the study period. A total of 1,802 gynaecological procedures were conducted and 802 of these were elective surgeries. Hence, gynaecologic surgeries contributed 43.6% of procedures and elective gynaecologic procedures accounting for 19.4% of all surgical procedures performed in the department.

The patients' age ranged from 2 to 87 years with a mean age of 37.5(SD±13.5) years. Majority 188(31.9%) of the operated patients belonged to the 30 – 39 age group (Table 1).

Majority of the procedures, 514 (85.1%) were done for benign conditions while 90 (14.9%) procedures were performed for malignant conditions (Table 1).

Table 1 also showed that Uterine fibroid was the commonest indication for surgery and accounted for 234(38.7%) cases. Other common indications were ovarian cyst/tumour 65 (10.8%), uterine prolapse 47(7.8%) and genital tract malignancies which include ovarian, endometrial, cervical and vulval cancers accounting for 67(11.1%) of the procedures.

Myomectomy for uterine fibroids was the commonest surgical procedure performed constituting 181 (30%) of all gynaecologic operations over the study period. This was followed by hysterectomy 115(19%), ovarian cystectomy/oophorectomy 42 (7%), colpoperineorrhaphy 40(6.6%) and obstetric fistula repair which accounted for 35 (5.8%) of all elective gynaecologic surgeries as shown in Table 2.

The commonest indication for hysterectomy was uterine fibroid. Details of other indications were shown in Table 3.

In most of the procedures (67.5%), the leading Surgeon was a Consultant Gynaecologist. The Senior Registrars did 193 (32%) procedures while the Junior Registrars performed only 3(0.5%) procedures. These were shown in Table 3.

Majority of the cases (55.1%) were done under general anaesthesia. Details of other forms of anaesthesia used were shown in Table 3.

Most of the surgeries done (68%) were major procedures in nature and were done by the Consultant Gynaecologist. This association was statistically significant. (x^2-16.628 p-0.000). Details were shown in Table 4,5,6.

TABLES:

Table 1: Age Distribution, Nature of Disease and Indication for Surgery

Age Group	Frequency	Percentage (%)
<10	6	1.0
10 – 19	23	3.8
20 – 29	110	18.2
30 – 39	188	31.9
40 – 49	114	18.9
50 – 59	57	9.4
60 – 69	21	3.5
70+	21	3.5
Not indicated	64	10.6
Total	604	100.0
Nature of Disease		
Benign	514	85.1
Malignant	90	14.9
Total	604	100.0
Indication for Surgery		
Uterine Fibroid	234	38.7
Ovarian Cyst/tumour (benign)	65	10.8
Polyp	26	4.3
Prolapse	47	7.8
Obstetric Fistula	35	5.8
Genital tract malignancies (ovarian, endometrial, cervical & vulval)	67	11.1
Congenital anomalies	26	4.3
Others (Bartholins cyst, Adenomyosis, Ashermans Syndrome etc)	104	17.2
Total	**604**	**100.0**

Table 2: Types of Procedure Performed

Procedure	Frequency	Percentage
Myomectomy	181	30.0
Hysterectomy	115	19.0
Cystectomy/Oophorectomy/Salpingoophorectomy	42	7.0
Colpoperineorrhaphy	40	6.6
Obstetric fistula Repair	35	5.8
Staging Laparatomy/Debulking/Biopsy	27	4.5
Polypectomy	21	3.5
Vaginal Hysterectomy	21	3.5
Excision of transverse septum/imperforate hymen &labial separation	20	3.3
EUA/Biopsy	19	3.1
Vulvovaginoplasty	16	2.6
Adhesiolysis for Ashermans Syndrome	14	2.3
Marsupialisation	11	1.8
Exploratory Laparotomy	7	1.2
BTL	4	0.7
Colpocleisis	4	0.7
Vulvectomy	3	0.5
Others	24	4.0
Total	**604**	**100.0**

Table 3: Indications for Hysterectomy, Lead Surgeon and Type of Anaesthesia

	Frequency	Percentage
Indications for Hysterectomy		
Uterine Fibroid	53	46
Ovarian masses	12	11
Polyp	5	4
Prolapse	1	1
Genital tract malignancies	25	22
Others	19	16
Total	115	100
Lead Surgeon		
Consultant	408	67.5
Senior Registrar	193	32.0
Registrar	3	0.5
Total	604	100.0
Type of Anaesthesia		
General	333	55.1
Spinal	246	40.7
Saddle Block	17	2.8
Epidural	4	0.7
Local	3	0.5
Sedation	1	0.2
Total	604	100.0

Table 4: Nature of Gynaecological Procedure

Nature of Procedure	Frequency	Percent
Minor	73	12.1
Intermediate	120	19.9
Major	411	68.0
Total	604	100.0

Table 5: Type of procedure vs cadre of surgeon

Type of Procedure	Cadre of Surgeon			Total
	Consultant	S/R	Register	
Hysterectomy	85	30	0	115
Vulvovaginoplasty	16	0	0	16
Excision of transverse septum/imperforate hymen &labial separation	15	5	0	20
Adhesiolysis for Ashermans Synd	11	2	1	14
Marsupialisation	3	8	0	11
Exploratory Laparotomy	6	1	0	7
BTL	4	0	0	4
Colpocleisis	4	0	0	4
Vulvectomy	3	0	0	3
Myomectomy	98	82	1	181
Cystectomy/Oophorectomy/Salpingoophorectomy	27	14	1	42
Polypectomy	10	11	0	21
Obstetric fistula Repair	35	0	0	35
Vaginal Hysterectomy	18	3	0	21
Colpoperineorrhaphy	30	10	0	40
Staging Lap/Debulking/Biopsy	21	6	0	27
EUA/Biopsy	5	14	0	19
Others	17	7	0	24
Total	**408**	**193**	**3**	**604**

Table 6: Nature of Procedure * Cadre of Surgeon Cross tabulation

Nature of Procedure		Cadre of Surgeon		Total
		Consultant	Resident	
	Minor	38	35	73
	Intermediate	96	24	120
	Major	274	137	411
Total		408	196	604

Df-2, χ^2-16.628, p value-0.000

Discussion

Elective gynaecologic procedures constitute 19.4% of procedures conducted in the department. This was higher than the prevalence of 4.0% reported in 2015 in the same centre by Takai *et al*.[2] However, that study was a one-year audit and was done at a time when there was recurrent strike in the health sector with consequential poor turnover of patients in tertiary health centres. Similar figures were, however, reported in the same centre by Yakasai *et al*[7] and in Zaria[8] and Jos[9] both in Northern Nigeria.

The mean age of the patients undergoing an elective gynaecologic procedure of 37.5 (SD±13.5) years is comparable to the finding of 39 (SD±14) years reported in the United States.[10] However, the mean age is higher when compared to the one reported in another study conducted in the same centre which encompassed both obstetric and gynaecologic procedures.[7]

Uterine fibroid was the commonest indication for elective gynaecologic surgery in our review with a prevalence of 38.7% and myomectomy was the commonest surgical procedure conducted accounting for 30% of all the elective procedures. This was higher than the period prevalence reported in a previous study conducted in this centre.[3] However, while the reported prevalence in this study was based on elective procedures only, the previous study combined both elective and emergency gynaecologic procedures and that might have accounted for the lower period prevalence. The relative young age of presentation of the uterine fibroids, the desire for uterine preservation for future fertility and the high interest in child bearing are some of the reasons women often prefer to have myomectomy in our environment.[3,5] This is also comparable to findings reported in previous studies conducted in this center.[3,5,8] However, this contrast with findings reported in the United States where hysterectomy surpasses myomectomy in the management of uterine fibroid.[10,11]

Hysterectomy is one of the most frequently performed gynaecologic procedures for benign diseases.[12,13,14] Hysterectomy accounted for 19% of elective gynaecologic procedures conducted over the period under review with the leading indication being uterine fibroids. This is similar to reported rates of 18.2% in another teaching hospital in Nigeria.[15] However, slightly lower rates were reported in studies conducted in northeast,[16] south-south[17] and south-western[18] regions. This might be attributable to the lower patient turnover in those regions when compared to our region.

Majority (67%) of the elective gynaecological procedures during the period under review were performed by Consultant Gynaecologist. They performed 74% of hysterectomies, 54.1% of myomectomies and all (100%) obstetrics fistula repair, vulvovaginoplasty and vulvectomy. The senior registrars on the other hand performed the remaining 32% of the procedures under the supervision of the consultants. As our centre is a teaching hospital, this finding is not surprising and is consistent with findings reported in a previous study.[2] Difficult procedures are more likely to be performed by the consultant themselves to avoid unnecessary complications. Only three complicated/major procedures were done by the Registrars which implied that they were mostly not allowed to do such kinds of procedures. On the other hand, majority of the procedures were assisted by the senior registrars as a way of teaching them. Our finding also showed little involvement of the house officers in these procedures.

General anaesthesia was used in more than half of the procedures (55.1%). The use of general anaesthesia was necessitated by huge masses and cases with malignancies. Only four cases had epidural as it is not widely practised in our centre probably because of a lack of adequate manpower and expertise for the procedure in our centre.

Conclusion

The prevalence of elective gynaecological procedures in this study was 19.4%. Consultants were the leading surgeons in most of the procedures and a statistically significant association was found between the nature of the procedure and the cadre of surgeons. There is a need to strengthen the postgraduate training of Resident doctors by exposing them to more hands-on training on major procedures.

Limitations

Lack of complete record for elective surgeries

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Prevalence and risk factors/predictors of seizure-related injuries among children with Epilepsy at the University of Benin Teaching Hospital, Benin City.

Okunola P.O. Ani C.K

ABSTRACT

Background: Children with epilepsy are considered to be at an amplified risk for injuries as compared to the general population. The increased risk may occur directly as a result of the seizure or due to other comorbid conditions that predispose to injuries. **Objectives**: This study aimed to determine the frequency and the pattern of seizure-related injuries in children aged 0-17 years with epilepsy seen at the University of Benin Teaching Hospital, (UBTH), Benin City, Nigeria. **Methods**: Consecutive cases of children with epilepsy seen at the Paediatric Neurology Clinic of UBTH, Benin-City over a period of 6 months were evaluated for injuries in the preceding 12 months using a structured questionnaire. **Results**: A total of 119 respondents were involved in the study, 50 (42.02%) sustained an injury at some point in the preceding 12 months. Participants in the middle socio-economic class had more seizure-associated injuries (n = 25, 59.5%), compared to those in the low socio-economic class (n = 20, 42.0%) and high socio-economic class (n = 5, 18.5%); P = 0.003. Seizure-related injuries were associated most with generalized seizure (50.5%) when compared with focal seizures (14.3%) P = 0.001. Among the subjects, a tonic-clonic seizure was the most common subtype of generalised seizure (p =22.306, p = < 0.001). The commonest seizure-related injuries are skin bruises (35.1%), followed by soft tissue lacerations (22.8%). Strong association between epilepsy-related injuries and compliance to anti-epileptic drugs (AEDs) were noted. **Conclusion**: Children with epilepsy are at higher risk of injury and this risk is modified by some factors like socioeconomic status, seizure type, and compliance with medication

Key words: Seizure, Children, Injuries, Epilepsy

Department of Paediatrics
University of Benin Teaching Hospital
Benin City

Corresponding Author:

Chidiebere Ani
Department of Paediatrics
University of Benin Teaching Hospital
Benin City
Email: mylifeisamiracle14@gmail.com
Tel: 08141586567

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Introduction

Epilepsy is a chronic neurological disease of the brain that affects around 50 million people worldwide.[1] It is a clinical phenomenon diagnosed by the occurrence of two or more unprovoked seizures occurring greater than 24 hours apart.[2] This recurrent seizure is characterized by brief episodes of involuntary movement which may be focal or generalised and is sometimes accompanied by loss of consciousness and control of bowel or bladder function. Majority of children with epilepsy are found in low and middle-income countries (LMICs), this could be due to the high level of poverty, ignorance, and lack/poor state of medical facilities that characterize such counties.[1]

Seizure episodes are a result of excessive discharges in a group of brain cells, which can vary from brief lapses of attention or muscle jerks to severe and prolonged convulsions.[2] Children with epilepsy are considered to be at an amplified risk for injuries as compared to the general population and it is reported that people with epilepsy also have higher incidences of home,

street and school accidents even without an obvious seizure.[2] The increased risk may occur directly as the result of a seizure or due to other comorbid conditions that predispose to injuries. Common seizure-related injuries include soft tissue injury, dental trauma, head trauma, submersion injury, burn, fracture etc. Seizures may lead to abrupt falls or a sudden loss of awareness that occur without warning and the child is unable to utilize his/her protective reflexes to brace their fall and may consequently suffer head, orthopaedic, or soft tissue injury. In addition, they may fall onto a hot surface or into water, and sustain burns or submersion injury.

Absence or complex partial seizures lead to loss of awareness, preventing the patient from realizing and responding to dangerous situations at that moment of seizure. Absence seizures occurring during sports or chores or while crossing the highway may lead to injuries. Even in the absence of obvious clinical seizure activity, paroxysmal electroencephalogram (EEG) discharge has been shown to affect alertness and mental speed.[3]

Anticonvulsant drugs and co-morbidities like attention deficit disorder are associated with cognitive and motor impairments predisposing these children to an amplified risk of injuries.[4] Some factors like high seizure frequency, types of seizures (e.g. generalized tonic-clonic or atonic seizures), use of AEDs and compliance with AEDs also determine the risk of seizure-related injuries.[5,6] The risk of injuries may be further increased in children living in poor socioeconomic conditions in the LMICs where awareness of epilepsy, general safety measures and enforcement of child safety laws are likely to be insufficient.[7] The purpose of this study is to guide clinical practice in reducing seizure-related injuries by drawing attention to its burden and encouraging more preventive measures through the education of caregivers and health workers alike.

Methods

This study was conducted in Paediatric Neurology Clinic of UBTH, Benin. Benin City is the capital of Edo State. Edo State is in the South-South geopolitical zone of Nigeria. It is a cosmopolitan city, largely inhabited by the Edo (Bini) people. Other dominant ethnic groups in Benin City include Etsako, Esan and Owan. The main language used in the state is Bini and Pidgin. UBTH has 700 bed capacity and provides tertiary health care services to the entire Edo State and neighbouring states of Delta, Ondo and Kogi States. The paediatric neurology clinic runs twice a week, children who were discharged from the ward are seen on Monday for follow up while Friday clinics are for cerebral palsy and other neurological disorders like epilepsy.

Ethical approval was obtained from the ethics committee of UBTH. Written consent was obtained from parents/caregivers and assent was obtained from children above 8 years.

This study was carried out over seven months (September 2020 - March 2021). Consecutive cases of children with epilepsy, aged between 0-17 years seen in the clinic over the stated period were evaluated for injuries in the preceding 12 months using a structured questionnaire that has been pretested. Children with severe cognitive dysfunction, motor disability and whose parents did not give consent were excluded from the study.

The parents of children and older children with epilepsy were interviewed with a semi-structured questionnaire and open-ended questions. Details regarding age and sex were documented, the socioeconomic status was determined using the method described by Olusanya *et al*.[8] The seizure types, type of injury sustained, drug compliance were documented (Excellent compliance = misses a maximum of a day medication in 4 weeks; Good = misses a maximum of 3 days medication in 4 weeks; Fair = misses a maximum of 5 days duration in 4 weeks; poor = miss up to 6 days medication or more in 4 weeks) and its effect on the quality of life. In this study, quality of life was defined by how epilepsy-associated injuries affected the education and/or recreation of the subjects. Seizure-related injuries were defined as injuries occurring as a direct result of a seizure.

Data analysis

Data was collected and analysed using the statistical software, IBM Corp. Released 2019. IBM SPSS Statistics for Windows, Version 26.0. Armonk, NY: IBM Corp. Data were presented using tables and charts. Frequencies and percentages were used to present categorical data, while continuous data were expressed as means and standard deviation. Frequencies were compared using the Pearson Chi-square test, Fischer's Exact test and Chi-square Goodness of Fit test. A $P<0.05$ was considered significant for all statistical comparisons.

Results

Tables 1 and 2 show the socio-demographic and anthropometric distribution of the participants. A group 0 – 5 years. Most respondents were within the low socio-economic class followed by middle and then high socio-economic class at 42.02%, 35.29% and total of 119 respondents were involved in the study with more males (55.46%) than females (44.54%). Most of the study participants (45.38%) were within the age 22.69%, respectively. The mean (SD) of OFC, weight and height of study participants were 51.27 (±4.59), 26.77 (±14.40), and 115.47 (25.86), respectively.

Table 1: Socio-demographic distribution of study participants

Variables; N = 119		n (%)
Sex of participants	Female	53 (44.54)
	Male	66 (55.46)
Age group (in years)	0 - 5 years	54 (45.38)
	6 - 11 years	30 (25.21)
	12 - 17 years	35 (29.42)
Socio-economic class	Lower class	50 (42.02)
	Middle class	42 (35.29)
	High class	27 (22.69)

N = Total number; n = frequency; % = per cent.

Prevalence of epilepsy-related injuries

Of the 119 study participants with seizures, 50 (42.02%) sustained an injury at some point in the preceding 12 months (Fig 1). Table 2 below shows no significant difference between the sex and age groups of those who had seizure-related injuries; however, participants in the middle socio-economic class had more seizure-related injuries (n = 25, 59.5%), compared to those in the low socio-economic class (n = 20, 42.0%) and high socio-economic class (n = 5, 18.5%); P = 0.003.

Figure 1: Study participants with seizure-related injuries.

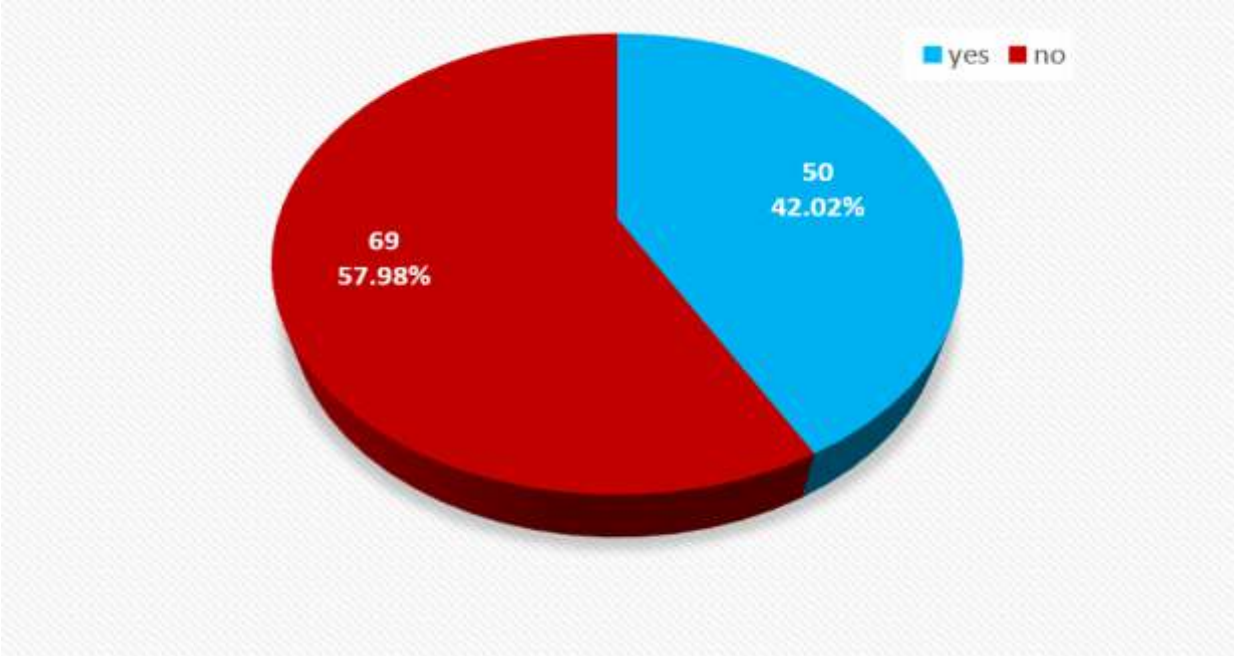

Table 2: Distribution of seizure-related injury by sex, age and socio-economic status.

Variables (N = 119)		Seizure related injury			
		Yes n (%)	No n (%)	X^2	P-value
Sex of participants	Female	26 (49.1)	27 (50.9)		
	Male	24 (36.4)	42 (66.6)	1.944	0.163
Age group (in years)	0 - 5 years	18 (33.3)	36 (66.7)		
	6 - 11 years	17 (56.7)	13 (43.3)		
	12 - 17 years	15 (42.9)	20 (57.1)	4.324	0.115
Socio-economic class	High class	5 (18.5)	22 (81.5)		
	Middle class	25 (59.5)	17 (40.5)		
	Lower class	20 (42.0)	30 (58.0)	11.487	0.003

N = total number; n = frequency; % = per cent; X^2 = Chi-square test statistics.

As seen in Table 3 below, subjects with generalized seizures had more injuries (50.5%), compared with subjects who had focal seizures (14.3%), $x^2 = 11.55$, p = 0.001. Among the seizure subtypes as seen in Table 4 below, tonic-clonic seizure was the commonest subtype of generalised seizure. However, the only child with absence seizure had epilepsy-related injury.

Table 3: Types of seizures and seizure-related injury.

Types of seizures (N=119)	Seizure related injury		X^2	P- value
	Yes n (%)	No n (%)		
Generalized (n = 91)	46 (50.5)	45 (49.5)	11.558	0.001
Focal (n = 28)	4 (14.3)	24 (85.7)		

N = total number; n = frequency; % = per cent; X^2 = Chi-square test statistics.

Table 4: Association of seizure subtypes with injury types

	Seizure subtypes						
Injury types	**Tonic-clonic n (%)**	**Clonic n (%)**	**Myoclonic n (%)**	**Atonic n (%)**	**Absence n (%)**	**X^2**	**P-value**
Soft tissue laceration	7 (21.9)	0 (0.0)	1 (50.0)	1 (20.0)	0 (0.0)	109.16	<0.001
Skin bruises	16 (50.0)	0 (0.0)	1 (50.0)	3 (60.0)	0 (0.0)		
Submersion injury	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (100.0)		
Tongue bite/oral injury	4 (12.5)	4 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)		
Dental injuries	5 (15.6)	0 (0.0)	0 (0.0)	3 (60.0)	0 (0.0)		
Head trauma	4 (12.50)	0 (0.0)	0 (0.0)	1 (0.0)	0 (0.0)		

n = frequency; % = percent; X^2 = Chi-square Goodness of Fit test statistics.

From Table 5 below, the commonest seizure-related injuries are skin bruises (n = 20, 35.1%), followed by soft tissue laceration (n = 13, 22.8%), then tongue bite/oral injury, dental injuries and head trauma, at 15.8%, 14.0% and 10.5%, respectively, p = 0.001.

Table 5: Association of seizure types with injury types

Injury types	Seizure types		X^2	P-value
	Generalized n (%)	Focal n (%)		
Soft tissue laceration	9 (20.0)	4 (100.0)	17.56	0.007
Skin bruises	20 (44.4)	0 (0.0)		
Submersion injury	2 (4.4)	0 (0.0)		
Tongue bite/oral injury	8 (17.8)	0 (0.0)		
Dental injuries	8 (17.8)	0 (0.0)		
Head trauma	6 (13.3)	0 (0.0)		

n = frequency; % = percent; X^2 = Chi-square Goodness of Fit test statistics.

Table 6 below, shows a strong association between seizure-related injuries and compliance to medication. Those with good (n = 6, 28.6%) and excellent (n = 12, 23.5%) compliance with medication had fewer injuries compared to those with no medication (n = 23. 79.3%) and poor (n = 9, 100%) compliance to medications P<0.001.

Table 6: Relationship between medication compliance and seizure-related injuries.

Compliance to medications (N = 119)	Seizure related injuries		p	P-value
	Yes n (%)	No n (%)		
Not on medication (n = 29)	23 (79.3)	6 (20.7)	44.210	<0.001
Poor (n = 9)	9 (100)	0 (0.0)		
Fair (n = 9)	0 (0.0)	9 (100.0)		
Good (n = 21)	6 (28.6)	15 (71.4)		
Excellent (n = 51)	12 (23.5)	39 (76.5)		

N = total number; n = frequency; % = per cent; p = Fischer's exact test.

Table 7 shows that 22% of respondents with injuries were affected (education, recreation or both) by the injury while 78.0% of respondents with epilepsy-related injuries had no affectation from the injury.

Table 7: Effect of epilepsy-associated injuries and quality of life (education and/or recreation)

Any effect of injury (N = 50)	n (%)	X^2	P-value
Yes	11 (22.0)	15.580	<0.001
No	39 (78.0)		

N = total number; n = frequency; % = per cent; X^2 = Chi-square Goodness of Fit test statistics.

Discussion

Epilepsy is the world's most common neurological disorder, with more affected people living in resource-constrained countries like Nigeria. Globally, most studies focus on the psychosocial impact of epilepsy, with little attention given to seizure-related injury, especially in the LMICs.[9]

In this study, the frequency of seizure-associated injury among children with epilepsy is similar to the finding by Lagunju *et al*[9], who reported a frequency of 45.6%. However, Bajaj *et al*[10] in India reported a much higher frequency of 70.4%. This could be due to differences in the study population. This study sought injuries that occurred retrospectively among Nigerian children while the study by Bajaj *et al*[10] was a prospective study conducted among Indians. This shows that injuries occur more frequently in children with epilepsy and this can be attributed to the associated factors seen among these children. Such factors include characteristics of the seizure such as the episodic nature of impairment of consciousness and motor control, psychomotor comorbidity, duration and frequency of the seizure and drug compliance. In the extant study, the majority of subjects with seizure-related injuries belong to the middle- and low socioeconomic class, this shows a possible link between poverty and the risk of injury among children with epilepsy. Thus, general awareness, general safety measures and enforcement of child safety laws are likely to be inadequate among these groups.

In the extant study, tonic-clonic seizure was the commonest seizure type that caused most injuries. This could be explained by the sudden falls caused by this seizure type. Similar findings were also reported by Lagunju *et al*[9], Appleton *et al*[11], and Ting *et al*[12].

Skin bruises and soft tissue lacerations were the most common injuries following seizure in our study. Similar findings were reported by some researchers [7,9,11] This implies that majority of injury types noted in this study following seizure were minor accidents that may or may not require hospitalization. However, major accidents such as head trauma and submersion injury are possible occurrences as noted in this study, hence adequate child monitoring and care should be stressed during parental counselling. Children with poorly controlled epilepsy should be prohibited from going to high-risk areas like near water bodies, this should also be emphasized during the counselling session with the caregivers.[10]

Our study showed a strong association between seizure-related injuries and compliance with medication. Children with good and excellent compliance to medication had fewer injuries compared to those who were not on medication or on medication but were poorly compliant with anti-epileptic. Hence, the need to advocate for early commencement of anti-epilepsy medication and also to encourage strict adherence to medication use among this group. It is pertinent to state that the data on poor drug compliance may be underrepresented due to the fear of the caregivers being blamed for the poor drug compliance.

Conclusion

Children with epilepsy are at higher risk of injury and this risk is modified by some factors like socioeconomic status, seizure type, and compliance with medication

Limitation of the study

Though, structured interview was used to obtain the data used for this study, the data was prone to recall bias.

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Complications of Ventriculoperitoneal Shunt for Infantile Hydrocephalus: A Single Nigerian Centre Experience

Usman B[1,2], Abubakar AM[3]

ABSTRACT

Background: Ventriculoperitoneal shunt (VP–shunt) is one of the easiest and most common ways of treating hydrocephalus worldwide. Common post-operative complications include shunt malfunction (obstruction, disconnection, fracture), infection of skin and hardware, exposed/extruded shunt, calcification and per anal extrusion. **Objectives:** A 5-year retrospective review of all complications observed among infants with VP Shunt in our centre. **Methods:** The study period was between July 2017 and June 2022. Extracted data included: Demographic data on the Age and sex at presentation, type of Hydrocephalus, and the observed complications. **Results:** Forty-six infants comprising 32 (70%) boys and 14(30%) girls had VP Shunt, with ages (number) of < 1 month (26.1%), 1 – 6 Months (43.5%), and 7 – 12 Months (30.4%). Types of Hydrocephalus were congenital (A. S. in 13, NTD associated in 18) and acquired (post meningitis in 13, IVHP in 2). Complications were observed in eight (17.4%), consisting of 6(75%) Males and 2(25%) Females, with M: F of 3:1. Complications among the eight (8) patients include: Shunt Obstruction (50.0 %), Shunt Disconnection (12.5 %), Shunt Infection (50.0 %), Skin Infection (25.0 %), Shunt calcification (12.5 %), Exposed Shunt(12.5 %), Extruded Shunt (12.5%), Per anal protrusion (12.5 %) and Death (25.0 %). **Conclusions:** Outcomes were very good, with few manageable complications.

Keywords: Children, Complications, Hydrocephalus, Infants, VP – Shunt.

[1]Surgery Department University of Maiduguri and Neurosurgery unit, University of Maiduguri Teaching Hospital, Maiduguri, Borno state, Nigeria.
[2] Visiting Neurosurgeon to Surgery Department Modibbo Adama University Teaching Hospital, Yola. Adamawa state, Nigeria.
[3] Surgery Department Modibbo Adama University Teaching Hospital, Yola. Adamawa state, Nigeria

Corresponding Author:
Dr Usman Babagana
Email: babaganau@yahoo.com
Tel: +2348035951137

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Introduction

Hydrocephalus (HCP) is clinically defined as the excessive and abnormal accumulation of cerebrospinal fluid (CSF) in the intracranial cavity; radiologically, it is defined as the dilatation of the ventricles or the increase in diameter of both temporal horns of the lateral ventricle to 62 mm. Patho-anatomically, it is defined as the extension of the frontal horn of the lateral ventricle beyond the genu of the corpus callosum[1]. However, the basic definition is an abnormal accumulation of cerebrospinal fluid within the brain's ventricles.[2]

Its reported incidence ranges from 0.2 to 3.5/ 1000 births.[3] HCP is either due to subnormal CSF reabsorption (non-communicating or communicating) or, rarely, CSF overproduction.[4] Clinically, it may be classified as communicating or non-communicating. A variety of congenital and acquired conditions may cause both types.[5] Hydrocephalus ultimately raises intracranial pressure, with or without ventricular dilatation.[6]

It is one of the most common reasons for neurosurgical consultations, irrespective of the patient's age.[7, 8] Over

30,000 procedures are performed annually in the United States.[9]

Ventriculoperitoneal Shunt surgery was first reported in 1898 and has become the mainstay of treatment for Hydrocephalus.[10] Most neurosurgeons prefer this because of fewer complications and the relative ease of performing it.[11]

Notwithstanding, this procedure remains one of the most complication-prone, with failure rates of 30% to 40% within the first year after implantation and 50% within two years of implantation.[12, 13] Some had reported incidences of VP-shunt failure/complications ranging from 25% to 40% at one year and 63% to 70% at ten years.[14] Most first-shunt complication revisions are done within the first year after the primary shunting.[15]

Obstruction is the most common cause of shunt malfunction/failure, with the proximal ventricular catheter (the most common site), valve mechanism, and distal peritoneal catheter in this order, as reported.[16] Disconnection at a junction or break at any point, an infection may produce obstruction and hardware erosion through the skin. Other complications include peritonitis from shunt infection, hydrocele, CSF ascites, and catheter tip migration.[16]

The incidence of infection of VP-shunts was approximately 8–10% in large trials.[17] Some wider ranges were reported from 4% to 30% of cases, varying according to patient history, presence of external drainage, and history of recent infection. The latency between surgery and presentation for infection ranges from 15 days to 12 months (infancy).[18,19] Raygor [20] *et al.* reported that most infections occurred within two months of surgery. Young age (< 6 months) at the time of surgery and the presence of a postoperative CSF leak were significantly associated with postoperative shunt infection.[20]

Although shunt exposure is a risk factor for shunt infection, it could occur the other way around. An existing infection around the shunt material may give way to shunt exposure. Continuous stress on the skin, especially where the skin is thinner and more fragile, may eventually lead to shunt exposure.[21, 22] This is attributed to the thinner skin of the child's head, increasing its risk of protrusion. The scalp becomes more delicate in children with Hydrocephalus, so VPS exposure becomes more likely.[23]

Shunts may disconnect, fracture, or migrate. The risk of disconnection may be mitigated by securing the shunt system tightly with a non-absorbable suture and limiting the number of connections when possible. Placement of the valve and connections over the skull, where these connections are not subjected to repetitive movement at the neck, is also encouraged.[24]

Anal protrusion of the peritoneal catheter has been reported as a complication with Chhabra shunts, probably because it has a slight tendency to stick and erode the bowel when it is in a dry state [25] and this could be a factor responsible for shunt migration in this type of shunt.

It is known that over-drainage of CSF in a child with a small abdomen may cause Cerebrospinal Fluid ascites. This increases the intraperitoneal pressure and may cause an inguinal hernia or hydrocele to develop.[26]

We retrospectively reviewed all infants with VP-shunt for Hydrocephalus and the complications observed in our Centre.

Methods

We undertook a five (5) year retrospective review of all infants (less than a year old) that had ventriculoperitoneal shunt (VP Shunt) as a treatment for hydrocephalus and the complications that ensued. The study was conducted from July 2017 to June 2022. Our Hospital, the Federal Medical Centre, is a tertiary medical centre in Yola, Adamawa state, in north-eastern Nigeria. We routinely use a medium-pressure Chhabra shunt and "bath" it in 160 – 240 mg of Gentamycin in 20 ml of normal saline, followed by intra and postoperative parenteral antibiotic (Ceftriaxone) for five days.

All infants who had VP Shunt in our hospital were included; excluded were those who had it performed elsewhere but were followed up in our institution because of proximity to their home. The patients were followed up clinically for the first seven days as an inpatient and in the outpatient clinic postoperatively upon discharge at one month, three months, extended to 6 months, then annually.

Extracted data on the patient's Demography, type of Hydrocephalus, available diagnostic imaging modality, and the observed complications with their period from the patient's case notes were analysed. The demographic data included the age at presentation and sex of the patient. Data were analysed using Statistical Package for Social Sciences (SPSS) version 26.0 (Chicago, IL, USA). Analysis was carried out using descriptive statistics and illustrated as proportions and percentages.

Results

A total of 80 patients had VP-shunt during the study period. There were 46(57.5%) infants, 30 (37.5%) older children, and 4(5%) adults. The infants comprised 32 (70%) boys and 14 (30%) girls. The infant's ages at presentation before surgery are as in Table 1.

The various types of Hydrocephalus were congenital (Aqueduct of Sylvius stenosis in 13, Neural Tube Defect associated in 18) and acquired (post meningitis in 13, Intraventricular Haemorrhage of prematurity in 2), as shown in Figure 1.

Infants with Neural Tube Defect-associated Hydrocephalus were 18: This includes 14 (77.8% of 18) that presented in pre–excision period (with 12 associated with Myelomeningocoele and 2 with Encephalocoele) and four that developed Hydrocephalus in the Post – excision period (with 3 Myelomeningocoele and 1 Encephalocoele)

Various complications of V-P Shunt were observed in only eight (17.4%) infants, in 6(75%) Males and 2(25%) Females, with a male-to-female ratio of 3:1.

Complications were diagnosed based on clinical suspicion, aided by readily available imaging modalities. The imaging modalities at the onset of the complications are presented in Table 2.

The various complications observed were predominantly shunt obstruction and shunt infection. However, the total number of patients with complications was few. The ages at complication, period, and number are shown below in Table 3.

Some of the postoperative complications observed are shown below in Figure 2.

Table 1: Showing the patient's age ranges at presentation(pre-operative).

Ages at presentation	Number	Percentage
< 1 month (Neonate)	12	26.1%
1 – 6 Months	20	43.5%
7 – 12 Months	14	30.4%
Total	**46**	**100%**

Table 2: Showing the available diagnostic imaging modalities

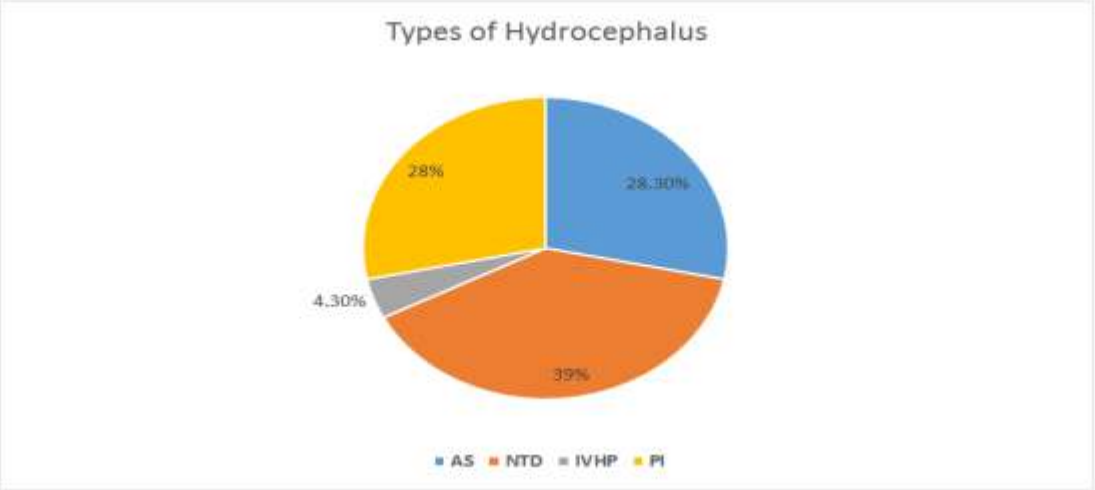
Imaging at complications	Number	Percentage
Trans fontanelle Ultrasound Scan	08	100%
Plain radiograph (shunt series)	06	75.0%
Computed Tomography Scan	02	25.0%
Magnetic Resonant Imaging	01	12.5%

Table 3: showing complications, age at complications, Postoperative period at complication and number.

Type of complications	Age	Post-op Period	Number	Percentage
Shunt Obstruction	3 months	2 months	4	50.0 %
Shunt Disconnection	11 months	8 months	1	12.5 %
Shunt Infection	3 months	1 month	4	50.0 %
Skin Infection	3 months	½ month	2	25.0 %
Shunt calcification	4 months	4 months	1	12.5 %
Exposed Shunt	4 months	3 months	1	12.5 %
Extruded Shunt	3 months	1½ months	1	12.5%
Per anal protrusion	4 months	3 months	1	12.5 %
Death	3 months	2 ½month	2	25.0 %

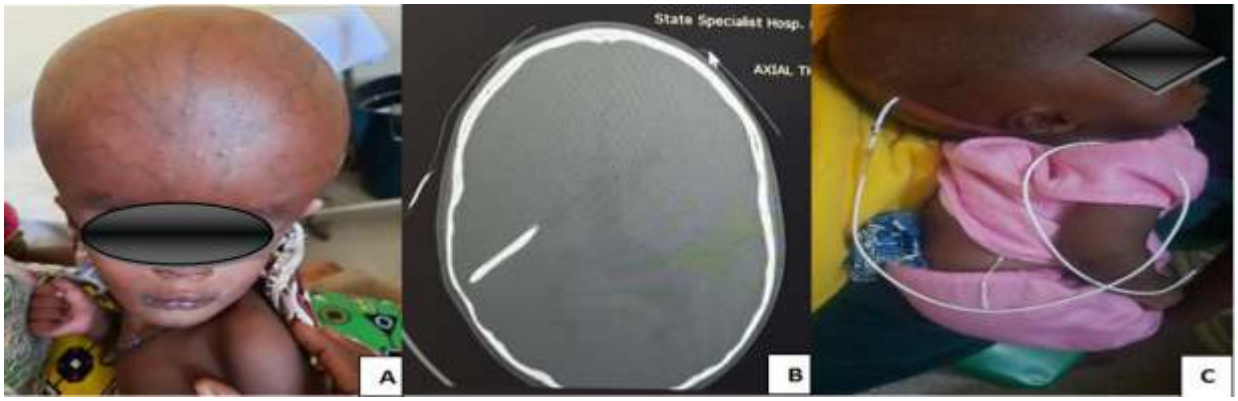
NB: Some patients had multiple complications.

Figure 1: Showing various types of Hydrocephalus at presentations.



AS = Aqueductal Stenosis, NTD = Neural Tube Defect, IVHP = Intraventricular Haemorrhage of Prematurity, PI = Post Infective.

Figure 2: Showing some of the complications.



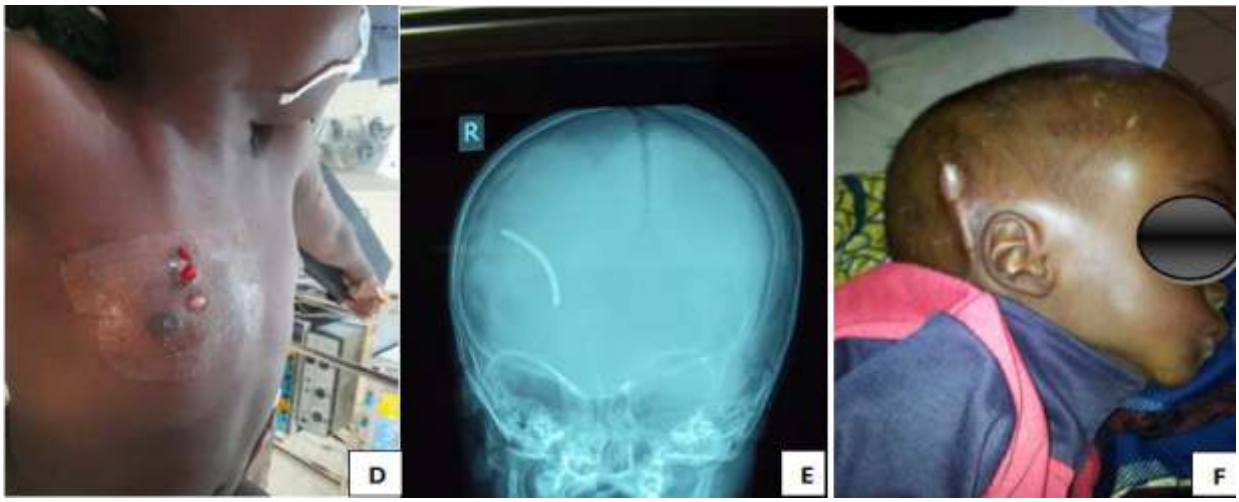


Figure 2 above shows a typical craniofacial disproportion in an infant with Hydrocephalus(A), an axial computed tomography (bone window) showing a calcified intraventricular catheter (B), an infant with a near total extrusion of a Ventriculoperitoneal shunt (C), a nodular discharging sinus along a shunt tract indicating an infection (D), a plain Anterior – Posterior skull X-ray showing total intracranial migration of a disconnected ventricular catheter (E), an infant with an exposed shunt (F).

Discussion

Preoperatively we found that infantile Hydrocephalus is characteristically commoner among boys. Kestle[17] reported slight male preponderance, and likewise, Mwang'ombe[27] in Nairobi found male preponderances but in lesser proportions than ours. However, Babagana *et al*.[28] found a similar distribution of boys (65%) to ours in the same institution but from a different study in 2020.

Among the infants, the main affectation involved 1 – 6 months olds, which is similar to the findings by Babagana *et al*. [28] that found 80% of Hydrocephalus among infants.

About 17.4% of our patients were found to have developed various complications, with some in multiples. Emejelu[29] reported higher complications of 28.1%, while lesser complications were reported by Amacher[30] (13%) and kestle[31] (8 – 10%), respectively.

We found the complications highest among the infants compared to the other age groups. It is similar to the findings of Hamdan[22], with up to 73% of complications among infants.

Our diagnoses of the complications were primarily based on clinical grounds, confirmed by imaging modalities of Trans Fontanelle Ultrasound Scan (TFUSS) in all infants, Computed Tomography of the brain (CT Brain) in some, and rarely by Magnetic Resonance Imaging (MRI). Gathura[32] reported the availability of very few CT scans among his patients. Radionuclide study is not available in our Centre.

We found obstruction (50%) and infective (50%) complications to be the commonest, with most observed within ½ a month to 4 months of the initial surgery and found mainly among those under six months old infants. Gathura[17] equally found mechanical complications of obstructions similar to ours (51.1%) but with lesser infectious (32.7%) complications in this order to be common among infants. While Usman *et al*.[33] found infections higher than obstruction in another study in 2020 among children in the same institution.

With regards to the number of obstructions, three (3, 75%) were proximal (ventricular catheter), and 1(25%) was distal (peritoneal catheter) obstructions. All four obstructions were associated with shunt hardware infection. Additionally, 2 of them began as skin infections. Dickerman[34] and McGirt[35] *et al*. found the common site of the block to be the proximal catheter (intraventricular).

We observed that infections appeared earlier than obstruction. Binitie[36] found this may occur within weeks, months, or even years after shunt placement. Infections tend to cause early shunt failures, while

catheter occlusion/obstructions typically account for late shunt failures.[37]

The complications and the ultimate need for shunt revisions were commoner among those less than 6 months old. Tervonen[38] found that patients younger than six months old were at higher risk for shunt revision from mechanical issues.

Our finding of 12.5% shunt tract infection is higher than the finding of Usman et al. of 3.3%, though the latter were essentially surgical sites and not a tract. We found the tract infection characterised by nodular-like lesions and some areas resembling sinuses. This finding of multiple skin ulcers and draining sinuses (Suppurative nodules and sinuses) has been reported elsewhere.[39,40]

We found a calcified intraventricular component of the shunt. Shunt calcification is a rare condition, mostly reported among adults. Ours was found in an 8-month-old child. Kural *et al.* [41] have seen this in a 10-year-old patient. Intraventricular catheter calcifications are rare, and the most extensive calcification was found in the neck, where the catheters were subject to heavy mechanical stress.[42]

We found a case of an anal protrusion (1, 12.5%) of the peritoneal catheter at the age of five (5) months. Ezzat [43] found as many as 4 (66.6%) between the ages 3 – 7 months with a mode of 6 months.

Of clinical importance, we observed that the patient with anal protrusion had a preceding history of low-grade fever and passage of loose stool (mimicking diarrhoea). This is contrary to what Ezzat[43] found in Cairo, with Vomiting and bulging of the fontanelle dominating.[43] In our index case, the shunt valve was still functional despite the exposure.

Another patient (1, 12.5%) had near total shunt extrusion following the scalp tract's ulceration. Earlier reports were those of its extrusion through the abdominal wall, Chest wall, and neck incision, respectively.[44, 45, 46, 47] There was a reported case of extrusion from the scalp behind the ear by Ghritlaharey[48] following the disconnection of a shunt. However, this was at a lower position (neck).

Our outcomes of ventriculoperitoneal shunt surgeries were good (82.3%). During a one-year follow–up period, the overall mortality was 4.4% among our patients. This is far better than the overall good of 40.2%, poor outcomes in 59.8%, and mortality of 7.1% by Gathura[32] from a sub–Saharan study.

Disclosure:

The authors report no conflict of interest concerning the materials or methods used in this study, including the findings specified in this paper.

Author contributions to the study and manuscript preparation include the following. Acquisition of data, review of the final version of the manuscript and its approval for submission were by all authors.

Conclusions: Ventriculoperitoneal shunt is the commonly accessible treatment modality for Hydrocephalus in our setting. We have routinely carried out VP Shunt on children, mainly infants. We found few manageable complications in young children (infants), multiple in some with overall good outcomes.

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Twenty Years of Experience with Lichen Planus in Kaduna, North-West Nigeria

Husain Yahya

ABSTRACT

Background: Background: Lichen planus (LP) is a chronic inflammatory papulosquamous autoimmune disease which predominantly affects the skin but may also affect mucous membranes and nails. It is commoner in adults and occurs in all races. Reports about LP from northern Nigeria are scanty. **Objective:** To report the relative prevalence, duration, clinical presentation, and outcome of treatment for patients with LP seen over 20 years. **Methods:** Retrospective review of records of patients diagnosed with LP in two dermatology clinics in Kaduna, Nigeria from September 2001 – August 2021. **Results**: Of 39,037 patients with new skin disease, 335 (0.9%) were diagnosed with LP: mean age 37.6 years (range 5 -81), 11.3% < 18 years and 55% < 40 years, male-female ratio 1:1. The median duration at presentation was 8 weeks (75% ≤ 16 weeks). The lower legs (65%), lower arms (61.2%), abdomen (31.6%), upper arms (29%), upper back (28.1%), lower back (27.2%), chest (22.4%) and thighs (21.5%) were the most frequently affected sites. The oral mucosa, penis and nails were affected in 6, 9 and 2 patients only. Itching (97%), hyperpigmentation (26.6%), and Koebner's phenomenon (23%) were also present. Classic LP accounted for 88.1% while hypertrophic LP (12.5%) and annular LP (6.3%) were other variants, some patients with multiple variants. Just over 7 % of patients had previous disease (median interval 7 years). Hepatitis C virus antibody was positive in 6.2%. All patients were treated with topical steroids but 45% required oral prednisolone. On follow-up, LP had resolved in 79.4% of patients. **Conclusion:** Lichen planus affected a younger population, presented in a classic way in most patients, affected the oral and other mucosae much less frequently and responded well to topical and systemic steroids.

Key words: Lichen planus, clinical presentation, Kaduna-Nigeria

Dermatology Unit, Department of Internal Medicine, Barau Dikko Teaching Hospital/Kaduna State University, Kaduna, Nigeria

Corresponding Author:

Dr Husain Yahya
Department of Internal Medicine, Barau Dikko Teaching Hospital, PO Box 9727, Kaduna, Nigeria
Email: husainyahya@yahoo.co.uk

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Introduction

Lichen planus (LP) is a chronic inflammatory papulosquamous disease affecting predominantly the skin but may also affect the nails, scalp, and mucous membranes.[1] Classic LP is characterized by multiple, itchy, discrete-to-confluent, flat-topped, polygonal papules and plaques which are purplish in Caucasians or the light-skinned but are slate grey in black skin.[2] The surface of lesions is shiny and dry and often has a fine, white, lacy scaling called Wickham's striae. It affects adults mainly – only 1 – 3% are children. [1] Cutaneous LP is symmetrically distributed on the extremities but may affect the trunk and face and may be generalized. Variants of lichen planus include annular, bullous, hypertrophic, linear, dermatomal, Blaschkoid, atrophic or actinic.[1, 2] Lichen planus may also affect the oral mucosa, oesophagus, penis, vulva and vagina; lesions in these locations, although mostly asymptomatic, may be erosive and produce a long-lasting disabling disease and interfere with the quality of life of patients.[2] Lichen planus usually lasts a year or two but may run a chronic and relapsing course [1, 2] and may also be associated with extra-

cutaneous and extra-mucosal disease: LP has been strongly associated with hepatitis C virus (HCV) infection[3] and may be accompanied by dyslipidemia and other metabolic abnormalities.[4] Furthermore, there is a high risk of malignancy in certain variants of the disease such as erosive oral or vulval disease;[5] Squamous cell carcinoma has also been reported to complicate longstanding hypertrophic LP.[6]

Lichen planus has a characteristic histopathologic appearance. Light microscopy shows marked orthokeratosis, circumscribed wedge-shaped hypergranulosis, irregular sawtooth-like acanthosis of rete ridges, vacuolar degeneration of keratinocytes giving rise to Civatte bodies, and a band-like inflammatory infiltrate of lymphocytes in the upper dermis which touches or obscures the dermo-epidermal junction.[7] The aetiology is unknown but is believed to be autoimmune in origin which results in CD8 + lymphocyte-mediated destruction of basal keratinocytes - LP may be associated with other autoimmune diseases. [2]

Lichen planus is a fairly common disease: it is estimated to affect 0.5 to 1% of the general population and is encountered frequently in dermatology clinics all over the world where the relative frequency of the disease ranges from 0.4 to 1.2% where it affects all races.[1, 2] In Nigeria, the relative frequency of LP in dermatology clinics in recent reports ranges from 1% in Calabar[8] to 4.5% in Ogbomoso[9]. Rates have also varied within Africa: Egypt (0.28%),[10] Senegal, (0.5%),[11] Togo (1.9%) [12] and Ghana (3.7%).[13] Lichen planus affects women slightly more than men.[1, 2]

Published reports about LP from northern Nigeria are scanty. The purpose of our study is to present our experience of diagnosing and treating patients with LP in Kaduna, north-west Nigeria over 20 years and highlight similarities and differences in the prevalence, spectrum of clinical presentation and variants of the disease in Nigeria, Africa and other parts of the world. It is hoped this will further our understanding of the disease in Black Africans.

Methods

The study was a retrospective review of records of consecutive patients with new skin diseases diagnosed with LP at the dermatology clinics of Barau Dikko Teaching Hospital and Habbat Medical Centre, in Kaduna, Nigeria from September 2001 to August 2021. Diagnosis of LP was mainly clinical; histopathology was used to establish the diagnosis where the diagnosis was uncertain. All the patients were examined by a dermatologist. Patients' confidentiality was strictly maintained. Kaduna, with an estimated population of 1.7 million, is a cosmopolitan city in north-west region of Nigeria with co-ordinates 10.5015° N, 7.4408° and has a diverse population with all ethnic groups and occupations represented. It is the capital of Kaduna State. Patients came to the clinics from within and outside Kaduna and from as far away as Sokoto 491 km in the northwest of Nigeria. They came to the clinic on their own, referred by other patients or from public and private healthcare facilities and pharmacies.

Data retrieval, processing and analysis

Medical records of patients who were diagnosed with LP were retrieved and demographic data, duration and type of disease, sites affected, symptoms associated with the disease, precipitating factors, history of previous disease and intervals between current and previous disease, what treatments were given, the outcome of treatment and duration of follow up extracted. Records of Hepatitis B virus and HCV infection were obtained. The study was approved by the Health Research Ethical Committee of Kaduna State Ministry of Health (approval number MOH/ADM/744/VOL.1/941). IBM SPSS version 22 (Armonk, New York, USA 2013) was to obtain descriptive statistics and to perform a Chi-Squared test to assess the significance of differences between categorical variables.

Results

From September 2001 to August 2021, we diagnosed LP in 335 out of 39,037 (0.9%) consecutive patients attending the outpatient skin clinics of Barau Dikko Teaching Hospital and Habbat Medical Center in Kaduna, Nigeria. There was a steady rise in the number of patients seen with the condition over 20 years, with 182/335 (54.3%) seen in the second decade (2012 – 2021) compared to 153/335 (45.7%) seen between 2001 – 2011 (see Figure 1). Table 1 shows a summary of the demographic and clinical characteristics of the patients. The mean age of the patients was 37.6 years (range 5 to 81) with 13.9% of patients being children or adolescents (< 20). Overall, 55% of the patients with LP were less than 40 years. The male-to-female ratio was 1:1. The disease had been present for a median of 8 weeks and 75% of patients had the disease for 16 weeks or less before

presentation. The distal legs and distal arms were the sites most frequently affected by LP at presentation (65% and 61.2%, respectively). The abdomen, the upper and lower back, (fig 2a) and the chest were affected in more than a quarter of patients. The disease manifested on the thighs (fig 2b) in 21.5%.

Legends for Tables and Figures

Table 1. Demographic and clinical characteristics of patients with lichen planus.

Table: Demographic and clinical characteristics of patients with lichen planus

Characteristic	n (%)*
Age (years):	
Mean ± SD	37.6 ± 16.9
Range	5 – 81
Age group:	
1 – 9	17 (5.1)
10 - 19	29 (8.8)
20 – 29	63 (19)
30 – 39	73 (22.1)
40 – 49	59 (17.8)
50 – 59	57 (17.2)
60 – 69	24 (7.3)
70 – 79	7 (2.1)
80 – 99	2 (0.6)
Gender:	
Male	169 (49.3)
Female	170 (50.7)
Sites of involvement	
Scalp	7 (2.1)
Face	12 (3.6)
Neck	21 (6.3)
Chest	75 (22.4)
Abdomen	106 (31.6)
Upper back	94 (28.1)
Lower back	91 (27.2)
Axillae/groin	3 (0.9)
Upper arms	97 (29)
Lower arms	205 (61.2)
Elbows/knees	26 (7.8)
Flexural wrists	49 (14.6)
Dorsal wrists	27 (8.1)
Buttocks	17 (5.1)
Thighs	72 (21.5)
Legs	218 (65.1)
Ankles	28 (8.4)
Dorsal feet	28 (8.4)
Palms of hands/soles of feet	9 (2.7)
Involvement of special sites	
Oral mucosa	6 (1.8)
Penis	9 (2.7)
Nails	2 (0.6)

Associated symptoms	
Itching	325 (97)
Koebner's phenomenon	77 (23)
Postinflammatory hyperpigmentation	89 (26.6)
Diagnosis of lichen planus	
Clinical	325 (97)
Histology required	21 (6.3)
Type of lichen planus:	
Classic	295 (88.1)
Hypertrophic	42 (12.5)
Annular	21 (6.3)
Lines of Blaschko	9 (2.7)
Dermatomal	5 (1.5)
Bullous	5 (1.5)
Actinic	1 (0.3)
Pigmentosus	2(0.6)
Hepatitis B and C virus serology: (n = 145)	
HBsAg positive	12 (8.3)
HCV antibody positive	9 (6.2)

Figures in parentheses are percent

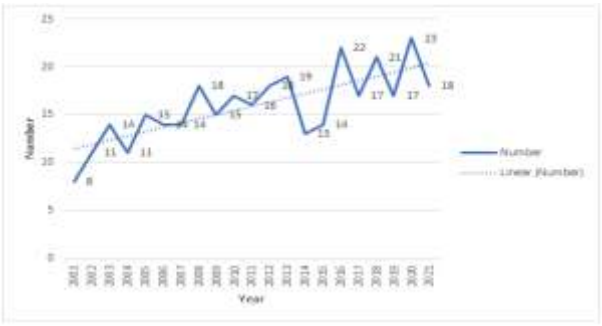
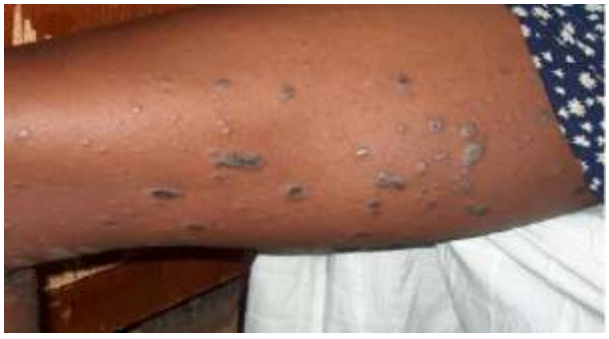


Fig 1. Number of patients with lichen planus seen over 20 years

Fig 2. (a) Classic lichen planus on the lower back

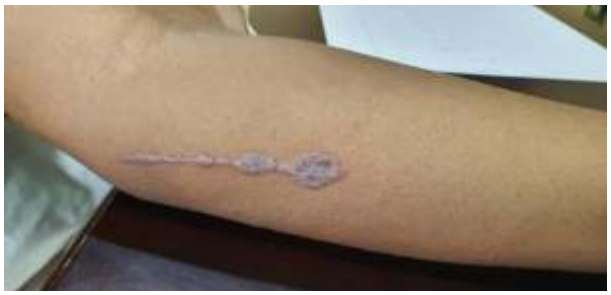


(b) Classic lichen planus on the thigh

(c) Erosive lichen planus hard palate

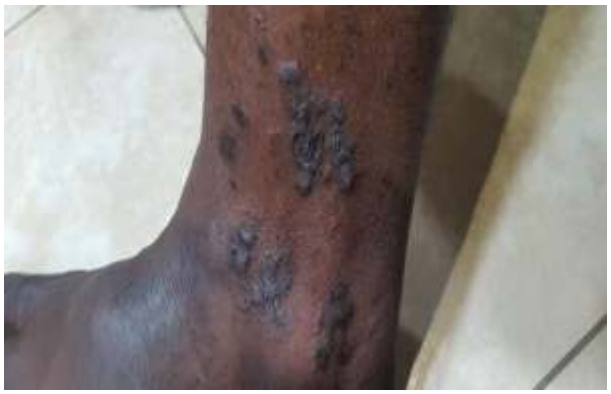
The scalp, the face including the lips, and the palms and soles were involved infrequently. So were the oral mucosa (fig 2c), the penis (fig 2d), and the fingernails. Itching of various degrees affected almost all patients; the Koebner's phenomenon (fig 1e) and post-inflammatory hyperpigmentation (fig 2f) were present in 23% and 26.6% of patients respectively. Diagnosis of the disease was clinical in most patients, with histological confirmation required in only 21. Although classic lichen planus was the dominant presentation affecting almost 90% of patients, in some instances, it was associated with hypertrophic lichen planus (fig 2g), which mostly affected the legs in 12.5% of patients, and annular lichen planus (fig 2h) (6.3%). Other types such as lichen planus on the lines of Blaschko or affecting a dermatome or associated with blisters were rarer. Lichen planus pigmentosus was seen in two patients. There were no gender and age-related differences in the clinical variants of LP. However, all nine cases of penile and six cases of oral disease were seen in adults. Two-thirds (4/6) of the patients with oral disease were women and their mean age was 43 years. Hepatitis B surface antigen was positive in 12/145 (8.3%) of patients in whom it was tested while HCV antibody was reactive in 9/145 (6.2%). All nine patients who tested positive for HCV had classic LP and none had the other variants. None of the HCV-positive patients had oral involvement. No specific precipitating factor for the disease was found and family history was absent in all patients. At presentation, 24 (7.2%) of patients had LP in the past (median interval from previous disease was 7 years, interquartile range 8 years). The median duration of follow-up for patients was three weeks with 88 (26.3%) never returning after the first visit. The longest duration of follow-up was 20 years in a patient with recurrent disease. During follow-up, 22/189 (11.6%) of patients had a recurrence – the median interval between presentation and recurrence was 4 years, with two-thirds of patients' disease recurring after 6 years. Almost all patients (97.6%) were treated with topical corticosteroids (clobetasol propionate, fluocinolone acetonide and betamethasone valerate). Topical 10% -15% salicylic ointment was used for hypertrophic lesions. An oral corticosteroid (prednisolone in a dose of 0.5 – 1mg/kg body weight) was used for two to six weeks in 45.4% of patients because of extensive disease or failure to respond adequately to topical steroids.

(d) Lichen planus glans and coronal sulcus of penis

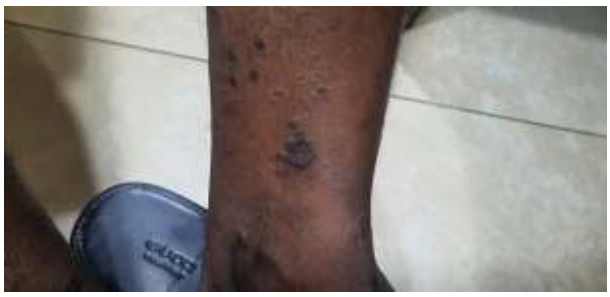


(e) Koebner's phenomenon in lichen planus

(f) Postinflammatory hyperpigmentation in lichen planus



(g) Hypertrophic lichen planus lower leg



(h) Annular lichen planus lower leg.

Oral dapsone (7.8%), oral metronidazole (6.6%) and azathioprine (2.7%) were used in patients with severe or recalcitrant disease. No oral retinoid (for example acitretin) was used in any patient because it was unavailable. Intralesional triamcinolone acetonide (9.3%) was used mainly in patients with hypertrophic LP or in patients who preferred an intramuscular injection to oral prednisolone. Triamcinolone paste was used to treat all patients with oral LP except the only patient with erosive palatal disease (fig 2c) which required an additional oral steroid and dapsone. In 196/247 (79.4%) of patients who returned for at least one follow-up, the lesions had resolved or were resolving satisfactorily. In 28/247 (11.3%), the disease had not responded well to treatment and required a longer period of topical or systemic agents.

Discussion

We have presented our experience and findings of treating lichen planus over 20 years in two outpatient dermatology clinics in Kaduna, north-west Nigeria. These were the only clinics in Kaduna where a trained dermatologist offered uninterrupted services. Although the overall relative frequency of lichen planus in relation to other skin diseases over the period has remained virtually the same - 0.9% in this study compared to 1.2% in a previous report from the same centers[14] – there was an upward trend in frequency of patients seen with the disease with almost 54.3% of patients seen between 2011 to 2021. This mirrors the overall increase in skin clinic attendance over the period (58% of patients), likely due to increased awareness of the service with time. There is a wide variation in the prevalence of LP in Nigeria: Yusuf et al.[15] diagnosed LP in 4% of 3,874 patients attending a tertiary centre dermatology clinic in Kano, north-west Nigeria. Rates of 1% and 4.5% have been reported recently in similar clinics in Calabar and Osogbo in southern Nigeria, respectively.[8,9] The same variation occurs in Africa. While Rosenbaum et al.[13] reported that 3.7% of 631 patients attending the skin clinic at The Korle Bu Teaching Hospital in Accra, Ghana were diagnosed with LP. Teclessou and colleagues[12] diagnosed LP in 1.9% of 42,135 attending two tertiary hospital dermatology clinics in Lome, Togo. Diop et al. [11] found 0.5% of 15,951 patients attending a similar clinic in Dakar, Senegal had LP. Anbar and colleagues [10] also reported a low frequency (0.28% of 17,940) of LP in patients attending a tertiary skin clinic in southern Egypt. Lower rates have also been reported recently from India by Bhattacharya et al. (0.38% of 60,312 patients)[16] and the United States (0.39% of 203,025 patients).[17] It is not clear why LP appears to be more common in West Africa than elsewhere but is likely genetic. An equal number of males and females were diagnosed with LP in our study in contrast to many reports from within and outside Nigeria[9-12,15,17] in which females predominated; in studies by Diop et al. and Leasure and Cohen, females constituted as high as 84.6% and 74% respectively.[11,17]Male patients predominated, however, in studies by Anbar et al. and Bhattacharya et al.[10, 16]. Lichen planus is more common in females likely because of their known predisposition to autoimmune diseases.[18] Our patients were younger than patients from developed countries[17] but similar in age to African and Indian patients.[10 - 12] Children (age < 18 years) also constituted a larger proportion of our patients (11.3%) than has been reported in developed countries where LP in children is said to be rare, affecting only 1 – 3% of patients.[1] Pediatric LP appears to be particularly common in India: 66.3% of 985 patients with childhood LP reported worldwide in one recent systematic review and meta-analysis were from that country.[19] It is also noteworthy that 72% of children with LP in one US study were African-American,[20] suggesting that genetic susceptibility is important in childhood LP.

Most of our patients had classic lichen planus alone or in combination with other variants such as hypertrophic LP, annular LP and dermatomal LP. Other variants such as actinic LP and LP pigmentosus were very rare. We did not see any patients with atrophic LP, LP pemphigoids or Lichen planus-lupus overlap. The distal arms and legs were the most frequently affected as has been reported worldwide.[1,2,10-12,15-17] Genital involvement (mainly the penis) was rare in our patients in contrast to many other reports. This may be related to high circumcision rates in Nigeria.[21] Amsellem et al. [22] in France, in the largest series to date of patients with penile LP, found 94.5% of 89 patients were uncircumcised. They suggested that, perhaps, Koebner's phenomenon may be partly responsible for this occurrence. Furthermore, penile and vulvovaginal LP is often asymptomatic and patients may not notice or report any abnormality unless specifically asked or looked for.[23] Oral involvement,

mainly the lacy type, was rare in our patients (1.8%), as in Yusuf et al.'s [15] report. All of our patients were asymptomatic and were treated with local triamcinolone paste except a patient with the erosive oral disease (fig 2c) who was also treated with prednisolone and oral dapsone but was lost to follow-up. Our study is, nonetheless, consistent with the finding of others that oral LP affected mainly an older adult population who were predominantly female.[24]

We found only 6.2% of patients were positive for HCV antibody and this did not differ from the general population of Kaduna State[25] and is consistent with Daramola et al.'s [26] finding that there is no documented association between HCV infection and LP in Nigeria. There's a wide variation in the rate of HCV infection in LP with some authors reporting an association [27] but not others.[28] What is generally accepted is that HCV infection may be more common in patients with oral LP3 but none of our patients with oral disease was positive for the virus; notably the number of this category is very small though. We did not observe Daramola et al.'s observations from Ibadan, Nigeria [29] that HCV was more common in patients with hypertrophic LP.

In a recent systematic review and meta-analysis of observational studies, Lai et al. found a strong association between lichen planus and dyslipidemia.[30] A similar link was also recently established in Nigeria by Okpala et al. [31] We did not routinely measure lipid levels in our patients and thus, we cannot determine if such a link existed.

Our study confirms that LP is a recurrent disease and responds well to topical and systemic medications. About a quarter of patients did not return for follow-up - the cost and inconvenience of travel or the need to pay a consultation fee at one of the clinics may have dissuaded many from coming back, especially if their condition had responded well to treatment.

Although our study is retrospective, it highlights the similarities and differences in prevalence, demographics, and clinical presentation of LP in our patients compared to other reports from within and outside Nigeria.

Conclusion

In a retrospective review of records of a large number of patients attending two dermatology clinics in Kaduna, north-west Nigeria over 20 years, we found lichen planus affected 0.9% of patients. Our patients were younger with a relatively larger number of children, affected the sexes equally, presented with well-known classic features of the disease in most patients and responded well to treatment. We found fewer patients with oral, genital and nail disease. We also found that HCV positivity was no different than what was reported for our community.

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Symmetrical Peripheral Gangrene Resulting from the Application of Henna: A Rare Clinical Occurrence

Abdullahi MA, Kabir MA, Mustapha MI, Mamuda AA, Shamsudeen MB

ABSTRACT

Background: Symmetrical peripheral gangrene (SPG) is a rare clinical entity leading to ischemic necrosis of extremities. We report a case of SPG in patient brought into the orthopaedic clinic of Aminu Kano Teaching Hospital (AKTH), Kano, two days after applying a beautification substance called Henna. **Case Summary:** We report a case of a 28-year-old lady who presented at the emergency department of AKTH with a complaint of extreme pains in both hands and feet. The patient noticed a gradual darkening of the fingers and toes two days after applying the Henna, associated with severe pain at rest. She was thoroughly evaluated and examined for other possible risk factors or illnesses, but none was found. The patient was counselled and she subsequently consented to amputation. The gangrenous parts of the digits of her fingers and the tarsometatarsal of her feet were amputated bilaterally and the procedure was carried out successfully. **Conclusion:** To our knowledge, this is the first case report of symmetrical peripheral gangrene occurring after routine application of Henna as a beautification agent. No other possible risk factor was identified. We highlight the possibility of a beautification agent (Henna) as a causative factor of SPG. Thus, women should be careful of the mixtures in Henna that could lead to SPG.

Key words: Symmetrical, Bilateral, Gangrene, Henna, Amputation

Orthopaedic unit, Surgery Department, Aminu Kano Teaching Hospital/Bayero University, Kano.

Corresponding Author:

Dr Mamuda Abdurrahman
Orthopaedic Unit, Surgery Department, Aminu Kano Teaching Hospital/Bayero University, Kano.
Email: nurubash@yahoo.com
Phone number: 08065567819

Introduction

Symmetrical peripheral gangrene (SPG) is a rare syndrome consisting of the sudden onset of symmetrical gangrene of the acral parts of the body with no evidence of significant vascular occlusive disease.[1] First described by Hutchinson in 1891, it is usually associated with a wide range of underlying medical conditions and may result in multiple limb amputations. SPG is generally associated with disseminated intravascular coagulation (DIC).[1] The precise pathogenesis of vascular occlusion in SPG is uncertain.[2] However, a typical clinical presentation of SPG, despite the many aetiological associations, suggests DIC as a final common pathway of its pathogenesis. The ischaemic changes often begin distally and may advance proximally to involve the whole extremity.[3]

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Case Presentation

A 28-year-old female patient presented to the Accident and emergency unit of Aminu Kano Teaching Hospital, Kano, with a 2-day history of pain and darkening of all her fingers. A week before presentation, she had developed constant pain at rest in her hands and feet after applying a locally prepared Henna mixture on all her digits. Her fingers and toes became dusky, with associated blistering of the fingers. She had no history of intermittent claudication. She does not drink alcohol nor smoke cigarettes and has no known chronic illnesses. There was no family history of diabetes mellitus, hypertension, heart disease,

dyslipidemias, and connective tissue disorders. Her past medical history was not significant. She was also negative for human immunodeficiency virus (HIV) and not on any medication. She had a pulse rate of 90 beats per minute, with blood pressure (systolic 120 mm Hg and diastolic 70 mm Hg). Examination of the hands showed mixed gangrene of all the fingers of the hands, which had started demarcating. She had good peripheral pulses in both upper limbs. In the lower limbs, she had gangrene on all toes. All the peripheral pulses in the lower limb were present and full volume. (See Figure 1.)

The patient had fluid resuscitation and empiric antibiotics, which were commenced on admission. The patient consented to amputating the gangrenous parts of her hands and feet. Hence, the amputation of the digits of her fingers and tarsometatarsal of both feet were done successfully. Post operational images are shown in Figure 2.

Figure 1: Demonstrating mixed gangrene of all the fingers of the hands and feet

Figure 2: Showing successful amputation of the digits of the fingers and tarsometatarsal of both feet.

Discussion:

Symmetrical peripheral gangrene is a clinical condition associated with symmetrical ischemia and gangrene of the distal extremities.[1,4] SPG is associated with a broad spectrum of infective and noninfective aetiological causes. Noninfective causes include but are not limited to malignancy, hypovolemic shock, myeloproliferative disorders, vasospastic conditions, connective tissue disorders like systemic lupus erythematosus (SLE) and antiphospholipid antibody syndrome, among other causes.[1,3,4] Drugs like noradrenaline, adrenaline, and dopamine have also been documented as causative agents in some patients.[3] The exact pathogenesis of the condition is not well understood.[5] However, the underlying mechanism includes a low-flow state with disseminated intravascular coagulation (DIC). Despite the wide array of aetiological causes for SPG, failing to identify an underlying cause is not uncommon.[5] While SPG is well documented in the literature, to our knowledge application of Henna for cosmesis has not been previously reported as a cause. In this case, the phenomenon was not precipitated by a known trigger of SPG, which is the application of a mixture of Henna, petrol, hydrogen peroxide(H_2O_2), lemon and urea fertilizer - all of which are not individually known to be a causative agent of SPG. It is often difficult to isolate the cause of vascular occlusion in SPG. But there is a possibility the chemical reactions from the petrol, H_2O_2, and urea fertilizer combination could spark a vaso-occlusive response that would lead to SPG. In the early stages of SPG, pulses may still be palpable, and the large vessels are often spared. As distal extremities are especially susceptible, these changes begin distally and may progress proximally to involve the entire limb.

Currently, no treatment is completely effective for the management of SPG. However, early recognition remains a critical factor in management.[6,7] If peripheral perfusion appears to be uncertain, aggressive fluid resuscitation is recommended to discontinue or reduce the precipitating aetiology at the earliest possible opportunity. Treatment of sepsis and DIC with IV antibiotics and low-dose heparin, respectively, where feasible, should be instituted promptly.[6] Other modalities tried with variable degrees of success includes sympathetic blockade, IV vasodilators, local injection or IV infusion of alpha-blockers, and IV prostaglandins, especially after the appearance of digital ischemia.[6,7] Amputation of the gangrenous tissue(s) may become inevitable, but an initial nonsurgical approach allows time for the

patient's condition to stabilise and for the gangrene to become well-demarcated.

We report a 28-year-old female with no medical history suggestive of a known predisposing condition for SPG. She presented to the casualty ward after applying the Henna mixture leading to a rapidly progressing acral limb gangrene. This case was fascinating because the patient had no reduction in blood flow to distal peripheries (as evidenced by peripheral pulses). We were not able to ascertain if the cosmetic mixture's components, individually or in combination, contributed to the gangrene.

Therefore, we recommend that people be cautious in mixing harmful chemicals while applying Henna for beautification.

Conclusion

Although the Henna mixture combination may contribute to SPG, none of the constituent substances has been implicated in the literature as a predisposing factor for SPG. Awareness, early recognition, and prompt management, including adequate fluid resuscitation and removal of known aetiological agent(s), are necessary to avoid catastrophic outcomes.

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Issue 2

Short Communication

Health Issues of Nigerian Muslim Pilgrims in The Immediate Post Covid-19 Era Hajj Year 2022 in the Kingdom of Saudi Arabia

Raji SO[1], Ismaila IA[2], Amina SM[3], A. Adam[4]

[1]Psychiatry Unit, Department of Clinical Services, Sarkin Maska Shehu Hospital (SMASH), Funtua, Katsina State, Nigeria, [2]Outpatient Department, General Hospital Duba, Tabuk Provoince, Saudi Arabia, [3]Physiotherapy Unit, Department of Clinical Services, Sarkin Maska Shehu Hospital, (SMASH), Funtua, Katsina State, Nigeria. [4]Nutrition and dietetics Unit, Department of Clinical Services, Sarkin Maska Shehu Hospital, (SMASH), Funtua, Katsina State, Nigeria and Department of Biochemistry, Ahmadu Bello University, Zaria, Kaduna State, Nigeria

Corresponding Author:

Raji Saheed Olanrewaju
Email: rajisaheed2003@gmail.com
Phone no; +2348034258404

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Introduction

Hajj and Umrah are the main pilgrimages recommended in the Islamic faith to be performed at least once in a lifetime by those who have the wherewithal. It is one of the largest mass gatherings worldwide.[1] Muslims all over the world (over 180 countries) visit the Great Holy Mosque in the city of Mecca to perform the prescribed religious rites of the main pilgrimage (Hajj) which spans the second week of the twelfth month (Zul-hijja) of the Islamic lunar Calendar. The lesser/minor pilgrimage (Umrah) can be performed at any time of the year. Most hujajs (pilgrims) from outside Saudi Arabia perform Umrah and Hajj in a single journey (tamatui). Some faithfuls also perform the lesser pilgrimage (Umra) in the last ten days of the month of Ramadan (9th month of the Islamic lunar calendar) due to the additional merits and blessings of this last third of the fasting month and additional opportunity of performing other meritorious and rewarding acts of worship such as i'tikaf (seclusion) in the Great Holy Mosque.

Ziyarahs (visitations) are also made to sacred mosques such as the mosque of the noble prophet Mohammad PBUH (peace and blessings of Allah be Upon him) in the city of Medina, Quba Mosque (the first mosque built in Medina), Baqeeah graveyard of the martyrs of the battle of Uhud as recommended in the scripts of hadeeth. Masjid Qiblatayn (the mosque with two prayer directions), the seven mosques (sab'a masaajid), Ajwa date farm plantation of the noble prophet PBUH, and other notable places of interest in Islamic history in the city of Medina which are not necessarily recommended are also visited despite the non-attachment of any spiritual benefits. Due to COVID-19 pandemic, only 1000 Saudi-based citizens and residents (as opposed to the usual 2.5 million international pilgrims)[2] within the age ranges of 20-50 years were allowed to perform the 2020 hajj to enable appropriate crowd control and physical distancing which was considered as one of the key ways of preventing the scourge of the pandemic.[3] In the year 2021, fewer than 60,000 citizens and residents of Saudi Arabia were allowed to perform the hajj for the same reason. Post-COVID-19 era refers to the period after the relaxation of the lockdown imposed on the people, businesses, and other activities by the government as a temporary measure for curtailing the then scourge of the COVID-19 pandemic.[4] It relaxation was a gradual process worldwide in all sectors as well as for hajj and other mass gatherings. The two-meter physical distancing initially proposed was noted to be infeasible in most countries that are already densely populated.[3,5] The same gradual easing of the strict

measures apply to hajj as seen from the initial reduction in the number of annual pilgrims to 1000 then the gradual increase in subsequent years. The hajj hiatus was opened to foreigners in the year 2022, with a restriction of the number of pilgrims to less than one million. 85% of the one million hajj quota was allotted to international pilgrims, with Indonesia (100,051), Pakistan (81,132), India (79,237), and Bangladesh (57,585) while 43,008 hajj pilgrims quota (fifth worldwide, highest slot in Africa) was allotted to Nigeria as opposed to over 90,000 slots allotted in 2019 pilgrimage year.[6] The same was done for other countries with significantly high Muslim and pilgrim populations like Indonesia, Pakistan, India, Bangladesh, Malaysia, and Gulf Cooperation Council (GCC) countries, all got less than 50% of the slots allotted in the preceding international hajj year 2019.[6] Several other measures needed to be modified, altered, or improved upon, apart from the reduction of the pilgrims' population. All these were put in place to avert the worsening of the health crises that may ensue from the mass gathering. Regarding Nigeria, other low and middle-income countries (LAMICs) as well as high income countries, pilgrims have so many prevailing health issues even in the pre-COVID-19 era. Most common health issues include increased risk of stampedes and injuries, fire outbreak, disease transmission, worsening of non-communicable diseases, complications of exposure to unaccustomed climate such as heat stroke, sunburns, harmattan, dehydration, psychological illness, health hazards from food and environmental hygiene. Challenges of crowd management, safety, security, and emergency preparedness are also posed. Provisions need to be made for these health factors and it will involve non-health specialists including venue engineers, event planners, security personnel etcetera to enable the successful performance of hajj rites as well as ensure optimal health of every member of the global community within and beyond the geographical area of the pilgrimage rites. Health infrastructure and service delivery still need to be maintained or improved upon after completion of hajj rites and remain in the cyclical path till the onset of the next hajj season which is usually about 11 days less than the same date of the preceding year in the Gregorian calendar. Non-Muslim imperial European powers were actively involved in hajj management before the emergence of the Saudi petrodollar and modern hajj management which is now being done entirely by the Muslims. Saudi Arabia's safety, security, environmental and health policies have evolved after several decades of conducting hajj rites for the Muslim populace as a useful mode of risk management and international collaboration.[2] This write-up is based on relevant published works of literature, inferences derived by authors based on their participation in pre-hajj medical screening at Sarkin Maska Shehu Hospital (SMASH) Funtua, Katsina State, and what was experienced by some of the authors as Nigerian pilgrims in the 2022 hajj and other previous hajj rites.

General Health Screening

Screening for non-communicable diseases such as hypertension, diabetes, obesity, hyperlipidaemia, bronchial asthma, neoplasm, osteoarthritis, mental health, neurological as well as other systemic illnesses must be done through detailed but focused history taking, purposeful methodical physical examinations, and relevant cost-effective simple laboratory investigations. Pilgrims should be encouraged to disclose their health status by revealing any chronic medical or surgical conditions they had in the past or which they are currently on treatment for. This will enable appropriate health education and care for the respective pilgrims. Long-term medications are usually required for most chronic illnesses, such pilgrims should be advised to visit their specialist at least a month before departure date, to allow ample time for pre-travel medical fitness evaluation, medication review, and refill stock of medications that can last up to two months. Copies of appropriate prescription forms should be available and presented when necessary to avert altercation with drug law enforcement agencies during departure as well as at the entry port. Screening is done for most emerging and re-emerging contagious diseases such as monkeypox, Ebola virus disease, Lassa fever etcetera during the pre-Hajj medical evaluation of intending pilgrims. Screening for tuberculosis is also done to identify those who may require diagnostic testing and to commence treatment for infected pilgrims who may otherwise transmit the disease to others. For the year 2022 Hajj, evidence of COVID-19 testing was mandatory as well as other age and situation-appropriate routine laboratory investigations. In fact, the National Medical Team (NMT) of the National Hajj Commission, Nigeria (NAHCON)

reported three confirmed cases of COVID-19 among Nigerian pilgrims in that the year which were all isolated and treated by Saudi authorities.[7]

Nail clipping and hair shaving are parts of the pilgrimage rites that can expose pilgrims to blood-borne infections (BBI) such as hepatitis B, hepatitis C, HIV, and syphilis, hence the need to screen pilgrims for these contagious diseases. Pilgrims are therefore enjoined not to share razors, scissors, shaving sticks, clippers, and other sharp objects. Unlicensed /roadside barbers should not be patronized. HIV infected pilgrims should take along their recent prescriptions and stock of highly active antiretroviral therapy (HAART). A comparative study of Kano State (Nigerian) Hajj Pilgrims and non-pilgrims revealed that treatment adherence is worse in pilgrims. This was attributed to the possibility of the belief in supernatural healing during the spiritual journey and tasks, stigma, disinclination, inability to cross the airport with the medication, forgetfulness and exhaustion of stock.[8]

Immunization

Evidence of vaccination against internationally notifiable diseases must be presented with appropriate timing. This is mandatory for the COVID-19 vaccine which includes complete doses plus a booster dose of any of the vaccines approved by the World Health Organisation (WHO). Quadrivalent (ACYW135) vaccine against cerebrospinal meningitis (CSM) is also mandatory for all pilgrims from all countries of the world. Pilgrims from Nigeria and other countries endemic or at risk of some ailments like yellow fever and poliomyelitis must also present valid evidence of vaccination against such diseases.[9] Influenza vaccine is recommended for people of extreme ages and those with chronic illnesses such as HIV/AIDS, asthma, Chronic Obstructive Pulmonary Diseases (COPD), heart diseases, internal pilgrims, and health workers.[9]

A 500mg single dose of ciprofloxacin tablet is given as chemoprophylaxis to all pilgrims from Nigeria and other countries in the meningitis belt of Africa at their port of entry (usually Jeddah airport) to lower their rate of carriage.[9]

Communicable (Infectious) Diseases

Infections (especially respiratory tract infections) are the leading cause of morbidity[10,11] and account for over 50% of all symptoms recorded during hajj. Increased density of contacts in mass gatherings can cause up to 78-fold[12] increase in rates of disease transmission as pilgrims come from places with varying health systems and they have different susceptibility and immunity to pathogens. The Kingdom of Saudi Arabia (KSA) specified some standard health requirements that must be met by pilgrims and ascertained by the home /native country health system before certifying the person as fit to partake in the hajj pilgrimage.[9] This will ensure the optimal health of other pilgrims from other parts of the globe, the native Saudi population as well as mitigate the risks of spreading the ailments by pilgrims upon returning to their home countries.

The malaria parasite is harboured by a significant number of pilgrims from Nigeria and other endemic countries, KSA is currently at the pre-elimination phase of malaria. The risk of transmission among pilgrims is very low due to an efficient vector control system and regional collaboration.[13,14]

Several other disease preventing efforts of KSA includes the provision of free face masks and sanitizers for pilgrims in the precincts of the holy mosques, continuous scrubbing and disinfection of floor, rails, and various surfaces, in addition to continuous waste disposal, and safe water supply.

Respiratory System

A 2007 study of morbidity data among French pilgrims in the city of Marseille showed that symptoms of respiratory illness is the leading (51%) cause of hospital presentation.[15] This is similar to the report by the Medical Director of the National Hajj Commission of Nigeria (NAHCON), respiratory tract infections is the leading cause of morbidity among Nigeria pilgrims in the hajj year 2022.[7]

Middle east respiratory syndrome (MERS, camel flu) is a viral respiratory illness caused by middle east respiratory syndrome coronavirus (MERS-CoV) that was first identified a decade ago (2012) in KSA.[13] Animal-to-human (zoonotic) transmission of MERS-CoV is established, and the causative virus has been isolated, identified, and linked to human infection in dromedary camel, common livestock, whose milk and meat are parts of delicacies in Arab communities. Human-to-human transmission is commoner in healthcare settings and among close contacts. Infection may be asymptomatic or present with fever, cough, dyspnea, or gastrointestinal symptoms like diarrhea.[16] Camel meat and milk are nutritious animal products that are safe for

consumption after proper cooking and pasteurization.[16] The sacrifice of a quadruped is part of hajj rites, especially for most Nigerian pilgrims who will be separating their hajj and umrah in a single journey (tamatu'). Most pilgrims however will not go to the abattoir/slaughter slabs on their own. They will rather contract this activity to recognised agencies including Jaiz and Al-Rajhi Bank (which are foremost Islamic Banks in Nigeria and Saudi Arabia respectively) that are licensed for the collection, processing, and distribution of meat to the needy. Few pilgrims get the animals and arrange with some residents to slaughter and process the meat with the hope of reducing cost and getting a part of the animal for their consumption as encouraged in the Islamic doctrine.

Individuals diagnosed with tuberculosis during the pre-hajj medical examinations should be advised to postpone their Hajj till subsequent years when they are expected to have completed their treatments. Those who have completed the first two months (intensive phase) of the directly observed therapy short-course (DOTS), with a negative sputum test (which excludes the possibility of infection transmissibility), are symptoms free and treatment adherent may be certified fit to partake in hajj by the medical authorities if established that they are not carrying a drug-resistant strains of the mycobacteria. Preventive hygiene of face mask use, cough etiquette, physical distancing, contact avoidance, and hand hygiene must be taught by the national medical team as part of pre-hajj medical advice/health education sessions.

Closing gaps in the rows of worshippers is highly recommended during Islamic prayer sessions (solat). Worshippers are supposed to line up toe-to-toe and shoulder-to-shoulder during solat. Some worshippers are noted to be abiding less by this recommendation, due to the observance of physical distancing as a preventive measure against COVID-19 and other contagious illnesses. The two-meter distancing earlier proposed has been realized to be infeasible for physical distancing in congested settings,[3,5] rather more emphasis needs to be laid upon face mask use, hand hygiene, and cough/ sneezing/ yawning etiquette.

Individuals with pre-existing illnesses of the respiratory system like bronchial asthma and chronic obstructive airway diseases (COPD) should take necessary precautions to avert symptom recurrence. Stress from intense activities, respiratory infection, cold air from air conditioners can lead to symptoms exacerbation.[17,18]Air-conditioners are not available for domestic use in most Nigerian homes as it is not affordable to purchase and maintain by average Nigerian families. However, the affluent Saudi community employs the use of air-conditioners in hotel rooms and Masjids. Cold air in winter/ harmattan season is known to be associated with airway hyper-responsiveness, air pollution, bio-contaminants proliferation, and other negative effects, especially on the lungs. Cold water/ beverages consumptions can also be irritating to upper airway in some individuals. There is risk of exacerbation of asthma and COPD when the air temperature drops too quickly by 2 to 5 degrees Celsius without gradual adaptation in individuals that are not accustomed to such.[18]

Inhalers and other necessary medications should be carried along with their recent prescriptions during the journey to enable early intervention during symptom exacerbation before hospital presentation. Lukewarm water or warm beverages are preferred to cold water as a thirst quencher in people at risk of airway disease.[19]

Cardiometabolic system

Evaluation of cardiovascular risk factors is essential component of pre-hajj medical screening. People with a history of stroke, systemic hypertension, diabetes mellitus, and hyperlipidaemia are placed on appropriate treatment and given health education to keep their illness in a stable and controlled state. The incidence of cerebrovascular accidents has been reported to be lower in Iranian pilgrims during hajj compared to the natives in home country. This was attributed to the proper screening for cardiovascular risk factors and intervention efforts that mitigate illness progression and complications.[20]

Authorities of the KSA Ministry of Health (MOH) should be commended for placing Automatic External Defibrillators (AED) at strategic places in the premises of the sacred mosques for use in resuscitation during emergencies like cardiac arrest. The security personnel in the premises of the Grand Holy Mosque (as well as other mosques) should be trained on the basic life support skills and the use of AED in such emergencies before the arrival of an ambulance for conveyance to the hospital.

As part of hajj preparations, intending pilgrims should engage in regular exercise[21] to enable them to be fit to perform the rigorous and physically

demanding tasks of hajj without getting exhausted easily.

Junk food is considered as high in fat, salt and sugar (HFSS)[22] with little dietary fiber, protein, vitamins, minerals, or other important nutrients. They are considered unhealthy for people with cardiovascular risk factors such as hypertension, diabetes, hyperlipidaemia, and obese individuals. These HFSS foods are usually distributed as free packaged meals for pilgrims by some Saudi Philanthropic agencies. Pilgrims from Nigeria and other LAMICs benefit from these meal packs to supplement their dietary needs without any regard or consideration for the effect on their cardiovascular health. Pilgrims with cardiovascular risk factors should be educated to avoid getting these meals but can get the fresh fruit and vegetable packs that are also distributed by the philanthropists for their nutritional supplementation.

Pilgrims need to take into cognizance the necessary dietary modifications occasioned by their health. Hypertensive individuals are to abide by the necessary salt restriction in their diet, refined sugars should be avoided by diabetic individuals as much as possible. Catering institutions that got contracts for mass meal supply to pilgrims should be notified and instructed by the company for the Mutawwifs of Non-Arab African countries (MU'ASSASA) of the need to prepare special dietary needs/dishes for these categories of people.

Gastro-intestinal System

Despite the heavy congestion, infectious diseases of the gastrointestinal system are less common among hajj pilgrims.[15] Diarrheal disease mean prevalence of 2% was recorded in a multinational study of pilgrims (from 26 countries) in 2013, with the highest prevalence of 23% among French pilgrims.[23] The cholera outbreak in Hajj which used to be a frequent occurrence seems to have ceased.[2] This may be due to remarkable improvement in food, water, and general hygiene in religious sites and the adoption of food and water hygiene principles by the pilgrims as made available by Saudi authorities.[24] Pilgrims should avoid unnecessary/ prolonged storage of cooked food, ensure proper washing of fruits and vegetables before consumption. Roadside food vendors are sometimes patronized by Nigerian pilgrims who crave African/Nigerian dishes. Such pilgrims need to be informed of the availability of licensed hygienic African food outlets in the city of Mecca and Medina at a reasonable cost.

Peptic ulcer disease (PUD) is reported as one of the commonest illnesses among Nigerian pilgrims.[7] Eating habits may be a focus of concern here as some food items may precipitate symptoms recurrence (e.g. caffeinated beverages) and should be taken with caution. The stress of the journey may also induce or precipitate PUD in the predisposed.

Zamzam is a readily available water source in the precinct of the Holy Mosque, prescribed in the religion to be consumed immediately after completion of sa'ay. It is also used for nutritional and medicinal value based on prophetic recommendations for quenching thirst, hunger and as a healing for several ailments. Modern plumbing and the hydrological system have made the claims of possible contamination or pollution of Holy Zamzam water from Hagar's well a thing of the past (2). A recent subject of controversy is the claim of unsafe high concentrations of arsenic and nitrates in Zamzam water. The possible carcinogenicity of arsenic as a heavy metal calls for caution as raised by British Broadcasting Corporation (BBC) in hot health and sociopolitical debate in May 2011.[25]

Arsenic is a heavy metal, though beneficial to a large extent it has also been described to be carcinogenic.[26] Organ toxicity (e.g. nephrotoxicity, hepatotoxicity) which are a typical occurrence in acute and chronic heavy metal poisoning like lead, and mercury was not demonstrated during five-week comparative study on experimental animals that were fed with Zamzam water.[27] Arsenic has also been used in some cancer chemotherapy, as it is not unusual for a chemotherapeutic agent to be found to be carcinogenic as well.[28] Such paradoxical and bidirectional effects have been described in several classes of drugs.[29] A study of 30 samples of Zamzam water obtained from the precincts of the Holy Mosque in Makkah as well as from pilgrims from several countries were analysed for different micronutrients, minerals, heavy metals, and other constituents. There was no significant difference between the constituents of all the samples even after storage for two years. The concentration of Arsenic and Lithium were demonstrably higher than WHO allowable limits in all the samples. The higher lithium concentration may be beneficial for mood stabilization and suicide prevention.[30] A possible rejoinder for higher concentration of arsenic and the

scriptural recommendation of healing properties of Zamzam water is the demonstration of the presence of antioxidant minerals like selenium, magnesium, manganese, and strontium concentrations of which probably counteract the oxidative effect of high arsenic concentration.[31]

Ingestion of Zamzam water for the few days or weeks of the annual Hajj and Umrah pilgrimage by pilgrims is unlikely to precipitate carcinogenesis or organ toxicity as demonstrated in experimental animals (27). Consistent use is probably more for the Meccan dwellers who are more likely to make use of the water on several occasions due to proximity, availability, and the belief in its healing properties. Retrospective epidemiological data may need to be garnered to know if any form of cancer (or other features of heavy metal poisoning) is more prevalent in Meccans than dwellers who drink Zamzam water.

Central Nervous System

The meningitis outbreak of the 2000-2001 led to the revolutionary mandatory vaccination with the quadrivalent meningococcal vaccine against serotypes A, C, W, and Y.[12] *Neisseria meningitides* infection of the central nervous system can be deadly and may cause long-lasting debilitating complications.

Incidence of cerebrovascular accidents was found to be about 8.9/per 100,000 pilgrims during the 2015 hajj, with peak occurrence on the day of Eid-ul-Adha and an 11.6% case fatality rate.[32] Azarpazhooh *et al.* estimated the adjusted incidence of first-ever stroke (FES) amidst Iranian pilgrims and compared it with the non-pilgrim Iranian population in Mashhad city of Iran. The incidence of FES was generally lower than that of the non-pilgrim populations.[20] Hypertension, diabetes mellitus, hyperlipidaemia, and other risk factors for CVA should be assessed and controlled before allowing pilgrims to proceed on hajj. Epilepsy is a common neurological illness, pilgrims are better stabilized on antiepileptic drugs (AEDs) before being certified fit to proceed with Hajj by the medical team.[33]

The prevalence of mental illnesses among Hajj pilgrims ranges between less than 1% and 7.2%.[34,35] Patients with major mental illnesses (like Schizophrenia and related disorders, bipolar, depressive, and anxiety disorders) should be encouraged to disclose their illnesses to the medical team who should advise or refer such pilgrims to a psychiatrist for assessment of their fitness to proceed on Hajj. An illness remission state must be attained before proceeding on hajj. The stock of medication and prescription notes should be carried along as done for other chronic ailments during the hajj journey for ease of refill and sustaining the maintenance dose to avert recurrence. It is not uncommon for mental illness to recur due to the strenuous nature of hajj rites. Early warning signs and relapse signature characteristics of the illness should be identified and the patient educated on the need for early presentation and early intervention to avert full relapse.

Hajj season is an opportunity for people who abuse psychoactive substances to abstain from their addictive behaviour as much of their time and attention should be dedicated to worship and not recreational drug use/activities. Consumption of alcoholic beverages is a punishable offense in Islam, the same applies to buying, selling or using it in the Kingdom of Saudi Arabia as well as most other Islamic countries of the world. Smoking is prohibited in most holy sites to avert the exposure of other pilgrims to passive smoking and prevent fire accidents in congested settings/mass gatherings. Most other psychoactive substances are considered khamr (intoxicants) whose consumptions are also sinful in Islam and should be avoided to enable the attainment of the desired spiritual benefit of the hajj. There are anecdotal reports that consumption of Zamzam water reduces addictive behaviour possibly because of its sub-therapeutic lithium content.[36] Lithium concentration of Zamzam water may be of therapeutic value in people with suicidality, mood, other behavioural disorders, and lead neurotoxicity.[37]

Some intending pilgrims could not perform the 2022 Hajj due to the stringent measures dictated by the COVID19 pandemic, and the limited period given to prepare for the operation by the Hajj Ministry of Saudi Arabia, which made NAHCON title it as an "emergency hajj."[7] Such people were emotionally distraught as that translated to missing the hajj chance for three consecutive years. NAHCON put measures in place that ensured such individuals were given topmost consideration during the 2023 hajj year.

Musculoskeletal System

Prevalence of musculoskeletal pain was reported to be as high as 80.46% among pilgrims of different nationalities who were interviewed at various sites

of hajj rites.[38] The painful conditions (especially lower limb pain) are more prevalent in females, older age groups, and the obese.[38] Disorders of the musculoskeletal system are next to respiratory tract infection in order of hospital presentation amongst Nigerian pilgrims,[7] same was reported in a study of Pakistani pilgrims presenting in Pakistani Hajj Medical Mission` Hospital and Dispensary in Mecca.[34] This is due to the need to walk in performing most tasks by pilgrims. Some pilgrims also miss their ways and end up walking long distances in search of their destinations. The language barrier also makes it difficult for most pilgrims to get appropriate guidance from Saudi security personnel. Making use of a wrist straps which can be read by the Saudi personnel, and the use of maps (including google maps) can ameliorate this. Pilgrims should also try to make use of the free transport systems (e.g. train services) provided by Saudi authorities.

Footwear should not be tight fitting (note that shoes and socks are not allowed for men). It is advisable to use old footwear than new ones to avoid sores and blisters during rigorous tasks like tawaf and sa'ay. Voluntary health workers (VHW e.g. Red Crescent Society of Saudi Arabia) are readily available and accessible on most walkways to the sites of performance of rigorous rites to assist people that have muscle cramps, osteoarthritis, sprains etcetera.

People with disabling illnesses and the aged should be informed about the permissibility of delegating a healthier younger person to perform the Hajj on their behalf. This will reduce the burden of illness, cost, and associated discomfort. Stampedes, accidents, injuries, and exhaustion are a common occurrence during the hajj.[39] This can be minimized by following Islamic guidelines on performance of rites, adoptions of permissible options, devices, and technologies.

Most activities can be done at convenient periods of different parts of the day. Pilgrims can be grouped into batches of genders, regions, or nationalities in performing tasks like the stoning of Satan effigy to avert congestion, falls, and stampede that may occur during the task.

People with physical disabilities are permitted to do the stoning at an earlier part of the day or delegate a healthy person to perform it on their behalf while able-bodied pilgrims are encouraged to do their stoning by mid-day.

The use of wheelchairs, electronic carts etcetera is permissible for the disabled. These are available for rent, even though it may not be affordable to some Nigerian pilgrims.

Adoption of apps and online portals (like tawakalna, absher, eatmarna, maqam, etc all available for free download on Play Store) enable pilgrims to book an appointment for timing specific period for one to do task like visitation of Holy Rawdah; the sacred place between the mimbar (pulpit) and the house of the noble prophet PBUH. This has been tried as part of technological approaches for easing hajj tasks. Some recognized limitations therein include non-compatibility of some devices with the apps, the requirement of valid and specific types of credit cards, affordability, and availability of internet access.

Genitourinary system

Islam encourages accompaniment by one's legally married spouse(s) in the hajj ritual, sexual cohabitation is however a forbidden act during Hajj and can nullify the validity of Hajj. Separate accommodation facilities are provided for each gender during hajj. Pregnancy is not a contraindication for pilgrimage. The pregnancy test is part of a routine tests conducted for women during pre-hajj medical screening. Pregnant women are encouraged not to perform Hajj to avert possible complications that may arise due to the strenuous nature of the rites. At least, a case of miscarriage was reported among Nigerian pilgrims in the Hajj year 2022,[40] despite the inclusion of pregnancy tests and ultrasound scanning as parts of pre-hajj medical screening. There are possibilities that such women got impregnated after the conduct of the pregnancy test, or the pregnancy was missed. It may therefore be recommended that, married female pilgrims practice sexual abstinence or be on contraceptives after the conduct of medical screening, if there are no other gynaecological reasons against such.

Menstruating women have some limitations in performing most of their worship generally in I*slam* as seen in solat (prayer) and sawm (fasting). However, most of the Hajj and Umra activities are not limited by menstruation except Tawafs which is one of the obligatory aspects of the pilgrimage rites. It is however allowed for women to defer the period of performance of compulsory Tawafs (tawaful ifada) till the cessation of menstruation, while other forms of the (voluntary) tawaf (eg Tawaful wada: farewell tawaf) may be left undone. It is also allowed for a woman to take

medications (eg norethisterone, combined oral contraceptive pills) that can suppress/ postpone her menstruation cycle during the Hajj period till a later time to enable prompt/timely performance of these rites. This should be done after discussing such with her gynaecologist to avert the possibility of any adverse effect that may arise upon the use of such medication.[41]

To avert dehydration from extremely hot arid weather, pilgrims are advised on the need for frequent drinking of water. Bottled Zamzam and non-Zamzam water are readily available, and freely distributed in the city of Mecca and the precinct of the Holy Mosques. Dysuria may be a feature of urine hyper-concentration in an individual that is not taking enough water. Heat stroke characterized by a sudden loss of consciousness can result from excessive heat. Pilgrims are therefore advised to make use of an umbrella to avert heat from intense sunshine.

Limitations

More qualitative and quantitative research are needed on the health issues of Nigerian pilgrims to enable the designation of appropriate preventive and interventional strategies. Studies that span over longer duration of time and which will of course require more resources are also desirable.

Conclusion and Recommendation

A holistic approach to healthcare is applicable in mass gatherings like hajj as it is for other aspects of the health sector. The tremendous and continuous developmental efforts by the Ministry of Hajj and Umrah and the Ministry of Health of the KSA is commendable. Continuous improvement in services, technological innovations, adaptations, collaborations, and training avenues like the Hajj University concept in KSA, Hajj Institute of Nigeria, (HIN), should not cease.

Health education of pilgrims during pre-hajj seminars and workshops need to be given priority among Nigerians and other LAMICs. Pilgrims should be encouraged to disclose their health status and assured that this may not necessarily prevent them from performing hajj but may serve to improve their health during hajj. Warm water/ beverages should be made available the same way as cold water is made to be readily available as a thirst quencher, prophylactic and therapeutic modality for people who are prone to respiratory illnesses.

Pilgrims should be advised (if not mandated) to undergo post-hajj health screening. Similar importance given to pre-hajj screening should be accorded to post-hajj screening to mitigate the risk of disease transmission in the native countries of all pilgrims.

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ORIGINAL ARTICLE

Knowledge and Attitude of infant Feeding among Health Workers in Private Health Facilities in Ibadan, Oyo State, Nigeria

O. Ariyo[1], B. O. Olaniyi[2], O. D. Onojade[1] and F. S. Oladipo [1]

ABSTRACT

Background: Knowledge and attitude of health workers affect caregivers' infant feeding practices. However, information on the knowledge and attitudes of health workers in private hospitals is lacking. This study was designed to assess the infant feeding knowledge, attitude, and personal experiences of health workers in private hospitals in Ibadan, Nigeria. **Methods:** This cross-sectional study involved sampling of 108 consenting health workers of registered private health facilities offering ante-natal care services in Ibadan North communities of Oyo State, Nigeria. Data were collected using a semi-structured questionnaire including the socio-demographic characteristics, knowledge, and attitude of infant feeding practices. Knowledge was assessed using a 19-point scale categorized as good (≥13) and poor (<13). Attitude was assessed using a 65-point scale, categorized as good (≥33) and poor (<33). Data were analysed using descriptive statistics at $p<0.05$. **Results:** Eighty five percent of the health workers were female, 51.9% were aged 21-30 years, 48.1% were married, and 25.9% were degree holders. Only 47.2% had attended infant feeding training recently, 57.0% had good knowledge and 53.0% had good attitude. Only 30.6% knew early initiation of breastfeeding, and 30.6% knew continued breastfeeding up 24 months and beyond. Just 49.1% considered breastfeeding in public non-embarrassing, and 33.3% agreed that infants less than six months should not be given water. **Conclusion:** There is evidence of limited knowledge and poor attitude towards the recommended infant feeding practices among the health workers in private health facilities in Ibadan. **Recommendation:** Periodic training on infant feeding for health workers in private health facilities is hereby recommended.

Key words: Exclusive breastfeeding, early initiation, private hospital, personal experience

[1]1Department of Human Nutrition and Dietetics, University of Ibadan, Nigeria. [2]World Bank Accelerating Nutrition Results in Nigeria Project, Lokoja, Kogi State, Nigeria

Corresponding Author:
Dr Oluwaseun Ariyo
E-mail: ariyoseun@gmail.com
Phone No:08037950483

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Introduction

Feeding practices of children during infancy and early childhood determine their overall health status and long-term well-being.[1] Infant feeding is not a simple operation as the methods or foods used must align to a variety of criteria which is adjusted as the infant develops and modified to suit the needs of the child.[2] The World Health Organization (WHO) and United Nations Children's Fund (UNICEF) recommended early initiation of breastfeeding (within one hour of birth), exclusive breastfeeding for the first six months, and continued breastfeeding for two years and beyond, together with nutritionally adequate, safe, age-appropriate, responsive feeding of solid, semi-solid and soft foods starting in the sixth month.[3-6] However, the global databases of UNICEF showed that only 44% of newborns are commenced on breastmilk within one hour of delivery and about 40% of infants are exclusively breastfed in the first six months of life.[7] In Nigeria, breastfeeding is predominant, however, compliance to recommended infant and young child feeding practices remains poor. According to the

recent survey, early initiation of breastfeeding was 23.1%, exclusive breastfeeding was 34.4%, and continued breastfeeding at 2 years was 26.1%.[8] These poor infant and young child indices endanger health and well-being of children, increases susceptibility to illness and death and cause enormous health care bills in treatment. Though multiple factors have been implicated for these poor infant and young child indices and series of interventions are being implemented, the rate of progress is slow.

Health workers are considered critical stakeholders in promoting mothers' compliance to recommended Infant and Young Child Feeding (IYCF) practices and as such they are expected to have sufficient knowledge and attitude on various aspects of infant feeding including its benefits, proper techniques, existing myths, and practical aspects of managing potential challenges. Evidence has shown that the knowledge and attitude of health workers in the facilities can affect infant feeding practices, and, studies in Nigeria have reported widespread poor knowledge of infant and young child feeding among health workers.[9-14] Interestingly, these results were obtained from public health facilities where most infant and young child feeding interventions are focused. Several approaches have been deployed in the promotion of appropriate IYCF practices in Nigeria, including adoption of Baby Friendly Hospital Initiatives, adoption, and promotion of IYCF guideline, and lately Maternal, Infant and Young Child Nutrition guideline, among other interventions. Despite all these efforts, infant care practices remain low and several studies have been conducted to identify the causes of these poor care practices with mixed result.

One in five births in low-income and middle-income countries occurred with care provided by the private health sector.[15] In Nigeria, the private hospitals constitute unavoidable choice for mothers as health services provided in public facilities have been persistently low in quality and adequacy.[16] About one-third (30.2%) of delivery in urban areas in Nigeria occurred in private health facility.[8] This reflects the significant role of the private health facilities in promoting compliance to recommended infant and young child feeding practices. Conventionally, the health facilities serve as a place for mothers to acquire knowledge and get motivation to adopt optimal infant feeding practices. Currently, there is limited information on the knowledge and practices of infant feeding practices among health workers in private hospitals as previous studies were conducted in public health facilities. Since private health care facilities are largely accessed and utilized in Nigeria, assessing the knowledge and attitude of infant and young child feeding among health workers in private hospitals will help identify existing gaps in knowledge and attitude and improvise strategies to strengthen the private health system to support and promote recommended infant and young child feeding practices and contribute to promoting good maternal and young child nutrition. This study was therefore designed to assess the knowledge, attitude, and personal experiences of health workers in private hospital on infant feeding practices in Ibadan North local government area of Oyo state, Nigeria.

Methods

Study Design*:* The study was descriptive cross-sectional in design and included 108 health workers of registered private health facilities offering ante-natal care services across Ibadan North Local government Area, Ibadan, Oyo State, Nigeria.

Study Area*:* The study was carried out in registered private hospitals in Ibadan North Local Government Area, Oyo State, Nigeria. Ibadan is the capital of Oyo state in Southwest Nigeria. There are eleven local government areas in Ibadan including five urban and six peri-urban local government areas. Ibadan North Local government was purposively selected being the largest and the most developed of the five urban local government areas and has an accessible list of registered private health facilities.

The local government area covers an area of 145.58-kilometer square, consists of 12 wards and has 15 registered private health facilities with antenatal care services.

Study Population and Sampling Procedure*:* The study population was health workers either male or female in private hospitals such as doctors, nurses, auxiliary nurses, matrons and midwives who offered support and advice to pregnant women and, rendered antenatal and postnatal care in the fifteen private health facilities.

A total of 108 health workers were recruited for the study. A health worker was considered eligible for the study based on involvement in either ante-natal or post-natal care services in the selected health facility as a full-time staff for at least six months,

ability to communicate verbally and giving informed consent to participate in the study.

Data Collection Procedure*:* This study was conducted between November 2020 and April 2021. Information was collected using a semi-structured, interviewer-administered questionnaire including the socio-demographic characteristics, knowledge and attitude of infant feeding practices and personal experience. Knowledge was assessed using a 19-point infant feeding scale categorized as good knowledge (≥13) and poor (<13) based on the mean knowledge score of 13.0. Attitude of the health workers towards recommended infant feeding practices was assessed using a 65-point scale based on 5-point Likert scale (strongly disagree (1), disagree (2), undecided (3), agree (4) and strongly agree (5). The cumulative score of each respondent was used to generate the final attitude score and categorized as good infant feeding attitude at a score ≥33 and poor at a score <33.

Data analysis: Data were entered and analyzed using the IBM Statistical Package for the Social Sciences (IBM SPSS) version 25.0. Age and other parametric variables were summarized using mean, while frequencies and percentages were used for categorical variables. Chi-square test was used to assess association between variables and differences were considered significant at $p<0.05$.

Ethical approval was obtained from University of Ibadan/University College Hospital Research and Ethics Committee at the Institute of Advanced Medical Research and Training (IAMRAT). Participation was entirely voluntary and informed consent was obtained from respondents. The ethical principles guiding research among human subjects as contained in the Helsinki Declaration were adhered to. Respondents were free to withdraw from the study whenever they deemed fit without any fear of victimization

Results

Socio-demographic characteristics of the health workers

The socio-demographic characteristics of the health workers are presented in Table 1. About 85 percent of the sampled health workers were female. The age distribution of the respondent showed that more than half (51.9%) were between 21-30 years and 22.2% were aged 31-40 years, 48.1% were married, and 47.2% were single. The health workers comprised of nurses (30.6%), auxiliary nurses (23.1%), midwives (13.9%), medical doctors (9.3%) and others (23.1%). Only 25.9% of the health workers had university education, 26.0% were graduates of Schools of Nursing/midwifery, 13.0% graduated from School of Health Technology, and 29.6% had not more than secondary school education. Majority of the health workers (79.6%) had served in the private health care system for 1-10 years, 12.0% had served for 11 – 20 years and 8.3% of the respondents had served for more than 20 years. About 82% of the health workers had received training on infant feeding and 70.4% had in-service training on infant feeding, however, only 47.2% had attended training in the last one year. Majority (75.0%) of the health workers expressed willingness to acquire more knowledge on infant feeding and 93.5% were willing to participate in infant feeding training.

Table 1: Basic Characteristics of Respondents

Variables		N	%
Gender	Male	16	14.8
	Female	92	85.2
Age (years)	<20	11	10.2
	21-30	56	51.9
	31-40	24	22.2
	>40	17	15.7

Marital status	Single	51	47.2
	Married	52	48.1
	Divorced	3	2.8
	Widowed	2	1.9
Cadre of respondents	Medical Doctor	10	9.3
	Nurses	33	30.6
	Midwives	15	13.9
	Auxiliary Nurse	25	23.1
	Others	25	23.1
Level of education	Primary education	1	0.9
	Secondary education	32	29.6
	School of Nursing/Midwifery	28	26.0
	School of Health Technology	14	13.0
	Graduate Degree (MBBS, B.Sc)	28	25.9
	Others	5	4.6
Year of service in private health facility	1-10	86	79.6
	11-20	13	12.0
	>20	9	8.3
Had ever received training on infant training	Yes	88	81.5
	No	10	18.5
Had ever received in-service training on infant feeding	Yes	76	70.4
	No	32	29.6
Had attended any IYCF training in the last one year	Yes	51	47.2
	No	57	52.8
Willing to acquire more knowledge on infant feeding	Yes	81	75.0
	No	27	25.0
Willing to participate in infant feeding training	Yes	101	93.5
	No	7	6.5

MBBS-Bachelor of Medicine and Bachelor of Surgery; B.Sc. - Bachelor of Science

Knowledge, attitude, and personal experience on Infant Feeding among Private Hospital Health Workers

The knowledge of the health workers on infant feeding is presented in Table 2. Most of the health workers (88.0%) knew human milk as the ideal milk for the newborn and 86.1% correctly defined exclusive breastfeeding, however, only 30.6% knew breastfeeding should be initiated within one hour of delivery. About 51.9% of the health workers recognized ROOMING-IN concept as the best hospital practice to support early initiation of breastfeeding, 87.0% knew breastmilk supplies essential nutrients and fluid a baby needs for the first 6 months, and 77.8% correctly identified the duration for exclusive breastfeeding. Though majority of the health workers (78.7%) knew breastfeeding should be given on demand, only 30.6% knew breastfeeding should be sustained till a child is at least 24 months. The knowledge of the benefits of exclusive breastfeeding among the health workers was limited. Only 50% of the health workers recognized that exclusive breastfeeding could reduce the risks of ovarian cancer, 63.9% knew it delays the return of ovulation in mothers and 71.3% knew it contributes to the maturation of the infants' gastrointestinal tract. About 82% knew giving colostrum is beneficial and 61% knew a malnourished mother can practice exclusive breastfeeding exclusively. Though 87% of the health workers knew that the quantity, texture, number of times a child eat complementary foods should increase as the child gets older, only 21.3% knew the appropriate timing of the introduction of complementary feeds. Majority of the health workers (86.1%) knew that quality complementary food can be home-made and 73.1% knew that adequate complementary feeding can prevent child malnutrition.

The attitude of the health workers to recommended infant feeding is presented in Table 3. Only 69.4% considered breastfeeding more convenient than formulae feeding, 49.1% considered breastfeeding in public non-embarrassing, and 33.3% agreed that infants less than six months should not be given water. About 65% agreed to the significance of hygiene in the preparation of complementary feeds, 92.6% agreed to the six-month duration of exclusive breastfeeding, and 89.8% agreed that mothers need adequate knowledge on complementary feeding for optimal feeding of their infants. Other results are as presented in the table. Overall, 57% of the health workers had good infant feeding knowledge and 53% had good infant feeding attitude (Figure I).

Table 2: Knowledge of health workers on infant feeding

Knowledge Variables	Frequency (N=108)	Percent
Knew human milk as the only ideal milk type for the newborn	95	88.0
Defined exclusive breastfeeding as breastfeeding only without other fluids or water for the first 6 months	93	86.1
Knew breastfeeding should be initiated within one hour of delivery	33	30.6
Knew rooming-in as a hospital practice that supports exclusive breastfeeding	56	51.9
Knew breastmilk supplies all the nutrients and fluid a baby needs for the first 6 months	94	87.0
Correctly identified 6 months as the duration of exclusive breastfeeding	84	77.8
Knew breastfeeding should be given on demand	85	78.7
Knew breastfeeding should be sustained up to > 24 months	33	30.6
Knew exclusive breastfeeding reduces the risk of ovarian cancer	54	50.0

Knew exclusive breastfeeding delays the return of ovulation after delivery	69	63.9
Knew colostrum is beneficial infant feeding practices	88	81.5
Knew that a malnourished mother can still breastfeed exclusively while working on her nutritional state	66	61.1
Knew the practice of exclusive breastfeeding contributes to the maturation of the gastrointestinal tract and development of jaws and teeth of the infant	77	71.3
Knew that complementary feeding should be introduced at 6 months	23	21.3
Knew that the quantity, texture, number of times a child eat complementary foods should increase as the child gets older	94	87.0
Knew that complementary foods should contain the vital nutrients for a growing child	99	91.7
Vital nutrient in complementary foods for a growing child		
Protein	27	25.0
Vitamin C	11	10.2
Vitamin A	2	1.9
Calcium	3	2.8
Mineral Salt	1	.9
3 or more Nutrients mentioned	16	14.8
Knew that a quality complementary food can be home made	93	86.1
Knew that adequate complementary feeding can prevent certain malnutrition related disease	79	73.1

Table 3: Attitude of health workers on infant feeding

	Strongly Agree Freq. (%)	Agree Freq. (%)	Undecided Freq. (%)	Disagree Freq. (%)	Strongly Disagree Freq. (%)
Formula-feeding is more convenient than breast feeding	16(14.8)	10(9.3)	7(6.5)	28(25.9)	47(43.5)
Breastfeeding in public is embarrassing	20(18.5)	25(23.1)	10(9.3)	30(27.8)	23(21.3)
Hygiene is of importance when preparing complementary foods	70(64.8)	25(23.1)	6(5.6)	4(3.7)	3(2.8)
Complementary foods can be at any time not necessarily after 6 months	11(10.2)	18(16.7)	8(7.4)	41(38.0)	30(27.8)
Believes babies less than 6 months should not be given water	37(34.3)	28(25.9)	7(6.5)	24(22.2)	12(11.1)
Formula-feeding is a better choice if a mother plans to work outside the home	15(13.9)	44(40.7)	12(11.1)	26(24.1)	11(10.2)
Believes in feeding a baby on demand	52(48.1)	33(30.6)	10(9.3)	6(5.6)	7(6.5)
Believes in exclusive breastfeeding for at least 6 months	64(59.3)	36(33.3)	4(3.7)	3(2.8)	1(0.9)
Believe that HIV can be transmitted through breastfeeding	49(45.4)	24(22.2)	11(10.2)	12(11.1)	12(11.1)
Mothers need adequate knowledge on complementary feeding for optimal feeding of their infants	58(53.7)	39(36.1)	7(6.5)	3(2.8)	1(0.9)
In complementary feeding: age group, frequency, amount of food, texture, variety of food, responsive feeding should be considered	51(47.2)	42(38.9)	9(8.3)	2(1.9)	4(3.7)
Fruits and vegetables can be added in complementary feeding	55(50.9)	39(36.1)	11(10.2)	2(1.9)	1(0.9)
New foods should be offered several times as the child may not like new foods in the first few times	28(25.9)	59(54.6)	11(10.2)	10(9.3)	0(0)

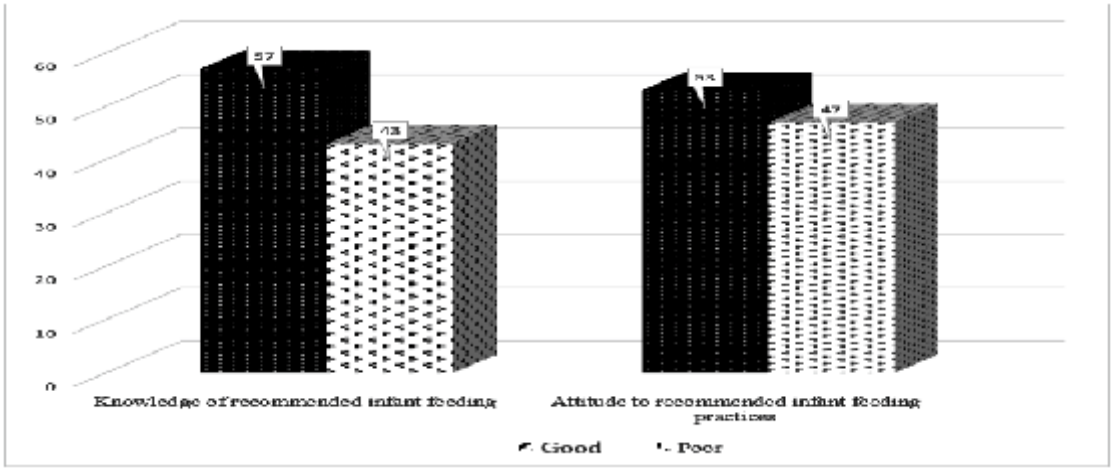

Figure I: Infants feeding knowledge and attitude scores of the health workers

Infant feeding experience among the health workers

The personal experience of the health workers is presented in Table 4. About 47% of the health workers had children, and 98% of them breastfed their children. Majority of the health workers (74.0%) breastfed for a period of 12-24 months and 26.0% breastfed for 6 -12 months. About 52% of the health

workers introduced complementary feeding earlier than recommended including 30% before age 4 months and 22% before age one month. Majority (70.6%) of the health workers did not prefer formula feeds.

Table 4: Infant feeding experience of health workers

Variables	Frequency	Percent
Had own child/children		
Yes	51	47.2
No	57	52.8
Ever breastfed own child/children (n=51)		
Yes	50	98.0
No	1	2.0
Duration of breastfeeding		
6-12 months	13	26.0
12-24 months	37	74.0
More than 24 months	-	-
Age of child when other foods were introduced		
Less than 4 weeks	11	22.0
4-15 weeks	15	30.0
At age 6 months	24	48.0
Preferred formula foods most times		
Yes	15	29.4
No	36	70.6

Discussion

Health workers in private health facilities constitute important stakeholders in achieving the WHO and UNICEF recommendations on infant feeding, and as such, they should be equipped with adequate knowledge and display right attitude towards promoting, protecting, and supporting appropriate infant feeding.[18,19] In this study, the health workers in the private health facilities were largely female and belong to diverse categories with varied level of trainings. However, some had no training on infant and young child feeding, and less than half had such training in the last one year. There is evidence of limited knowledge of recommended infant feeding practices among the health workers particularly in early initiation of breastfeeding, use of the rooming-in concept to promote recommended breastfeeding practices, continued breastfeeding up to 24 months and the benefits of exclusive breastfeeding to mothers and infants, and appropriate timing of complementary feeding. Furthermore, the health workers reflect poor attitude to infant feeding and their personal experience portrays them as poor role models to promote recommended infant feeding practices.

The preponderance of female among the health workers in this study may be attributed to the focus on ante-natal care section of health services and the larger proportion of nurses, midwives and community health workers compared to medical doctors. This distribution agrees with several other studies on primary health care services in southern Nigeria which has also reported larger proportion of females compared to male counterparts.[11,19-21] The large representation of mid-level health

professionals is typical of the private health facilities and can be attributed to the cost-minimizing strategy of using many low-level staff to support high level workers.[22] Although this may help the facilities to reduce wage bills, caution must be ensured that the quality of services is not compromised.

The large proportion of health workers without training and lack of periodic training on recommended infant feeding practices constitute a red flag on the potential of the private health facilities to provide adequate support for mothers to adopt recommended best practices on infant feeding. Health workers have an indispensable role particularly during the first year of a child's life which includes documenting and reporting on their promotion and support of proper infant nutrition (including breastfeeding) and hygiene.[23]

Only 30.6% of the health workers knew that breastfeeding should be continued till 2 years and beyond. An earlier study also reported that 40.7% of female medical personnel in Benin city, Nigeria did not know that breastfeeding should be continued for 24 months or beyond.[10]

Earlier studies have also documented poor infant and young child feeding knowledge among health workers in public health facilities in different parts of Nigeria and beyond.[10-13,24-27]

The United Nations Children Fund/World Health Organization Baby Friendly Hospital initiative (BFHI) recommends the training of all health personnel to implement best practice breastfeeding policies .[7,28]

The large proportion of health workers with poor knowledge and attitude on optimal infant feeding practices reflect a wide gap in the successful implementation of best breastfeeding practices in the private health facilities. This gap possibly contributes to the unsuccessful efforts to increase compliance to early initiation of breastfeeding, exclusive breastfeeding and continued breastfeeding up to 24 months among Nigerian mothers. Presently, about 70 percent of under-five children in Nigeria missed the benefits associated with early initiation of breastfeeding, exclusive breastfeeding, and continued breastfeeding at 2 years.[8] The large proportion of the health workers with poor knowledge of the benefits of exclusive breastfeeding to the mother and child reflects poor capacity to convince the mothers to practice exclusive breastfeeding.

In this study, poor attitude, and the non-inspiring personal experience of some of the health workers are even more exasperating. This makes the heath workers poor role models in promoting optimal infant feeding practices. Personal experiences with breastfeeding influence attitude towards breastfeeding.[29] Similar negative experience and attitude have been reported among nursing and medical students.[30-32] The poor knowledge and attitude can be a barrier to successful implementation of recommended breastfeeding best practices in private health facilities. Dykes (2006)[33] reported that attitudes towards breastfeeding are rooted in personal and vicarious experiences. Poor attitudes can debar acquisition and application of new knowledge and skills. Evidence has shown that poor knowledge on the part of health workers influences provision of supports and guidance that caregivers expected from health workers and when this is not achieved infant feeding practices suffer.[34,35]

The findings in this study reflect systemic gaps in the private health care service delivery that inhibit promotion of appropriate infant feeding practices, however, the willingness of these workers for periodic training constitutes a green light. These gaps constitute major concern with the large patronage of private health facilities by Nigerians in the urban centers and the large number of the private health facilities in the country. It is therefore important to rejig the private health care sector and better position it to support and promote ongoing efforts to improve infant and young child feeding indicators in the country. Based on this, it is essential to strengthen the infant and young child feeding component or curriculum of all categories of health workforce across Universities, Colleges of Nursing, Polytechnics, and Colleges of Health Technology. This recommendation is in line with efforts to improve infant and young child feeding in other countries.[36,37] Evidence has shown that improved professional training has the potential to scale up the knowledge, skills, and practices of health workers on infant feeding.[38] In addition, the peculiarities of the private health facilities in the large use of semi-skilled non-health professionals as health workers should be taken into consideration. Though this constitutes a malpractice in health profession, its proliferation is high and is becoming a new normal in Nigeria.[39] Therefore, there is a need for the inclusion of infant and young child feeding components in the training schedule of auxiliary nurses and ensure services by these categories of workers are closely supervised by the qualified health professionals. In addition, it is essential to institute periodic in-service trainings or short courses on infant and young child feeding for these health workers to update their knowledge and keep them align to current understanding and emerging best practices in infants and young child nutrition. These recommendations are important for the private health facilities to contribute meaningfully to enhancing maternal and child nutrition, child survival and overall development of the country. The strength of our study lies in the uniqueness of the study population with respect to knowledge and attitude of infant feeding. Many nutrition studies

have focused on public health facilities and undermine the contribution of the private health facilities in promoting knowledge and attitude of optimal infant and young child feeding. To the best of our knowledge, this is the first study in Nigeria that sought to understand the gaps in promotion of optimal feeding practices by health workers in private health facilities. This effort has the potential to strengthen and scale up infant and young child feeding. However, reliance on self-reported data is a limitation of this study. Responses are largely based on experiences, beliefs and perceptions of the health workers which may be prone to bias or inaccuracies. Future studies may consider the use of other methods such as observational or experimental methods to overcome these limitations and better understand the knowledge and attitude of infant feeding in these facilities.

Conclusion

There is evidence of limited knowledge and poor attitude towards the recommended infant feeding practices among the health workers in private health facilities in Ibadan, particularly in early initiation of breastfeeding, use of rooming-in concept to promote recommended breastfeeding practices, continued breastfeeding up to 24 months, benefits of exclusive breastfeeding to mothers and infants, and appropriate timing of introduction of complementary feeding. There is need for improved curriculum and in-service trainings on infant feeding for health workers especially in the private hospitals to improve and support appropriate infant feeding practices.

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Assessment of Right Ventricular Systolic Function Using Tissue Doppler-Derived Tricuspid Lateral Annular Systolic Velocity (S`) Among HIV Patients on Highly Active Antiretroviral Therapy (HAART) And Its Relationship with CD4 Cell Count and Viral Load

Baba M.M.[1], Buba F.[2], Talle M.A.[2], Garbati M.A.[2], Abdul H.[3], Mairari F.G.[1]

ABSTRACT

Background: Human immunodeficiency virus-infected patients are at increased risk of cardiovascular diseases compared with the general population, and right ventricular systolic dysfunction is said to be associated with poor outcomes. We therefore assessed right ventricular systolic function using tissue Doppler-derived tricuspid lateral annular systolic velocity (S`) among HIV-infected patients on highly active antiretroviral therapy (HAART). We evaluated its relationship with viral load and cd4 cells count. **Methods:** The study was a cross-sectional conducted among HIV-infected patients receiving HAART at the Federal Medical Centre, Nguru, Yobe State, Northeastern Nigeria using tissue Doppler-derived tricuspid lateral annular systolic velocity (S`). **Results**: One hundred and seven (107) subjects were recruited into the study comprising thirty-seven (34.6%) males and seventy (65.4%) females. Ninety-six (89.71%) had preserved right ventricular systolic function (RVSF) while 11(10.28%) had reduced RVSF. The mean CD4 cells count of patients with preserved RVSF and those with reduced RVSF were 838.37±27.50 and 301.66±12.38 respectively (P = <0.001). Similarly, the mean viral load of patients with preserved and reduced RVSF were 547.90±10.75 and 10293.00±74.67 respectively (P = <0.001). Pearson Correlation analysis between CD4 cell count and S` revealed a positively significant relationship (r = 0.894, P = < 0.001); while the relationship between viral load and S` was negative but significant (r = -0.879, P = < 0.001). **Conclusion:** The prevalence of right ventricular systolic dysfunction among patients with HIV on HAART was found to be 10.28%. There was a positive and significant correlation between the parameter of RVSF (tissue doppler derived tricuspid lateral annular systolic velocity) with CD4 cell count and a negative but significant correlation with HIV viral load.

Keywords: Right ventricular systolic function, Tissue Doppler derived lateral tricuspid annular systolic velocity (S`), CD4 cells, viral load.

[1] Department of Medicine, College of Medical Sciences, Yobe State University Damaturu, Nigeria. [2]Department of Medicine, College of Medical Sciences, University of Maiduguri, Maiduguri, Nigeria.[3]Department of Medicine Yobe State University Teaching Hospital Damaturu, Nigeria

Corresponding Author:

Dr Musa Mohammed Baba
Dept of Medicine, College of Medical Sciences, Yobe State University Damaturu. Email: drbaba01@gmail.com; Phone: +2348065588144

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Introduction

Nigeria has the second highest burden of Human Immunodeficiency Virus (HIV) infection in the world, with about 3.6 million people living with the virus.[1] The introduction of highly active antiretroviral therapy (HAART) has decreased the morbidity and mortality associated with HIV infection[2]. Therefore, HIV patients live longer; however, this survival advantage is not free from complications. HIV patients are more likely to develop cardiovascular diseases than the general population, the reasons are probably multifactorial, such as the direct myocardial effect of HIV on cardiac myocytes or dendritic cells, opportunistic infections, neoplasms, autoimmunity and dietary deficiencies[3-7]. HIV infection was reported to be an established

risk factor for pulmonary hypertension[6-8,9], while on the other hand, pulmonary hypertension directly affects right ventricular function through an increase in pulmonary vascular resistance causing right ventricular hypertrophy, chamber dilatation and myocardial fibrosis[10]. Previous studies have shown that right ventricular systolic dysfunction is associated with poor outcomes[11,12]. Bassey et al in Port Harcourt-Nigeria, reported a prevalence of right ventricular systolic dysfunction among HIV-infected patients of 11.6% [13], while other researchers reported a prevalence of 11.0%[14,15]. However, there is paucity of data on right ventricular systolic function (RVSF) among HIV-infected patients on HAART in our environment. We therefore assessed the right ventricular systolic function using tissue doppler derived tricuspid lateral annular systolic velocity (s`) among HIV-infected patients on HAART and evaluated its relationship with CD4 cell count and viral load.

Methods:

This was a cross-sectional study conducted among asymptomatic HIV patients receiving HAART at the Federal Medical Centre, Nguru, Yobe State, Northeastern Nigeria. Patients with a positive sputum Xpert MTB/RIF assay, acid-fast bacilli or a chest X-ray suggestive of pulmonary tuberculosis (PTB) were excluded. Also excluded from the study were patients with chronic obstructive pulmonary disease, asthmatic patients, patients with a history of heart disease predating the diagnosis of HIV infection, cigarette smoking, those with known connective tissue disease or sickle cell anaemia and pregnant women. Ethical approval was obtained from the Ethics and Research Committee of the Federal Medical Centre Nguru and all subjects signed an informed consent form after being clearly explained. Sample size was calculated using the formula

$$\frac{N=Z2\ P(P-1)2}{D2}$$

Where N = Sample size, Z= Level of confidence at 95% (1.96), P = Prevalence and D = Margin of error at 5% (0.05). Using the prevalence of right ventricular systolic dysfunction among HIV patients as 11.6%, the calculated sample size was ninety-six (96). However, to enhance the strength of our study we increased our sample size to one hundred and seven (107).

Information on demographic and clinical characteristics of the patients were obtained from their respective case notes. General physical examination including anthropometric measurements were carried out for all subjects, and their body mass indices (BMI) were calculated. All patients had full cardiovascular and respiratory system examinations, fasting blood glucose, fasting lipid profile, serum electrolytes, urea, creatinine, urinalysis and packed cell volume (PCV) done. CD4 cell count and viral load estimations were done using Cyflow laser product Patec GmbH Am plus Platz 13 D028282010 and Cobas Ampliprep Cobas tagman (48 samples per batch) model 395808 Ampliprep/4312 machines, respectively. A comprehensive echocardiographic examination was carried out on all participants by the first author, using a Hitachi Prosound Aloka α6 Japan echocardiography machine with a transducer frequency range of 1-15Hz following the American Society of Echocardiography guidelines on the Assessment of the Right Heart in Adults. Right ventricular systolic dysfunction (reduced RVSF) was defined as tissue Doppler-derived tricuspid lateral annular systolic velocity (S`) less than 10cm/sec[16].

Statistical analysis was done using SPSS version 27.0 (IBM SPSS Statistics). Data are presented as mean ± standard deviation (SD) for continuous variables. Student T-test was used to compare means between groups while Pearson correlation and linear regression analysis were done to determine the relationship between CD4 cell count and viral load with S`. A p-value of < 0.05 was considered significant.

Results:

One hundred and seven subjects were recruited into the study comprising thirty-seven (34.6%) males and seventy (65.4%) females. The mean age, body mass index (BMI) and duration of HIV treatment in years of the studied subjects were 37.32±1.02, 23.52±1.21 and 5.50±1.12, respectively. Eight subjects (7.5%) with HIV were diagnosed to be hypertensive prior to the diagnosis of HIV infection while the remaining 99(92.5%) were normotensive. The mean systolic and diastolic blood pressure of the subjects were 137.66±3.52 and 82.52±2.13 respectively, none of the subjects were diabetic. All the eight hypertensive patients had optimal blood pressure control. One patient (0.93%) had HIV/Hepatitis B virus (HBV) co-infection and none had Hepatitis C virus (HCV) co-infection. The mean packed cell volume (PCV) and estimated glomerular filtration rate (eGFR) of the studied patients were 31.02±2.12 and 77.36±3.32

respectively. The mean CD4 cells count and viral load of the studied patients were 612.65 ± 34.62 cells/µL and 315.44±27.11copies/mL respectively. Table 1 showed the baseline characteristic of studied patients. Out of the 107 studied patients, ninety-six (89.71%) had preserved right ventricular systolic function (RVSF) while 11(10.28%) had reduced RVSF, all the eight hypertensive patients had preserved RVSF.

Table 1 Baseline characteristics of studied patients

Parameter	Mean value
Age in years	37.32±1.02
SBP in mmHg	137.66±3.52
DBP in mmHg	82.52±2.13
BMI in Kg/m^2	23.52±1.21
Duration of Treatment in years	5.50±1.12
CD4 cells count in cells/µL	612.65 ± 34.62
Viral load in copies/mL	315.44±27.11
PCV in%	31.02±2.12
eGFR in ml/min	77.36±3.32

SBP = Systolic Blood Pressure, DBP = Diastolic Blood Pressure, BMI = Body Mass Index, PCV = Packed Cells Volume, eGFR = Estimated Glomerular Filtration Rate

The mean tissue Doppler-derived tricuspid lateral annular systolic velocity of patients with preserved RVSF and reduced RVSF were 11.15±1.19 and 5.80±1.23 respectively (p= <0.001). Pearson Correlation analysis between CD4 cell count and S` revealed a positive and significant relationship (r = 0.894, p = < 0.001). On the other hand, that between viral load and S` was negative and significant (r = -0.879, p = < 0.001). Linear regression analysis between CD4 cell count and S` was significant and positive (Beta = 0.894, p = < 0.001), while that between viral load and S` was negative but significant (Beta = -0.879, p = < 0.001).

There was no significant difference in the mean age and systolic blood pressure of the patients with preserved RVSF and those with reduced RVSF. However, there were significant differences in mean BMI, DBP and duration of HIV treatment between those with preserved RVSF and those with reduced RVSF. Table 2 shows the baseline characteristics of the patients with preserved RVSF and those with reduced RVSF.

Table 2: Baseline characteristics of patients with preserved and reduced right ventricular systolic function

Parameter	Preserved RVSF	Reduced RVSF	P-value
Age in years	36.74±9.62	38.11±9.43	0.465
Duration of HIV treatment in years	5.97±2.00	4.71±2.21	0.003*
SBP in mmHg	126.45±11.74	153.11±14.78	0.160
DBP in mmHg	81.29±7.57	84.22±7.22	0.046*
BMI in Kg/m^2	24.80±6.68	21.77±4.90	0.012*

RVSF = Right Ventricular Systolic Function, SBP = Systolic Blood Pressure, DBP = Diastolic Blood Pressure, BMI = Body Mass Index, * = Significant at P = < 0.05

The study also showed a statistically significant difference in mean CD4 cell count, viral load, packed cell volume, eGFR, serum creatinine and serum urea between the group with reduced RVSF (S` < 10cm/sec) and that with preserved RVSF (S` ≥ 10cm/sec). The mean CD4 cell count of patients with preserved RVSF and those with reduced RVSF were 838.37±27.50 and 301.66±12.38 respectively p = <0.001. Similarly, the mean viral load of patients with

preserved and reduced RVSF were 547.90±10.75 and 10293.00±74.67 respectively p = <0.001.

Table 3 showed the distribution of laboratory results of patients with preserved RVSF and those with reduced RVSF.

Table 3: Distribution of laboratory parameters of patients with preserved and reduced right ventricular systolic function

Parameters	Preserved RVSF	Reduced RVSF	P-value
CD4 cell count in cells/µL	838.37±27.50	301.66±12.38	< 0.001*
Viral load in copies/mL	547.90±10.75	10293.00±74.67	< 0.001*
Packed cell volume in %	33.95±3.60	27.00±5.77	< 0.001*
Serum Creatinine in µmol/L	146.93±36.37	102.96±28.84	< 0.001*
Serum Urea in mmol/L	4.97±2.05	8.39±2,79	< 0.001*
eGFR in ml/min	91.95±32.55	58.02±19.41	< 0.001*

RVSF = Right Ventricular Systolic Function, eGFR= Estimated Glomerular Filtration Rate, * = Significant at P < 0.05

Discussions

Cardiac involvement among HIV-infected patients is relatively common and is associated with increased morbidity and mortality. HIV-associated cardiovascular manifestations may be detected even in the early stage of the disease and are often asymptomatic. In this study, we found that the mean age of the patients was 37.3±1.0 years indicating that the productive age group of people are the most affected patients and female constitutes the higher proportion of patients. This finding is similar to the report by Amobi et al in their study on estimation of HIV prevalence and burden in Nigeria: a Bayesian predictive modelling study[17]. The study also showed that the mean systolic and diastolic blood pressure of the patients were within normal limit. This could perhaps be due to higher proportion of the patients been normotensive, and the comprehensive patients care services been provided at the antiretroviral (ART) clinic making it possible that even the eight hypertensive patients were having optimal blood pressure control

In this study we found a prevalence of right ventricular systolic dysfunction (reduced RVSF) among patients with HIV on treatment as 10.28%, which is lower compared to the study by Bassey et al where they reported a prevalence of 11.6% among treatment naïve patients[13]. The lower prevalence of reduced RVSF in our study could be due to the fact that our subjects were on HAART that might have restored their immunity and reduced opportunistic infections and improved the overall clinical condition and preserved the RVSF as previously reported[2,4 & 5]. The prevalence of 10.28% in our study is also lower compared to the prevalence reported by Christopher et àl[14] and Simon et àl[15] where they both reported a prevalence of 11.0% using right ventricular fractional area change. Right ventricular endocardial trabeculation may make endocardial tracing difficult which may erroneously give a false result. While on the other hand, tissue Doppler-derived lateral tricuspid annular systolic velocity that does not require endocardial tracing is more objective in assessing RVSF that perhaps explained the lower prevalence of reduced right ventricular systolic function in our study. Patients with preserved RVSF were found to have a significantly higher CD4 cells count compared to those with reduced RVSF, while on the other hand the viral load of patients with preserved RVSF was significantly lower compared to those with reduced RVSF. Furthermore, our study revealed a positive and significant correlation between CD4 cell count and a parameter of right ventricular systolic function (S`) so also on regression analysis the relationship was positive and significant. While on the other hand, the relationship between HIV viral load and S` was negative and significant on both Pearson correlation and regression analysis. This finding is similar to study by Adebola et al where they reported a positive and significant corelation between CD4 cell

count and left ventricular systolic function, though their study was on left ventricular function[18]. Reddy et al also reported a similar finding of reduced left ventricular systolic functions among HIV patients with low CD4 cell count[19]. These findings implied that overwhelming viraemia, compromised CD4 cells count and opportunistic infections causing myocarditis or dilated cardiomyopathy leading to reduced right ventricular systolic function as earlier described[3-7] Similarly, the findings also suggest that HIV infected patients with high CD4 cell count and suppressed viral load or lower viral load are likely to have preserved right ventricular systolic function while those with low CD4 cell count and high viral load are likely to have reduced RVSF. Bassey et al also reported a similar finding though using tricuspid annular plane systolic excursion to assess the right ventricular systolic function. However, their study did not report any relationship with CD4 cell count[13].

In this study, we found that there was no significant difference in the mean age of patients with preserved RVSF and those with reduced RVSF. While on the other hand, there was a significant difference in the duration of HIV treatment between the patients with preserved RVSF and those with reduced RVSF this could perhaps be due to the effect of treatment suggesting that the longer the duration of treatment, the more likely that the patient's immunity will be restored and opportunistic infections are reduced with overall clinical improvement and RVSF preserved as previously reported by other researchers[2,4,5].

Similarly, the BMI of patients with preserved RVSF is significantly higher compared to those with reduced RVSF this implies that a higher BMI in a HIV patient on treatment is associated with higher CD4 cell count and improved immune status as previously reported by Zhu et al [20]. Even though the diastolic blood pressure of the studied subjects were within normal limits, subject with reduced RVSF had significantly higher diastolic blood pressure compared to those with preserved RVSF, this perhaps might be due to hypertension (secondary to HIV associated nephropathy)[21]. While the lack of significant difference in systolic blood pressure between patients with preserved RVSF and those with reduced RVSF could be due to age similarities among the studied subjects.

Anaemia is one of the most common haematological complications associated with HIV, with increasing rate as the disease progresses[22]. In this study we found a significant difference in mean packed cell volume (PCV) of patients with reduced RVSF compared to those with preserved RVSF. Anaemia has also been reported as an independent risk factor for decreased quality of life, accelerated disease progression, and increased mortality[23,24]. HIV infection causes anaemia via direct effects of the virus itself, which may inhibit haematopoiesis through infection of progenitor cells or upregulation of cytokines[25]. Our study also revealed that patients with reduced RVSF also had reduced eGFR compared to those with preserved RVSF, this further explains the relationship between HIV infection and kidney disease as previously described[26]. The CD4 cell count of patients with preserved RVSF was found to be significantly higher compared to those with reduced RVSF, while on the other hand the viral load of patients with preserved RVSF was significantly lower compared to those with reduced RVSF. This could be due to overwhelming viraemia, compromised CD4 cell count and opportunistic infections causing myocarditis or dilated cardiomyopathy leading to reduced right ventricular systolic function as earlier described.[3-7]

Therefore, this finding of right ventricular systolic dysfunction (reduced RVSF) among HIV-infected patients could perhaps be due to overwhelming viraemia, compromised CD4 cell count and opportunistic infections causing myocarditis or dilated cardiomyopathy leading to reduced right ventricular systolic function as earlier described.[3-7] While treatment with HAART is associated with HIV viral suppression, improvement in immunological status and subsequent decrease in opportunistic infections and myocarditis, it is also seen to cause overall improvement in clinical condition[2,4,5&26]. These findings implied that HIV-infected patients when adequately treated with HAART, achieved a sustained virologic suppression and recovered immune response, right ventricular systolic function can be preserved.

In **c**onclusion therefore, our study revealed a prevalence of right ventricular systolic dysfunction (reduced RVSF) among HIV infected patients on treatment as 10.28%, and that there was a positive and significant relationship between right ventricular systolic function (tissue Doppler-derived

tricuspid lateral annular systolic velocity) with CD4 cell count and negative but significant relationship with HIV viral load.

Study limitations: The study was cross-sectional and thus no follow-up of the patients to determine if immune restoration and virologic suppression following adequate treatment can reverse the reduced RVSF to preserved RVSF. Secondly, the study has no control subjects to compare the right ventricular systolic function between the cases and controls, even though our exclusion criteria were robust to eliminate compounding factors. Thirdly our subjects were only one hundred and seven therefore, there is a need to have a larger multi-centred population study with follow-up to determine the relationship between RVSF, viral load and CD4 cell count.

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A Huge Submucosal Fibroid Polyps; A Hidden Cause of Necroturia

Muhammad A.S.[1], Aminu M.B.[1], Dattijo L.M.[1], Oluwagbemiga U.O.[1], Ezugwu O.P. [2]

ABSTRACT

Background: Fibroids are benign neoplasms of the uterus arising from smooth muscle. They are also termed uterine leiomyomas. It is the most common growth found in the female reproductive system and may undergo malignant transformation in less than 1% of cases to form leiomyosarcoma. Fibroids may present with abnormal uterine bleeding and pelvic pressure symptoms. Fibroid polyp can be a cause for concern especially if it grows so large to cause symptoms of obstructive uropathy. Thus, the patient may present with dysuria, anuria, or even necroturia as seen in our patient. **Case summary:** We present a case of 40-year-old P_5 **+** 0, A_3 lady, whose last childbirth was 10 years before presentation. She presented with 3 years history of recurrent vaginal bleeding, dizziness, and a mass protruding through her vagina. Her packed cell volume was 14%. She was fully investigated and upon catheterization, nectroturia was observed. She was counselled and had vaginal polypectomy. **Conclusion:** Necroturia associated with uterine fibroid polyp is a rare occurrence, hence physicians should have a high index of suspicion when evaluating patients with necroturia.

Keywords: Submucosal Fibroid Polyps, Nectroturia, Foley Catheter.

[1] Department of Obstetrics and Gynaecology Abubakar Tafawa Balewa University/Abubakar Tafawa Balewa University Teaching Hospital, [2]Department of Surgery Abubakar Tafawa Balewa University/Abubakar Tafawa Balewa University Teaching Hospital.

Corresponding Author:

Muhammad AS
Department of Obstetrics and Gynaecology Abubakar Tafawa Balewa University/Abubakar Tafawa Balewa University Teaching Hospital.

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Introduction

Fibroids are monoclonal benign tumors that arise from uterine smooth muscles and are steroid-responsive.[1] Fibroid is the most common reproductive tract tumor in women and present a major quality of life problem for a large fraction of the population. It is estimated that up to 77% of all women will develop uterine fibroid in their lifetime, and 15-30% of these women suffer from substantial symptoms, ranging from pelvic discomfort, dysmenorrhea, menorrhagia, anaemia, urinary incontinence, recurrent miscarriages, preterm labour and sometimes infertility.[2]

Large submucosal or subserosal uterine fibroids can cause pressure on adjacent structures leading to pain, urinary symptom and constipation.[3]

Submucosal fibroid polyp may cause acute urinary retention and possible necroturia. Necroturia may be due to compression of the upper urethra and the bladder neck caused by forward and upward displacement of the cervix from the impacted fibroid. During normal micturition, the cervix is moved away from the urethra and bladder neck; but this action is prevented by the impacted uterine fibroid.[4,5,6] A direct compression of only the lower portion of the bladder due to forward and upward displacement of the cervix has been hypothesized to cause urine retention.[4] All these pressure effects may lead to some degree of ischemia, necrosis, and subsequent sloughing of the bladder wall which may be seen in the urine as necroturia. In untreated and neglected cases, bladder perforation may result leading to vesico-vaginal fistula.

This case report highlights the dangers of late presentation of submucosal fibroid polyps and its attendant complications if left untreated. Hence

highlighting the need for early presentation and treatment.

Case Presentation

presentation. She presented with a 3-year history of recurrent vaginal bleeding and a feeling of mass in her vagina. She had an associated history of dizziness and one episode of acute urine retention in the past.

She was worried, moderately pale, with a pulse rate of 110b/m regular and moderate volume. Her blood pressure was 90 /70 mmHg. The chest was clinically clear. The uterus was 14 weeks in size. A vaginal examination revealed normal external genitalia. A polypoid mass was felt in the vagina measuring about 10cm by 8cm. The base of the stalk could not be palpated; a rim of cervix was felt around the stalk. The gloved finger was clean. An assessment of the submucosal fibroid polyp was made. A pelvic ultrasound scan revealed multiple small uterine fibroids, the largest measuring 4.8cm in the upper anterior uterine segment but missed the submucosal fibroid polyps. A full blood count revealed haemoglobin of 3.7g/dl, but other parameters and serum chemistry were normal. The patient was admitted and her blood level was optimized by blood transfusion. The findings were explained to the patient including the need for polypectomy in the theatre, which she consented.

The patient was a 40-year-old P_5 +0 A_3 whose last menstrual period was 10 days prior to presentation and whose last childbirth was 10 years prior to

She was given spinal anesthesia, and urethral catheter was inserted where the necrotic tissue was observed in the tube (Fig 1).

Vaginal polypectomy was done under direct vision using ovum forceps and the findings were noted as earlier explained (Fig 2). Her post-operative condition was satisfactory. The catheter was left for 10 days (to prevent possible vesicovaginal fistula). She was reviewed two weeks after discharge in the clinic, with no complaints.

Fig 1: Necrotic Tissue Within a Catheter

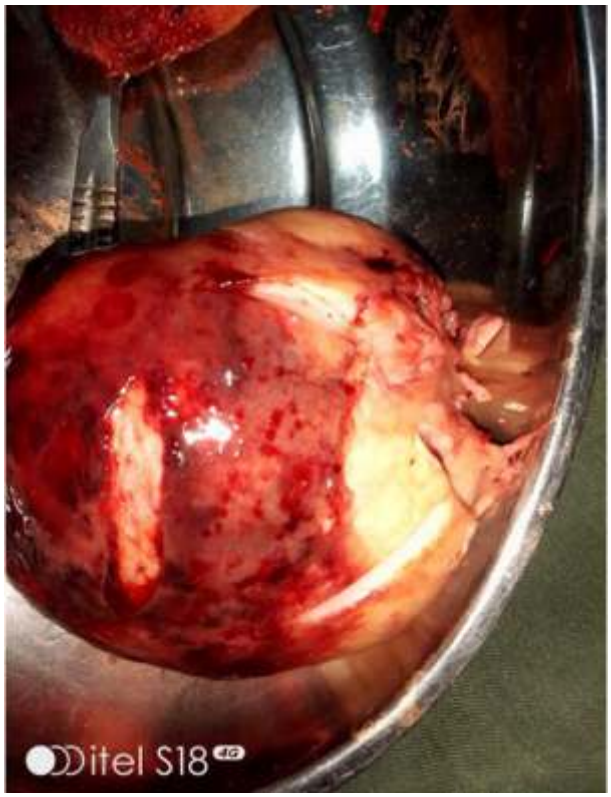

Fig 2 Fibroid polyp seen through the vagina, showing some areas of necrosis and hemorrhage

Discussion

The large submucosal uterine fibroid within the uterus contributes to the symptoms a patient presents with. The location can be subserosal, intramural, cervical, intraligamentary, parasitic, submucosal, or pedunculated.[3] Large submucosal uterine fibroids can lead to pressure on adjacent structures resulting in pain, constipation, or urinary symptoms.[4]

Our patient had a fibroid polyp compressing the bladder causing an episode of acute urine retention that warranted catheterization in a comprehensive health centre and she was noticed to have necroturia during the second catheterization before surgery. The treatment for fibroid polyp includes polypectomy which can be hysteroscopic[7] or by direct vision using ovum forceps (which our patient had).

She had the urethral catheter left in situ for 10 days to prevent the possible development of a vesicovaginal fistula. Vesicovaginal fistula was not observed in our patient following the removal of the catheter and also during a follow-up visit.

In conclusion, a uterine fibroid can present as a submucosal pedunculated mass which may be huge enough to protrude through the vagina and compress the bladder and may present with necroturia. Hence, early presentation, detection, and appropriate management is important to prevent complication that may arise.

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CASE REPORT

Unusual sequelae of persistent digit sucking Habit Facial Hyperkeratosis/Hyperpigmentation

Umweni A.A, Otaren N.J.

ABSTRACT

Background: Although digit sucking is normal in infants and young children, prolonged duration of these habits might have consequences for the developing orofacial structures and occlusion. It is advisable to intercept the habit between the ages of 4 and 7 years. **Case Summary:** We report the case of a 9 year old boy who presented with a history of chronic digit sucking habit with associated hyperkeratosis/hyperpigmentation of the left cheek from repeated mechanical trauma from his left ring finger while he sucked his left index and middle fingers. The lesion is about 5mm in diameter. Full orthodontic assessment of the patient was carried out and habit breaking appliance instituted after counseling mother and child. Occlusal problems were reversed after habit cessation. Six months after breaking the habit, the hyperkeratosis/hyperpigmentation of the left cheek was still present even though it is reduced. This is an unusual finding in a child with chronic digit sucking habit.

Key words:

[1] Department of Preventive Dentistry, University of Benin and University of Benin Teaching Hospital, Benin City, Nigeria

Corresponding Author:

Dr. N.J. Otaren
Department of Preventive Dentistry
University of Benin
nosakhare.otaren@uniben.edu

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Introduction

Digit sucking (thumb/finger sucking) is one of the most common forms of non-nutritive sucking.[1] Due to frequent dento-facial manifestations digit sucking habit has become of great interest to specialists in Dentistry (Orthodontists and Paedodontists).[2]

At birth, non-nutritive sucking is related to rooting (a reflex in the new born in which stimulation of the side of the cheek or the upper lip causes the infant to turn the mouth and face to the stimulus) and sucking reflexes up to 12 months of age.[2] Up to the age of 2 to 3 years, sucking is considered a normal developmental response,[2] but after this, it is considered a learned habit.[1]. The habit is considered prolonged when it is continued up to the age of 7 years and beyond.[3] The prevalence of digit sucking habit is between 2% and 23% in Nigerian children.[4] Other studies[4,5] reported the prevalence of digit sucking habit in an African group (Tanzanians) as 10%. As many as 19% of children in the United States of America continue the habit after their 5th birthday.[2,4]. The prevalence rate is 17% among Indian children and 30% among Swedish children.[6] but a low prevalence rate of 1% was observed in Eskimo children.[6] The severity of displacement of the teeth and investing tissues depend on the trident conditioning factors, duration which is the amount of time spent on sucking. The longer the duration of each sucking period the greater is the damage,[5] frequency of indulgence is the number of times the habit is practiced. Frequent and continous sucking is more damaging than occasional short time practice,[5] the intensity of force is the mount of force exerted on teeth while practicing the habit. The more the force applied, the greater is the damage.[5] The sequelae of prolonged (persistent) digit sucking habit are, anterior open bite which interference with occlusal movement of the incisors. This open bite can lead to tongue thrusting problems and speech difficulties,[5,7] proclination and spacing of the maxillary anterior teeth if digit is held

upward against the palate,[5,7] increased overjet, mandibular postural retraction may develop if the weight of the hand or arm continuously forces the mandible to assume a retruded position in order to practice the habit. Pressure in the lingual direction causes lingual tipping of mandibular incisors,[5,7] when maxillary incisors have been tipped labially and an open bite has been developed, it becomes necessary for the tongue to thrust forward during swallowing in order to effect an anterior oral seal,[5,7] if the digit is placed between the upper and lower teeth, tongue must be lowered, which decreases the pressure exerted by the tongue against the lingual aspect of the upper posterior teeth, at the same time cheek pressure against these teeth is increased as buccinators contracts during sucking. Cheek pressures are greatest at the corner of the mouth, therefore maxillary arch becomes narrower than the mandibular arch.[5,7] With these changes in the force system in and around the maxillary complex, it is often impossible for the nasal floor to drop vertically to its expected position during growth. Therefore, digit suckers have a narrow nasal floor and a high palatal vault.[5,7] The habit is also associated with self-mutilating behavior such as hair pulling leading to alopecia (hair loss)[7].

The aim of this article was to report and discuss a case of hyperkeratosis/hyperpigmentation of the face as a sequela of chronic digit sucking habit, an occurrence which is rare in previous literature.

Case Presentation

A 9-year old boy with persistent digit sucking habit presented with various manifestations of the habit in our clinic. Review of the patient's medical, dental, and family histories revealed no significant findings. The patient presented a Class II, division 1 malocclusion with overjet of 10mm and anterior open bite of approximately 4 mm The permanent teeth in the upper arch were the central incisors, lateral incisors and the first permanent molars.

In the lower arch the following permanent teeth were present, the central and lateral incisors, the canines and first permanent molars. Mother reported that her child persistently sucked his left index and middle finger while his left ring finger rests firmly on the skin of the left cheek (Fig 3). There is a well circumscribed area of hyperkeratosis and hyperpigmentation on the left cheek where his left ring finger rested firmly on while he sucked his index and middle fingers (Fig 4).

After assessment, mother and child were counselled on the deleterious effects of his digit sucking and a fixed habit breaker (goal post) was fabricated with the molar bands cemented on the maxillary first molars. Patient and mother were informed that after this first phase treatment of habit breaking, he shall undergo comprehensive orthodontic treatment to correct other anomalies of his occlusion. Patient was reviewed regularly to assess correction of the anterior open bite and habit cessation. After about 6 months, the patient stopped the sucking habit and anterior open bite was corrected but the hyperkeratosis/hyperpigmentation on the left cheek persisted (Fig 5).

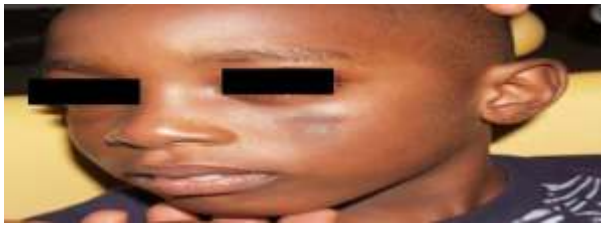

Fig 1 frontal facial photograph showing hyperkeratosis/hyperkeratinization of the left infraorbital area

Fig 2 Frontal facial photograph showing digit sucking pattern of patient

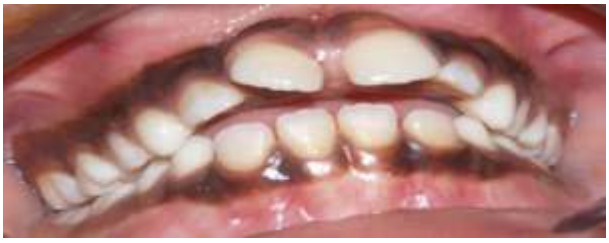

Fig 3 Intra oral photograph- frontal view

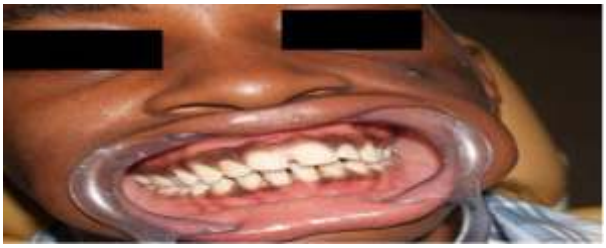

Fig 4 Frontal facial photograph showing persisting hyperkeratosis/hyperkeratinization of the left infraorbital area 6 months after habit cessation.

Discussion

The influence of digit sucking habit on dental arch characteristics and development has long been recognized.[3,8] These include incomplete overbite, anterior open bite, and an increased over jet, and a higher incidence of class II relationship of the canines and molars.[3,8] Such habits are also associated with narrowing of the maxillary arch and increased mandible arch width.[8] Following cessation of the habit, there is generally some spontaneous correction in the form of reduction in open bite and maxillary incisor proclination. The more persistent the habit is, the greater its contribution to the disturbance of forces operating on the teeth.[3,8] In the management of digit sucking habit in this patient, the improvement in occlusion following cessation of the habit was very encouraging for the parent and child; however the persistence of the scarification on the left cheek was quite surprising. Due to the persistence of the digit sucking habit and firm pressure on the skin of the left cheek may have triggered a chronic irritation of the subcutaneous tissue of the area thereby causing the scarification. The patient is the final phase of orthodontic treatment, which in about 6 years after digit sucking habit stopped and the hyperkeratosis/hyperpigmentation on the left cheek remain very visible. This type of injury to the left cheek is a form of mechanical injury. In mechanical injuries, hyperpigmentation or hyperkeratinization or a combination of both can occur.[9] It is documented in literature that to a certain extent the skin may adapt to mechanical stresses by presenting with various reaction patterns ranging from hyperpigmentation to ulceration and hyperplasia.[9] The type of skin reaction depends on the amplitude and frequency of the factor acting on it as well as on the direction of force.[9] In this patient the chronic mechanical trauma from the left ring finger on the left cheek has caused the hyperpigmentation/hyperkeratosis.

The manner of occurrence of this lesion is similar to the group of lesions called "Self Inflicted Skin Lesions" by the European Society for Dermatology and Psychiatry (ESDaP).[10]. No similar lesion in a child with persistent digit sucking has been found in existing literature and the short and long term implications of the lesion is unknown, but there is a cosmetic implication attached to it.Furthermore, there is a possibility that this lesion may predispose to the formation of precancerous lesion which can set off non-melanocytic or melanotic skin cancer in the future.[9] Due to the uncertainty surrounding this lesion on left cheek in this patient, referral to a dermatologist was carried out so as to prevent untoward consequences in the future.

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Spondylocostal Dysostosis: Mild variant in a Nigerian Newborn

Umar H.U.,[1] Mohammed L.M.,[1] Farouk A.G.,[2,3] Mustapha Z.[4]

ABSTRACT

Background: Spondylocostal dysostosis (Jarcho-Levin Syndrome) is a rare congenital abnormality of spines and ribs which usually presents with trunk dwarfism, scoliosis, and respiratory symptoms. Its occurrence can be sporadic or familial. The clinical characteristics are vertebral abnormalities of hemivertebrae, butterfly vertebrae, scoliosis and variable rib abnormalities. Imaging is critical in its evaluation and management. **Case Summary:** A 4-day-old child of a non-consanguineous couple delivered with swelling at the back. The family history was unremarkable for congenital anomalies. Clinical examination and radiological findings was consistent with spondylocostal dysostosis. **Conclusion:** Spondylocostal dysostosis is a rare musculoskeletal abnormality. Imaging plays a vital role in its diagnosis. An early diagnosis is necessary to prognosticate and institute appropriate management.

Key words: Spondylocostal dysostosis, Jarcho-Levin, Hemivertebrae, Rib anomalies, Congenital scoliosis.

[1]Department of Radiology, Faculty of Clinical Sciences, College of Medical Sciences, University of Maiduguri, Nigeria. [2]Department of Paediatrics, Faculty of Clinical Sciences, College of Medical Sciences, University of Maiduguri, Nigeria. [3]Department of Paediatrics, State Specialist Hospital Maiduguri, Borno State, Nigeria. [4]Department of Radiology, State Specialist Hospital Maiduguri, Borno State, Nigeria.

Corresponding Author:

Dr Abubakar Garba Farouk,
Department of Paediatrics, Faculty of Clinical Sciences, College of Medical Sciences, University of Maiduguri and State Specialist Hospital, Maiduguri, Borno State, Nigeria.
Phone: +2348038164110
Email: farouk649@gmail.com

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Introduction

Spondylocostal dysostosis (SCD) also known as spondylocostal dysplasia or Jarco-Levin syndrome is a rare congenital disorder associated with vertebral and rib abnormalities.[1,2] It presents as one of the spectra of short trunk dysplasias with hereditary or sporadic occurrence. It is usually inherited as an autosomal recessive or rarely autosomal dominant trait.[3] The clinical features include short neck and trunk, scoliosis, dyspnea with sometimes respiratory failure due to constricted thorax.[1,2]

Hemivertebra is a congenital vertebral anomaly that results from failure of development of one-half of the vertebral body and is reported to be the common cause of congenital scoliosis with an estimated incidence of 0.5-1.0 per 1,000 births; it was also reported to be more common in females fetuses, with a male to female ratio of 0.68 for solitary vertebral anomalies and 0.31 for multiple vertebral anomalies.[4] Congenital malformations of the vertebral bodies are recognised to be associated with other diseases/syndromes such as Alcardia syndrome, Cleidocranial dysostosis, foetal pyelectasis, gastroschisis, Gorlin syndrome, Jarcho-Levin syndrome, OEIS complex, VACTERL association and mucopolysaccharidosis.[5] Few anomalies of vertebral bodies not associated with neural tube defects have been reported in the literature.[6,7] Other terms used for this lesion are congenital scoliosis, unilateral aplasia of the body of the vertebrae, and complete unilateral failure of formation of the vertebral body.[8] Hemivertebra can equally be isolated or associated with defects of other major organ systems. We describe a case with clinical findings and radiological characteristics consistent

with spondylocostal dysostosis diagnosed at neonatal age with no associated anomaly.

Case Presentation

The patient was a 4-day-old boy, the fifth child of healthy, non-consanguineous parents who presented with swelling in the middle of the back. The mother was 30 years old, and the father was 58 at the time of the patient's birth. Family history was unremarkable, especially for congenital anomalies. The boy was born via spontaneous vertex delivery after a normal 40-week supervised gestation and no history of exposure to ionizing radiation during the pregnancy. His weight was 3,000 g, length 50 cm, occipitofrontal circumference 36 cm, and chest circumference 34 cm. There was a swelling at the mid portion of the back but there was no paucity of movement of any limb and no other gross dysmorphology. Other systems examinations were essentially normal (other than the musculoskeletal system). The results of examinations of blood and urine were all normal. Trunk radiographs showed thoracic spine scoliosis with convexity to the left side, a peak at T10 vertebra with a Cobb angle of 45^0 (severe scoliosis) and a focal kyphosis peak at T9 vertebra (Figure 1). Wedge-shaped vertebrae on the left side were noted involving T9 and T11 vertebrae (hemivertebrae), sagittal cleft was also noted involving T8 and T10 vertebrae, which represent butterfly vertebrae and absence of the right 9^{th} and 11^{th} ribs was also noted (Figure 1). However, their posterior elements and the remaining visualised vertebrae and ribs were normal. Computed tomographic (CT) scan of the trunk showed scoliosis at lower thoracic spine, focal kyphosis, hemivertebrae at T9 and T11, butterfly vertebrae at T8 and T10 and absence of 9^{th} and 10^{th} right ribs (Figure 2). It also showed a normal heart, great vessels, lungs and abdominal organs. The CT of the head showed normal brain. The diagnosis of isolated spondylocostal dysostosis in a neonate was made. The patient was clinically stable for three months of follow up at the time of writing this report.

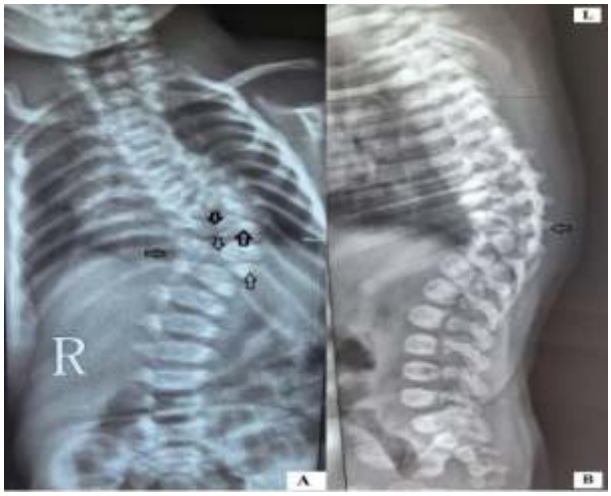

Figure 1: Anteroposterior (A) & lateral (B) views of trunk radiographs showing hemivertebrae of T9 & T11 (up arrows), butterfly vertebrae at T8 & T10 (down arrows), absence of right 11^{th} rib (left arrow), kyphosis peak at T9 vertebrae (right arrow) and scoliosis.

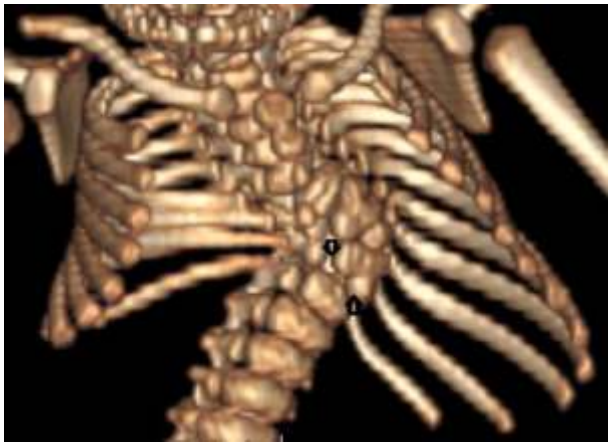

Figure 2: Volume rendered computed tomographic image of the trunk showing hemivertebra at T11 (up arrow), butterfly vertebra at T10 (down arrow), absence of right 9^{th} & 11^{th} ribs and Kyphoscoliosis.

Discussion

The first report of this distinctive complex of vertebral and rib malformations was that of Jarcho and Levin (1938), who described two siblings of the opposite gender with dysostosis of the vertebrae and associated rib anomalies.[9] Few cases in SCD patients were reported worldwide,[1,3] and also very few cases were reported in Africa (to the best of knowledge only three cases in literature).[3] The index case has no familial history of similar condition or teratogenic exposure which favours sporadic occurrence.

The affected baby was a male with multiple vertebral involvement. This contrasts with the described higher incidence for females compared to males. The spondylothoracic dysostosis (STD) is a strong differential of SCD.While STD is characterized with severe spinal and rib deformities which is associated with respiratory failure and high neonatal and early infant mortality, SCD has a wide variation of presentation and prognosis which some patients incidentally diagnosed as adult age. [1-3] However, this case has had no respiratory symptoms.

The cause of hemivertebra is unknown. One hypothesis has suggested that the hemivertebra may result from the intersegmental arteries of the vertebral column's abnormal distribution.[9,10] The distribution pattern of the anomaly does not implicate any specific environmental or genetic factor.

Hemivertebrae may be isolated or occur in multiple areas within the spine and are frequently associated with other congenital anomalies.[11-13] Multiple rib abnormalities including fused/broad ribs, absence and supernumerary ribs involving more than four ribs were reported in most cases.[1-3]

While our case had only the absence of two ribs. Genitourinary tract and cardiac anomalies are the most common extra-musculoskeletal anomalies seen. Index case had no cardiac or genitourinary tract involvement.

Anomalies of the gastrointestinal tract, renal, central nervous system and diaphragmatic and inguinal hernias have also been reported.[8] In contrast, the index case had none of these associations, hence diagnosed with a mild penetrance of this disorder. Approximately one-sixth of patients with vertebral body anomalies have associated malformations unrelated to the axial skeleton and spinal cord.[4,9]

Hemivertebra may be part of syndromes including Jarcho-Levin syndrome, Klippel-Fiel syndrome, VATER syndrome (vertebral anomalies, imperforate anus, tracheoesophageal fistula, and renal anomalies), VACTERL syndrome (VATER with cardiac and limb anomalies), OEIS (omphalocele, bladder extrophy, imperforate anus, and spine anomalies), the Potter sequence, and open spina bifida.[14]

When involving the thoracic spine, there is usually a missing rib on the affected side, presenting with an unequal number of ribs.

This is consistent with the findings in our subject. Failures of unilateral spine formation can be classified into segmented, semi-segmented, and non-segmented hemivertebra variants. The hemivertebra in our patient was the multiple, unilateral, segmented type involving the thoracic spine. Although the cause of most hemivertebrae is unknown and familial cases of idiopathic scoliosis have occasionally been reported, suggesting autosomal dominant inheritance.[15]

Since the spinal curve usually progresses more slowly in hemivertebrae than in idiopathic scoliosis, some familial members with mild scoliosis may have been overlooked. Such familial occurrence may be diagnosed by radiographic examination.

The prognosis of hemivertebra is related to the site of the affected vertebra, the number of affected vertebrae, and the associated anomalies. Thus, the prognosis is favourable in the index case. In addition, recent corrective surgery of congenital scoliosis caused by hemivertebra has much improved the prognosis. If no other major congenital malformations exist, the prognosis of hemivertebra may be favourable.

Conclusion

Spondylocostal dysostosis is a rare Musculo-skeletal abnormality involving the vertebrae and ribs, and presenting with a short trunk. A hemivertebra is a typical congenital vertebral anomaly with the potential for a severe spine deformity later in life (scoliosis).

Imaging plays a vital role in its diagnosis. An early diagnosis is necessary to anticipate the prognosis per the specific deformity to enable the stoppage by surgery. It is much better to do a relatively simple operation at a very young age to balance the growth of the spine than to wait until the deformity is severe when complex salvage procedures would be needed.

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Authors' contributions

FAG conceptualized the report, performed a literature search, and wrote the first draft. ML performed a literature search and reviewed the

manuscript. UHU searched the literature, prepared the images, and reviewed the manuscript. ZM analysed and interpreted the patient data regarding the images. All authors read and approved the final manuscript.

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Declarations

Ethics approval and consent to participate
Approval was obtained from the hospital research and ethics committee of the State Specialist Hospital Maiduguri (SSHM).

Consent for publication
Written informed consent was obtained from the patient's caregiver for publication of this case report and any accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal or any other authorized person/body as appropriate.

Competing interests
The authors declare that they have no conflict of interest.

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