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■ Original Research Article

An Audit of Gynecological Surgeries at the Modibbo Adama University Teaching Hospital, Yola, Adamawa State, Northeastern Nigeria.

*Maisaratu A. Bakari[1], Umaru Inuwa[2], Anthony Yakubu[3], Arwa Mustapha Abba[3]

Department of Obstetrics and Gynecology, College of Medical Sciences, Modibbo Adama University/ Modibbo Adama University Teaching Hospital, Yola, Adamawa.

ABSTRACT

Background: The audit of surgeries in gynecological practice is essential for maintaining high standards of patient care, improving clinical outcomes, and fostering a culture of continuous quality improvement within the healthcare system. The study was aimed at determining the rate of all gynecological surgeries performed, the common gynecological surgeries and their indications within the period under review. **Materials and Methods:** This was a 5-year retrospective observational study of 587 gynecological surgeries performed between 1st January, 2018 and 31st December, 2022. Patients with complete relevant information in the registers were included in the audit and those with incomplete data were excluded. Data was analysed using IBM Statistical software SPSS package version 23.0 for frequencies and percentages and results were presented by simple statistical tables. **Results:** A total of 10,597 patients were gynecological attendees, out of which 587 patients had gynaecological surgeries performed, giving an institutional gynecological surgery rate of 5.5%, within the period under review. The most common gynecological surgery performed in our facility was hysterectomy (38.3%). The most common indication for the surgery was uterine fibroid (26.8%) and the route commonly used was the abdominal route (62.2%). General anaesthesia was given in about (68.7%) of cases. **Conclusion:** It is recommended to increase the frequency of audits for the services provided by the department. This can aid in pinpointing training and service gaps, thereby enhancing the overall quality and safety of healthcare delivery. Regular audits play a pivotal role in upholding and reinforcing the governance framework by overseeing and enhancing clinical practices.

Key Words: Modibbo Adama university teaching hospital, audit, gynaecological surgery, Yola

*Correspondence:

Dr. Maisaratu A. Bakari
maisaratu_bakari@yahoo.com
Tel: +2347068758423

INTRODUCTION

Surgical audit is a systematic, critical analysis of the quality and outcomes of surgical care, including the structures, processes, and results of surgical services. It involves the evaluation of surgical performance against established standards, guidelines, or benchmarks, with

the aim of identifying areas for improvement in patient care, safety, and overall surgical practice[1].

Gynecological operations including hysterectomy, laparoscopies, and manual vacuum aspiration (MVA), are thus the commonest procedures in medical practice[2]. Gynecological procedures are performed on the female reproductive system in nongravid women. They are performed for emergency or elective purposes[2]. Emergency procedures are indicated for ruptured ectopic pregnancy and Bartholin's abscesses amongst others, while elective ones can be performed for genital prolapse, obstetric fistulae, or even cancerous conditions[3].

The common gynecological procedures reported in Nigerian literatures include myomectomy salpingectomy, hysterectomy and laparoscopy[3-6]. They are performed for various indications, as reported from various studies. In Abuja and Kano, Nigeria, the major indication for laparoscopy was infertility[3,7].

Reviewing surgical procedures through audits aids in recognizing and mitigating potential risks and complications associated with gynecological processes, offering valuable insights into the quality of care provided. Surgical audits play a vital role in clinical governance, and constitute an ongoing process aiming at enhancing healthcare services for optimal patient outcomes. Continuous learning and skill refinement contribute to advancing surgical techniques and ultimately improving patient results. Comparing surgical outcomes to national or international benchmarks enables gynecologists to evaluate their performance against established standards. Audit data serves as a valuable resource for research, facilitating the identification of trends, patterns, and factors influencing surgical outcomes. Routine scrutiny of surgical practices by healthcare providers demonstrates accountability and transparency, consequently minimizing the risk of legal issues. Furthermore, surgical audits contribute to comprehensive documentation and record-keeping, ensuring the availability of accurate and detailed information for each surgery. The assessment and enhancement of the quality of gynecological surgeries have a positive impact on patient satisfaction. This study was aimed at determining the rate of all gynecological surgeries performed, the common gynecological surgeries and their indications within the period under review.

METHODOLOGY

This was a retrospective study of all gynaecological surgeries performed in the Department of Obstetrics and Gynecology in Modibbo Adama University Teaching Yola, Adamawa state, Northeastern, Nigeria, from January 2018 to December 2022. The records were obtained from the theatre operation register. The following parameters were analysed; Total number of surgeries, the indication for the surgery, the type of surgery, age of the women and the type of anaesthesia used. Ethical approval was obtained from research and ethics committee of the hospital. Patients with complete relevant information in the registers were included in the audit and those with incomplete data were excluded. The total number of all gynecological attendees during the study period was also obtained from the medical records department. Data was analysed using IBM Statistical software SPSS package version 23.0 for frequencies and percentages and results were presented by simple statistical tables.

RESULTS

A total of 10,597 patients were gynecological attendees, out of which 587 patients had gynecological surgeries performed, giving an institutional gynecological procedure rate of 5.5% within the period under review. About 33 different types of gynecological surgeries were done, as presented in Table 1. Two hundred and twenty-five (38.3%) had hysterectomies, 157 myomectomies (26.8%), 48 cervical cerclage insertion (8.2%), 67 had examination under anaesthesia and biopsy (11.4%), 17 exploratory laparotomies (2.9%), 23 exploratory laparotomies and total salpingectomy (2.9%), 24 suction evacuation (4.1%) and 26 other major, intermediate and minor surgeries. Table: 1

Table 1: Frequency Distributions of All Gynecological Surgeries

Surgery	**Frequency**	**%**
Hysterectomy	225	38.3
Cervical cerclage insertion	48	8.2
Exploratory laparotomy	17	2.9
Suction evacuation	24	4.1
Myomectomy	157	26.8
Examination under anaesthesia and biopsy	67	11.4
Exploratory laparotomy and salpingectomy	23	3.9
Others	26	4.4
Total	587	100

The mean age of the women was 40.6 years and the minimum age was 4 years while the maximum age was 82 years. Majority of the gynecological surgeries (339) were among the 27–48year age group (57.7%), whilst the least were among the less than 5 and greater than 82year age group (0.2%). The peak age-specific distribution of number of gynecological surgeries of 30.3% was among the 27–37year age group. Table: 2.

The abdominal route was used in 365 (62.2%) while the vaginal route was utilized in 222 (37.8%) of cases.

Table 2: Age-Specific Distribution of Number of Gyecological Surgeries

AGE GROUP	FREQUENCY	%
<5	1	0.2
5-15	5	0.9
16-26	81	13.8
27-37	178	30.3
38-48	161	27.4
49-59	83	14.1
60-70	56	9.5
71-81	21	3.6
>82	1	0.2
TOTAL	587	100

Table 3: Indications for the Commonest Gynecological Surgeries

INDICATION	FREQUENCY	%
Uterine fibroid	157	26.7
Suspected cervical cancer	51	8.7
Utero vaginal prolapse	40	6.8
Endometrial neoplasia	36	6.1
Ovarian neoplasia	33	5.6
Hydatidiform mole	24	4.1
Gestational trophoblastic disease	6	1.0
Cervical insufficiency	48	8.2
Ectopic pregnancy	33	5.6
Vesico-vaginal fistula	23	3.9
Perineal tear	15	2.6
Uterine synechia	15	2.6
Transverse vaginal septum	7	1.2
Uterine inversion	5	0.9
Others	94	16.0
Total	587	100

Uterine Fibroid was the indication for the surgery in 157 (26.8%), suspected cervical cancer in 51(8.7%), pelvic floor prolapses in 40 (6.8%), endometrial neoplasia in 36 (6.1%), in 33 (5.6%); ovarian neoplasia, hydatidiform mole and gestational trophoblastic neoplasia in 24 (4.1%) and 6 (1.1%) respectively and in 45 cases were done for other reasons. Table: 3

Majority of the cases 403 (68.7%) had general anaesthesia given while 184 (31.3%) had regional anaesthesia.

DISCUSSION

The present study reports a gynecological surgery rate of 5.5% within the period under review which is, however, lower than the rates of 9.8% and 28.5% reported in previous studies conducted in Nigeria.[1-3] This may occur due to limitations in the availability of many skilled specialized staff, affecting the capacity for surgical procedures.

Common surgeries carried out in our facility include hysterectomy, myomectomy, examination under anaesthesia and biopsy, cervical cerclage insertion, suction evacuation and others. While less frequent surgeries outlined in our audit include excision of transverse vaginal septum, cauterization for vulval warts, cruciate incision for imperforate hymen and marsupialization, all of which are done for very rare conditions. The primary indications for surgeries in our study align with those reported in other studies.[2,4-9]

In this audit, one third of the surgeries were hysterectomies, making it the most common surgery performed in our department. This prevalence surpasses that observed in other studies conducted for benign gynecological conditions in Kano and Gombe. [10-14] This finding aligns with a study in Pakistan, where hysterectomy accounted for two thirds of total gynecological surgeries in their facility.[15] In our study, a majority of hysterectomies were conducted abdominally, while the vaginal route was utilized in 37.8% of cases, a trend similar to a study in Anambra.[16]

The average age of women undergoing these procedures was 40.6 years, with a minimum age of 4 years and a maximum of 82 years. Gynecological surgeries typically target women of childbearing age, given that many indications are related to this demographic. The majority of these procedures were performed in the 27–48 year age group, while the least common were in the less than 5 and greater than 82-year age group (0.2%). The age group of 27–37 years has the highest proportion of gynecological surgeries, accounting for nearly one-third of the total, which was similarly observed in Kano.[2] Gynecological surgeries are common in reproductive-age individuals due to prevalent medical conditions associated with this stage of life. The frequency of these surgeries underscores the importance of addressing reproductive health for the well-being of individuals during their childbearing years.

Common indications for gynaecological surgeries identified in this audit were uterine fibroids for myomectomy and hysterectomy all shown in table 3. This finding diverges from other studies where uterovaginal prolapse (47.3%), followed by uterine fibroids (33.3%), emerged as the leading indications for hysterectomy.[17] The documented factors contributing to lower hysterectomy rates in developing countries encompass concerns about surgery, the potential

cessation of menstruation in premenopausal individuals, and cultural, religious, and social beliefs/misconceptions. These misconceptions include fears such as loss of sex drive, femininity, and potential sexual rejection by a spouse and other cultural beliefs, which contributes to the relative unacceptability of hysterectomy among women in our setting.[18 -19] Conversely, higher rates of hysterectomy in developed countries can be attributed to factors such as smaller family sizes, weaker cultural ties, elevated literacy levels, improved health-seeking behaviors, and early detection and treatment of premalignant gynecological conditions, among other reasons.[18,20]

CONCLUSION

This study provided a comprehensive documentation of the landscape of gynecological surgeries carried out at the Department of Obstetrics and Gynaecology in Modibbo Adama University Teaching Hospital, situated in Yola, Adamawa State, North Eastern Nigeria. This comprehensive analysis contributes valuable insights into the surgical view of gynecological interventions in this particular healthcare setting.

Limitation and Recommendation:

One limitation of this study lies in its retrospective nature, which could introduce challenges related to data storage and retrieval. Additionally, the study is constrained by the absence of an audit on the outcomes of the gynecological surgeries investigated. It is recommended to enhance the data storage method through the adoption of a computer-assisted record system. Furthermore, advocating for a more frequent audit of the department's services is advised, as this could effectively pinpoint gaps in training and service delivery. This approach aims to improve versatility and competence. Ultimately, individual audits may prove more advantageous for the department's overall performance.

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Conflicts of Interest: We declare no conflict of interest by any of the authors.

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■ Original Research Article

Utilisation of Modern Contraceptives Services Among Women of Reproductive Age in a Tertiary Hospital in North-eastern Nigeria. A 6 Year Review.

Umaru Inuwa[1], Maisaratu A. Bakari[1], Gokir Nengak[1], Clement Ayuba[1], Gracious Simon[2]

[1]Department of Obstetrics and Gynaecology, Faculty of Clinical sciences, college of Medical Sciences, Modibbo Adama University Yola, Adamawa State; [2]Family planning unit, Modibbo Adama University Teaching Hospital Yola, Adamawa State.

ABSTRACT

Background: Contraceptive use is one of the key factors in protecting women health and right, when generally accepted and properly utilize in any community is proven to reduces unwanted pregnancies, high parity and maternal death. **Objective:** To determine the prevalence and trend of modern contraceptive use and the reasons for their discontinuation among women of reproductive age accessing family planning clinic in Modibbo Adama University Teaching Hospital Yola, Adamawa state. **Method:** Retrospective descriptive studies of all the new contraceptive acceptors over a period of 6 years (2014-2019 inclusive) was carried out. Data obtained was analysed using SPSS version 16.0 (Chicago, USA 2006). Results were presented in simple proportions and compare where necessary using chi square. **Results:** In this study there were 1746 new contraceptive acceptors including Bilateral tubal ligations during the period under review. A total of 9833 deliveries were conducted during the same period, giving rise to contraceptive prevalence of 17.8%. The commonest contraceptive method patronized was injectables 510(29.2%) followed by implantable contraceptives 486 (27.8%)) while the least contraceptive method utilized was barrier method 149(8.5%). The commonest reasons for discontinuation of method was irregular menstrual bleeding 90(29.1%) fallowed by desire for pregnancy 79(25.6%). there was strong association between age (p-v= 0.001), marital status(p-v=0.000). and parity p-v= 001 and discontinuation of contraceptive method, no significant relationship between education, religion and discontinuation of contraceptive method. **Conclusion:** Contraceptive acceptance in this environment is still low despite widespread awareness campaign worldwide. This might not be unconnected to cultural, religious, ignorance, myth and perception of the society on modern contraceptives use. **T**herefore, there is need for more awareness campaign on contraceptive used in the region because of its pertinent role in reducing too frequent deliveries, illegal abortions and maternal morbidity and mortality.

Correspondence:

Umaru Inuwa,
Department of Obstetrics and Gynaecology, Faculty of Clinical sciences, college of Medical Sciences, Modibbo Adama University Yola, Adamawa State.
-08035763388,
juyoh20@gmail.com

Keywords: Modern contraceptives, reproductive right, utilization, reproductive age, Yola.

INTRODUCTION:

Contraception is a deliberate attempt or intentional method employed to prevent pregnancy, through the use of agents like drugs, devices and surgery.[1-3] These agents and or surgical method interferes with the chain of events that leads to fertilization, thus, preventing pregnancy. Fertilization therefore, is a union between male and female gametes to form a zygote or fertilized ovum and eventual conception,[1,2]The various contraceptive methods include Hormonal (pills, injectables and implantable), Barrier method (male and female condom), intrauterine contraceptive devices (IUCD) and surgical- Bilateral tubal ligation (BTL)[1,2]. The world population currently is estimated to be around 8 billion with over 80% of them living in developing countries.[2-5] This is partly attributed to poor contraceptive usage and underutilization of various methods used in birth control. Despite the availability of these agents and other affordable technologies, women in low resource countries like Nigeria, are still dying from pregnancy complications .[4-8]

Nigeria, has one of the highest maternal mortality ratios and ranked as the country with the second highest number of maternal deaths after India[2,4,6-9]. Majority of death occur due to inadequate Obstetrics care, short inter- pregnancy interval and unsafe abortions[2,7-9]. Fertility rate is still on the increase despite economic hardship most especially in northern Nigeria. Currently the crude birth rate is about 5.7 per woman of child bearing age as against 5.3 births per woman in 2020. This figure is expected to double in 24 years.[2,4-6,8,10]Consequently, since resources are limited and coupled with economic hardship, unplanned or unwanted pregnancies stands the risk of being terminated. Furthermore, due to the existing law prohibiting abortion in the country, these individuals are compelled to procure the procedure in an unsafe or hidden area leading to unsafe abortion which is associated with high maternal morbidity and mortality. Series of studies in Nigeria had shown that unsafe abortion contribute to maternal mortality in about 20-40% which is one of the highest in the world,[3,10-11]. It was also reported that among women of reproductive age group one out of seven attempted terminating unwanted pregnancies and one out of ten actually terminated the pregnancy[10,11]. Other similar Studies had also demonstrated that unexpected or unplanned pregnancy occur in about 1.5 million annually,760,000 induced abortions with over 60,000 thousand annual maternal death.[2] Factors that may increase maternal morbidity and mortality include unsafe abortions, increased parity and too many short inter-pregnancy intervals and poor obstetrics care.[2,9-12]

Proper and effective use of contraception is key to protecting women right and health through the prevention of unwanted or unplanned pregnancies, abortion related complications, and maternal death[2,5,7,10-13]. It could also help in reducing the too many short inter-pregnancy intervals by either delaying or spacing the number of deliveries, thereby, increasing the economic gains of the family by limiting the number of children per family[11]. Thus, resulting in improving and promoting the health status of the mother and welfare of the entire family as the number of births are controlled[11-15]. Studies had also proven that Contraceptive use reduces maternal mortality by 20% or more and infants are twice as likely to survive if the previous birth interval is about 2- 4 years.[10,11,13,] Unfortunately, Nigeria has one of the highest unmet need for family planning compared to other countries like Ghana[2,10,16-18]. Unmet need for family planning in Ghana was reported to be 30% while that of Nigeria was 48% [20-21]. Recent evidence from Nigeria Demographic health survey had shown that only about 15% of sexually active women currently practicing effective modern contraception, being higher in the south (12.5%) and low ((5.3%)) in the northern part of the country. Conversely, fertility rate is higher (6.6%) in the northern part of the country compared to (4.5%) in the southern region. Consequently, maternal mortality is higher in the north than in the southern part of the country.[2,4,5,10,]

The aimed of the study was to determine the prevalence rate of modern contraceptive uptake, complications, preferred method and the reason for discontinuation of any contraceptive method. The study also aimed to examine the trend and pattern of contraceptive usage among women of reproductive age accessing family planning services in our maternity section of Modibbo Adama University Teaching Hospital Yola, Adamawa State, North- eastern Nigeria. This study will also serve as a baseline for subsequent studies as to the best of the authors knowledge there was paucity of studies in our environment on the modern contraceptive usage.

MATERIALS AND METHODS

This was a 6year (January 2014- December 2019) retrospective descriptive study of all the new modern contraceptive acceptors that accessed the family planning unit of Modibbo Adama University Teaching Hospital (MAUTH) Yola, Adamawa State.

The state with its capital in Yola was created in 1992 from the defunct Gongola State, Nigeria. It has 21 Local Government areas with a land mass of 39,940km^3, has a population of 3,178,950 according to 2006 Nigeria population census. As at 2022, the Adamawa state population was reported to be about 4,902,100, with population density of 122.7/km$^{3-5}$ and annual population increase of 2.7%. [3-5]. It is inhabited by multinational and multitribal population with majority consisting of Fulani, Hausa, Bata, Vere, Bachama, Chamba, kilba, Ga'anda, Bura and Lunguda among others. MAUTH is the only Federal Teaching Hospital in the state. It was upgraded from the then Federal Medical Centre Yola to Teaching hospital following the approval by the Federal Government of Nigeria in 2020.

The family planning clinic runs daily except on weekends. Clients with or without their spouses

received group or individual counselling before making an informed choice as to which methods are suitable for them. Contraceptives agents were administered by trained Nurses and Doctors. The hospital records of all the family planning attendees during the period under review were retrieved from the family planning clinic, hospital medical record department and theatre registers. Information regarding age, parity, occupation, religion, educational status, tribe and marital status were extracted from the records, also the previous contraceptive practices, method chosen, source of information about the modern contraceptive were also recorded. Obstetrics history, breast feeding history, reason for discontinuation of the method and complications were studied. The data was analysed using SPSS versus 16 (Chicago, USA 2006). Results were presented as simple proportion and compare where necessary using Chi square. Line graphs were used for trend analysis. The confident level was set at 95% ($P < 0.05$). Ethical approval was obtained from the ethics and research committee of Modibbo Adama University Teaching Hospital Yola, Adamawa state.

RESULTS

In this study a total of 1746 clients accepted modern contraceptives methods including tubal sterilization during the year under review and there were 9833 deliveries conducted over the same period., giving the modern contraceptive prevalence of rate of 17.8%.

Table 1 shows the Sociodemographic characteristic of modern contraceptive acceptors. Majority of the clients were between age range of 30-34 years 422 (24.2%) followed by 35-39 years of age 284(21.2%). Most of them were married, 1136(65.1%) and educated 751(43.0%) as most of the clients attained tertiary education. In this study the modal parity was above 5, (558(32%), majority were Christians 902(51.7%). Majority of the clients got information about modern contraceptive usage from health personnel 81.1 % (doctors, Nurses chews Junior-chews and other health workers), friends 5.2%, mass media 7.4% and others 6.3%. Majority of the clients requested for contraceptive methods within 6 months of delivery and almost all were breast feeding their babies at the time of conducting this research. Most of the clients had used one or more of the modern contraceptive methods in the past during their previous pregnancies.

Table 2 depicts the current contraceptive method chosen, most of the clients used injectable contraceptive methods (Levenogestrel and depot Medroxyprogestrone acetate) 510(29.2%) followed by implantable (Implanon and Jadelle) contraceptive methods 486(28.0%), while barrier method 149(8.5%) was the least accepted modern contraceptive method chosen.

Table 3 shows the complications and the reasons for discontinuation of any contraceptive method chosen. A total of 17.7% of the study population discontinued the modern contraceptive method due to various complications while using the various methods. The most common complication and cause of discontinuation of the method was excessive and irregular menstrual bleeding.90(29.1%) followed by desire for subsequent pregnancy 79(25.6%). Method failure 7(2.3%) was the least recorded complications and the reason for discontinuation of any method. One resulted in ectopic pregnancy, 3 normal pregnancies and 3 miscarriages.

Table 1: Socio-demographic characteristic of contraceptive acceptors

Variables	Number	Percentage (%)
Age (years)		
<20	230	13.2
20-24	280	16.0
25-29	284	16.3
30-34	422	24.2
35-39	370	21.2
>	160	9.2
Total	**1746**	**100**
Parity distribution		
0-1	335	19.2
2-3	416	23.8
4-5	437	25.0
>5	558	32.0
Total	**1746**	**100**
Educational status		
No formal education	192	11.0
Primary school	349	20.0
Secondary school	454	26.0
Tertiary	751	43.0
Total	**1746**	**100**
Marital status		
Married	1,136	65.1
Single	403	23.1
Divorcee	117	6.7
Widow	88	5.1
Total	**1746**	**100**
Religion		
Christian	902	51.7
Muslim	840	48.1
Others	4	0.2
Total	**1746**	**100**

Table 4: Depicts the relationships of sociodemographic characteristic and discontinuation of the various method. In this study age, parity and marital status were significantly associated with discontinuation of any modern contraceptive methods Chi-square 26.23, 30.46

and 23.21 with their p-values of <0.001, <0.000 and <0.001 respectively.

Table 2: Current Contraceptive Method Chosen

Variables	Number(frequency)	Percentage (%)
Implant	486	28.0
IUCD	210	12.0
Injectables	510	29.2
OCP	273	15.6
Barrier	149	8.5
Barrier	118	6.8
Total	**1746**	**100 .0**

NB Oral Contraceptive Pills

While religion and level of education does not seem to be significantly related to the discontinuation of any method X^2 =1. 35 and 6,45 with their p-values of 0.633 and 0.544 respectively.

Table 5 showed the trend of modern contraceptive prevalence over the period under review. The study population in the first 3 years (2014-2016) showed a progressive decline in the use of chosen modern contraceptive prevalence with a nadir in 2016, followed by progressive increased demand for the methods in the last 3 years (2017-2019). The prevalence rate was fairly constant between 2018-2019. This is perhaps due to increased awareness.

Figure. 1: Is the line graph demonstrating the total yearly trend in the used of modern contraceptives.

Figure. 2: Is the line graph which demonstrate the demand for individual modern contraceptive methods. The injectables contraceptives was the most common patronized modern contraceptive method over the period of 6 years followed by implantable contraception, while the barrier method was the least patronized method.

Table 3: Complications and Reasons for discontinuation

Variables	Number	(%)
Menstrual irregularities	90	29.1
Desire for pregnancy	79	25.6
Lower Abd/back pain	47	15.2
Infections	29	9.4
Headache	8	2.6
Displaced IUD	20	6.5
Weight changes	16	5.2
Method failure	7	2.3
Others	13	4.2
Total	**309**	**100**

Others - may cause cancer, husband refusal, menopause, culture and religious barriers.

Table 4: Sociodemographic Influence on Discontinuation of Modern Contraceptive Methods

Variables	Number (freq)	Chi-square (X^2)	P-V
Age(years)			
<20	4		
21-24	14		
25-29	90		
30-34	98	26.23	< 0.001
35-39	68		
≥40	35		
Parity			
0-1	33		
2-3	56		
4-5	88		
>5	132	30.46	< 0.000
Marital status			
Married	216	23.21	< 0.001
Single	40		
Divorce	33		
Widow	20		
Educational status			
No formal education	52		
Primary	56		
Secondary	98		
Tertiary	103	6.45	0.544
Religion			
Christians	158	1.35	0.633
Muslims	138		
Others	13		

Table 5: Trend In Contraceptive Prevalence Rate

Years	Clients	Total del	Contraceptive Prevalence
2014	216	1284	16.8%
2015	247	1556	15.9%
2016	282	1901	14.8%
2017	309	1700	18.2%
2018	333	1636	20.4%
2019	359	1756	20.4%
Total	**1746**	**9833**	**17.8%**

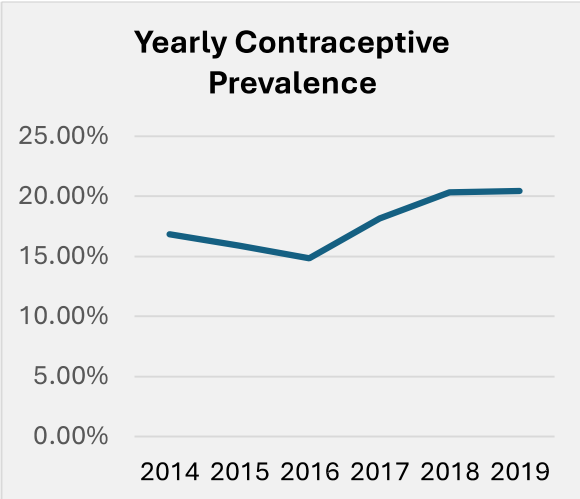

Fig 1. Total yearly trend in the used of modern contraceptives among the study population

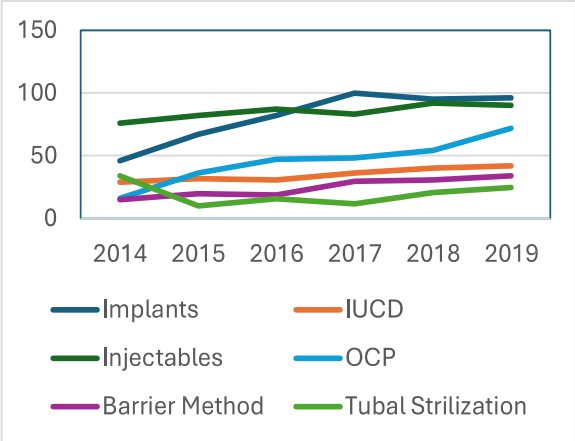

Fig.2 Trend of various contraceptive method chosen.

DISCUSSION

Effective use of modern contraceptive method is pivotal to women protection of right and health. In Nigeria the unmet need for family planning is still high despite widespread campaign on contraception. The Nigeria demographic health survey reported that effective utilization of modern contraceptive methods was 15 percent.[4.] In this study the prevalence of modern contraceptive uptake was 17.8% which was slightly above the national figure. It is however comparable with the prevalence of 18.1% reported by Akintayo et al from Ado Ekiti Northwest Nigeria [2]. But lower than 51.1% reported by Envaladu et al in Jos, North central Nigeria[9], a similar finding was also reported from Northwest Nigeria [19.] Thus, findings suggest that Unmet need for family planning is still high. Albeit awareness about modern contraception has increased significantly in recent time, it does not reflect in the clinical practice in our environment.

Majority of the study population ranged between 30-39 years of age with peak age between 30-34 years 422(24.2%), followed by age range of 35-39 years 370(21.2%). This finding is similar to findings reported by other studies across the country. [2-3, 9-11, 13, 18-19.] Majority of the clients were married 1136(65.1%) and were Christian 902(51.7%) this was similar to the studies reported from Ife, Gombe, Jos and Calabar South-South Nigeria.[2,7,9 12]. Most of the women were para 5 and above 558(32%) and educated up to tertiary level of education 751(43%). This finding was similar to the findings reported from Malawi and Ghana and some studies in Nigeria. [2, 7,8-16]. However, the parity distribution in this study was at variant with the findings reported from Jos and Ile Ife, where they reported in their separate studies as para 2-4 and 2-3 respectively as the most common parities.[2, 9.]

It is a known fact that Education affects woman's awareness about her fertility which can in turn affect their use and choice of contraception. About 70 % of the study population had secondary school and tertiary level of education. Perhaps, the reason for majority of the clients of the study population demanded for contraception but is still insignificant when compared to general population in the study region. People that have high level of education tend to delay pregnancy or space their children for pursuance of academia and carrier advancement. In recent time, desire for knowledge and epistemophile also contribute to the delay in conception leading to low parity. [2,9]

The commonest and most popular contraceptive method utilized among the clients in this study was injectable contraception 510(29.21%) followed by implantable method, a finding that was in contrast to the findings reported in Jos by Mutihir et al [18]. They reported in their study that intrauterine contraceptive device was the most common (26.1%) accepted method[18]. The preferred short-term reversible contraception in this study as against the reported long-term reversible contraception from other studies might be due to individual desire and choice [5-7,9,18-21.]

The major complications that led to discontinuation of any method was irregular and heavy menstrual period suggesting that the hormonal contraceptives, especially injectable are associated with irregular menses. This finding was similar to the findings reported by other authors, while in contrast to other findings, Akintayo et al reported desire for pregnancy as the main reason for discontinuation of the modern contraceptive use[2,9,11]. Our study also showed that some of the socio - demography characteristics of the clients were associated with the discontinuation of modern contraceptive method. While others do not. Age, parity and marital status were significantly associated with discontinuation of the method P-V = <0.001, <0.000 and <0.001 respectively. While educational status and religion were not significantly associated with discontinuation of the methods P-V = 0.633 and 0.544 respectively. Similar studies were reported by Envuladu et al and Akintayo et al [2,7].

Comparable findings were also reported from Malawi and Ghana.,[9-16]. Looking at the trend of the modern contraceptive uptake in this study, there was initial declined (2014-2016) in the demand for the method with a nadir in 2016. However, we observed that it was followed by steady increased in the demand for the contraceptive method between 2017-2019. Table 5 and figure 1. This perhaps was due to increase in awareness and Knowledge about the contraception. This finding was similar to the findings reported from Ile Ife and Calabar South - South Nigeria [2,12].

Finally, in this study, the injectable contraceptive was largely the most common acceptable contraceptives method while barrier method was the least see figure 2. Similar findings were reported across Nigeria[7, 9-14, 17,19].

CONCLUSION

Contraceptive acceptance in this environment is still low despite increased awareness on modern contraceptive use. This might not be unconnected to myth, perception, cultural and religious practices of the people in the region, discouraging them from practising family planning in general. **T**herefore, there is need for more advocacy and awareness campaign on contraceptive use because of its pertinent role in reducing unwanted pregnancy, illegal abortions and maternal morbidity and mortality.

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■ Original Research Article

Histopathological Features of The Ovaries, Physical and Behavioural Patterns Following Administration of Cadmium in Wister Rats

Okpala Nneoma CV[1], Asomugha Lasbrey A[1], Menkiti Felix E[2], Adinma JI Brian-D[3]

[1]Department of Human Anatomy Nnamdi Azikiwe University, Nnewi
[2]Department of Anatomic Pathology and Forensic Medicine, Nnamdi Azikiwe University, Nnewi.
[3]Department of Obstetrics and Gynaecology, Nnamdi Azikiwe University and Teaching Hospital, Nnewi, Nigeria.

ABSTRACT

Background: Cadmium is an environmental pollutant, toxic to humans and animals. Cadmium toxicity affects tissues including reproductive system causing infertility. **Study Objective**: To determine the effect of cadmium on behavior and ovaries of Wister rats. **Materials And Methods:** Two groups - A and B, each of 5 Wister rats were studied at the Laboratory of Anatomy Department of Nnamdi Azikiwe University, Nnewi, Nigeria. Following acclimatization, rats in group A (control) were weighed and administered distilled water and laboratory chow while rats in group B were administered 50mg per kg of Cadmium Chloride. Both groups were fed daily and monitored weekly (for weight and behavior over seven weeks). Following final weighing, the rats were sacrificed, and the ovaries harvested and prepared for histology, carried out with photomicrography. Data analysis employed SPSS version 25, comprise of variables employed T dependent test with $p < 0.05$ considered significant. **Results:** Rats in group A showed significant weight gain, 144. 407±07g vs. 167.107 ±87g (P=0.009) between initial and final measurement. They also showed normal behavioral pattern, then rats in group B showed significant weight loss, 201.405 ± 48g vs. 163.801 ± 78g (P=0.04) and severely abnormal behavior. Ovarian sections in group A were normal while sections in group B showed degenerated follicles, absence of secondary ovarian follicles and presence of multiple cysts. **Conclusion:** Cadmium toxicity manifested as abnormal behavior and pathological ovarian changes in rats administered cadmium chloride. Cadmium toxicity is linked to human reproduction particularly polycystic ovary syndrome, and infertility. Further studies on effect of cadmium on steroidogenesis and counter effect of some antioxidants on cadmium toxicity are recommended.

Keywords - Histopathological features of the ovary; physical and behavioral patterns; Cadmium; Wister rats.

Correspondence:

Prof J. I. Brian-D Adinma:
Department of Obstetrics and Gynaecology,
Nnamdi Azikiwe University and Teaching Hospital, Nnewi, Nigeria.
brianadinma@yahoo.com;
br.adinma@unizik.edu.ng
Tel- +2348037080814

INTRODUCTION

Industrialization and agriculture have to a large extent resulted in varying degrees of the pollution of the environment and reorganization of some toxic elements in the food chain[1] Exposure to toxic environmental and occupational pollutants has been identified to play significant role in the disruption of the reproductive system causing some public health issues[2]. Of notable concern is infertility, a condition that affects as much as 15-25% of couples globally.[2,3,4] Over the past 5 decades, there has been report of increasing trends of adverse effects on reproductive functions in particular; male reproductive organs related more to toxic environmental factors rather than genetic factors. It has been reported that the response of reproductive organs to toxic pollutants is different from that of other target organs which distinguishes it as a veritable benchmark for the measurement of the adverse effect of environmental pollutants on humans and animals[2].

Some widely studied environmental pollutants associated with diseases and disorders of the reproductive system are the heavy metals - notably cadmium, lead and mercury. In a recent review by Peter et al[2] experimental studies were carried out on a variety of animals- Rats, Mice, Birds and rabbits to demonstrate the effect of cadmium, lead and mercury on the structure and function of reproductive organs. Their findings, along with other reviews demonstrated the particularly sensitive nature of the gonads to the heavy metals (cadmium, lead and mercury) attributable to their distinct intense cellular activities involving the vital processes of sperm, follicles and oocytes production[2,5,6,7]. They also reported that specifically ovarian toxicity manifested as retarded follicular growth, occurrence of follicular atresia, Corpus luteal degeneration and cycle alteration[2].

Cadmium is a non-essential transitional metal that is toxic and constitutes a health risk to both humans and animals[8]. It is an environmental pollutant usually resulting from agricultural and industrial activities[8,9,10]. Cadmium usually occurs in the human and animal population through contaminated water and food such as meat and milk product, and inhalation of fumes from tobacco smoking[10,11,12]. In humans the absorption of cadmium from foods is about 3-5% and this is easily well reabsorbed by the kidneys with a biological half-life of a reasonably long period of approximately 10-30 years[13,14,15,16,17,18,19,]. Several studies had been carried out that have demonstrated the effect of cadmium on the structure of the ovaries in rats and rabbits. Parizek et al.[12] demonstrated massive hemorrhagic necrosis of the gonads of male rats following subcutaneous injection of cadmium salts together with an analogous destruction of the fetal surface of the placenta of pregnant rats but did not demonstrate any changes in the ovaries of experimental rats following the administration of similar or even larger doses of cadmium salts. Massanyi et al.[19,20] similarly carried out intra-peritoneal injection of varying doses of cadmium chloride on 32 experimental rats and observed a high concentration of cadmium in the rat ovaries 48 hours after administration. Similar observations were made in studies carried out on rabbits[22]. Findings in the ovaries included a relative reduction in volume of growing follicles with an increase in stroma. [23,24] Other findings include significant elevation in the number of atretic follicles and other ultra-structural alterations of granulosa, luteal, stroma and endothelial cells in the form of undulation of external nuclear membrane, together with the dilatation of perinuclear cistern and endoplasmic reticulum[25].

This study has been undertaken in female whisker rats to elicit the effect of cadmium chloride on the structure of the ovaries of the rats, and on their physical and behavioral patterns. Findings from this animal study can be extrapolated to humans. The implications of the findings to ovarian disease, and infertility in particular are discussed, and the literature reviewed.

RESULTS

Table 1 shows the distribution by physical features and behavioral pattern of the rats for the control (group A) and group B before and following the administration of cadmium chloride alone. The rats in the two groups exhibited healthy features and normal behavior during the period of acclimatization- healthy skin with normal color and smoothly laid hairs, pinkish eyes, increased physical size, active movement, normal breathing patterns and good appetite. Following the administration of the test substances, group A (control) remained normal showing no change in features and behavioral pattern, group B however manifested marked changes to severe degrees, which includes weight alterations, loss of skin hairs, changes in skin color, labored breathing, staggering gait, lethargy and loss of appetite manifesting as decreased food intake.

Table 1-The Distribution by physical changes and behavioral pattern of the rats, following the administration of test substances for the group A (control) and group B

Groups	Physical and behavioral pattern (following administration of test substance)	During Acclimatization (2wks)
Group A(control)	Normal	Nil
Group B(50mg/Kg of CDCL2)	Severe	Nil

Table 2 shows the distribution by the rats in the 2 groups for their initial mean body weight and final weight

following the administration of the test substances. Rats in group A (control group) showed a significant increase in the mean body weight from initial value of 144.407 to 167.107 following the administration of test substance-distilled water and laboratory chow, (P= 0.009). Rats in group b on the other hand showed a significant decrease in mean body weight from an initial value of 201.405± 48 to 163.801 ±78 following the administration of 50mg per kg of cadmium chloride (P= 0.046)

Table 2: Distribution by the rats in various groups for their initial mean body weight and final weight following the administration of the test substances.

Body weight (grams)	Mean	± SEM	P value	Test of Significance
Group A(control)	Initial-144.407 Final-167.107.	±07 ±87	0.009	Significant
Group B (50mg/kg of CdCl2)	Initial-201.405 Final-163.801	±48 ±78	0.046	Significant

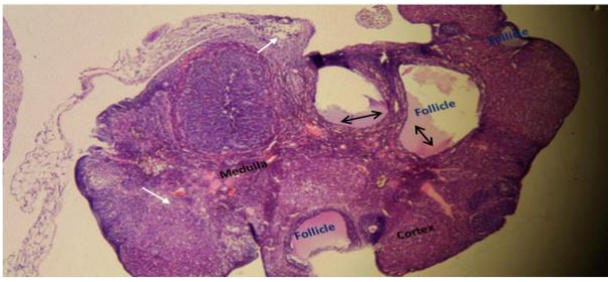
The distribution by the mean weight of the ovaries for the 2 groups as shown in table 3 indicates that the mean weight of the ovary in group B (rats administered with 50mg per kg of Cadmium Chloride) was relatively higher, 0.00170 compared to the mean weight of the ovaries of the rats in the control group, 0.00150. However, the difference was not statistically significant (p = 0.341).

Table 3: Distribution by the rats in the 2 groups for the mean weight of their ovaries

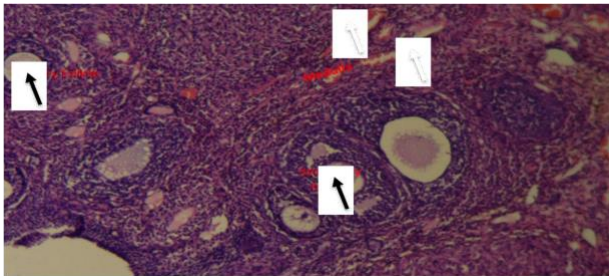
GROUPS	Mean Weight (grams)	± SEM	P-value
Group A (control)	0.00150	±0.002	0.341
Group B	0.00170	±0.002	

Figure 1 is a photo micrograph showing the histological pattern of the ovaries from rats in group A (control), section of the various tissues showed follicles at various stages of maturation, including primary and secondary follicles and appears normal with well intact ovarian blood vessels.

Figure 2 is a photomicrograph showing the histopathological changes in the ovaries of rats in group B- administered with 50mg per kg Cadmium Chloride. Sections show degenerated ovarian follicle, absence of secondary follicles together with the presence of multiple cysts.



Photomicrograph Section of Ovarian tissue for Group A (Control)


Photomicrograph section of ovarian tissues for Group B (administered 50mg per kg Cadmium Chloride)

DISCUSSION

Changes in physical and behavioral patterns demonstrated in this study following the administration of cadmium to the rats are a physical behavioral manifestation of cadmium toxicity observed in various studies. Mouloud et all[27] observed the depression-like, Anxiety-like, memory state and oxidative stress effect on Wister rats following the chronic administration of Cadmium. Severe alterations in physical and behavioral pattern observed in this study include weight alterations, loss of skin hairs, changes in skin color, labored breathing, staggering gait, Lethargy and loss of appetite manifesting as decreased food intake. Cadmium has been recognized to be one of the toxic element existing in the environment particularly in industrial areas through environmental pollution involving dispersion into the environment and contamination of the ground surrounding metal emitting industry[28] the low rate of excretion of cadmium from the body enables it to have a long biological half-life spanning through 10-30 years- a period long enough to cause toxic damage to the body.[29, 13]

Toxicity can occur from accumulation of cadmium over long period of time, at peripheral level in a variety of tissues including- liver, Kidneys ovaries and both Central and peripheral nervous systems[30]. The preliminary step in regulating the entry of cadmium into the CNS is through transportation into the blood brain barrier. The nasal mucosa through the olfactory pathway is also an alternative entry pathway of Cadmium into the Central Nervous System (CNS).[31] Heavy metals such as

Cadmium are known to act as catalysts to biochemical reaction; cofactors for many vital enzymes; second messengers signaling pathways and regulators of gene expression- all pathways recognized in the regulation of important physiological, pathological and behavioral functions. Chronic exposure to cadmium, therefore, affects several nervous system functions leading to symptoms such as headache, vertigo, pseudo-parkinsonism, unstable gait, peripheral neuropathy, loss of concentration and impaired learning ability[32,33,34]. The hippocampus of the brain has been observed to accumulate heavy metals such as cadmium leading to dysfunction manifesting as behavioral alteration which has been shown in animal studies such as ours[35,36,37].

Maoloud et al[27] observed that this derangement in behavior correlated with levels of oxidative stress markers in the hippocampus of their experimental rats and hypothesized that behavioral Neuro dysfunction occurring from administration of cadmium maybe linked with the elevation of the levels of oxidative stress markers in the hippocampus. Cadmium toxicity result from its generation of non-radical hydrogen peroxide which in turn generates free radicals through the Fenton reaction[38,39]. Cadmium indirectly induces oxidative stress through causing a decrease in intracellular levels of glutathione, combining with thiol groups of antioxidant enzymes e.g. catalase, glutathione peroxidase and superoxide dismutase ultimately preventing their normal function. Cadmium in addition obstructs complex 111 of the mitochondrial electron transport chain thereby enhancing the production of reactive oxygen species that will result in negative alteration of mitochondrial membrane and subsequently encouraging apoptosis[40]. Cadmium is capable of replacing Iron, Zinc, copper Magnesium and Calcium from a number of biomolecules and membrane proteins. This can alter the function of such biomolecules and cause an increase in the levels of such metals, this can, in some cases be related to production of oxidative stress through the Fenton reaction. Cadmium has a binding capacity that is 10 times more than that of Zinc and has even much greater difficulty to unbind[40].

The histological features of the ovary following the administration of cadmium in this study showed pathological changes that constitutes a clear departure from the normal pattern shown in the control and signifies cadmium toxicity. Sections of these ovaries showed degenerated ovarian follicle, absence of secondary ovarian follicle and presence of multiple cysts. Several studies carried out on experimental rats have demonstrated high concentration of cadmium in ovaries 48hours following intra-peritoneal administration of varying doses of cadmium chloride; and a relative reduction in volume of growing follicle, increase in stroma, significant increase in the number of atretic follicles, and ultra-structural alterations of other cells of the ovarian tissue- Granulosa, Luteal and endothelial cells[21 23,24]. Cadmium is a known endocrine disruptor associated with reproductive complication and in fact has been ranked as one of the top ten most toxic chemicals for human health[41] it has been reported that cadmium exposed workers can harbor blood levels of cadmium ranging between 2 and 50ug/L[42]. Environmental pollution with Cadmium is of major world health public concern because of its notoriety as an endocrine disrupting chemical (EDC) and reproductive toxicant[43].

In specific terms cadmium has been reported to cause dysfunction of the menstrual cycle; infertility and in recent times polycystic ovary syndrome and premature ovarian failure (POF)[44]. Polycystic Ovarian syndrome (PCOS) is a condition characterized by ovulatory dysfunction, excessive action of androgen hormones and development of multiple cysts in the ovary. The condition also features high levels of luteinizing hormones (LH) being stimulated by gonadotropin releasing hormones leading to high LH/FSH ratio[45]. PCOS and Primary Ovarian Failure (POF) occur in approximately 1 and 10% of women of reproductive age respectively[46] Recent studies have shown that exposure to cadmium has resulted to the development of PCOS and POF in mammalian models[47]. Data obtained from an even more recent study conducted on rats suggested that sub-acute cadmium exposure using doses found in workers occupationally exposed to cadmium disrupt the Human Pituitary Gonadotropin (HPG) axis function, leading to PCOS and POF features and other abnormalities in the female rats. The study further reported that in specific terms exposure to cadmium resulted in irregularity of the estrous cycle, abnormal hypothalamic gene expression, high levels of luteinizing hormone (LH), low levels of ant-Mullerian hormone (AMH) and abnormal development of the follicles. The study in addition observed a reduction in ovarian reserve and antral follicle number which suggests ovarian depletion. Cadmium exposure also caused a reduction in corpora luteal, thickness of the granulosa layer and an increase in cystic/atretic follicles. Other findings associated with cadmium exposure include inflammation of the reproductive tract (RT), Fibrosis and Oxidative stress[48].

CONCLUSION

This study has demonstrated the toxic effect of cadmium on the Nervous system and the ovaries of Wister rats evident from severe alterations in the physical features and behavioral patterns of the rats as well as pathological changes observed from photo micrographic studies of sections of the ovaries. Physical and behavioral manifestations observed in this rats following exposure to cadmium includes loss of body weight, alteration in skin color, loss of body hairs, staggering gait, labored

breathing, Lethargy and loss of appetite. Histopathologic manifestations of ovarian toxicity featured as degenerated ovarian follicles, absence of secondary follicles and presence of multiple cysts. The mechanism of action of cadmium in the causation of toxicity to tissues and in particular its role in increasing levels of oxidative stress markers has been discussed. The implication of ovarian toxicity, linked to human reproduction and in particular polycystic ovarian syndrome, primary ovarian failure and infertility has also been discussed extensively. Further studies in relation to the effect of cadmium on steroidogenesis and the possible effect of certain antioxidant substances such as curcuma longa in ameliorating the toxic effect of cadmium on reproductive function is recommended.

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■ Original Research Article

Impact of Naira Scarcity Resulting from Cashless Policy On Health-Seeking Behaviour and Ante-Natal Care Utilisation Among Pregnant Women in A North Central State, Nigeria.

Matthew Olusegun Fijabiyi[1], Adegoriola Olubisi Ojurongbe[2,&], William Oladiran Taiwo[3], Adeola Folasade Afolabi[2], Uche Augustine Akunaeziri[2], Toyin Oluwumi Fijabiyi[4], Oluwasegun Ajala Akanni[2].

[1]Department of Obstetrics and Gynaecology, College of Clinical Sciences, Ladoke Akintola University of Technology, Ogbomoso, Oyo State, Nigeria; [2]Department of Obstetrics and Gynaecology, Federal Medical Centre Keffi, Nasarawa State, Nigeria; [3]The Limi Hospitals, Federal Capital Territotry, Abuja, Nigeria; [4]Department of Family Medicine, Federal Medical Centre Keffi, Nasarawa State, Nigeria

ABSTRACT

Introduction: Cashless policy is a macroeconomic measure aimed at repositioning the nation for economic growth, through reduction of currency notes in circulation, lowering of the inflation, money laundering and other financial related crimes. Unfortunately, the implementation of this policy brought about untoward hardship to the citizens. Among the worst hit by the naira scarcity are the pregnant women, whom by virtue of their physiological state could not endure the long queues at automated teller machine or the banking hall to access cash. Thus, the artificial naira scarcity created could negatively affect the uptake of antenatal care services among pregnant women .**Objectives:** This study sought to determine the effects of naira scarcity on the difficulties encountered in seeking health care among pregnant women attending antenatal clinic, determine the effects of socioeconomic indices on the difficulties in seeking health amidst the naira scarcity and to access the perception of pregnant women on the effect of naira scarcity on their health and pregnancy outcome. **Materials and Methods:** This was a cross sectional study conducted among pregnant women attending antenatal care in Federal Medical Centre Keffi, Nasarawa State, Nigeria. The study was carried out during the period of naira scarcity between 10th January 2023 and 9th march 2023. During the period, a total of 340 pregnant women were recruited using a convenient sampling method. Consecutive, consenting patients were interviewed through researcher administered questionnaire and information of pregnant women including the sociodemographic, obstetrics, modes of transaction before the naira scarcity and during the scarcity, effect of naira scarcity on their willingness to attend ANC, difficulty in transportation and difficulty in accessing care. Data were got and analyzed using SPSS 25. Categorical variables were presented as frequencies and percentages. **Results:** A total of 340 pregnant women were recruited for this study. Women aged between 30-39 years (60.3%) ranked highest in the study with 246(72.4%) having tertiary level of education. A larger number of the women in the study were unemployed 135(39.7%) while majority of the husbands of the women in the study were civil servants accounting for 195(57.4%). Most of the families in the study earned an average monthly income of >100,000 naira per month. The point of sale (POS) was the most preferred mode of transaction accounting for 34.7% and 44.4% before and during the naira scarcity. The association between level of education and the mode of transaction during the period of the naira scarcity was significant with mobile bank app with a ($P < 0.0001$). About 189(55.5%) women missed between 1-6 antenatal visits due to the naira scarcity. However, association between the average monthly family income of respondents and the number of antenatal care missed was not statistically significant with an overall P= 0.479. Most of the women in their response, believed that the prolonged effect of the naira scarcity on pregnancy outcome and pregnant women's well-being could lead to increased maternal mortality and morbidity. **Conclusion:** The artificial naira scarcity has potential to negatively impact on the health seeking behavior of pregnant women. The effects include difficulty in accessing care, missed antenatal appointments and denial of antenatal care services due to lack of cash.

Keywords: Naira scarcity, Cashless policy, Health, Antenatal Care, Pregnant, North Central

[&]Correspondence:

Adegoriola Olubisi Ojurongbe

Department of Obstetrics and Gynaecology, Federal Medical Centre Keffi, Nasarawa State, Nigeria.
dradegoriola@gmail.com
Phone no: 08036973251.

INTRODUCTION

Cashless policy is a macroeconomic measure aimed at reducing the amount of currency notes in an economy thus making way for modern day electronic based payments such as Automated Teller Machines (ATM) transfer, online banking and mobile banking. This strategic measure is a statutory responsibility of the Central Bank of nations across the World to reduce reliance on currency for transactions.[2,3] Naira redesigning has been done couples of times in the past years, other countries have also done same in the past thus a common development among both developed and developing economies. The rationale for change of design of Naira appears benefiting for Nigerians. Also, it was aimed at intensifying monetary accountability and transparency.

The implementation of Naira redesign and cashless policy caused bank notes denominations such as 1000, 500, 200 to be recouped from the circulation. The resulting cash crisis posed weighty untoward consequences on the wellbeing of many Nigerians.[7-8] Among the worst hit by the naira scarcity are the women, especially the pregnant ones whom by the virtue of their physiological state could not go through the long queues at ATM or at the banking hall in order to access cash. Also, illiteracy and poverty among the rural pregnant women also make it impossible for this vulnerable group to do cashless transactions as many are non-bank account holders and also due to technical difficulties encountered in operating electronic gadgets. Consequently, many developed apathies seeking healthcare since they largely depend on their husbands for healthcare decisions. Moreover, secondary delay in accessing health care was occurring as naira scarcity-imposed hardship on both motorist and those relying on the commercial transportation for movement across locations in quest for health services. Majority of pregnant women and other patients attending government and private hospitals in Nigeria pay out of pocket for the hospital expenses. And thus, with the cash crisis, many of the patients attending the hospital especially pregnant women would likely be faced with different levels of hardship with payment for services, as most hospitals still predominantly engage in cash transactions.

Antenatal care (ANC) services remain sacrosanct for maternal health.[9-10] Nigeria, the most populous nation in Sub- Sahara Africa still has a low proportion of pregnant women who attends minimum of four antenatal clinic. [11]

The country's maternal mortality ratio remains alarming, average of 556 maternal deaths per 100,000 live births. This is a true reflection of low antenatal coverage and utilisation in Nigeria. [12]

Factors influencing ANC uptake and optimal utilisation are multifactorial. They consist of sociocultural factors such as ethnicity, educational status, employment status, religion, level of income, proximity to health center and availability of means of transportation among others. All these factors have been said to contribute to different level of delays in accessing care and thus indirectly impact negatively on maternal mortaliity.[11] Poor uptake of antenatal care services among pregnant women in Sub-Sahara Africa has been ascribed as a major contributor to maternal mortality, risk of maternal complications during antepartum period such as anemia in pregnancy, eclampsia, among other problems which are direct causes of maternal mortality. Fetal complications such as preterm birth, low birth weight and still birth are also common among women with poor ANC attendance. [13]

Problems brought by cash crunch and other associated aftermaths have high tendencies in affecting ANC utilization and thus poor fetomaternal outcomes.

Aims and Objectives

The aim of this study was to evaluate the effects of naira scarcity and cashless policy on the health seeking behaviour among pregnant women attending antenatal clinic in Federal Medical Centre Keffi.

The objectives of the study are as follows:

- To determine the effects of naira scarcity on the difficulties encountered in seeking health care among pregnant women attending ANC clinic.
- To determine the effects of socioeconomic indices on the difficulties in seeking health care amidst the naira scarcity.
- To access the perception of pregnant women on the effect of naira scarcity on their health and pregnancy outcome.

METHODOLOGY

This was a cross sectional study conducted among pregnant women attending antenatal care in Federal Medical Centre Keffi, Nasarawa State, Nigeria. The study was carried out during the period of naira scarcity between 10th January 2023 and 9th march 2023. During the 2 months period, a total of 340 pregnant women were selected using a convenient sampling method. Consecutive, consenting patients were interviewed by the researchers during their antenatal clinic visits. Information including their sociodemographic, obstetrics, modes of transaction before the naira scarcity and during the scarcity, effect of naira scarcity on their willingness to attend ANC, difficulty in transportation, and difficulty in accessing care among many other data were gotten and filled into questionnaire by the researchers. The data was analysed using SPSS 25. Categorical variables were presented as frequencies and percentages.

Sample Size Determination

According to the recent National demographic and Health Survey report 2018, the rate of antenatal attendance in Nasarawa State is 67.3%. [12]
The sample size was calculated using the formula below.

$n=pqz^2/d^2$
n=minimum sample size
Z= 1.96 which is the standard normal deviation at 95% confidence level.
P= prevalence of antenatal attendance in Nasarawa State
q= 1- p
d= absolute precision level of 5%
Therefore, $n= 0.67 \times (1-0.67) \times 1.96^2/(0.05)^2$
=339.6

Approximately 340 participants.

RESULTS

A total of 340 pregnant women were recruited for this study. The table showed socio-demographic characteristics of the study population. Women aged between 30-39 years (60.3%) ranked highest in the study. Majority of the women were Christians accounting for 235 (69.1%). Most of the women belong to other minority ethnic groups, accounting for 171 (50.3%) apart from the major ethnic groups of Yoruba, Igbo and Hausa.

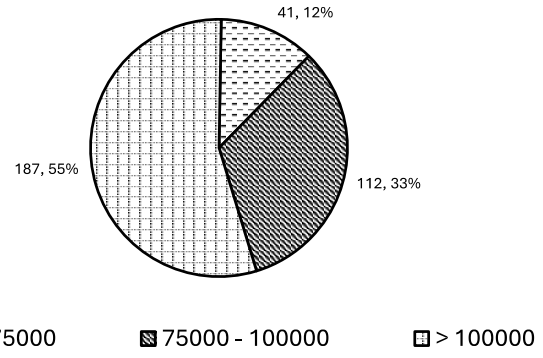

Figure 1: Average Family Monthly Income of Respondents

Women with tertiary level of education accounted for 246 (72.4%), while women with no formal education were 2 (0.6%). A larger number of the women in the study were unemployed 135(39.7%), while 13(3.8%) were farmers. On the contrary majority of the husbands of the women in the study were civil servants accounting for 195 (57.4%), as seen in Table 1.

Most of the families in the study earned an average monthly income of >100,000 naira per month as shown in Fig 1.

Table 1: Socio-demographic Data

Variable		Frequency (No.)	Percentage (%)
Age (Years)	<20	1	0.3
	20-29	124	36.5
	30-39	205	60.3
	≥40	10	2.9
Religion	Christianity	235	69.1
	Islam	105	30.9
Ethnicity	Hausa/Fulani	88	25.9
	Igbo	45	13.2
	Yoruba	36	10.6
	Others	171	50.3
Highest level of education	No formal	2	0.6
	Primary	19	5.6
	Secondary	73	21.5
	Tertiary	246	72.4
Occupation	Civil servant	76	22.4
	Trader	88	25.9
	Farmer	13	3.8
	Artisan	28	8.2
	Unemployed	135	39.7
Occupation of husband	Civil servant	195	57.4
	Trader	74	21.8
	Farmer	14	4.1
	Artisan	48	14.1
	Unemployed	7	2.1
	Clergy	2	0.6

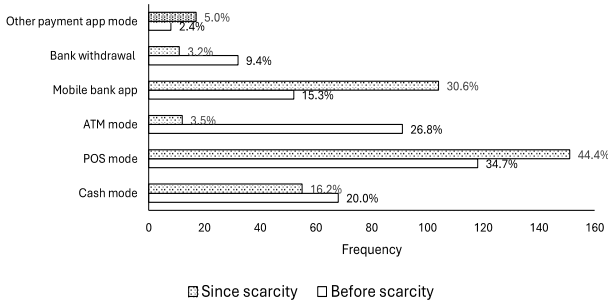

Figure 2: Mode of Transaction Before and During Scarcity.

The modes of transaction before and during the naira scarcity are as shown in Fig 2. Before the naira scarcity the most preferred mode of transaction was Point of sale (POS) accounting for 34.7%, next was Automated teller machine (ATM) 26.8%, followed by cash 20%, while other payment app mode ranked least 2.4%. During the naira scarcity it was observed that Point of sale (POS) still ranked highest as the preferred modes of transaction accounting for 44.4%, this was followed by transactions through mobile bank app 30.6% and cash ranked third with 16.2%.

Table 2: Association Between Level of Education and Mode of Transaction During Scarcity

Mode of transaction since scarcity	Response	Highest level of education				
		No formal	Primary	Secondary	Tertiary	Total
Cash	No	2(0.7)	15(5.3)	57(20)	211(74)	285(100)
	Yes	0(0)	4(7.3)	16(29.1)	35(63.6)	55(100)
POS	No	1(0.5)	6(3.2)	39(20.6)	143(75.7)	189(100)
	Yes	1(0.7)	13(8.6)	34(22.5)	103(68.2)	151(100)
ATM	No	2(0.6)	18(5.5)	69(21)	239(72.9)	328(100)
	Yes	0(0)	1(8.3)	4(33.3)	7(58.3)	12(100)
Mobile bank app	No	0(0)	19(0.081)	55(0.233)	162(0.686)	236(1)
	Yes	2(0.019)	0(0)	18(0.173)	84(0.808)	104(1)
Bank withdrawal	No	2(0.006)	18(0.055)	70(0.213)	239(0.726)	329(1)
	Yes	0(0)	1(0.091)	3(0.273)	7(0.636)	11(1)
Other payment app	No	2(0.6)	19(5.9)	71(22)	230(71.4)	322(100)
	Yes	0(0)	0(0)	2(11.8)	15(88.2)	17(100)

$p > 0.05$ indicates no significant association

Table 3: Association Between Average monthly income and Mode of Number of ANC Missed

Variable		Average monthly income [Frequency (Percentage)]				Fisher's exact test
		Low income	Middle Income	High income	Total	
How many Anc visits did you miss in the last 3 months	0	16(10.6)	46(30.5)	89(58.9)	151(100)	9.377; 0.479
	1	14(15.9)	27(30.7)	47(53.4)	88(100)	
	2	7(10)	31(44.3)	32(45.7)	70(100)	
	3	4(15.4)	6(23.1)	16(61.5)	26(100)	
	4	0(0)	2(50)	2(50)	4(100)	
	6	0(0)	0(0)	1(100)	1(100)	

The association between level of education and the mode of transaction during the period of the naira scarcity was significant with mobile bank app use (P = 0.0000), while other modes of transactions like Cash, POS, ATM and bank withdrawal were not statistically significant as shown in table 2.

The table 3 showed that about 189(55.5%) women missed between 1-6 antenatal visits due to the naira scarcity but the association between the average monthly family income of respondents and the number of ante natal care missed was not statistically significant with an overall P= 0.479.

The association between the modes of transactions and difficulty in accessing health care during naira scarcity were not statistically significant with P-values P>0.05, as shown in Table 4.

The perception of women in the study on the prolonged effect of the naira scarcity on pregnancy outcome and pregnant women's well-being were 266(78.2%) and 310 (91.2%) respectively as shown in table 5. They are believed to be associated with adverse pregnancy outcome and increased maternal mortality and morbidity.

Table 4: Association Between Mode of Transaction During Scarcity and Difficulty in Accessing Health Care

Mode of transaction since scarcity	Response	Difficulty in accessing health [Frequency (Percentage)			Fisher's exact test; p-value
		No	Yes	Total	
Cash	No	130(45.6)	155(54.4)	285(100)	0.000; 0.551
	Yes	25(45.5)	30(54.5)	55(100)	
POS	No	82(43.4)	107(56.6)	189(100)	0.000; 0.211
	Yes	73(48.3)	78(51.7)	151(100)	
ATM	No	146(44.5)	182(55.5)	328(100)	0.000; 0.036
	Yes	9(75)	3(25)	12(100)	
Mobile bank app	No	110(46.6)	126(53.4)	236(100)	0.000; 0.326
	Yes	45(43.3)	59(56.7)	104(100)	
Bank withdrawal	No	149(45.3)	180(54.7)	329(100)	0.000; 0.380
	Yes	6(54.5)	5(45.5)	11(100)	
Other payment app	No	150(46.6)	172(53.4)	322(100)	2.629; 0.215
	Yes	5(29.4)	12(70.6)	17(100)	

Table 5: Perception of the effect of Naira Scarcity on health of pregnant women

Variable	Response	Frequency (No)	Percentage (%)
Tendency for poor pregnancy outcome due to naira scarcity	No	74	21.8
	Yes	266	78.2
Protracted naira scarcity will adversely affect health of pregnant women	No	30	8.8
	Yes	310	91.2

DISCUSSION

This study assessed the effect of naira scarcity and cashless policy of the central bank of Nigeria on the health seeking behaviour of pregnant women attending antenatal care in Federal Medical Centre, Keffi. The sociodemographic indices from the study shows that majority of the respondents are between ages of 30-39 yrs. This finding is similar to the one conducted in delta state by Yubing Sui et al where predominant age of women attending ANC clinic was 35-39 yrs.[14] Over 70% of the respondents have highest level of education but surprisingly about 40% of respondents were unemployed during the study time frame. It can be inferred from this finding the marginalizations of women in the labour space and the ripple effect in the economy and the overall health status of women. This is similar to findings in a study by Nghargbu where nearly 40% of the respondents

were unemployed.[15] The over- reliance on men for economic support, since most women are unemployed significantly reduces the average family income as evident in this study. Thus the financial constraints brought about as a result of naira scarcity and cashless policy might greatly affect families with just one source of income.

The mode of payments for hospital services was evaluated, and it was found that before the cashless policy and the attendant naira scarcity became a national issue, the use of point of sale (POS) in payment was popular among the pregnant women attending antenatal care in Federal Medical Centre, Keffi. It is not a surprise that this mode of payment still ranked highest, gaining more ground during the harsh realities of naira scarcity contributing a staggering 44.4% as the preferred means of transaction. This is made possible by a well-coordinated electronic payment system adopted by the hospital management.

There is a statistically significant association between the mode of transaction during the period of naira scarcity and educational status of the respondents. This is not far-fetched as about three quarter of the respondents have tertiary level of education, therefore, literate enough to make payment using mobile banking.

Assessing the difficulties encountered in seeking antenatal care and the utilization of antenatal care services during the period of naira scarcity. It was observed that vast majority of the respondents missed antenatal care visits. Over half of pregnant women missed between 1 to 6 antenatal visits between the preceding months of the naira scarcity and time of interview. About 24% of respondents that failed to make their clinic appointments due to scarcity of naira notes missed 1 clinic visit, 21% missed two visits and 0.7% missed four clinic visits. The reasons for failure to make clinic visits were difficulty in paying for transportation (67.5%), lack of cash to pay for hospital consultation and other services (55%). The overall effect of naira scarcity on these vulnerable women could negatively impact their source of income as businesses suffer from the financial constraints thus surge in the poverty level. A study on socioeconomic inequalities in maternal health service utilisation by Nwosu showed that antenatal utilisation is largely influenced by poverty.[16-17] Assessment of mode of transaction during the study time and the difficulty encountered in accessing antenatal care services shows that there is a significant association between automated teller machine use and difficulty in accessing care with the P value of 0.036. This finding reiterated the enormous burden faced by the respondents that predominantly make payments for services using automated teller machine either for direct payment or cash withdrawal. At the time of scarcity, most automated teller machine outlets including those within the hospital had long queues and long hours of waiting which most pregnant women can't endure due to fatigue.

The perception of respondents on the effect of naira scarcity on wellbeing of pregnant women shows that 78.2% and 91.2% of respondents believed that there is a serious threat to the pregnancy outcome and health of pregnant women respectively should the naira scarcity continues for a long time.

This sums up the socioeconomic impact of government policy on the health status of the people especially the vulnerable groups such as pregnant women in sub- urban and rural areas where poverty and illiteracy predominate.

CONCLUSION

The impact of naira scarcity and cashless policy on health seeking behaviour of pregnant women cannot be over emphasised. Array of problems such as difficulty in accessing care, missed antenatal appointments, denial of antenatal care services due to lack of cash and failure of electronic payment platforms. All the aforementioned caused antenatal care services utilisation to reduce significantly. The resulting effect of this would potentially negatively impact on the maternal health and pregnancy outcome.

Recommendations

Government monetary policy especially those with capacity to affect the well-being of pregnant women should be rightly timed. Also, sensitisation of the citizens especially rural dwellers on the role of technology driven economy and the importance of reducing the over-reliance on cash transactions as many Nigerians still find it difficult to embrace the opportunities that lie in modern day electronic transactions.

Healthcare facilities in Nigeria should embrace the numerous benefits of hospital based central electronic payment platforms for enhancement of healthcare delivery.

Limitations

A multicenter study would have given more information of the impact of this dual monetary policy on the antenatal care services utilisation among pregnant women. Constraints in access to information as this research topic are novel in nature.

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Conflict of Interest: The authors declared no conflict of interest.

Ethical approval: Health research ethics committee of Federal Medical Centre Keffi approved the conduct of this study with the reference number of the ethical clearance FMC/KF/REC/0235/23**.**

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■ Original Research Article

The Role of Salivary Progesterone in Predicting Women At-Risk of Preterm Delivery in Kano, Nigeria

Umar Suleiman Sabo[1] (umar4sabo@gmail.com), Ibrahim Danladi Muhammad[2] (ORCID: 0000-0001-6611-2951; mdibrahim422@gmail.com), Ayyuba Rabiu[3] (rayyuba.gyn@buk.edu.ng), Sumaila D. A. Shuaibu[4] (sumailashuaibu@gmail.com), Rabiu Ibrahim Jalo[5] (rabiuibrahimjalo@yahoo.com), Amina Danladi Muhammad[6] (aminadmuhd@gmail.com), Usman Ali[7] (hafusali@yahoo.com), Sherifah Sheriff[8] (sheryfasheriff@gmail.com), Ibrahim Adamu Yakasai[9] (ibrahimyakasai57@hotmail.com)

[1]Department of Obstetrics and Gynaecology, Murtala Muhammad Specialist Hospital, Kano – Nigeria; [2]Department of Obstetrics and Gynaecology, Aminu Kano Teaching Hospital, Kano – Nigeria; [3]Department of Obstetrics and Gynaecology, Bayero University, Kano – Nigeria; [4]Department of Obstetrics and Gynaecology, Bayero University, Kano – Nigeria; [5]Department of Community Medicine, Bayero University Kano – Nigeria; [6]Department of Family Medicine, Aminu Kano Teaching Hospital, Kano; [7]Department of Chemical Pathology, Aminu Kano Teaching Hospital, Kano – Nigeria; [8]Department of Chemical Pathology, Aminu Kano Teaching Hospital, Kano – Nigeria; [9]Department of Obstetrics and Gynaecology, Bayero University, Kano – Nigeria

Correspondence

Ibrahim Danladi MUHAMMAD
Department of Obstetrics and Gynaecology
Aminu Kano Teaching Hospital
P.M.B. 3452, Zaria Road, Kano
: mdibrahm422@gmail.com
ORCID ID: 0000-0001-6611-2951

ABSTRACT

Background: Vaginal fetal fibronectin assay has been used as a gold standard biomarker for the prediction of preterm birth especially among symptomatic pregnant women with relatively good sensitivity and high specificity. However, recent evidence is emerging that salivary progesterone assay can be used to predict preterm birth. **Methodology**: A cohort study was used to assess the predictive values of salivary progesterone in women at-risk for preterm delivery at a tertiary hospital in Kano – Nigeria. Salivary samples were collected for progesterone level assay between 28-32weeks of gestation among 135 asymptomatic pregnant women. The study participants were followed up and the gestational age of delivery was determined, and receiver operator characteristic curve was plotted to determine the predictive cut off value for salivary progesterone. **Results**: The mean salivary progesterone was found to be 854.24 ± 192.25pg/ml and 1599.06 ± 226.09pg/ml for those who had preterm and term deliveries respectively. There was a statistically significant difference in the mean salivary progesterone between the two groups. At a cut off value of 1253.3pg/ml, salivary progesterone was found to have a Sensitivity of 100%, Specificity of 90.8%, Positive Predictive Value of 85.7 and Negative Predictive Value of 100%. **Conclusion**: This study found salivary progesterone quantitative assay to be useful in predicting preterm birth among women at-risk, with high diagnostic accuracy. Therefore, it can be used as screening tool for women at risk of preterm delivery.

Key words: Salivary; Progesterone; Assay; Preterm

INTRODUCTION

Preterm birth is defined as the delivery of a baby before 37 completed weeks, after the age of viability.[1] Age of viability however differs among regions of the world, in developed nations like the United Kingdom and United States of America, 24 and 22 weeks respectively are used as their ages of viability, while in sub-Saharan Africa including Nigeria 28 weeks is used as the age of viability.[2,3]

Worldwide about 15 million babies are born preterm annually.[4] However, the incidence varies significantly across the globe. The countries with the greatest number of preterm births are; India, China, Pakistan, Indonesia, the United States of America and Nigeria,[4] mostly due to the increasing number of pregnancies from assisted reproductive technology and multiple gestation. The incidence of preterm delivery in southern Nigeria was quoted at around 16.9%,[5] with a rate of 12% in North central Nigeria[6] and a rate of 6.9% in North-western Nigeria.[7]

Previous studies have shown that effort in prolonging pregnancy among women with preterm labour has not yielded any significant result, moreover the efficacy and long term safety of the drugs used in the management of preterm labour especially tocolytics have not been proven, therefore many sonological, clinical and biological markers have been suggested for predicting preterm birth, some of the biomarkers proposed include corticotropin releasing hormone (CRH), human chorionic gonadotropin (HCG), cervicovaginal fetal fibronectin and serum progesterone and estriol.[8] The aim is to develop a biomarker that is rapid, and simple to perform with high sensitivity and specificity for the prediction of preterm delivery. Accurate prediction of preterm birth will help in the early commencement of preventive measures, especially among asymptomatic women, while for symptomatic women it will aid in-utero transfer to secondary and tertiary health facilities where neonatal services are readily available.

Transvaginal ultrasonography is the gold standard method for cervical length measurement in the second trimester and screening for spontaneous preterm delivery.[9,10,11] However, the cultural acceptability of transvaginal ultrasonography, the need for skilled sonologist and repeated sessions of transvaginal cervical length measurement, coupled with multiplicity of aetiology of preterm birth are some of its shortcomings.
Salivary progesterone has been shown to correlate well with serum concentration, and therefore reflect the unbound, unconjugated form which is the biologically active form.[12] Therefore salivary progesterone if found to be valuable in predicting preterm birth among women at-risk, it will go a long way in preventing preterm birth. Salivary progesterone has the advantage of easy sample collection, non-invasiveness, cost and requires simple technology that is readily available in our environment, and can be offered to both patients with or without symptoms of preterm birth.

This study aim to determine the predictive value of salivary progesterone quantitative assay for preterm delivery in women at-risk attending antenatal clinic in Aminu Kano Teaching Hospital, Kano – Nigeria.

MATERIALS AND METHODS

A prospective cohort study was conducted at the Obstetrics and Gynaecology Department of a tertiary hospital in Kano, Nigeria. The study population comprised pregnant women attending antenatal clinic. Pregnant women with singleton or multiple live fetuses between the gestational ages of 28-32 weeks with known risk of preterm delivery were included. Women with cerclage in-situ, those with chronic medical conditions, those with premature rupture of membranes (PROM)/cervical dilation >2cm and those with preterm labour were excluded. One hundred and thirty-five (135) clients that fulfilled the inclusion criteria were recruited for the study. The purpose and nature of the study was explained to the patients, and written consent was obtained.

Measurement of Variables

An interviewer administered questionnaire was used to obtain information such as age, parity, gestational age (from LMP/first trimester scan), weight, height, BMI, educational status, previous obstetrics history and socioeconomic status. Salivary samples were collected for progesterone level assay between 28-32weeks of gestation from the study participants. Free progesterone level in saliva was measured using the Salivary Free Progesterone ELISA Kit (PRG32-K01). The study participants were followed up and the gestational age of delivery was determined.

Data Analysis

The results were collated and analysed using SPSS version 27 software (IBM Corporation, Armonk, NY). The participants were grouped into two based on the delivery gestational age. Those that delivered at 37 weeks and above were categorized as term while those that delivered before 37 weeks were Preterm. The mean salivary progesterone for term and preterm delivery was determined and presented in tables. Qualitative variables were presented using frequencies and percentages where appropriate and presented in tabular forms and figures. Student t-test was used to determine difference in mean salivary progesterone between the two groups. *P* value <

0.05 was considered statistically significant. The sensitivity, specificity, positive predictive value, and negative predictive value were determined using the predictive validity test. Receiver operating curve (ROC) graph was plotted to determine the cut off value for salivary progesterone with the highest predictive value.

RESULTS

The mean age of participants was 34.8±6.06 and 34.36±5.91 years among patients who delivered preterm and term respectively. Majority of the patients were multiparous in both groups. Majority were Hausa/Fulani by tribe in both groups, and mainly of low socioeconomic status.

Table 1: Socio-demographic characteristics

Characteristics	Preterm Frequency(percentage)	Term Frequency(percentage)	P-value
Age			
Mean ± SD	34.79 ± 6.06	34.36 ± 5.91	0.69
< 20	0(0)	2(2.3)	
20 -24	5(10.4)	7(8.0)	
25-29	4(8.3)	10(11.5)	
30-34	7(14.6)	7(8.0)	
35-39	23(47.9)	50(57.5)	
≥40	9(18.8)	11(12.6)	
Total	48(100)	87(100)	
Parity			0.52
0	2(4.2)	5(5.7)	
1-4	32(66.7)	64(73.6)	
≥5	14(29.2)	18(20.7)	
Total	48(100)	87(100)	
Ethnicity			0.68
Hausa/Fulani	41(85.4)	77 (88.5)	
Igbo	1(4.2)	1 (1.1)	
Yoruba	2(4.2)	1 (1.1)	
Others	4(8.3)	8 (9.2)	
Total	48 (100)	87 (100)	
Socioeconomic Status			0.24
High	19(39.6)	25(28.7)	
Medium	10(20.8)	29(33.3)	
Low	19(39.6)	33(37.9)	
Total	48(100)	87(100)	
Anthropometric & Obstetrics Characteristics.	**Preterm (mean ± SD)**	**Term (mean ±SD)**	**P-Value**
Weight	70.33 ±12.281	72.21 ±12.081	0.39
Height	159.198±5.251	158.149 ±4.87	0.25
BMI	27.67±3.92	28.8±4.02	0.11
Booking G.A	24.27 ±3.09	23.37 ±2.79	0.09

The mean weight was 70.33±12.3, and 72.21±12.08kg in preterm and term respectively. The mean height was 159.20±5.25 and 158.15±4.87cm in preterm and term parturient respectively. The body mass index (BMI) were 27.67±3.92 and 28.8±4.02 respectively, while their mean gestational age at booking were 24.27±3.92 and 23.37±2.79weeks respectively.

Table 2: Predictive Value of Salivary Progesterone Assay

Salivary progesterone (pg/ml)	Preterm	Term	Total
≤1253.85	48	8	56
>1253.85	0	79	79
Total	48	87	135
Sensitivity 100%	Specificity 90.8%	PPV 85.7%	NPV 100%

Table 3: Mean Salivary Progesterone Level in Preterm and Term Delivery

	Preterm (Mean ±SD)	Term (Mean ±SD)	P-Value
Salivary Progesterone (pg/ml)	854.242±192.25	1599.062±226.091	<0.05

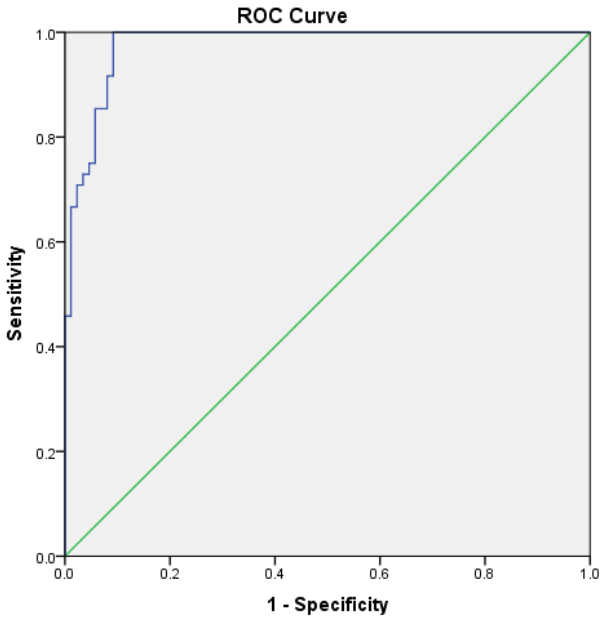

Figure 1: Receiver operator curve (ROC) for salivary progesterone test

Figure 1

Area	Std. Error[a]	P-Value	95% Confidence Interval	
			Lower Bound	Upper Bound
.976	.010	.000	.956	.997

The mean salivary progesterone was found to be 854.24 ± 192.25 and 1599.06 ± 226.09 for those who had preterm and term deliveries respectively. There was a statistically significant difference in the mean salivary progesterone between the two groups. This is shown in Table 2.

A receiver operator characteristic curve was plotted (Figure 1). At a cut off value of 1253.85pg/ml, salivary progesterone was found to have a Sensitivity of 100%, Specificity of 90.8%, Positive Predictive Value of 85.7 and Negative Predictive Value of 100% . This is shown in Table 3.

DISCUSSION

This study found that salivary progesterone assay had a high predictive value, with high sensitivity, specificity, negative predictive value, positive predictive value and accuracy at a cut-off point of 1253.85pg/ml. At this value, salivary progesterone had sensitivity of 100%, specificity of 90.8%, positive predictive value of 85.7%, negative predictive value of 100%, and accuracy of 94%. This is similar to the findings of a study conducted in university hospital Egypt, where the sensitivity, specificity, positive predictive value, negative predictive value and accuracy were 85%, 90%, 98.5%, 85.7%, and 92.1% respectively, using a cut-off point of ≤933.6pg/ml of salivary progesterone.[13] The difference in cut-off point of salivary progesterone used in their study may be due to difference in gestational age of recruitment between 26 to 34weeks gestation, and their study was a case control study in which their cases are women with signs of labour, and healthy pregnant women as control.[13] Another study in Egypt to assess the role of salivary oetriol and progesterone among women at risk found a similar sensitivity, specificity, positive and negative predictive values of 100%, 97.8%, 97.8% and 100% respectively, at salivary progesterone cut-off point of 1.6ng/ml.[14]

Another study conducted in a teaching hospital, Iraq to compare the predictive values between cervical length measurement and salivary progesterone at cut-off point of 234.3pg/ml found a sensitivity, specificity, positive and negative predictive values and accuracy of 96.7, 90.0, 90.6 and 96..4% respectively.[15] The difference may be attributed to smaller sample size of 30, methodology being a case-control study, including symptomatic women, and setting a lower progesterone cut-off value.

In another study conducted in Delhi, India, where salivary progesterone was assayed in asymptomatic pregnant women between 24 to 28weeks of gestation, it was noticed that salivary progesterone level declines from first to second visit among women that delivered before 34weeks of gestation, with salivary progesterone cut-off point set at 2575pg/ml, below which more than 80% of participants delivered before 34weeks of gestation, with sensitivity, specificity, positive predictive and negative predictive values of 83, 86, 60 and 95% respectively.[16] The difference in the above study may be attributed to gestational age of recruitment between 24 to 28weeks, and the use of higher salivary cut-off point of 2575pg/ml, thereby having lower predictive values.

Another study in Madras, India, where salivary progesterone assay was compared with trans-vaginal cervical length measurement to predict preterm birth at 24 to 28weeks of gestation and repeated at 29 to 32weeks of gestation, reported salivary progesterone sensitivity and specificity of 100% and 94.2% at cut-off point of 3903pg/ml and sensitivity and specificity of 100% and 100% at cut-off point of 2975pg/ml respectively.[17] The difference may be attributed to gestational age of recruitment, and smaller sample size of 90.

The mean salivary progesterone was 854.242±192.25 and 1599.062±226.091pg/ml among study participants who had preterm and term delivery respectively. This is similar to the findings in a case-control study in Cairo Egypt, where cervical length measurement and salivary progesterone was compared among cases and controls at similar gestational age of recruitment between 26 to 34weeks, they found a higher predictive value for salivary progesterone than cervical length measurement with mean salivary progesterone of 728.9±222.3 and 1099.9±189.4pg/ml among cases and controls respectively.[18]

CONCLUSION

This study found salivary progesterone quantitative assay to be useful in predicting preterm birth among women at-risk, with high diagnostic accuracy. Therefore, it can be used as screening tool for women at risk of preterm delivery.

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■ Original Research Article

Domestic Violence in Antenatal Attendees at Alex Ekwueme Federal University Teaching Hospital Abakaliki, Ebonyi State, Nigeria: Prevalence, Pattern and Determinants

Emmanuel Chijioke Uwakwe[1], Darlington-Peter Chibuzor Ugoji[2*], Kelvin Emeka Ortuanya[3], Paschal Chijioke Okoye[2], Enemma Christian Enemma[1], Chukwuma Elom[1]

[1]Department of Obstetrics and Gynaecology, Alex Ekwueme Federal University Teaching Hospital Abakaliki, Ebonyi State, Nigeria; [2]Department of Obstetrics and Gynaecology, David Umahi Federal University Teaching Hospital, Uburu, Ebonyi State, Nigeria; [3]Department of Obstetrics and Gynaecology, Enugu State University Teaching Hospital Parklane, Enugu State, Nigeria

***Correspondence**

Darlington-Peter Chibuzor UGOJI

darlingtonpeter2012@gmail.com
+2348068748644
ORCID ID: 0000-0003-4962-8053

ABSTRACT

Background: Domestic violence is a form of subjugation on women by their intimate partner. It is associated with adverse consequences particularly when it occurs during pregnancy. The aim of this study was to determine the prevalence, Pattern and determinants of domestic Violence in antenatal attendees in our facility. **Method:**A self-administered pretested questionnaire was used for this cross sectional survey of pregnant women who attended antenatal clinic between September to December 2016 at Alex Ekwueme Federal University Teaching Hospital Abakaliki. Data were inputted into Epi info software and analyzed. The level of significance was set at $p<0.05$. **Results:** A total of 400 questionnaires were correctly filled out of 409 questionnaires that was administered. The questionnaires were then analyzed using the Epi info. Bivariate Analysis between sociodemographic variables and presence of domestic violence was done. The mean age of participants was 28.8 years. The prevalence of domestic violence was 61%. Half of responders (50.6%) suffered emotional violence, followed by physical violence (42%), then sexual violence (32%). The main determinants of domestic violence were early age of marriage, marital status and the socio-economic status of the partners. **Conclusion:** The prevalence of domestic violence was high and most of these cases were not reported. Public health enlightenment and incorporation of domestic violence management into the antenatal care models are critical and effective intervention to assist our client to have an optimal pregnancy outcome.

INTRODUCTION

Over the last 25 years increasing attention has been devoted to domestic violence (DV), initially defined as abuse committed against a spouse, former spouse, fiancée, boy- or girlfriend, or cohabitant[1]. As time has passed, the definition has been broadened to include other family members--elders, children, and siblings[1]. The Centers for Disease Control and Prevention (CDC) now uses the term intimate violence for intentional emotional

or physical abuse inflicted by a spouse, ex-spouse, a present or former boyfriend, girlfriend, or date[1]. Domestic violence is the most common form of violence against women[2]. It is predominant in patriarchial societies where such structures are endorsed and reinforced by legislations, customs and religious systems[2].

Domestic violence can be physical, sexual, emotional, economical or psychological actions or threats of action that influence another person[2-4]. These attitudes intimidate, manipulate, humiliate, isolate, frighten, terrorize, coerce, threaten, blame, hurt, injure or wound someone[2]. Domestic violence may take on different forms within specific communities and can include so-called 'honour killings' where members of the abuser's family including mothers and sisters may encourage or instigate the abuse[5,6]

Domestic violence does not only affect those who are abused, but also has substantial effects on family members, friends, co-workers, other witnesses, and the community at large[7]. Children who grow up witnessing domestic violence are amongst those who are seriously affected by this crime[7]. Frequent exposures to violence in the home not only predisposes children to numerous social and physical problems, but also teaches them that violence is a normal way of life therefore increasing their risk of becoming society's next generation of victims and abusers.[7]

Pregnancy when coupled with domestic violence amplifies the health risks of the women[8,9]. Abuse during pregnancy many have adverse physical and psychological effects for both the mother and fetus[8,9]. Significant correlation observed between incidence of domestic violence and pregnancy[8,9]. Although female-to-male partner violence occurs in these settings, the overwhelming form of domestic violence is perpetuated by men against women[9,10]. Domestic violence during pregnancy has been associated with miscarriages, ante partum haemorrhages, Stillbirths, preterm birth, fetal injuries, and low birth weight[13,14]. It also leads to additional risks for the mother such as increased mental health problems, suicidal attempts, worsening of chronic illness, substance abuse, anxiety, stress, chronic pain etc.[13,14]

Because of the consequences of domestic violence to the individual and the society as a whole, various countries has adopted laws that prohibit and punish perpetrators thereby providing help for the at risk group[3]. In Nigeria since the year 2000, there have been debates aimed at enacting laws against domestic violence[3]. This has given way to domestic violence and other related bill in 2006, which is still pending at the national assembly[3]. However, in 2007, Lagos State Government passed a bill to provide protection against domestic violence and others matters related to it[3]. Subsequently, four other states followed thereafter[3]. These states include Cross River, Ekiti, Ebonyi, and Jigawa[3]. The obstetrician in conjunction with other health workers are best suited to pilot the advocacy groups and implementation of these laws, hence the need for this study in our Centre to drive policies toward achieving this goal during clinical visit.

METHODOLOGY

Study Design: This was a cross-sectional study conducted by use of pretested semi-structured self-administered questionnaire. The questionnaires were pretested for clarity, assessment of length of time of administration, comprehension and other attributes at Mile Four Hospital Abakaliki. The questionnaire assessed the socio-demographic, determinants and the pattern of domestic violence in the participant. Informed consent was obtained from the respondents before the questionnaires are administered.

Time of Study: This study was conducted between 1st September 2016 and 30th December 2016.

Study Population: Pregnant women who came for antenatal clinic and who also gave consent for this study were selected for this study.

Sample Technique: Simple random sampling technique was used for this study. The sampling was done to accommodate all the antenatal days. From Monday to Friday.

Sample Size Determination: The sample size was obtained using Fishers 1998 Formula for sample size determination:

$N=Z^2Pq/d^2$

Where N= desired sample size population

Z=set at 1.96 is the critical value that divides the central 95% of Z distribution from 5% in the tail

P=prevalence of domestic violence in my locality

q=1-p

d=0.05 (5% error margin)

Also adding the 10% attrition rate. Using prevalence of 44.6%

N=1.96 x 1.96 x0.44x0.55/0.5x0.5=371.86

10% attrition is 37%

Thus N=371.9+37=409 antenatal attendees

Analysis of Data: The data obtained was entered into the computer. EPI info version 7 was used for the analysis of the data. The test of significance was determined and the P-value of less than 0.05 was taken to be statistically significant.

RESULTS

Table 1 showed the age, marital status, parity, children sex distribution and religion among respondents.

Table 1. Distribution of the Demographic Characteristics of the Respondents

Characteristics	Frequency	Percentage
Age (yrs)		
15-20	**50**	**12.22**
21-26	**113**	**27.63**
27-32	**122**	**20.83**
33- 38	**81**	**19.8**
39- 44	**43**	**10.51**
Total	**409**	**100.00**
Marital status		
Single	**33**	**8.1**
Married	**326**	**79.7**
Separated	**28**	**6.8**
Divorced	**22**	**5.4**
Total	**409**	**100.00**
Number of children		
None	**157**	**38.4**
Primigravidae	**148**	**36.2**
2-4	**72**	**17.6**
5 and above	**32**	**7.8**
Total	**409**	**100**
Sex of children		
Only male	**84**	**20.5**
Only female	**96**	**23.5**
Both male and female	**72**	**17.6**
Total	**409**	**100.00**
Religion		
Christianity	**338**	**82.6**
Islam	**31**	**7.6**
African traditional religion	**12**	**2.9**
Others	**28**	**6.8**
Total	**409**	**100**

. Table 2: Employment Status

Characteristics	Frequency	Percentage
Employment status (wife)		
House wife	81	19.8
Unskilled worker	88	21.5
Civil servants	190	46.5
Vocational services	50	12.2
Total	409	100
Employment status (Husband)		
Unemployed	81	19.8
Unskilled	88	21.5
Semiskilled	92	22.5
Senior public servants	98	24.0
Vocational services	50	12.2

Table 2 showed the employment status of the couples who participated in the study.

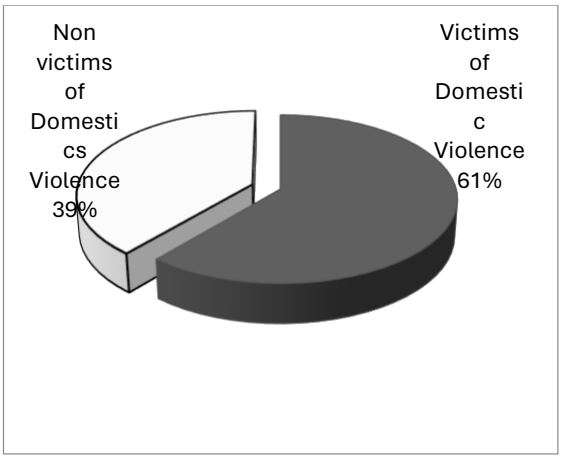

Figure 1: Prevalence of Domestic Violence

This showed that majority of the participant underwent and may still be undergoing domestic violence.

Table 3: Pattern Of Domestic Violence

Pattern of Domestic Violence	Frequency	Percentage
Physical violence		
Shouted or verbally abused you	125	30.6
FLogging	101	24.7
Kicked, dragged or beaten you up	40	9.8
Pushed or Shoved	96	
23.5		
used a weapon	6	1.5
Sexual Violence		
Having sexual intercourse with your spouse without		
Your due consent	116	28.4
Forced by your spouse for sex in a degrading		
or humiliating	31	7.6
Emotional Violence		
Not allowing you visit your family and friends	52	12.7
Ignored you and treated you indifferently	75	18.3
Deprives you of financial resources	61	14.9
Stopped you from going to church due to a little		
Misunderstanding with him	33	8.1
Insisted on knowing where you are at all times	48	11.7
Suspected that you are unfaithful	18	4.4

This table showed the pattern of domestic violence among the respondents.

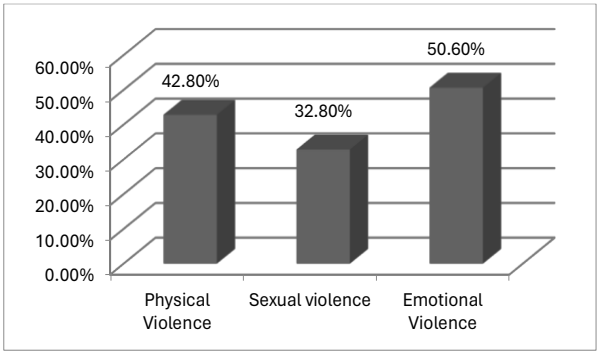

Figure 2: Prevalence of Different Types of Domestic Violence in the Study Area

This showed that emotional violence was the commonest type of violence among the respondents.

Table 4: Logistic Regression Model for Determinants of Domestic Violence

Predictors	B (regression Coefficient)	F test	P-value
Age	1.155	0.000	0.000
Marital status Married Non-married	1.808	151.51	0.006
Religion Christians Other religions	1.712	0.745	0.048
Occupational Status	1.408	79.00	0.002

This table 4 showed that all the predictors were associated with domestic violence.

DISCUSSION

Domestic violence is defined as a pattern of abusive behavior in any relationship that is used by one partner to gain or maintain power and control over another intimate partner[2]. The prevalence rate of domestic violence in this study was 61%.This is higher than 44.6% prevalence rate that was gotten by Onoh et al[3] in there study on Prevalence, Pattern and Consequences of Intimate Partner Violence During Pregnancy at Abakaliki Southeast, Nigeria in 2013 . This was the same locality for this study few years after. This clearly shows that there has been an increase in the prevalence of domestic violence. No factor in comparism of both results was able to define the reason for rise in the prevalence of domestic violence.

Among respondents who had experienced domestic violence, Emotional violence accounted for the highest proportion and over four-fifths had suffered at least 3 forms of violence. Also, 8.5% had experienced physical violence even during pregnancy. This is at variance with the result of a study done in Nsuka, Nigeria, in 2013 which showed that verbal violence was more common than physical violence[12]. Many victims of violence are less likely to associate insults and verbal abuse with domestic violence as they would with various forms of physical violence [5,6,7].

Prevalence of domestic violence was found to be closely associated to the demographic characteristics. Although the occupation of the husband is a major determinant in this study. Other determinants include not having both male and female children, educational status of both couples and occupational status of the wife, these other factors and not statistically significant. Several studies and articles have expounded on the fact that while Christianity and Islam do not promote or encourage domestic violence, the role required of women as taught by the religions is sometimes misinterpreted as men being superior and therefore justified in his attitude to have control on their wives regardless of how he gains such control[9]. Many women are forced under a false interpretation of the religion they practice to forebear bodily harm and forced sexual intercourse and count it all as being a form of submissiveness to their husbands[9]. The association between religion and prevalence of domestic violence was however not statistically significant. Domestic violence was most prevalent among families with low socio-economic status.

CONCLUSSION

The prevalence of domestic violence obtained from this study is 61%, which is high. Occupation of the husband has a significant impact on the prevalence of domestic violence. Some women who experience domestic violence in pregnancy have been victims of domestic violence in the past. It was found from this study that higher socio-economic status was protective. Emotional violence is the predominant pattern of violence from this study. Most of the domestic violence experienced by women is not reported.

Recommendation

1. Screening tools for identification and care of victims of domestic violence in pregnancy should be incorporated to the antenatal care model.

2. Improvement in socio-economic status will lead to significant reduction in the prevalence of domestic violence.
3. Also creation of jobs for the unemployed and creation of avenues for diversification of sources of income.
4. Laws prohibiting violence against women should be enacted adopted and strengthened at various levels of government is essential in taming this unwholesome act.

Informed Consent: A signed consent was obtained by the researcher and research assistants before recruitment of the participants into the study after appropriate counseling.

Ethical Considerations: Ethical clearance was obtained from the Hospital and Research Committee (HREC) of the Alex Ekwueme Federal University Teaching Hospital. This study was conducted in compliance with the ethical standards of our institution on human subjects as well as with the Helsinki Declaration.

Funding: The entire financial burdens were burn by the researchers.

Author Contributions: Emmanuel C UWAKWE conceptualized the topic. All the authors were involved in data collection and literature review. Emmanuel C UWAKWE and Darlington-Peter C UGOJI supervised the work. All the authors wrote the final draft and approved the final manuscript.

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■ Original Research Article

Pattern of Cervical Cytology in a Tertiary Health Care Centre in Abuja – The Capital City of Nigeria

Juliet O. Offor[1*], Waleola H. Akinboboye[1], Chinwe I Igwilo[1], Izuchukwu B. Achusi[2], Michael Izuka[3]

[1]Department of Obstetrics & Gynaecology, Federal Medical Centre Abuja FCT Nigeria.
[2]Department of Anatomic Pathology, Federal Medical Centre Abuja FCT Nigeria.
[3]Department of Public Health, Federal Medical Centre Umuahia

ABSTRACT

Background: Cervical cancer is a preventable disease. Its incidence and mortality have reduced drastically in countries with well-established cervical cancer screening programmes. **Objectives:** To determine the pattern of cervical cytology and associated risk factors in women routinely screened at the Federal Medical Centre Abuja. **Methodology:** This was a cross-sectional study conducted from September 2018 to September 2019. An equal number of 270 women each were recruited from the postnatal, family-planning and gynaecological clinics giving a total of 810 women enrolled in the study. Informed consents were obtained from the participants and data on risk assessment was collected using an interviewer administered structured questionnaire. Afterwards, a cervical sample was taken from each participant's transformation zone (liquid-based cytology), and results were reported using the Bethesda classification. The data was analysed and presented as tables of frequencies/percentages and central tendencies. The risk factors for cervical dysplasis were determined using multiple logistic regression analysis. Statistical significance was set at p-value < 0.05. **Results:** Overall, the prevalence of abnormal/dysplastic smears was 3.95% while 96.05% had negative smears for intraepithelial lesion or malignancy (NILM). According to the severity of dysplasia, ASCUS had prevalence of 2.96%, ASC-H 0.37%, LSIL 0.37% and HSIL 0.25%. Group specific prevalence was highest among the postnatal group (6.3%). Age was the only factor associated with increased likelihood of developing dysplasia. **Conclusions:** The prevalence of cervical dysplasia is relatively low in Federal Medical Centre Abuja. Instituting routine screening of all sexually active women at every opportunity especially in postnatal clinics be encouraged as this will help in early detection of cervical dysplasia and management, thus reducing the incidence of cervical cancer.

Keywords: cervical dysplasia, screening, sexually active women, pap smear, Bethesda classification

***Correspondence:**

Juliet O. Offor,

Department of Obstetrics & Gynaecology, Federal Medical Centre Abuja FCT Nigeria
joluchioffor@yahoo.com

INTRODUCTION

Cervical cancer, globally, is the 4th most common cancer in women in both incidence and mortality.[1,2] The burden has progressively reduced in most developed countries with well-established cervical cancer screening and management programmes[2] The high burden of the disease in developing economies of the world such as Nigeria,where it ranked 2nd in women, has been linked to lack of national policies on effective cytological screening and treatment, poverty and high rates of unawareness[3].

Cervical cancer is a highly preventable malignancy preceded by precursor lesions that are treatable and are generally referred to as cervical dysplasia or cervical intraepithelial neoplasia when suspected by cytology or diagnosed by histology respectively[4]. Cervical dysplasia has a variable prevalence depending on the socio-economic characteristics and geographical areas of the population being studied. It can be as low as 1.05% and as high as 13.7% in family planning clinics and sexually transmitted disease clinics respectively[5]. A prevalence rate of 19.8% was reported in Sokoto, a state located in the Northwestern region of Nigeria[5], 13.9% reported in a primary care clinic by Mosuro et al in Ibadan, South west Nigeria[6] and 16.2% recorded in Benin by Obaseki and Nwafor[7].

The human papilloma virus (HPV) has been implicated in the aetiology of Cervical intraepithelial neoplasia (CIN) and cervical cancer and it is sexually transmitted to susceptible women. Other risk factors that may enhance the oncogenic potential of HPV include multiple sexual partners; high parity, smoking and immunosuppression[4, 8-9].

Cervical cytology using the conventional Papanicolaou (Pap) smear test and Liquid - based cytology, as well as Human papillomavirus (HPV) testing and colposcopy are the major screening methods used worldwide.[9-12] Pap smear testing has been a key factor in the global strategy for reducing cancers with evidence showing its effectiveness in reducing the incidence and mortality associated with cervical cancer in developed regions of the world with national routine screening programs[13,14]. This unparalleled success in cancer prevention was most importantly due to the partnership between cervical cytology screening and treatment of colposcopically detected high grade dysplasia[2]. In Nigeria, and other countries in sub-Saharan Africa that lack structured screening programmes, the incidence is still high. Cytological findings are reported using the Bethesda system which was developed as a uniform system of terminology with the aim of providing guidance on clinical management[14-16].

Recent epidemiological studies on the incidence and prevalence of these premalignant cervical lesions are few in our environment and none documented in Federal Medical Centre Abuja-the second largest tertiary care centre within the metropolis of the Nigerian capital city. This study was designed to determine the pattern of cervical cytology amongst women that were referred to the cervical cancer screening clinic from other clinics within and outside the hospital.

MATERIALS AND METHODS

Study Designs and Setting

This was a cross-sectional study carried out at the Cervical Cancer Screening Clinic, a section of the Gynaecologic Oncology Unit of the Obstetrics and Gynaecology Department of the Federal Medical Centre Abuja (FMC Abuja). FMC Abuja is one of the main referral tertiary hospitals with a functional Cervical Cancer Screening, Colposcopy and modern treatment facility (for CIN) in Abuja. Federal Capital Territory (FCT) has an estimated population of over 3 million comprising different ethnic groups [17]. FCT is located in the North Central region of the nation and bounded by states including Nassarawa, Kogi, Kaduna and Niger[18]. This Cervical Cancer Screening Clinic receives patients from postnatal, family planning, gynaecological and general outpatient clinics within the hospital and referrals from other hospitals. Since inception in 2015, the clinic screens on an annual basis about 1000 – 2500 women.

Study Population

This included consenting non-pregnant, sexually active women aged 25 to 65 years who came for routine cervical screening or referred from any clinic/hospital to the Cervical Cancer Screening clinic. Women who were currently pregnant, had previous total hysterectomy, had cervical cancer and had not given consent were excluded from the study.

Sample Size Estimation

The sample size was calculated using the following formula $N = Z^2 P (1-P)/D^2$ [19]. Where, N is the minimum sample size, P is the prevalence value, D is the absolute precision of the study which is 0.05. and Z is the area under normal curve corresponding to 95% confidence interval = 1.96. Using 19.8% prevalence of cervical dysplasia in a previous study done amongst women who were attending the Family Planning and Gynaecology clinics in Usman Dan-Fodio University Teaching Hospital Sokoto [5]. Using a 10% non-response rate, we

calculated a sample size of 810, which was then distributed equally amongst the three study groups (postnatal, family-planning and gynaecological clinics).

Study Procedure and DATA Collection

All women who met the eligibility criteria and gave written informed consent were recruited by consecutive sampling technique over a period of one year from 18th September 2018 to 17th September 2019. A structured questionnaire was administered by the investigator and a trained assistant to obtain participants' personal information. They were properly informed about the purpose of the study and a written consent was obtained. The questionnaire included information on socio demographic characteristics, smoking, age at first sexual intercourse, sexual habits of the woman and her spouse, lifetime use of contraceptives and previous papanicolaou smear result.

Sample Collection

All pelvic examinations were performed by either a Consultant Gynaecologist or a Resident doctor in the department of Obstetrics and Gynaecology. The participant was placed in the lithotomy position and a sterile Cusco's speculum was used to expose the cervix. Following visual inspection with a good light source, the cervix was assessed for gross lesions and abnormal discharge. Cervical sample was collected with a disposable cervical broom from the transformation zone and the broom detached into the pre-labeled preservative solution (liquid-based). The samples were transferred to the Pathology laboratory for cytology (Votex method) [20] and reporting. Bethesda system of reporting was employed[15].

Statistical Analysis

Data coding, entry, cleaning, and analysis were done using Epi Info™ version 7.2.2.6 2018 [21]. Results were presented in tabular format and charts. Categorical variables were presented as frequencies and proportions and Chi Square test was used to test for associations between the outcome variables (presence or absence of cervical dysplasia) and independent risk factors at bivariate level of analysis. Multivariate analysis using Logistic regression was done to identify the significant predictors of cervical dysplasia and presented as odds ratio with 95% confidence interval. Statistical significance was set at p value < 0.05.

Ethical Considerations

Ethical approval was obtained from the Federal Medical Centre Jabi Health Research and Ethics Committee according to the declaration of Helsinki [22]. All participants were counselled prior to enrolment and signed an informed consent form. The investigators ensured strict confidentiality of participants information.

RESULTS

Socio-Demographic Characteristic of the Study Population

The overall mean age was 36.2 $\pm$ 8.7years. A greater proportion of the women who were referred from the gynaecological (gynae) clinic to the screening clinic were in the older age group (>45years) compared to the those referred from family planning or postnatal clinics. Likewise, the median parity differed significantly among the groups. Fewer grand-multiparous women were in the postnatal compared to either the family planning group or the gynae-referred counterparts. Overall, majority of the respondents had low parity and only nineteen percent had high parity (**≥4**). Majority (88.8%) had tertiary education, were currently married (89.8%), in monogamous setting (92.01%), were Christian (85.5%), and were civil servants (60.56%). See Table 1.

Of the 810 women studied 32 participants had Epithelial squamous cell abnormality; a prevalence rate of 3.95% for cervical dysplasia as shown in figure 1.
Further analysis of the types/patterns of epithelial squamous cell abnormality showed that atypical squamous cell of undetermined significance (ASCUS) was the most prevalent. Out of the 32 persons with abnormal cytology results 24 (75%) had ASCUS but overall, the prevalence of ASCUS was 2.96%, three (0.37%) had atypical squamous cell - high grade lesion not excluded (ASC-H), three (0.37%) Low grade squamous intraepithelial lesion (LSIL), and two (0.25%) High grade squamous intra-epithelial lesion (HSIL) as shown in figure 2.

Cervical Dysplasia Distribution Among Postnatal, Family Planning and Other Routine Groups

The specific prevalence of epithelial cell abnormality among each groups was sought as shown in Table 2

Table 1: Socio-demographic Characteristics

Variables	Groups RG n=270(%)	PN n=270(%)	FP n=270(%)	Total N=810(%)	χ^2	df	p
Age group					319.3	4	0.001
25-34	62 (23.0)	207 (76.7)	171 (63.3)	440(54.4)			
35-44	75(27.8)	58(21.5)	95 (35.2)	228 (28.2)			
>45	133(49.3)	5 (1.9)	4 (1.5)	142 (17.5)			
Mean Age ± SD	*43.7± 9. 9*	*31.7 ±4.7*	*33.2± 4.9*	*36.2±8.7*			
Parity					203.8	4	0.001
0-1	113 (41.9)	178(65.9)	26 (5.6)	317(39.1)			
2-3	90(33.3)	85 (31.5)	164(60.74	339(41.85)			
≥4	67 (24.81)	7 (2.6)	80 (29.63)	154(19.01)			
Median (IQR)	*2(1-3)*	*1(1-2)*	*3(2-4)*	*2(1-3.5)*			
Education level					3.44	2	0.179
≤ Secondary	25(9.3)	28(10.4)	38(14.1)	91(11.2)			
Post-secondary	245(90.7)	242(89.6)	232(85.9)	719(88.8)			
Marital status					43.52	2	0.001
Married	216(80.0)	260(96.3)	251(93.0)	727(89.8)			
Not married	54(20.0)	10(3.7)	19(7.0)	83(10.2)			
Religion					1.41	2	0.493
Christianity	226(83.7)	234(87.3)	229(85.4)	689(85.5)			
Islam	44(16.3)	34(12.7)	39(14.6)	117(14.5)			
Occupation					12.50	6	0.052
Unemployed	25(9.4)	27(10.4)	34(13.0)	86(10.9)			
Self-Employed	53(19.9)	80(30.9)	69(26.4)	202(25.7)			
Civil Servant	182(68.4)	144(55.6)	150(57.5)	476(60.6)			
Professional	6(2.3)	8(3.1)	8(3.1)	22(2.8)			
Smoking					1.99	2	0.999
No	269(100.0)	269(99.6)	269(100.0)	807(99.9)			
Yes	0(0.0)	1(0.4)	0(0.0)	1(0.1)			
Alcohol					2.88	2	0.236
No	194(72.9)	210(78.1)	209(78.6)	613(76.5)			
Yes	72(27.1)	59(21.9)	57(21.4)	188(23.5)			
Comorbidity					2.15	2	0.340
Yes	45(16.7)	33(12.2)	39(14.4)	117(14.4)			
No	225(83.3)	237(87.8)	231(85.6)	693(85.6)			
Supplement					4.89	2	0.086
No	194(73.8)	212(81.2)	207(79.9)	613(78.3)			
Yes	69(26.2)	49(18.8)	52(20.1)	170(21.7)			
Family History					1.25	2	0.534
No	247(92.5)	251(94.7)	247(94.3)	745(93.8)			
Yes	20(7.5)	14(5.3)	15(5.7)	49(6.2)			
Age at first delivery					50.56	4	0.001
<19	3(1.4)	2(0.8)	2(0.7)	7(0.9)			
20-29	154(73.7)	163(61.3)	234(87.6)	551(74.3)			
>=30	52(24.9)	101(38.0)	31(11.6)	184(24.8)			
Sexual partners					3.71	2	0.156
1.00	111(41.3)	128(47.4)	132(48.9)	371(45.9)			
≥2.00	158(58.7)	142(52.6)	138(51.1)	438(54.1)			
Coitarche					35.10	4	0.001
<19	103(38.1)	51(18.9)	71(26.3)	225(27.8)			
20-29	153(56.7)	200(74.1)	195(72.2)	548(67.7)			
≥30	14(5.2)	19(7.0)	4(1.5)	37(4.6)			
Contraceptive use					6.91	2	0.032
No	248(92.9)	253(94.1)	238(88.1)	739(91.7)			
Yes	19(7.1)	16(5.9)	32(11.9)	67(8.3)			

PN - postnatal, FP - family planning, RG - routine guide, SD = standard deviation, IQR = interquartile range, DF = degree of freedom.

The prevalence of cervical dysplasia among the 270 postnatal women was 6.3%. ASCUS type was the most prevalent form of cervical dysplasia observed in 15 (88.2%) out of the 17 cervical dysplasia reported in this group. For the remaining two participants in the group, one person had ASC-H and the other had LSIL type of cervical dysplasia. There was no HSIL in this group. In the Family planning group, only three (1.11%) women developed cervical dysplasia and all of them developed the ASCUS form.

Among the 270 other women for routine gynaecological check, the prevalence of cervical dysplasia was 4.44% (12). The prevalence of ASCUS, ASC-H, LSIL and HSIL were 2.2% (6), 0.7% (2), 0,7% (2) and 0.7% (2) respectively for this group. All the cases of HSIL(2) reported in the studied population were found among this subgroup. Similarly, two out of the three (66.7%) of LSIL from the studied population were found in this group.

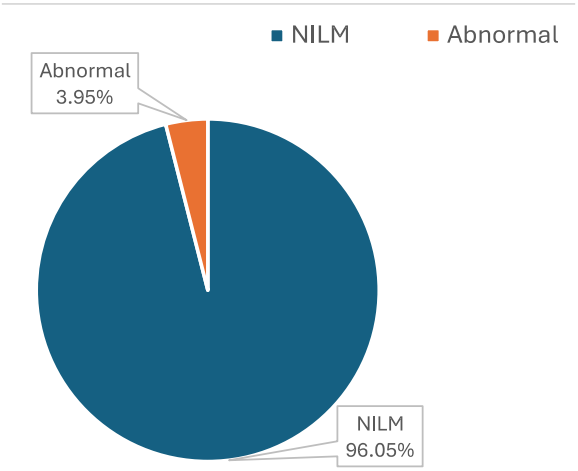

Fig 1: cytological results of the studied population

Cytological Finding Distribution Among the Study Group

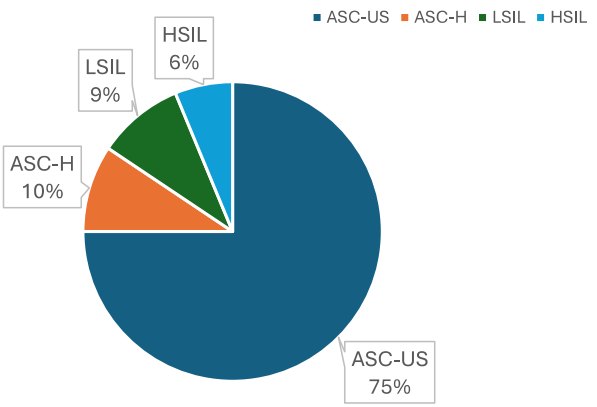

Fig 2: cytological type of the epithelial squamous cell abnormality in studied population

Risk Factors That Modulate The Oncogenic Effect Of HPV

The risk factors (advanced age, high parity, low level of education, low socio-economic status, multiple sexual partners, early age at coitarche, early age at first delivery, OCP use, smoking, marital status, married type, co-morbidities, family history of cancers and alcohol use) which modulate the oncogenic potential of human papillomavirus with its subsequent persistence and progression was sought as shown in Table 3. It was found that age was the only risk factor that was significantly associated with cervical dysplasia (p-value of 0.019).

Table 2: Distribution of Cytological findings among the 3 Groups

Variables	Groups RG n=270(%)	PN n=270(%)	FP n=270(%)	Total N=810(%)	χ^2	df	p
Smear result					9.82	3	0.007
Abnormal	12(4.4)	17(6.3)	3(1.1)	32(3.95)			
NILM	258(95.6)	253(93.7)	267(98.9)	778(96.05)			
	Epithelial Cell Abnormality						
ASC-US	6(2.2)	15(5.6)	3(1.1)	24(2.9)			
95% CI	*0.9 – 4.5*	*3.2 – 8.7*	*0.3 – 2.9*	*1.9 - 4.3*			
ASC-H	2(0.7)	1(0.4)	0(0)	3(0.3)			
95% CI	*0.1 – 2.3*	*0 – 1.7*		*0.1 – 0.9*			
LSIL	2(0.7)	1(0.4)	0(0)	3(0.3)			
95% CI	*0.1 – 2.3*	*0 – 1.7*		*0.1 – 0.9*			
HSIL	2(0.7)	0(0)	0(0)	2(0.2)			
95% CI	*0.1 – 2.3*			*0 – 0.7*			
Total	**12(4.4)**	**17(6.3)**	**3(0.1)**	**32(3.9)**			
95% CI	***2.4 – 7.4***	***3.8 – 9.6***	***0.3 – 2.9***	***2.7 – 5.4***			

The prevalence rate of NILM and epithelial cell abnormality in general population and in various categories

However, other known risk factors from previous literature were not significantly associated with cervical dysplasia in this study: high parity (p=0.055), multiple sexual partner (p=0.544), polygamous family type (p=0.280), OCP use (0.787), early coitarche (p=0.176), low level of education (p=0.817), marital status (p=0.668), early age at first delivery (p=0.164), smoking (p=0.999), alcohol use (p=0.858), co-morbidities (p=0.999), family history of cancer (0.999) and lack of multivitamin supplementation (p=0.238). See Table 4

The prevalence of cervical dysplasia rose with increasing maternal age. The prevalence rose from 2.5% to 4.4% and to 7.7% for 25-34, 35-44 and ≥45 age group respectively. Age >45 years were found to have highest numbers of ASC-H (66.7%), LSIL (66.7%) and HSIL (100%), while age 25-34 had highest number of ASCUS (41.7%). Also, the distribution of cervical dysplasia among all the parity groups showed some increase towards higher parity (para- 0-1, 2-3 &≥4 have 3.2%, 3.2% and 7.1% respectively).

Furthermore, post-secondary level of education has 87.5% of cervical dysplasia with ASCUS (91.7%), ASC-H (66.7%), LSIL (66.7%) and HSIL (100%). Upper 1 & 2 socio-economic level have 93.7% of cervical dysplasia including all of LSIL and HSIL while lower middle class 3 had 6.25% of cervical dysplasia. Those with multiple sexual partners (>2) had 31.2% of cervical dysplasia (with LSIL 66.7% and HSIL 50%), whereas those with single partners had 68.75% of cervical dysplasia (with about 75% being ASCUS). For marital

Table 3: Relationship between cytology result and Cofactors

	Dysplasia					NILM	χ^2	p*
	ASC-US	*ASC-H*	*LSIL*	*HSIL*	*Sum total*			
Age group							7.94	0.019
25-34	10(2.3)	0(0.0)	1(0.2)	0(0.0)	11(2.5)	429(97.5)		
35-44	9(3.9)	1(0.4)	0(0.0)	0(0.0)	10(4.4)	218(95.6)		
>45	5(3.5)	2(1.4)	2(1.4)	2(1.4)	11(7.7)	131(92.3)		
Parity							5.11	0.078
0-1	7(2.2)	2(0.6)	0(0.0)	1(0.3)	10(3.2)	307(96.8)		
2-3	9(2.7)	0(0.0)	2(0.6)	0(0.0)	11(3.2)	328(96.8)		
≥4	8(5.2)	1(0.6)	1(0.6)	1(0.6)	11(7.1)	143(92.9)		
Marital Status							0.18	0.668
Currently Married	23(3.2)	2(0.3)	2(0.3)	1(0.1)	28(3.9)	699(96.1)		
Not married	1(2.3)	1(0.0)	1(0.0)	1(2.3)	4(4.8)	79(95.2)		
Family type							1.38	0.280
Monogamous	20(2.9)	2(0.3)	2(0.3)	1(0.1)	25(3.6)	666(96.4)		
Polygamous	3(5.0)	0(0.0)	1(1.7)	0(0.0)	4(6.7)	56(93.3)		
Highest Educational Level							0.05	0.775
≤Secondary	2(2.2)	1(1.1)	1(1.1)	0(0.0)	4(4.4)	87(95.6)		
Tertiary	22(3.1)	2(0.3)	2(0.3)	2(0.3)	28(3.9)	691(96.1)		
Coitarche							3.83	0.176
<19	7(3.1)	2(0.9)	3(1.3)	1(0.4)	13(5.8)	212(94.2)		
20-29	17(3.1)	1(0.2)	0(0.0)	1(0.2)	19(3.5)	529(96.5)		
≥30	0(0.0)	0(0.0)	0(0.0)	0(0.0)	0(0.0)	37(100.0)		
Lifetime Sexual Partners							1.90	0.597
1.00	10(2.7)	2(0.5)	0(0.0)	1(0.3)	13(3.5)	358(96.5)		
≥2.00	14(3.2)	1(0.2)	3(0.7)	1(0.2)	19(4.3)	420(94.8)		
Age at first delivery							2.94	0.164
<19	0(0.0)	0(0.0)	0(0.0)	1(14.3	1(14.3)	6(85.7)		
20-29	21(3.8)	1(0.2)	3(0.5)	0(0.0)	25(4.5)	526(95.5)		
>=30	3(1.6)	2(1.1)	0(0.0)	0(0.0)	5(2.7)	179(97.3)		
Ever used OCP							0.07	0.338
Yes	3(4.5)	0(0.0)	1(1.5)	0(0.0)	4(6.0)	63(94.0)		
No	21(2.8)	3(0.4)	2(0.3)	2(0.3)	28(3.8)	695(93.9)		
Alcohol							0.04	0.775
Yes	6(3.2)	1(0.5)	1(0.5)	0(0.0)	8(4.3)	180(95.7)		
No	18(2.9)	2(0.3)	2(0.3)	2(0.3)	24(3.9)	589(96.1)		
Comorbidity							0.10	0.999
Yes	4(3.4)	0(0.0)	0(0.0)	0(0.0)	4(3.4)	113(96.6)		
No	20(2.9)	3(0.4)	3(0.4)	2(0.3)	28(4.0)	665(96.0)		
Supplement use							2.89	0.089
Yes	7(4.1)	1(0.6)	1(0.6)	1(0.6)	10(5.9)	156(91.8)		
No	14(2.3)	2(0.3)	2(0.3)	1(0.2)	19(3.1)	580(94.6)		
Family history of Cancer							0.00	0.999
Yes	2(4.1)	0(0.0)	0(0.0)	0(0.0)	2(4.1)	47(53.9)		
No	22(3.0)	3(0.4)	3(0.4)	2(0.3)	30(4.0)	715(96.0)		
Occupation							3.37	0.260
Unemployed	1(1.2)	1(1.2)	0(0.0)	0(0.0)	2(2.3)	84(97.7)		
Self-employ	7(3.5)	0(0.0)	3(1.5)	1(0.5)	11(5.4)	191(94.6)		
Civil Servant	14(2.9)	2(0.4)	0(0.0)	1(0.2)	17(3.6)	459(96.4)		
Professional	2(9.1)	0(0.0)	0(0.0)	0(0.0)	2(9.1)	20(90.9)		
Socioeconomic status							9.27	0.090
Upper	23(3.3)	1(0.1)	3(0.4)	2(0.3)	29(4.2)	654(95.7)		
Low /middle	1 (0.7)	2 (1.5)	0(0.0)	0(0.0)	3 (2.4)	124(97.6)		

**fishers exact p values*

status, those who were married contributed 87.5% of cervical dysplasia, with those in monogamous setting having 86.21% of dysplasia. Early age at first delivery (<19 years) contributed 3.23% of cervical dysplasia while ages 20-29 years had 80.65%. Early age at coitarche contributed 40.63%% of cervical dysplasia (with 100% LSIL and 50% HSIL) while ages between 20-29 has 59.38% and above 30 years 0.0%. Those not using OCP had 96.9% of cervical dysplasia (all ASC-H, LSIL & HSIL inclusive), while OCP use contributed 3.1% of dysplasia (only ASCUS). Almost all of them (99.9%) were non-smokers with 100% of cervical dysplasia. Also, cervical dysplasia was seen in majority of those who did not drink alcoholic beverages (75%) and only in 25% of those that drank alcoholic beverages. Those that did not use multivitamin had 64.5% of dysplasia (including 66, 7%.for ASCUS, ASC-H, LSIL respectively and 50% for HSIL).

Analysis of the socio-economic class using Kuppuswamy's Socio-economic Status Scale [23] showed most patients (86.2%) fell into upper and upper middle class, with few (13.8%) in lower middle class.

Table 4: Multinomial logistic regression

	Dysplasia	No dysplasia	OR (95% CI)	p	AOR (95% CI)	p
Age group						
≥45	11(7.7)	131(92.3)	3.27(1.39-7.73)	0.007	2.91(1.14-7.40)	0.025
35 -44	10(4.4)	218(95.6)	1.79(0.75-4.28)	0.191	1.59(0.64-3.96)	0.318
25 -34 (ref)	11(2.5)	429(97.5)	1			
Parity						
≥4	11(7.1)	143(92.9)	2.36(0.98-5.69)	0.055	1.73(0.66-4.57)	0.265
2-3	11(3.2)	328(96.8)	1.03(0.43-2.46)	0.948	0.91(0.37-2.23)	0.833
0-1 (ref)	10(3.2)	307(96.8)				
Currently married						
Married	28(3.9)	699(96.1)	0.79(0.26-3.18)	0.668	1.21(0.40-3.66)	0.739
Not married	4(4.8)	79(95.2)				
Educational level						
≤ Secondary	4(4.4)	87(95.6)	1.13(0.28-3.35)	0.817	1.03(0.35-3.07)	0.958
Tertiary	28(3.9)	691(96.1)				
Sexual partners						
≥2	19(4.3)	419(95.7)	1.24(0.27-2.79)	0.544	1.24(0.59-2.58)	0.568
1(ref)	13(3.5)	358(96.5)				
Ever used contraceptives						
Yes	10(4.3)	221(95.7)	1.11(0.46-2.49)	0.787	1.12(0.51-2.44)	0.781
No (ref)	22(3.9)	540(96.1)				
Alcohol					1.10 (0.48-2.54)	0.825
Yes	8(4.3)	180(95.7)	1.09(0.41-2.56)	0.858		
No (ref)	24(3.9)	589(96.1)				
Comorbidity present						
Yes	4(3.4)	113(96.6)	0.84(0.21-2.46)	0.999	1.07(0.13-8.73)	0.953
No(ref)	28(4.0)	665(96.0)				

a. The reference category is: NILM for pap smear results. Ref = reference category for the predictors, AO= adjusted odds ratio., CI = confidence interval

b. The reference category is: NILM for pap smear results. Ref = reference category for the predictors, AO= adjusted odds ratio., CI = confidence interval

DISCUSSION

Our study showed that epithelial cell abnormality occurred in 32 participants giving rise to a prevalence rate of 3.95%. Although similar to the 3.23% obtained by Gupta el al in Western Uttar Pradish, India [24] the prevalence was however lower than the 7% obtained in a similar study done by Nnadi et al [25] in Sokoto and 7% reported by Avidime et al [26] in Zaria, both cities in Northwestern Nigeria. In UCH Ibadan, Southwestern Nigeria, a prevalence of 13.9% was reported in a primary care clinic by Mosuro et al [6] and much higher prevalence of 16.2% was recorded in Benin by Obaseki and Nwafor.[7] These figures were much higher than that reported in our study. The probable reason for the low prevalence in our study might be because most of these studies used the conventional pap smear method, whereas we used liquid based cytology which gives better clarity and more accurate interpretation especially for haemorrhagic and inflammatory smears. Also, majority of the participants in our study were below age 36 years, of low parity, had post-secondary level of education and were of upper-middle to upper-upper socio-economic class using the modified Kuppuswamy scale[23]. The relatively higher socio-economic status of the participants in this study might have been responsible for the lower prevalence and this was in consonance with fact that cervical cancer, has an inverse relationship with socio-economic status [24].

Atypical squamous cells of undetermined significance (ASCUS) was the commonest epithelial cell abnormality found in this study with a prevalence of 2.96%. This was in consonance with existing reports of ASC-US being the most common form of cervical abnormality as reported by cytology laboratories [27], but differed from the study by Gupta et al [24] which had LSIL and that of Yakassai [28] which had HSIL as the majority. The probable reason might be the difference in the socio-demographic status and type of study. This prevalence for ASCUS was much lower than 11.8% found by Magaji et al [29] in Kaduna but similar to the 2.9% by Mosuro et al in UCH Ibadan [6], and higher than 1.6% by Avidime et al [26] in Zaria.

Mild dysplasia (LSIL) constituted 0.37% prevalence rate, which was lower than 1.36% by Guptal et al [24] and 11.8% from the study by Mosuro et al at UCH Ibadan.[6] The probable reason for this might be the difference in socio-demographic status and screening methods used. Atypical squamous cells not exclude high grade lesion (ASC-H) had prevalence rate of 0.37% which was higher than the 0.04% found by Wang et al in Chinese women[30]. The prevalence rate for high grade squamous lesion (HSIL) was 0.25% and was lower than 0.91% from Guptal et al [24] study and 2.3% by Avidmine in Zaria [26].

Majority of the women with Cervical Dysplasia (53.2%) were found in the Post-natal group. Most of these postnatal women had ASCUS component while there was no patients with HSIL. Further analysis of cervical dysplasia among the postnatal women only showed a prevalence rate of 6.3% which was higher than 3% obtained by Ago et al amongst post natal clinic attendees at the university of Calabar Teaching Hospital [31] and the 4.9% reported by Weiss et al at University of Arizona College of Medicine, Tucson [32] and hence may help in further justifying routine post-natal screening. The probable reason why postnatal women had majority of cervical dysplasis might be because they were younger and sexually active and at risk of sexually transmitted infection. Also, the hormonal effect of pregnancy on the HPV activation and progression might also contribute to this [33].

Specific prevalence of cervical dysplasia among family planning group was 1.11% with ASCUS component only. This was markedly lower than the prevalence of 12.0% found by Ayinde et al. in UCH among family planning women [34].

Women that came for routine screening from the gynaecological clinics contributed the least to cervical dysplasia prevalence of the study population, but had more of ASC-H, LSIL and HSIL components. However, the specific cervical dysplasia prevalence among these other women was 4.44%. This was higher than the 3.2% by Gupta et al [24]. Most of these women were of advanced age and of high parity which may have contributed to a higher-grade lesion.

The only statistically significant risk/co-factors associated with cervical dysplasia in this study was advanced age (p=0.007). This was in agreement with many studies[34-37]. On the other hand, high parity, multiple sexual partner, polygamous family type, OCP use, early coitarche, low level of education, married status, early age at first delivery, smoking, alcohol use, co-morbidities, family history of cancer and non-use of multivitamin had some associations that were not statistical significant for cervical dysplasia as documented in literature [36- 38]. Smoking was not associated with cervical dysplasia in this study due to the insignificant number of smokers. Many studies found smoking to be a significant risk factor [31, 38].

The risk of cervical dysplasia increases with advancing maternal age with age-group ≥45 years having a higher rate and also had the highest number of ASC-H, LSIL and HSIL, while age 25-34 had the highest number of ASCUS. This was in agreement with many documented studies that found higher prevalence in older women[6, 25, 32].

Also, the distribution of cervical dysplasia among all the parity groups showed some increase towards higher parity of ≥4. This was in agreement with many studies that found a linear trend in the association between parity and risk of developing cervical dysplasia[37, 38], but differed from the study by Monsuro et al [6] which did not find any association with high parity.

The limitation of this study was that it was a hospital-based study and may not be representative of the general population. However, it provides a vista into what might be the pattern of cervical cytology in Abuja and further studies can build on this.

Conclusion/recommendation: This study found a prevalence rate of 3.95% for cervical dysplasia, with ASCUS being the commonest abnormality in FMC Abuja. Majority of the participants in the post-natal group contributed highest to this prevalence signalling the need for screening of women during this period. There was also a linear trend in association between cervical dysplasia, advancing maternal age and high parity.

This study showed that there is need to intensify campaign on routine cervical cancer screening and treatment programmes among all sexually active women within 25 to 65 years in FCT. It is also pertinent for the government to establish a structured national screening programmes and offer free or affordable services in all public hospitals, in order to achieve the WHO 90 -70 - 90 target aiming to eliminate cervical cancer by 2030. All women and their girls in FCT should be encouraged through awareness programmes or by invitation or during hospital appointments, to key into the cervical cancer elimination programmes provided by the Federal government, non-governmental agencies and some public hospitals.

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■ Original Research Article

Preterm Prelabour Rupture of Membranes at the University of Medical Sciences Teaching Hospital Complex, Ondo: A 5-Year Review.

Ayodeji F Oladiran[1], Akinshete A Babatunde[2], Oyeneyin O Lawal[3], Akinkumi Bola F. [4], Adewole S Ayodele[5].

[1,2,3,5.]Department of Obstetrics and Gynaecology, University of Medical Sciences Teaching Hospital, Ondo, Nigeria; [4]Department of Paediatrics, University of Medical Sciences Teaching Hospital, Ondo, Nigeria; [5]Department of Obstetrics and Gynaecology, University of Medical Sciences Teaching Hospital, Ondo, Nigeria.

ABSTRACT

BACKGROUND: Preterm prelabour rupture of membranes (PPROM) accounts for a third of preterm births. It is associated with increased risk of maternal and perinatal morbidity and mortality. **OBJECTIVES:** To evaluate the prevalence, clinical characteristics as well as feto-maternal outcomes of PPROM at the University of Medical Sciences Teaching Hospital (UNIMEDTH) Complex, Ondo. **METHODS:** A retrospective review of women with PPROM from January 2013 to December 2017 was carried out. Data were retrieved from hospital, labour room and Neonatal intensive care unit records. Data was analyzed by descriptive statistics using Statistical Package for Social Sciences (SSPS), Windows version 23, Computer Software. **RESULTS:** There were 13,425 births, of which 352 women had PPROM giving a prevalence of 2.6%. The mean age of the women was 30.02 ± 5.26 years. A total of 68.5% of subjects were not registered for care in our facility. The mean gestational age at delivery was 32.12 ± 2.41 weeks. Caesarean section was the mode of delivery in 32.7% of patients while 17.3% had chorioamnionitis, and 9.4 % developed puerperal sepsis. Live births accounted for 95.1% of total while 83% and 4.9% of latter had low birth weight and birth asphyxia, respectively. Neonatal unit admission was necessary in 72% of the live births and perinatal mortality was 10.4%. One maternal mortality was recorded. **CONCLUSION**: The prevalence of PPROM at the UNIMEDTH Ondo is 2.6%. Majority of women with PPROM were not registered for antenatal care at our facility. The high-risk nature of PPROM is evidenced by 83% of babies with low birthweight and almost 5% with birth asphyxia. Early booking for antenatal care and hospital delivery is advocated. Availability of quality neonatal intensive care services is critical in management of babies delivered. **KEYWORDS:** Preterm prelabour rupture of membranes, preterm delivery, low birthweight, birth asphyxia, neonatal intensive care.

Correspondence

Name: Oladiran F. AYODEJI.
Address: Department of Obstetrics and Gynaecology, University of Medical Sciences, Laje Road, Ondo, Nigeria.
fayodeji@unimed.edu.ng; ladiran54@gmail.com
+2348033082718
ORCID ID: https://orcid.org/0000-0002-3006-5812.

Keywords: Preterm prelabour rupture of membranes, preterm delivery, low birthweight, birth asphyxia, neonatal intensive care.

INTRODUCTION

Preterm (or premature) prelabour rupture of fetal membranes (PPROM) is a significant contributor to preterm birth and a leading cause of perinatal morbidity and mortality worldwide[1,2]. In Nigeria, the reported incidence of preterm birth varies between 5.8% and 11.1%.[3,4]. Also, preterm babies account for 40-60% of all perinatal deaths.[3] To reduce perinatal mortality requires understanding the clinical characteristics and risk factors of PPROM.

Rupture of fetal membranes (ROM) is a normal component during labour, usually occurring after the onset of established uterine contractions[1]. However, fetal membrane rupture may occur at any time in second or third trimesters of pregnancy. Preterm rupture of membranes is the rupture of fetal membranes before 37weeks of pregnancy. Prelabour rupture of fetal membranes however is the spontaneous rupture of fetal membranes prior to the onset of labour.[1,5.]

Generally, prelabour rupture of membranes occurs in about 3 – 6% of all pregnancies and approximately 60-80% of cases of prelabour rupture of membranes occur at term. [1,5.] In Nigeria, incidences of 0.94% and 3.3% have been reported in different studies[6,7]. While the aetiology of PPROM is multifactorial, intrauterine infection is the most common risk factor. The proposed hypotheses for fetal membrane rupture involves a progressive decrease in the collagen content of the amnion in the later part of pregnancy. This is believed to account for the spontaneous rupture of membranes during labour, which is a physiological event. However, whether the same applies to

PPROM is not fully established[8]. It is hypothesised that obstetric infections or de novo inflammatory processes, are triggers for the progressive disruption of collagen content in fetal membranes.[9] Risk factors associated with ROM include conditions like bacterial vaginosis, cervical weakness, abnormal lie, polyhydramnios and multiple pregnancy as well as socio-demographic characteristics like low socio-economic status, black race, cigarette smoking and previous history. [1,5]

More than 90% of patients presenting with PPROM will provide a clinical feature of fluid leakage from the vagina. [1,5] Occasionally, patients will present with history of perineal dampness or an isolated loss of fluid. Such women would require additional tests to confirm the diagnosis. It is important to verify the gestational age of the indexed pregnancy because this information will directly affect subsequent management.[1] Obstetric ultrasound assessment is useful for pregnancy dating, to ascertain the presence of oligohydramnios and measure the biophysical profile [10,11]. A speculum examination should be done to confirm the flow of fluid from the cervical os, and ascertain the presence or otherwise, of cervical dilatation and effacement. Digital vaginal examination should be avoided unless the patient is having uterine contractions or suspected to be in established labour. Digital vaginal examination increases the risk of infectious morbidities. [1,5]. The presence of amniotic fluid can be further ascertained by ferning test, nitrazine test, amnisure and assays for specific molecules which are present in high concentrations in the amniotic fluid. [1,5]. The mode of management of PPROM depends on gestational age and mode of presentation of the patient.[1]

Gestational age should be ascertained by reliable last menstrual period, or preferably by early ultrasound scan assessment where available. PPROM is far more challenging to manage than fetal membrane rupture at term as prematurity must be weighed against maternal and perinatal infectious morbidities. Patient should be counseled with regards to neonatal survival as this is contingent on the expertise available for neonatal care. The Neonatologist should be involved in the management of these patients from the start. Obstetric care should take place in a facility with neonatal unit equipped to cater for preterm babies. [1,5]. In women between 34 to 36 weeks of pregnancy, where fetal lung maturity is generally expected, immediate induction of labour is the management line of choice.[10]. In cases between 28 to 33weeks, conservative management is the rule in the absence of chorioamnionitis or any threat to the fetomaternal wellbeing.[1,10] The use of antibiotics and corticosteroid have been shown to improve fetomaternal outcome.[1,5,10]

The implication of adequate care for women with PPROM and their neonates is huge in socio-economic, medical and psychological terms. Studies like this may provide clinical evidence upon which to base advice to women with PPROM, and identify treatment strategies. It is for these reasons that studies like this is important. Our aim is to determine the prevalence and feto-maternal outcome of PPROM in UNIMEDTH Complex, Ondo over a 5-year period.

Aim And Objectives: To review cases of preterm prelabour rupture of membrane at the UNIMEDTH Complex, Ondo, over a 5-year period.

Objectives

a. To determine the prevalence of PPROM at the UNIMEDTH Complex, Ondo
b. To identify their socio-demographic and clinical characteristics
c. To evaluate associated maternal and perinatal outcomes

MATERIALS AND METHODS

Study Setting

The Department of Obstetrics and Gynaecology of the state government-owned University of Medical Sciences Teaching Hospital Complex, Ondo was established in August 2018. The structure housing the Department was formerly known as the Mother and Child Hospital Ondo which, from inception in November 2012 till 2015, ran a free maternity care service. However, subsidized fee-paying services were introduced from 2016 till 2018. Our facility continues to serve the obstetric population majorly from the central and southern senatorial districts of Ondo state, representing roughly two-thirds of the total population.

Methods

This study is a retrospective review of patients who presented with preterm prelabour rupture of membrane and were managed at UNIMEDTH Complex, Ondo, Nigeria from 1st January 2013 to 31st December 2017. Over this period, all patients coded as PROM by our Health Information unit were identified. A total of 370 patient files were so coded. These medical histories were retrieved. These records were reviewed by one of the authors and data extracted according to pro-forma designed for this purpose. Labour ward records were also perused for relevant data concerning these patients. A total of 352 patients were confirmed as PPROM from these clinical records and were of gestational ages between 28 weeks to less than 37 completed weeks. Gestational ages were based on recorded, reliable dates of the last menstrual period provided. Occasionally, early ultrasound assessment was used, where available. Labour room records also served as sources of confirmation of the PPROM diagnosis. The protocol for management of PPROM in our institution included the use of steroids given intramuscularly in prescribed international doses over 48hour period and antibiotic therapy usually erythromycin. Tocolysis was not practised.

Ethical Consideration and Data

The study involved the use of anonymised data, for which the UNIMEDTH gave consent. The following data was extracted: maternal age, parity, educational status, occupation, marital status, gestational age at presentation, mode of delivery, fetomaternal outcomes like Apgar scores and birth weight and mode of delivery. Complications arising from delivery and neonatal care were obtained from Labour room record. Neonatal data were obtained from the Neonatal Intensive Care Unit (NICU) record. The total number of deliveries during the period of study was obtained from the delivery register and confirmed by our Health Information Unit. The data collected were collated in proforma

forms designed for this purpose and inputted and analyzed with Statistical Package for Social Sciences (SPSS) (Windows version 23) computer software.

RESULTS

A total of 352 women with the admission diagnosis of preterm prelabour rupture of membranes were seen at the UNIMEDTH Ondo over the period of this study. The total number of delivery during this time, as provided by our Health Information unit, was 13,425 births. The incidence of PPROM was 2.6%. The socio-demographic data of the women are as shown in Table 1. The mean age of the subjects was 30.02 ± 5.26 years while the 30-34 years age group had a frequency of 112 representing 31.8%.

Parameters of the obstetric history of the women are shown in Table 2. Majority (68.5%) of the women were not registered for obstetric care at our facility. Only 31.5% of the women were booked for antenatal care and delivery at our facility. Majority of presenting parturient were of low parity (<2) accounting for 79.6% of cases, and 48.9% of the women had a previous history of miscarriage. There were 12 women (3.4%) with multiple pregnancies. Mean Gestational Age at presentation was (32.12 ± 2.41) weeks. Women in the gestational age bracket of 31-33weeks were highest in number accounting for 127(36.1%) of the cases.

Table 1. Maternal Socio-Demographic Characteristics

Variables	Categories	Frequency	%
Age Range(yrs.)	15 – 20	2	0.6
	21 – 25	68	19.3
	26 – 30	118	33.5
	31 – 35	112	31.8
	36 – 40	40	11.4
	41 – 45	12	3.4
	Total	352	100.0
Mean Age ± SD (30.02 ± 5.26)			
Marital Status	Married	328	93.2
	Single	24	6.8
	Total	352	100.0
Occupation	Trader	102	29.0
	Artisan	54	15.3
	Professional	38	10.8
	Civil Servant	93	26.4
	Housewife	59	16.8
	Student	6	1.7
	Total	352	100.0
.Educational Status	Primary	65	18.5
	Secondary	185	52.5
	Tertiary	102	29.0
	Total	352	100.0
Religion	Christianity	303	86.1
	Islam	49	13.9
	Total	352	100.0

Table 2. Obstetric History of Patients.

Variables	Categories	Frequency	%
Booking Status	Booked	111	31.5
	Unbooked	241	68.5
	Total	352	100.0
Parity	0	185	52.6
	1	95	27.0
	2 – 4	67	19
	≥ 5	5	1.4
	Total	352	100.0
Gestational Age	28 – 30	105	29.8
	31 – 33	127	36.1
	34 – 36	120	34.1
	Total	352	100.0
Mean Gestational Age ± SD (32.12 ± 2.41)			
Presentation	Cephalic	282	77.5
	Breech	71	19.5
	Shoulder	3	0.8
	Compound	8	2.2
	Total	364	100.0
Previous Miscarriage	Yes	172	48.9
	No	180	51.1
	Total	352	100.0

Table 3: Maternal Outcome

Variables	Categories	Frequency	(%)
Maternal Complication	Chorioamnionitis	61	17.3
	PPH	13	3.7
	Sepsis	33	9.7
	Maternal mortality	1	0.3

The maternal outcome is shown in Table 3. Clinical evidence of chorioamnionitis was present in 17.3% of the women and 9.7% had puerperal sepsis. One woman (0.3%) died due to puerperal sepsis. The fetal outcome is presented in Table 4. Majority of the women (67.3%) delivered vaginally while 32.7% had Caesarean section. There was a total of 364 births, 346 (95.1%) of which were live births while 18(4.9%) were still births. Birth weight less than 2.5kg was observed in 302 neonates which represents 83% of all births. The first minute Apgar score was less than seven in 88(25.4%) but only 17(4.9%) of the live neonates had five minutes Apgar score < 7.

The neonatal outcome is shown in Table 5. Most, (72 %), of the neonates were admitted to the neonatal intensive care ward. Of those that required NICU admission, 68.7 % were on admission for up to 1 week while 21.3 % were on admission for between 1-4 weeks. There were 35 neonatal deaths, 20 of which occurred within the first week of life. The perinatal mortality represents 10.4% of all deliveries.

Table 4. Foetal Outcome

Variables	Categories	Frequency	%
DELIVERY STATUS	Live birth	346	95.1
	Stillbirth	18	4.9
	Total	364	100.0
MODE OF DELIVERY	SVD	245	69.6
	CS	107	30.4
	Total	352	100.0
GESTATION	Singleton	340	96.6
	Multiple	12	3.4
	Total	352	100.0
FETAL SEX	Male	137	37.6
	Female	227	62.4
	Total	364	100.0
BIRTH WEIGHT	< 2.5	302	83.0
	≥ 2.5	62	17.0
	Total	364	100.0
Apgar Score 1min	1 – 3	28	8.1
	4 – 6	60	17.3
	≥7	258	74.6
	Total	346	100.0
5min	1 – 3	2	0.6
	4 – 6	15	4.3
	≥7	329	95.1
	Total	346	100.0

Table 5. Neonatal Outcome. (Nicu: Neoatal Intensive Care Unit)

Variables	Categories	Frequency	%
NICU Admission	Yes	249	72
	No	97	28
	Total	346	100.0
Duration of Admission	<7 days	171	68.7
	> 7 ≤28 days	53	21.3
	>28 days	25	10
	Total	249	100.0
Neonatal Event	Alive	311	89.9
	Dead	35	10.1
	Total	346	100.0
Neonatal Death	≤ 7days	20	57.1
	> 7 - ≤28 days	15	42.9
	Total	35	100.0

DISCUSSION

There were 13,425 deliveries over the period of this study with 352 women clinically confirmed to have preterm prelabour rupture of membranes. The incidence of preterm prelabour rupture of membranes was 2.6%. This incidence is comparable to 2.5% found in Enugu, Nigeria by Obi et al and 3.1 % found by Hackenhaar et al in a similar study in Brazil.[7,12] Okeke and other workers also found an incidence of 3.3% in a tertiary hospital in Nigeria.[13] Unbooked patients accounted for over half of the women in this series. This finding probably reflects the poor attitude of our women towards antenatal care and enrolment. Despite free obstetric services for most of the period of this study, 68.5% of women failed to register for obstetric care. The alarming and emergency nature of PPROM apparently forced them to seek specialist attention. Our rate of 68.5% is higher than 50.2% by Okunade et al [14] and 20.7% by Zini et al [15] in southern Nigerian population. Zini and co-workers confirmed that the unbooked status showed some association with preterm birth. The mean age of the women in our series is 30.02 ± 5.26 years, a figure comparable to 31.3±5.0years found by Okunade et al. [14] The 26 – 30 years age group had the highest frequency, accounting for 33% of cases. Okunade and co-workers however, had an older demographic with the age group 30-34years having the highest frequency of 39.4%. The nulliparous women in this series accounted for the highest number of cases at 52.6%, a figure higher than the 42.3% recorded by Noor and co-workers in a Pakistani study.[16] Most of the women in our study were of low parity, which is similar to the finding of Obi and co-workers. However, 75.65% of patients in the series by Hossain et al[17] were primipara. It would appear that younger women of low parity are the identified risk group in many series. The presentation was cephalic in about 77.5% of cases and breech in about 19.5%. The fact that most babies are preterm and the increased rates of multiple pregnancies in the cohort, accounted for this finding.

About half (49%) of the women had a history of previous miscarriage whether voluntary or spontaneous. This agrees with the finding of Obi et al. [7] Previous miscarriage may lead to cervical weakness, a known risk factor for PPROM. This finding would suggest the need for sonographic evaluation of cervical length at specified gestational ages, in pregnant Nigerian women. The mean gestational age at delivery in this series, is 32.12 ±2.41 weeks. This is in consonance with the figure of 32.7±2.4weeks by Okunade and co-workers in the same geographical area in Nigeria. Noor and others, in Pakistan, found that women with PPROM delivered at significantly lower gestational ages (31-35) compared with control women with preterm labour. [20.] Hossain and others also reported a mean gestational age of 32.34weeks at delivery for women in Pakistan. [17] The mean gestational age at delivery appear to vary from one geographical area to another, probably due to recruitment criteria and the socio-demographic characteristics of the population. The highest number of cases in our series were between 31-33 weeks gestational age, which is in contrast to the findings of Obi et al in which 28-30 weeks gestational age had the highest number of patients[7.]

Cesarean section was the mode of delivery in 33% of patients in this study, a figure less than the 37.1% rate obtained by Yu and co-workers [19] in a tertiary centre in China and 44.35% by Hossain and others. [17] The higher figure reported by Yu and co-workers may be explained by their recruitment of women below 34weeks gestation. Despite similar mean gestational age at delivery of 32.34weeks, the caesarean rate of 44.35% is markedly higher than our figure of 33%. It would appear that other factors underscore the decision to deliver abdominally. Okunade and others reported a Caesarean rate of 49.3% despite having the highest percentage of their subjects between 34week and 36weeks gestation. They averred that the threshold for Caesarian delivery was unnecessarily low in their centre. Noor and co-workers, in their comparative prospective study, reported a Caesarian section rate of 14%[20], a figure that bucks the trend of high Caesarean rates in many series. Their study sample size of 85 PPROM patients were compared with equal number of women with preterm labour.

Their reported Caesarean section rate could not be explained on the basis of mean gestational age at delivery nor by the proportion of low birthweight babies. About 62% of the neonates in our series were female while 38% were male. Eighty three percent (83%) neonates in this series had birth weights less than 2.5kg. Our figure is higher than 79.1%% found by Okunade in Lagos, Nigeria, and 62.3% reported by Noor and co-workers, from Pakistan [14,20]. The proportion of low-birth-weight babies delivered may be due to socio-demographic factors of the parturient and their reported mean gestational age at delivery. One-minute Apgar score less than 7 was reported in about 25% of our neonates, a figure that underscores the high-risk category of babies born following PPROM. However, Apgar scores less than 7 were observed in 5% of the neonates at 5 minutes. This marked improvement in the physical evaluation of these newborn babies, attests to the effectiveness of neonatal resuscitation at our centre. Comparatively, Sultana and co-workers found that 54.8% and 30.6% of neonates in their series, had Apgar scores <7 at 1 and 5-minute scores respectively.[21] Stillbirth rate of 5% was recorded in this study, a figure in synchrony with 5.88% found by Noor et al.[16.] Seventy two percent (72%) of the neonates required neonatal ward admission, a figure similar to 72.5% reported by Okunade and co-workers and 72.9% by Yu and colleagues.[14,19] Our neonatal ward admission appears high despite the low figure of 5% neonates with Apgar scores less than 7 at 5minutes. This observation is probably explained by the high proportion (83%) of low birth weight babies born in our series. There is strong possibility that indications for neonatal ward admission would vary between institutions as a result of proportion of low birth weight neonates, prevalent neonatal complications and staff complement available. We recorded 18 stillbirths, and one severe case of severe puerperal sepsis leading to maternal death. These events are probably due to delay in seeking medical specialist attention. About 69% of neonates admitted to our intensive care unit stayed for up to one week, 21% from one week but up to 4 weeks, while 10% were on admission for more than 4 weeks.

There were 35 neonatal deaths, a figure representing 10.1% of live births, 20 of which were early neonatal deaths. From this study, the perinatal mortality was 10.4%, a figure lesser than 13% recorded by Noor et al and 52% found by Obi et al.[7,16] The high perinatal mortality recorded by Obi and colleagues was most likely due to the high proportion of women with gestational ages between 28 to 30weeks gestation in their series. Another explanation may be the quality of neonatal intensive care services available at that time in their institution. Sixty-one (17.3%) of the patients had clinical evidence of chorioamnionitis, 13(3.7%) had postpartum hemorrhage, and 33(9.4%) had puerperal sepsis. One(0.3%) maternal death was recorded which was lesser than 0.6% found by Obi et al.[7] The comparatively low complication rates recorded in our series can be linked to the protocol of administration of antibiotics, corticosteroids and clinical vigilance to identify complications and treat them promptly.

CONCLUSION

The incidence of Preterm prelabour rupture of membranes at our facility is 2.6%. Younger women of low parity are the modal at risk group, majority of whom were not registered for antenatal care at our facility. The mean gestational age at delivery was 32.12±2.14weeks. This factor, combined with possible delay at seeking specialist treatment, contributed to the high maternal morbidity, and the high perinatal and neonatal mortality in our series. Majority of the neonates required neonatal intensive care. The increased perinatal and neonatal deaths make the availability of efficient neonatal care services mandatory. Obstetricians must be on alert for increased maternal morbidities, especially chorioamnionitis and puerperal sepsis.

Recommendations

1. Co**n**tinued researches to identify local and peculiar socio-demographic factors associated with PPROM in the country.
2. Consistent advocacy to ensure early registration for antenatal care. Pregnant women should be alerted through media to recognize both the clinical signs and the seriousness of PPROM. Women with PPROM must be advised to present early in hospital for the prompt management of this condition.
3. Delivery of these high risk women in centres equipped with Neonatal Intensive Care Units. Prompt care of these preterm neonates would reduce the morbidity and mortality associated with PPROM.

Conflict of Interest: There are no conflict of interest.

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■ Original Research Article

Fertility Indicators and Prevalence of Infertility in Benue State South Senatorial District

Silas Ochejele[1], Ediga B. Agbo[2], Yemisi Anebi [3], Bawa Inalegwu [4], Irowa Omoregie[1], Paul Ogwuche[1]

1. Department of Obstetrics and Gynaecology, College of Medicine, Federal University of Health Sciences, Otukpo (FUHSO), P.M.B 145, Otukpo, Benue State, Nigeria. Email: silasfriday@yahoo.com
2. Department of Microbiology, Faculty of Science, Federal University of Health Sciences, Otukpo (FUHSO), P.M.B 145, Otukpo, Benue State, Nigeria. Email: ediga_agbo@yahoo.com,
3. Department of Paediatrics, College of Medicine, Federal University of Health Sciences, Otukpo (FUHSO), P.M.B 145, Otukpo, Benue State, Nigeria.
4. Department of Biochemistry, College of Medicine, Federal University of Health Sciences, Otukpo (FUHSO), P.M.B 145, Otukpo, Benue State, Nigeria

ABSTRACT

Background: Sub-Saharan Africa, unlike the rest of the world is yet to achieve demographic fertility transition. In Nigeria, Benue state and Benue South senatorial particular, there is a paucity of vital statistics, and hospital-based studies constitute the main source of information. Therefore, the aim of this study was to determine the indicators of fertility and the prevalence of infertility in Benue State South Senatorial District. **Aim:** To determine fertility indicators and prevalence of infertility in Benue South Senatorial District. **Materials and methods:** This was a community-based, descriptive cross-sectional study involving women of childbearing age. Multi-stage sampling technique was used to select eligible women from communities in Benue South Senatorial District.Ethical clearance was obtained from theEthical Committee of the Federal University of Health Sciences, Otukpo before commencement of the study and informed consent was obtained from the study participants. A pre-designed, pre-tested Proforma was used for data collection in the selected communities. Data obtained was analysed using SPSS version 20 **Results:** The mean age at first pregnancy of the 226 women studied was 24 years and their average parity was 4. Level of education, body mass index (BMI), age at first pregnancy and tribe were the significant predictors of fertility in this study. Prevalence of infertility was 4%. **Conclusion**: Benue South Senatorial District's fertility indicators is similar to the national indicators and is on course with her demographic transition.

Correspondence:
Silas Ochejele

Keywords: Predictors, fertility, prevalence, infertility, Benue South

INTRODUCTION

Globally, many countries have achieved their demographic transitions except Sub Saharan Africa.[1,2]The population of the continent is expected to grow from 1 billion in 2015 to more than 2 billion and nearly 4 billion in 2100.[1,3] According to the 2018 Nigeria Demographic and Health Survey, the national total fertility rate is 5.3 children/woman and that of Benue State is 4.8 children/woman.[4]Nigeria and Benue State have total fertility rates of 5.5 and 5.2 respectively in 2013.[5] In Nigeria, ethnicity, religion, place of residence, level of education and socioeconomic status were the major determinants of fertility[6-8]Infertility is defined as the inability to achieve conception after a year of regular unprotected sexual intercourse.[9,10] Women bear the brunt of the psychological and emotional trauma of an infertile union.[11]Infertility occurs in approximately 48.5 million couples globally and 1 in 7 couples in the United Kingdom.[12] However, infertility is the most common presentation among the gynaecological outpatients with a prevalence range of 14.8% to 38.8%.[13-15]

To make a statement of the problem and clearly explain the need for this study.

Aim and Objectives: The main aim of the research is to determine fertility indicators and prevalence of infertility in Benue South Senatorial District. The specific objectives are:

1. To determine the predictors of fertility.
2. To determine the prevalence of infertility.
3. To determine the duration of infertility.
4. To determine the types of infertility.
5. To determine the causes of infertility in infertile couples.

MATERIALS AND METHODS

Benue State is located within the North Central Geo-political zone of Nigeria with a land mass of 34,059 square kilometers and population of 6,141,300 (projected population from 2006 National census).[16,17] It has geographic coordinates of Latitude 7° 19′ 60.00″N and Longitude 8°44′59.99″E.[18] The State is comprised of three Senatorial Districts which are Benue South, Benue North-West and Benue North-South Senatorial Districts.[19] Benue South Senatorial district is made up of nine (9) Local Government Areas (LGAs) which are Ado, Agatu, Apa, Obi, Ogbadibo, Ohimini, Oju, Okpokwu, and Otukpo LGAs.[19] There are a total of nine (9) General hospitals and two mission hospitals in Benue South Senatorial District with one General Hospital in each LGA. However, none of the General hospitals nor the mission hospitals run specialist clinic. The study was a community-based descriptive, cross-sectional study. The study population was made up of women of childbearing age (15-49 years) within the Benue South Senatorial District. Since there was no specialist clinic in any of the General Hospitals, participants for the proposed infertility study could not be drawn. Inclusion criteria were women aged 15-49 years in Benue South Senatorial District who gave consent. The exclusion criteria were unmarried women within the selected age bracket.

Sample Size Calculation

The sample size was calculated using the formula for cross-section study when the parameters are in proportions.[11]

$N= Z_{n}^2 \times PQ/ E^2$.

Where N= Sample size

Z_{n}^2 = normal deviation for two-tailed alternative hypothesis at 5 % level of significance which is 1.96.

P= Prevalence or proportion (Prevalence of infertility of 15.7% from previous study in Sokoto, Northwest Nigeria.[13]

E= Precision or the Margin of error, which is taken as 0.05 (5%).

$N= (1.96)^2 \times 15.7 \times 84.7 /(0.05)^2 = 205$.

Using a non-response rate of 10%, the total sample size N= 226 women.

Sampling Technique

A multistage sampling technique was used in this study. A simple random sampling technique was used to select five out of the nine LGAs in Benue South Senatorial District. The LGAs selected were Agatu, Otukpo, Ogbadibo, Ohimini and Oju LGAs. Again, simple random sampling technique was used to select two communities from each of the selected LGAs, making a total of ten communities across the 5 LGAs. A convenient sampling technique was used to recruit Twenty-three participants from each community. Out of the 230 questionnaires, 226 returned completely filled and were entered for data analysis.

Ethical Clearance and Consent

An informed consent was obtained from each of the study participants and ethical clearance was obtained from the Ethical Committee of the Federal University of Health Sciences, Otukpo.

Data Collection

A pre-designed, pre-tested Proforma was used to collect information regarding fertility profile of the sampled women in the selected communities. Information collected included sociodemographic data, number of children ever born alive, last childbirth, duration of relationship, age at menarche, as well as weight and height.

Data Analysis

Data was analyzed with the Statistical Package for Social Sciences (SPSS) software version 20.0. Frequencies and percentages were calculated. P-value less than 0.05 was considered significant. Variables with p-value less than 0.05 in binary logistic regression analysis were subjected to multivariable logistic regression analysis to control for confounders. Odds ratio with 95% confidence interval was used to examine associations between sociodemographic factors and fertility. Results were presented with tables.

RESULTS

The sociodemographic profile of the respondents is as shown in Table I. Of the 226 respondents, 65.0% were Idomas, and 11.5% were Igede. Ninety-six (42.48%) of the respondents had secondary education, and those without formal education were the least, accounting for 7.08% of the respondents. The predominant occupation of the respondents was farming, with a frequency of 91 (40.27%) and the teachers were the least with frequency

of 8 (3.54%). Half of the respondents had normal weight as determined by Body Mass Index (BMI) and 4% were obese.

Table I: Sociodemographic profile of the respondents (N=226)

Variables	Frequency(n)	Percentage (%)
Tribe		
Idoma	147	65.0
Igede	26	11.50
Igala	12	5.31
Tiv	3	1.33
Igbo	9	3.98
Yoruba/Hausa	18	7.96
Marital Status		
Married	198	87.61
Divorced/Separated	15	6.64
Widow	13	5.75
Body Mass Index (BMI)		
Underwieght	37	16.37
Normal weight	112	49.56
Over weight	68	30.08
Obese	9	3.98
Level of Education		
No formal education	16	7.08
Primary Education	75	33.19
Secondary Education	96	42.48
Tertiary Education	39	17.25
Occupation		
No response	4	1.77
Trader/Business	63	27.88
Farmer	91	40.27
Teacher	8	3.54
Civil Servant	21	9.29
Paramilitary/Military	9	3.98
Others	30	13.27

Table 2 shows the age distribution of the respondents. Women aged 30-34 years were the highest, accounting for 38.05% of the respondents while those 50 years and above were the least (1.33%).

Table 2: Age distribution of the respondents (N=226)

Age group	Frequency (n)	Percentage (%)
15-19	13	5.75
20-24	31	13.73
25-29	47	20.79
30-34	86	38.05
35-39	29	12.83
40-44	9	3.98
45-49	8	3.54
≥50	3	1.33

Fertility Indicators

Table 3. Mean fertility indicators of the respondents

Variables	Mean
Duration of marriage (years)	15
Age at first pregnancy (years)	24
The number of children ever born alive	4
Total number of sons ever born alive	2
Total number of sons living during study	1
Total number of sons born alive who died before study	1
Total number of daughters ever born alive	2
Total number of daughters living during study	1
Total number of daughters born alive who have died before study	1
Last child birth (years)	2

Measures of Fertility

The total number of live births among the 226 respondents was 790 giving an average parity of 4. Out of the 226 women studied, 9 were infertile giving a prevalence of infertility rate of 4%. The average age at first birth was 24 years. All the infertile cases were primary infertility.

Table 4: Measures of fertility

Age groups (in years)	Average parity/ children ever born
15-19	1
20-24	2
25-29	3
30-34	4
35-39	5
40-44	6
45-49	5
≥ 50	6

Table 5: Fertility History of the Respondents

Variables	Mean
Duration of marriage (years)	15
Age at first pregnancy (years)	24
The number of children ever born alive	4
Total number of sons ever born alive	2
Total number of sons living during study	1
Total number of sons born alive who died before study	1
Total number of daughters ever born alive	2
Total number of daughters living during study	1
Total number of daughters born alive who have died before study	1
Last child birth (years)	2

Table 6 shows univariate logistic regression for demographic factors against fertility. Level of education, occupation, body mass index (BMI), age at first delivery, partner's age and tribe of the respondents were found to influence fertility.

Table 6: Regression Analysis on Sociodemographic Factors the Predictors of Fertility

Variables	OR	95% CI OR Min	Max	P-value
Level of education				
No formal education	Reference			
Primary education	0.67	0.49	0.90	0.047*
Secondary education	1.96	1.34	2.48	0.004|*
Tertiary education	1.63	1.29	1.92	0.535
Occupation				
Trade/Business	Reference			
Farmer	1.59	1.36	1.82	0.03*
Teacher	0.16	0.09	0.39	0.02*
Civil Servant	0.79	0.31	1.30	0.57
Paramilitary/Military	0.93	0.45	1.41	0.84
Others	1.07	0.78	1.36	0.93
BMI				
Normal weight	Reference			
Under weight	0.168	0.10	0.87	0.002*
Overweight	0.193	0.13	1.24	0.023*
Obese	0.231	0.19	0.36	0.001*
Age at first delivery (in years)				
15-19	Reference			
20-24	2.29	1.69	2.60	0.004*
25-29	1.65	1.30	2.05	0.020*
30-34	0.76	1.32	2.16	0.001*
35-39	0.98	0.58	1.39	0.047*
40-44	1.42	0.99	1.83	0.071
□	0.67	0.36	1.01	0.720
Partner's age (in years)				
15-25	Reference			
26-36	0.43	0.29	0.72	0.575
37-47	0.59	0.31	0.85	0.001*
□	0.65	0.40	0.96	0.14
Tribe				
Idoma	Reference			
Igede	0.38	0.22	0.49	0.067
Igala	1.35	1.14	1.40	0.002*
Tiv	1.96	1.45	2.38	0.004*
Igbo	0.99	0.58	1.22	0.40
Yoruba	0.42	0.31	0.53	0.001*
Hausa	1.16	0.34	1.86	0.0000*

*P<0.05

Table 7: Multivariate Logistic Regression analysis on sociodemographic factors of the predictors of fertility that were significant.

Variables (Reference group)	OR	95% CI OR Min	Max	p-Value
Level of Education (No formal education)				
Primary education	0.83	0.42	1.24	0.028*
Secondary education	1.54	0.29	2.74	0.002*
Tertiary education	1.38	0.99	1.66	0.670
BMI (Normal Weight)				
Underweight	0.214	0.19	0.32	0.004*
Overweight	0.133	0.10	0.56	0.026*
Obese	0.241	0.17	0.34	0.001*
Age at first delivery in years (15-19)				
20-24	3.12	1.98	4.30	0.0000*
25-29	1.49	0.74	2.25	0.004*
30-34	1.87	1.04	2.56	0.024*
35-39	0.32	0.18	0.46	0.064
40-44	0.96	0.50	1.31	0.467
□45	0.48	0.34	0.68	0.230
Tribe				
Igede	1.38	0.80	1.75	0.05*
Igala	1.59	1.01	2.20	0.002*
Tiv	2.99	1.50	4.48	0.008*
Igbo	1.96	1.45	2.50	0.100
Yoruba	2.44	1.16	3.69	0.000*
Hausa	3.24	1.81	4.69	0.002*

DISCUSSION

The average parity of the respondents in this study was 4, which is less than the National and Benue State fertility rates of 5.3 and 4.8 children per woman respectively according to the 2018 National and Demographic Health Survey.[4] This shows that Benue South Senatorial District is making good progress in Her demographic transition. The Prevalence of primary infertility in this study was 4%. This is lower than the value obtained in the 15.7% by Panti et al[13] in Sokoto, and the 22.5% reported by Sule et al[22] in Osun State. The disparity observed may be because while our study was community-based, the others were hospital-based.

Level of education was a positive predictor of fertility in this study. Women with secondary education had the highest odds for high fertility when compared to women without formal education. They were closely followed by women with tertiary education. This is in contrast with the studies by Mahanta A[23] in India and Akpa et al[24] in Nigeria where fertility was found to decrease with increasing education. No study with similar findings to what was obtained in this study was found. The finding in this study may be because women with higher education were more financially secure to cater for their young ones compared to women without formal education.

Weight was another predictor of fertility in this study. Women with abnormal weight (underweight, overweight and obese) were all likely to be less fertile compared to women with normal weight. The reduced prospects of fertility with abnormal BMI as seen in this study could be because BMI at either side of normal have been linked with an increased risk of infertility.[25] Disease like Polycystic Ovary Syndrome is associated with infertility and obesity.

The average age at first birth from this study was 24 years. This is higher than the finding in the 2018 National and Demographic Health Survey in which the median age at first delivery was 20.4 years.[4] This finding could be as a result of this age bracket being the period of highest fertility in women.[25] There was a general decline in the odds of fertility as the age at first delivery increased. This observation is likely to be due to decline in chances of conceiving with advancing age in women.

Hausa women had the greatest odds of high fertility in this study when compared to Idoma women. This is in keeping with the findings by Adebowale A S.[27] there was no contrasting findings seen our literature search. This finding may be because Hausa women are more likely to be less educated and to marry earlier compared to women from other parts of Nigeria.[27]

CONCLUSION??

A major concern here is the absence of a conclusion from the data presented in this study.

Conflict of Interest: There is no conflict of interest.

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■ Case Report

Bilateral Ureteric Injury: Its Presentation, Management and Outcomes. A Case Report.

[1]Peter Olalekan Odeyemi (docpeto4all@yahoo.com; ORCID ID. 0000-0003-4239-9534), [2]Is'haq Ishola Aremu. (iiaremu10@gmail.com; ORCID ID. 0000-0003-3485-3346), [3]Musa Ayinde. (musaayinde150@gmail.com; ORCID ID. 0000-0002-1289-7447), Olusola Oyewole Oladosu (oladosudoc@gmail.com; ORCID ID. 0009-0002-5939-3112), [1]Najeem Adedamola Idowu. (idowunajeem0@gmail.com; ORCID ID. 0000-0003-4231-7703.), [5]Ibukun Adewumi Okunade (ibukunokunade70@gmail.com; ORCID ID. 0009-0003-0252-5564)

[1]Division of urology, Department of Surgery, Ladoke Akintola University of Technology Teaching Hospital, Ogbomosho; [2] Department of Surgery, General Hospital Ilorin, Nigeria.; [3]Department of Obstetrics and Gynaecology, General Hospital Ilorin, Nigeria; [4]Department of Anaesthesia, General Hospital Ilorin, Nigeria; [5]Department of Family medicine, Bowen University Teaching Hospital, Ogbomosho , Nigeria.

Correspondence

Dr Peter Olalekan ODEYEMI
Division of Urology, Department of Surgery, Ladoke Akintola University of Technology Teaching Hospital, Ogbomosho, Nigeria.
docpeto4all@yahoo.com

ABSTRACT

Background: Iatrogenic ureteric injury is a common complication of pelvic surgery especially gynaecological procedures. However, bilateral ureteric injury is very rare with significant morbidity and occasional mortality. Total abdominal hysterectomy is responsible for most cases in our environment especially when performed by non-specialist medical professionals. While literature is sparse on the presentation, management and outcomes of this rare condition, the few ones available do not give a clear guideline.

CASE SUMMARY. A 48-year-old woman with 2 days history of not passing urine through the urethral catheter following abdominal hysterectomy by a general practitioner. Indication for the surgery was a symptomatic fibroid. There was associated progressive abdominal distension. Significant findings on examination were non draining 18Fr foley's urethral catheter, lower abdominal midline surgical wound, significant abdominal distension with vague tenderness. Serial electrolyte, urea and creatinine showed significant progressive deterioration of the renal functions. Ultrasound showed bilateral hydroureteronephrosis with significant intraperitoneal fluid collection. Patient had emergency exploratory laparotomy with intra operative findings of 2.5L of intraperitoneal urine collection, dilated ureters, bilateral suture ligation of distal ureters with leakage of urine around suture lines. Patient had drainage of intraperitoneal collection, bilateral ureteroneocystostomy, bilateral ureteric stenting, peritoneal lavage and was placed on continuous bladder drainage.

CONCLUSIONS: Bilateral ureteric Injury is a urological emergence especially when the patient is rendered anephric by bilateral ureteric ligation. Prompt diagnosis and treatment are important to salvage the renal functions and achieve good outcomes.

Key words; Ureter, Ureteroneocystostomy stent. Hysterectomy , Renal functions

INTRODUCTION

Iatrogenic injuries bring to mind the Latin phrase *primum non nocere* meaning 'first do no harm'. When clinicians inadvertently injure the ureters they violate this basic principle.[1] Injury to the ureter is one of the most serious complications of any abdominal or pelvic procedure whether from gynaecological, urological or general surgical disease with concern about the medico-legal implication.[2] The incidence varies between 0.5 and 10% in most series.[3-5] Traditionally, gynaecological procedures have been reported to account for between 50 and 75% of iatrogenic ureteric injuries (IUI) with hysterectomy accounting for majority of the cases.[6] Since the ureter lies very near the female reproductive organs throughout its course from the pelvic brim to the bladder, gynaecological or pelvic disease can involve the ureter directly or can cause the course of the ureter to deviate. The normal anatomic relations of the ureter in the pelvis can also vary, thereby making it vulnerable to injury.[7-10]

In Sub-Saharan Africa, with an endemic scarcity of gynaecologists, the practice of major gynaecological surgical procedures is not limited to the specialists alone but also inexperienced non-specialists.[5,11] Ureteric injury may result from such practices and if not properly managed could lead to increase in morbidity and mortality.[5,11] Injuries may however be almost unavoidable in some situations, even in the hands of the most skilled and experienced gynaecologists. Though bilateral ureteric injuries are rare, it presents a considerable reconstructive challenge.[12,13]Injuries recognised during the initial surgery are generally straightforward to treat involving immediate open repair over a ureteric stent.

The management of injuries presenting in the postoperative period has evolved over the past decade changing from a predominantly open approach to endourological retrograde or antegrade stent placement.[4,12] In addition to the ureteric injury it must not be forgotten that pelvic surgery such as radical hysterectomy can affect lower urinary tract function, typically by injury to the pelvic nerves, resulting in a proportion of women experiencing long-term bladder dysfunction.[14]Issues surrounding the management of bilateral ureteric injury are more complex and are less considered in the literature despite the challenging reconstructive problem that they present. The standard methods of surgical management used for unilateral injury may need to be modified or used in combination for cases of bilateral injury and close observation is needed to minimise further loss of renal function and to avoid uro-sepsis.[1]

Objective: To present a case of bilateral ureteric injury, its presentation, diagnosis, management and outcomes.

CASE PRESENTATION

A 48-year-old woman with 2 days history of not passing urine through the urethral catheter following abdominal hysterectomy by a general practitioner. Indication for the surgery was a symptomatic fibroid. There was associated progressive abdominal distension which became worse when kidneys were challenged with IVF and IV frusemide. There was difficulty in breathing presumably due to splitting of the diaphragm. Significant findings on examination were non draining 18Fr foley's urethral catheter, lower abdominal midline surgical wound, significant abdominal distension with vague tenderness. There was also shallow respiratory and tachypnea. Paracentesis done in the accident and emergency yielded free flowing clear fluid presumable to be urine. Full blood count showed anaemia despite two units of blood transfusion from the referral centre. Serial electrolyte, urea and creatinine showed significant progressive deterioration of the renal functions. Ultrasound showed bilateral hydroureteronephrosis with significant intraperitoneal fluid collection.

Patient had emergency exploratory laparotomy by a urologist with intra operative findings of 2.5L of intraperitoneal urine collection, dilated ureters, bilateral suture ligation of distal ureters with leakage of urine around suture lines. Fig 1. Patient had drainage of intraperitoneal collection, bilateral ureteroneocystostomy, bilateral ureteric stenting, peritoneal lavage and was placed on continuous bladder

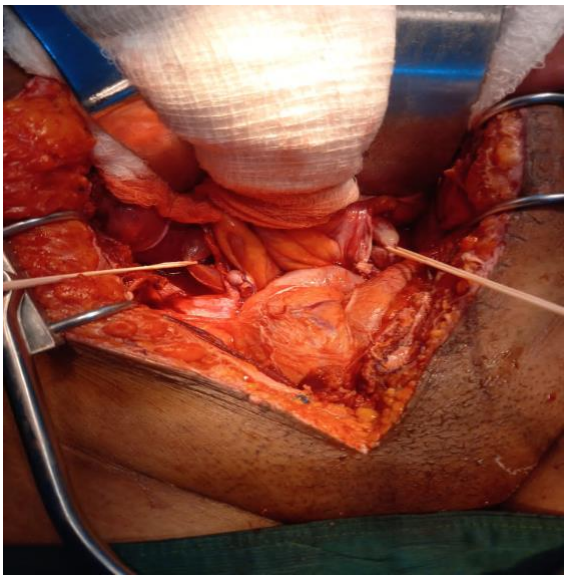

Fig 1. Ligated ureters with leakage of urine

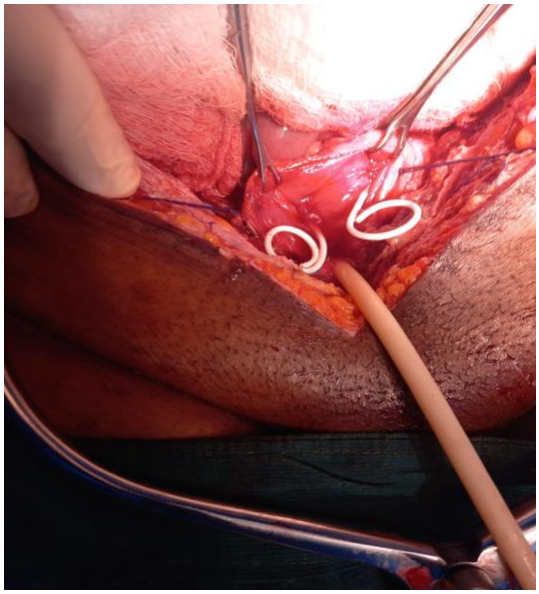

Fig.2. Ureteroneocystostomy with Stenting

Outcomes

Patient had significant improvements post operatively with stable vital signs. Renal functions returned to normal within 48 hours after surgery. Tables 1 and 2. She was subsequently discharged 4 days post op and had ureteric stents removed six weeks postoperative.

RESULTS

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Table 1. Post Ureteric Injury EnU, Cr

Day	**Cr**	**Ur**	**Na**	**K**	**Cl**
2	245	11.4	140	4.4	107
3	379	17.3	137	_	100

Table. 2. 2-Day Post Ureteroneocystostomy EnU, Cr

Day	Cr	Ur	Na	K	Cl
2	100	3.6	136	2.3	112

Abbreviations; **EnU,Cr –** Electoryte, Urea and Creatinine**. IVF –** intravenous Fuid

DISCUSSION

Iatrogenic ureteric injuries are well recognised complications of gynaecological surgeries. Total abdominal hysterectomy accounts for the majority of the causes accounting for about 83%. Corroborating these, our patient had total abdominal hysterectomy.[3,6,8] Our patient was 48 years; a similar pattern to what had been reported previously indicating that this often occurs in women during their reproductive periods.[6,15,16,17]

The practice of major gynaecological surgical procedures by inexperienced non-specialist is common in Sub-Saharan Africa.[5,11] This may lead to increase incidence of ureteric injury and if not properly managed could lead to increase in morbidity and mortality.[5,11] Our patient was operated by inexperienced non-specialist medical professional. Lack of specialist training and inadequate experience may contribute to this injury. However, an experienced non-specialist can safely perform some gynaecological surgical procedures without increase in the incidence of ureteric injury. Emergency surgeries account for majority of the cases.[6] Although, our patient had elective surgery, bilateral ureteric injury might have occurred while the surgeon was trying to secure haemostasis. Bilateral ureteric injury is rare and mostly presents later with symptoms ranging from fistula to renal failure.

Our patient presented immediately after the surgery with non-draining urethral catheter, progressive abdominal distension and deterioration of the renal functions. Our patient may have presented later if only one ureter was injured. We infer that bilateral ureteric injury is one of the major factors for early presentation. The main stay of diagnosis is CT urogram. This could not be done in our patient due to financial constraints and deterioration of the clinical condition. We relied majorly on ultrasound findings of significant intraperitoneal collection and bilateral hydroureteronephrosis with progressive deterioration of the renal functions. Treatment depends on the type of injury, presentation, and surgeon choice. Injuries recognised during the initial surgery are generally straightforward to treat involving immediate open repair over a ureteric stent. The management of injuries presenting in the postoperative period generally ranges from endourological retrograde or antegrade stent placemen to open approach and sometimes nephrectomy.[6,12,14]

Our patient had open approach involving exploratory laparotomy, bilateral ureteroneocystostomy and stenting. Patients with urinary retention or bilateral ureteric obstruction is at risk of hydronephrosis follows by progressive renal damage as evidence by deranged renal functions with progressive elevation of urea and creatinine. Prompts relieve of the obstruction leads to resolution of hydronephrosis and progressive improvement in renal functions. If elevation of urea and creatinine persist despite resolution of the hydronephrosis, this may mean the patient has reached baseline and will not improve further.[15]

In our patient, serum creatinine and urea increased rapidly to 379 and 17.3 mmol/l respectively

within 72 hours of injury suggesting rapid deterioration of the renal functions with possible contribution from peritoneal absorption. There was rapid reduction of creatinine and urea to normal with values of 100 and 3.6 mmol/l suggesting complete recovery of the renal functions within 48 hours of repair. As noted in other studies,[6,12,14] our patient improved significantly with restoration of the renal functions and general clinical improvement.

CONCLUSIONS:

Bilateral ureteric Injury is a urological emergence especially when the patient is rendered anephric by bilateral ureteric ligation. Prompt diagnosis and treatment are important to salvage the renal functions and achieve good outcomes.

Conflict of Interest: The authors declare no conflict of interest.

Ethical Issues: The informed consent of the patient was obtained, and the case report was conducted in compliance with the guidelines of the Helsinki declaration on biomedical research in human subjects. Confidentiality of the patient and personal health information was maintained.

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■ **Clinical Practice Guideline**

Management and the Prevention of Anaemia in Pregnancy: SOGON Clinical Practice Guidelines

Bosede B. Afolabi[1], Olayinka O. Ogunbode[2], Oliver C. Ezechi [3], Rosemary N. Ogu[4], Chris O. Agboghoroma[5], Abiodun P. Aboyeji[6], Jamilu Tukur[7], Tinuade Oyebode[8], Patrick H. Daru[9], Ayodeji A. Oluwole[10], Azubuike Onyebuchi[11], Bala Audu[12], Christopher O. Aimakhu[13], Oluwarotimi I. Akinola[14], Okechukwu C. Ikpeze[15], Habib M. Sadauki[16]

1. Department of Obstetrics and Gynaecology, College of Medicine, University of Lagos and Lagos University Teaching Hospital, Lagos, Nigeria; Director, Centre for Clinical Trials, Research and Implementation Science (CCTRIS), University of Lagos, Lagos, Nigeria. email: bbafolabi@unilag.edu.ng; 2. Department of Obstetrics and Gynaecology, College of Medicine, University of Ibadan, Ibadan and University College Hospital, Ibadan, Nigeria. email: yinkaogunbode@yahoo.co.uk; 3. Centre for Reproduction and Population Health Studies, Nigerian Institute of Medical Research, Lagos, Nigeria. email: oezechi@yahoo.co.uk; 4. Department of Obstetrics & Gynaecology, Faculty of Clinical Sciences, College of Health Sciences, University of Port Harcourt and University of Port Harcourt Teaching Hospital, Port Harcourt, Nigeria. email: rosemary.ogu@uniport.edu.ng; 5. Department of Obstetrics and Gynaecology, National Hospital, Abuja, Nigeria. email: agboschris@yahoo.com; 6. Department of Obstetrics and Gynaecology, Faculty of Clinical Sciences, College of Health Sciences, University of Ilorin and University of Ilorin Teaching Hospital, Ilorin, Nigeria. email: abidunpeter@yahoo.co.uk; 7. Department of Obstetrics and Gynaecology, Faculty of Clinical Sciences, College of Health Sciences, Federal University Dutsinma, Katsina, Katsina state. email: jtukur@yahoo.com; 8. Department of Obstetrics and Gynaecology, Faculty of Clinical Sciences, College of Health Sciences, University of Jos and Jos University Teaching Hospital, Jos. email: tinuadeoyebode@yahoo.com; 9. Department of Obstetrics and Gynaecology, Faculty of Clinical Sciences, College of Health Sciences, University of Jos and Jos University Teaching Hospital, Jos. email: phdaru@yahoo.com; 10. Department of Obstetrics and Gynaecology, College of Medicine, University of Lagos and Lagos University Teaching Hospital, Lagos, Nigeria. email: dejwol@yahoo.com; 11. Department of Obstetrics and Gynaecology Federal Teaching Hospital, Abakaliki, Ebonyi State. email: kanayo009@yahoo.com; 12. Department of Obstetrics and Gynaecology, and Vice Chancellor, Federal University of Health Sciences, Azare, Bauchi State. email: balaaudu19@gmail.com; 13. Department of Obstetrics and Gynaecology, College of Medicine, University of Ibadan, Ibadan and University College Hospital, Ibadan, Nigeria. email: chrisaimakhu@yahoo.com; 14. Department of Obstetrics and Gynaecology, Lagos State University and Lagos State University Teaching Hospital, Lagos, Nigeria. email: iretiakinola@hotmail.com; 15. Department of Obstetrics and Gynaecology, Nnamdi Azikiwe University, Awka, Nigeria. Email: ocikpeze@yahoo.com; 16. Premier Clinic, Kano. President, Society of Gynaecology and Obstetrics of Nigeria. Email: habibsadauki@gmail.com

ABSTRACT

Anaemia during pregnancy is a significant public health concern in this country. With 40% of the population living in poverty and 63% facing multidimensional poverty as reported by the National MPI 2022, it is not surprising that women often have poor diets, making them more prone to iron and folate deficiency anaemia, which are the leading causes of anaemia during pregnancy. Other factors contributing to anaemia during pregnancy include having multiple pregnancies in quick succession, giving birth to multiple babies, pre-pregnancy menorrhagia, worm infestation, severe and prolonged hyperemesis gravidarum, among others. Anaemia during pregnancy can cause serious complications for the fetus, such as preterm birth and low birth weight. It can also affect the mother's well-being, with severe anaemia increasing the risk of death or near misses. Recent evidence also suggests that anaemia during pregnancy significantly increases the risk of postpartum haemorrhage caused by uterine atony. It's crucial for healthcare providers to be aware of the issues associated with anaemia during pregnancy and the measures for preventing and detecting high-risk pregnancies early. Healthcare providers must understand the different types of anaemia, common symptoms, and treatment options to recognize the warning signs of anaemia and avoid complications. This clinical guideline is designed for obstetricians and midwives to help manage pregnant women with anaemia appropriately. The document's layout and practical step-by-step approach to managing anaemia during pregnancy are commendable, and the team of experts who produced this high-quality document under the chairmanship of Prof Abiodun Aboyeji deserves appreciation. All members of the committee deserve commendation for a job well done. Healthcare practitioners should use this guideline to manage anaemia during pregnancy effectively, reducing complications for both mother and foetus, and ultimately reducing the burden of high maternal and perinatal mortality and morbidity related to anaemia. This is one of four clinical guidelines to be produced by the SOGON Executive under my leadership. The other three will be rolled out shortly.

Correspondence

Dr. Olayinka Oladunjoye Ogunbode
Department of Obstetrics and Gynaecology,
College of Medicine, University of Ibadan, Ibadan
& University College Hospital, Ibadan, Nigeria.
email: yinkaogunbode@yahoo.co.uk
Phone: 08023258010

INTRODUCTION

Anaemia is a global public health challenge and is among the commonest medical disorders of pregnancy. It is a significant contributor to maternal and perinatal morbidity and mortality, particularly in low resource countries. The global prevalence of anaemia in pregnancy is 36.5%[1], but in Nigeria, the prevalence of anaemia in pregnancy ranges between 37.6% and 76.5%. Studies from northern and southern Nigeria have reported prevalence rates of Iron deficiency Anaemia (IDA) in pregnancy of 12.3 - 65.1%[2–6]

Definition

The World Health Organization (WHO) defines anaemia in pregnancy as a haemoglobin (Hb) concentration of less than 11g/dl and postpartum less than 10g/dl.[1] However in obstetrics in the tropics, the cut off for anaemia in pregnancy is generally accepted as Hb concentration less than 10g/dl or a Packed Cell volume of 30%. This is because of mean Hb values among the populace and the fact that side effects associated with anaemia are not commonly found at Hb values above 10g/dl.

Consequences of Anaemia in Pregnancy

Anaemia in pregnancy can lead to maternal and foetal complications including preterm deliveries, postpartum haemorrhage, infections and depression.[6,7] Anaemia has socioeconomic implications and also contributes to suboptimal work performance, reduced mental function, and productivity, hence reduced earning capacity.[8] The foetus may suffer from foetal growth restriction and stillbirth, while the infant of an affected mother may develop neurodevelopmental impairment and diseases in adult life.[6,7]

AETIOLOGY

In Nigeria, the common causes of anaemia in pregnancy include nutritional deficiencies (iron, folate and vitamin B12), haemoglobinopathies (sickle cell disorder), blood loss (antepartum and postpartum haemorrhage), infections and infestations (malaria, urinary tract infection, HIV and hookworm).[4,9] Other less common causes include drugs, Glucose-6-Phosphatase dehydrogenase (G6PD) deficiency and autoimmune disorders.[4,9]

Classification

Anaemia in pregnancy can be classified based on severity into mild (Hb = 10.0 – 10.9 g/dl), moderate (Hb = 7.0 – 9.9g/dl) and severe (Hb = < 7.0 g/dl).[10] The incidence of associated complications will rise with progression from mild to severe forms.

Anaemia can also be classified morphologically into various types, where the morphology of the RBCs can indicate the cause of the anaemia. The first is normocytic normochromic anaemia, which can be due to physiologic haemodilution of pregnancy. Secondly, it can be Microcytic hypochromic anaemia which is typical of Iron deficiency. Thirdly it can be Macrocytic (megaloblastic) anaemia which occurs in Vitamin B12 and Folic acid deficiency. There may be mixed picture when the cause of the anaemia is multifactorial.

Anaemia can also be classified based on kinesis into those from excessive destruction of RBCs which can occur in haemolysis like Haemoglobinopathies, autoimmune disorders, infestations (like malaria), severe infections, uraemia and others. Second, it can occur from excessive blood loss that can occur in acute or chronic bleeding. Thirdly, anaemia can occur from inadequate production of RBs like in Iron, folate and Vitamin B12 deficiency, severe malnutrition, bone marrow atrophy like in aplastic anaemia or bone marrow infiltration by malignant cells.

Anaemia can also result from other severe medical conditions like severe endocrine, liver and kidney diseases among others. Knowing the cause of anaemia in pregnancy is critical to manage it correctly and successfully, in order to prevent maternal and perinatal morbidity and mortality.

DIAGNOSIS

Considering the various causes of anaemia, the knowledge of the aetiology is important to ensure correct management of the condition. This entails taking a thorough history including symptoms, pre-existing disease conditions, dietary history, family and social history, obstetrics, gynaecologic and drug history. The symptoms and duration of the condition should also be looked for. This should be followed by comprehensive examination and relevant investigations.

Clinical Features

In most cases women with anaemia in pregnancy are asymptomatic. The asymptomatic anaemias are majorly chronic, while the acute anaemia, usually from acute blood loss or sequestration tend to be more symptomatic. As severity of anaemia increases, they may present with symptoms such as weakness, tiredness, lassitude, easy fatiguability, dizziness, fainting attacks, headaches, breathlessness on exertion, palpitation, and swollen legs, while anaemia from acute blood loss can lead to hypovolaemia and haemorrhagic shock.

History of prescription and recreational drug use should be sought, presence of passage of frequent

stool, cough, weight loss, fever, urinary symptoms, parity and occupational history will be relevant. There may also be associated foetal complications including abortion, foetal distress or demise, preterm delivery and growth restriction in chronic anaemia.

Physical Examination

The commonest sign of anaemia is pallor, which may present in varying degrees. The pallor can be elicited from the conjunctiva, buccal mucosa and palmar surface, but this can be affected by other factors like crying, exposure to smoke (conjunctiva), conditions like liver diseases (palms) and diet (buccal mucosa). Other signs of moderate to severe anaemia include generalized oedema, jaundice, fever, petechial haemorrhages and hepatosplenomegaly. Dyspnoea, heart failure, glossitis, stomatitis, pharyngeal webs and koilonychia may also develop.

Patients should be examined for lymphadenopathy, hepatomegaly and splenomegaly. The size and regularity of the uterus and the presence of abdominopelvic masses should be looked for. Pelvic examination and digital rectal exam should also be performed as indicated.

With increasing severity, anaemia can progress through three clinical phases. It can begin with compensation with episodes of dyspnea with activity, then progress to the phase of decompensation with dyspnea at rest, and if uncorrected can lead to cardiac failure.

The clinical findings will determine the appropriate Investigations that should be requested in managing the patient.

Investigations

General

1. Full blood count (FBC). This is the most important test in the evaluation of anaemia and it includes the Hb concentration, packed cell volume (PCV), red blood cell count (RBC), white blood cell count (WBC), platelet count and reticulocyte count, mean corpuscular volume (MCV), mean corpuscular haemoglobin (MCH) and mean corpuscular haemoglobin concentration (MCHC).
   - ⇒ Normal reticulocyte is 1-2.5% and it may be increased (haemolytic anaemia or acute blood loss) or decreased (iron, B12, or folic deficiency and anaemia of chronic disorders.
   - ⇒ Mean Corpuscular Volume (MCV) may be < 80fL(microcytic), 80-100fL (normocytic) or >100 fL(macrocytic).
   - ⇒ Mean Corpuscular haemoglobin (MCH). It is the average amount of hemoglobin in a person's red blood cells and normal value is 34pg/dl.
   - ⇒ Mean Corpuscular Haemoglobin Concentration (MCHC) may be high (> 34pg/dl) in macrocytic anaemia), normal (17–34pg/dl) or low (<17pg/dl) in microcytic anaemia.
2. Peripheral blood films: It is useful in showing characteristic abnormalities of red blood cell shape, size and appearance, also the presence of precursor RBCs and platelet count.
   - ⇒ It may be microcytic (iron deficiency, thalassemia, chronic disease), macrocytic (folate deficiency, vitamin B12 deficiency, drug induced haemolytic anaemia, liver disease), normocytic (haemorrhagic anaemia, early iron deficiency anaemia, chronic disease, autoimmune haemolytic anaemia) or dimorphic (iron deficiency and folate deficiency).[11,12]
   - ⇒ Others may show hypochromic (Iron deficiency), spherocytes (immune hemolysis, microangiopathic haemolysis), sickle cells (sickle cell anaemia) or target cells (thalassemias).[12]
3. Haemoglobin Genotype: To diagnose haemoglobinopathies.
4. Malaria test: Blood film for identification of malaria parasites, or malaria rapid diagnostic tests
5. HIV test: Rapid test according to Nigerian national HIV testing guidelines
6. Stool microscopy: To check for the presence of ova of hookworm and the count.
7. Urinalysis and microscopy, culture and sensitivity: To diagnose urinary tract infection.

Specialized tests (These tests should only be done when indicated)

8. Iron studies: Serum ferritin has the highest sensitivity and specificity in pregnancy and is recommended when it is necessary to determine the cause of anaemia.[13] As Serum ferritin is sometimes elevated in the presence of inflammation, C-Reactive Protein may also be necessary.[14] The serum ferritin threshold for the diagnosis of IDA is < 30µg/L.[13,15]
9. Biochemical parameters: These include liver function tests (increased LDH, increased Indirect bilirubin), renal function tests, thyroid function tests, serum haptoglobin and haemoglobinuria. These are indicated when clinical features of the specific disease conditions are elicited.
10. Direct Antiglobulin test (DAT): To distinguish immune causes (DAT-positive) from non-immune causes (DAT-negative).
11. Vitamins and Micronutrients: Serum vitamin B12 level, folate levels, copper and zinc.
12. Bone marrow studies: Should only be done in collaboration with haematologist.

TREATMENT

The treatment of anaemia in pregnancy varies depending on the cause, severity, the symptoms and gestational age.

A. Iron Deficiency Anaemia

Maternal iron deficiency anaemia impairs neurodevelopmental function and learning in children.[16–18] It is therefore important to treat pregnant women promptly even when presenting with mild asymptomatic IDA. IDA is treated with oral and parenteral iron, and blood transfusion. Hb concentration rise of > 1g/dl in two weeks after treatment with oral iron is seen as evidence of iron deficiency anaemia if properly taken. To enhance absorption, pregnant women should be advised to take oral iron one to two hours after meals preferably with 100mg of vitamin C. Oral iron should also not be taken with antacids or with caffeine containing beverages including tea and coffee.[19] Parenteral iron preparations are also available and can be used if indicated. Older dextran-based preparations have been associated with hypersensitivity reactions, but newer preparations are largely known to be safe.

In most cases packed red blood cell (pRBC) is preferable for blood transfusion except in acute blood loss, severe anaemia close to term and when the patient is clinically unstable. The benefits of blood transfusion must be assessed to outweigh the associated risks (infections, transfusion reactions, sensitization in rhesus negative, volume overload and others).

In the management of IDA folic acid 5mg daily should also be administered. Adjuvant recombinant human erythropoietin (rHuEPO) 4000 units subcutaneously, three times a week should be used in patients who refuse blood transfusions. Table 1 below shows the treatment of IDA based on gestational age and severity.

Table 1: Treatment of IDA Based on Gestational Age and Severity of Anaemia in Pregnancy.

	Trimesters of pregnancy		
Severity of anaemia	**First**	**Second**	**Third**
Mild (Hb = 10 – 10.9g/dl)	Oral elemental iron 60mg bd. If no rise of 1g/dl in 4 weeks, administer parenteral iron in second trimester	Oral elemental iron 60mg bd. If no rise of 1g/dl in 4 weeks, administer parenteral iron	Oral elemental iron 60mg bd. If no rise in 4 weeks, administer parenteral iron
Moderate (Hb = 7 - 9.9g/dl)	If asymptomatic, administer oral elemental iron 60mg bd. If no rise in Hb of up to 1g/dl in 2 weeks, administer parenteral iron in second trimester. If symptomatic administer pRBC,	If asymptomatic, administer oral elemental iron 60mg bd. If no rise in Hb of 1g/dl in 2 weeks, administer parenteral iron. If symptomatic administer pRBC,	If asymptomatic, administer oral elemental iron 60mg bd. If no rise in Hb of 1g/dl in 2 weeks, administer parenteral iron If symptomatic or close to delivery transfuse pRBC
Severe (Hb < 7g/dl)	Transfuse pRBC,	Transfuse pRBC,	Transfuse pRBC,

NB: Dose of iron stated in the table above refers to elemental iron.

Blood transfusion should be considered in acute blood loss where patient is decompensated, when the foetus is affected, when the Hb is very low, and when delivery is close. The benefits should outweigh the risks.

The following doses of oral iron commonly used, correspond to 60mg elemental iron - ferrous sulphate 200mg, ferrous gluconate 500mg, ferrous fumarate 180mg.

The recommended intravenous iron preparation is intravenous sucrose because of its relative safety and availability. The formula for calculating the dose of intravenous iron: Weight (Kg) X (110g/L – initial Hb) X 0.24 + 500mg (replacement of iron stores).[20]

Other Causes of Anaemia

Table 2 below refers to the treatment of other common causes anaemia in pregnancy.

Table 2: Treatment of Other Causes of Anaemia in Pregnancy

Causes	**First**	**Second**	**Third**
Malaria	Quinine or Artemether Lumefantrine	Artemether Lumefantrine (AL)	Artemether Lumefantrine (AL)
Infections	Appropriate antimicrobial for pregnancy	Appropriate antimicrobial for pregnancy	Appropriate antimicrobial for pregnancy
Sickle cell disease	Transfuse packed AA RBCs, if consistently less than steady state, or less than 6g/dl	Transfuse packed AA RBCs, if consistently less than steady state, or less than 6g/dl	Transfuse packed AA RBCs, if consistently less than steady state, or less than 6g/dl
Folate deficiency	Folic acid 5mg daily	Folic acid 5mg daily	Folic acid 5mg daily
Haemorrhage	Transfusion of whole blood if symptomatic or Hb < 9g/dl Administer oral iron if stable and Hb ≥ 9g/dl	Transfusion of whole blood if symptomatic or Hb < 9g/dl Administer oral or parenteral iron if stable or Hb≥9g/dl	Transfusion of whole blood if symptomatic or Hb < 9g/dl Administer oral or parenteral iron if stable or Hb≥9g/dl
Hookworm or other Helminths	Defer treatment till second trimester	Albendazole 400mg single dose or Mebendazole 500mg single dose	Albendazole 400mg single dose or Mebendazole 500mg single dose

PREVENTION OF ANAEMIA IN PREGNANCY

Anaemia is an indicator of both poor nutrition and poor health.[21] Maternal undernutrition is highly prevalent in Nigeria and is recognized as a key determinant of poor perinatal outcomes.[21] Measures to improve maternal malnutrition are good preventive strategies to prevent anaemia in pregnancy. Prevention of other common causes of maternal anaemia should occur as early as possible during or before pregnancy.
The preventive measures include:

1. Preconception care for women of reproductive age with emphasis on good nutrition, genotype awareness, and appropriate care for heavy and/or prolonged menstrual bleeding.[21,22]
2. Pregnant women should be encouraged to register for antenatal care in the first trimester.[21]
3. Specific health education on optimal nutrition during pregnancy.[21,22]

4. Screen all pregnant women for anaemia using haemoglobin concentration or PCV at booking.[21]
5. Commence prophylactic iron supplementation (60mg of elemental iron daily) for all pregnant women from booking till six weeks post-partum (except those with sickle cell disorder) - (WHO Recommendations on ANC). Although oral iron supplementation was found to increase malaria and other infection rates in children in some malaria endemic settings, a review of the literature did not find any epidemiological evidence that daily maternal supplementation with 60mg elemental iron, leads to increased maternal P. falciparum infection.[16]
6. Commence prophylactic folic acid 5mg daily (ideally from 12 weeks before conception) throughout pregnancy.[21]
7. Commence malarial chemoprophylaxis with monthly Sulphadoxine-Pyrimethamine regime starting from the second trimester till delivery.[21]

Summary of Recommendations

1. The World Health Organization (WHO) defines anaemia in pregnancy as a haemoglobin concentration of less than 110g/l (11g/dl) and postpartum less than 100g/l (10g/dl).[10]
2. Anaemia in pregnancy is classified based on severity into mild (Hb = 10.0 – 10.9 g/dl), moderate (Hb = 7.0 – 9.9g/dl) and severe (Hb = < 7.0 g/dl).[10]
3. Full blood count (FBC) is the most important test in the evaluation of anaemia, and it includes the Hb concentration, packed cell volume (PCV), red blood cell count (RBC), white blood cell count (WBC), platelet count and reticulocyte count, mean corpuscular volume (MCV), mean corpuscular haemoglobin (MCH) and mean corpuscular haemoglobin concentration (MCHC).
4. Serum ferritin has the highest sensitivity and specificity in pregnancy and is recommended when it is necessary to determine the cause of anaemia. The serum ferritin threshold for the diagnosis of IDA is < 30µg/L.[13,15]
5. IDA should be treated with oral and parenteral iron, and blood transfusion. Packed red blood cell (pRBC) is preferable for blood transfusion except in acute blood loss, severe anaemia close term and when the patient is clinically unstable.
6. In the management of IDA folic acid 5mg daily should also be administered.
7. Adjuvant recombinant human erythropoietin (rHuEPO) 4000 units subcutaneously, three times a week should be used in patients who refuse blood transfusions.
8. Hb concentration rise of > 1g/dl in two weeks after treatment with oral iron is seen as evidence of iron deficiency anaemia.[23,24]
9. The doses of elemental oral iron for prophylaxis and treatment of IDA in pregnancy should be 60mg daily and 60mg twice daily, respectively.
10. Preventive strategies during and before pregnancy, including IPTp should be emphasised in women of reproductive ages and their partners.

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ERRATUM

This article published in the Vol. 41. No. 3, (2023) of Tropical Journal of Obstetrics & Gynaecology, contained errors of, omissions of tables which have been corrected in the present issue of the journal.

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■ Original Research Article

Prevalence and Factors Associated with Intra-Vaginal Tobacco Powder Use among Women in The Gambia

Jaiteh, M.[1,5], Awolude, O.A. [1,2], Tunkara-Bah, H.[3], Jatta, J.W[4].

[1]Pan African University Life and Earth Sciences Institute (Including Health and Agriculture), University of Ibadan, Ibadan, Nigeria; [2]Department of Obstetrics and Gynaecology & Infectious Disease Institute, College of Medicine, University of Ibadan/University College Hospital, PMB 5017, G.P.O. Ibadan, Nigeria; [3]Department of Nursing, School of Medicine & Allied Science, University of The Gambia, The Gambia; [4]Directorate of Health Research, Ministry of Health, The Gambia; [5]Directorate of Nursing, Ministry of Health, The Gambia.

Abstract

Background: Intra-vaginal tobacco powder, locally known as "Tabaa," is a mixture of powdered tobacco and other substances that women use vaginally for sexual enhancement and other perceived benefits. This issue elicited mixed feelings among Gambians, particularly healthcare professionals. Through a media report, the Ministry of Health warned women to stop the practice due to the potential negative consequences. **Objectives:** This study aimed to determine the prevalence and factors associated with intra-vaginal tobacco powder use among women in The Gambia. The findings will provide baseline information regarding the extent of intra-vaginal tobacco usage and the factors promoting them to enable the Ministry of Health and relevant stakeholders to design strategic interventions to combat the practice. **Methods:** A sequential exploratory mixed (qualitative-quantitative) approach was used. The research was a combination of healthcare facility-based and community-based studies, which was carried out in both rural and urban areas of The Gambia. Thirty (30) purposively selected participants were interviewed for the qualitative study, while the quantitative study recruited 400 women using a multistage sampling method. A structured questionnaire developed from the qualitative results was used to collect the quantitative data. STATA version 18 was used for the data analysis. Chi-square test and multivariate logistic regression analysis were used with a significance level of $p<0.05$, Adjusted Odds Ratio (aOR) and a 95% confidence interval (CI). **Results:** The qualitative results reveal that sexual enhancement, treating genital infections, hastening labour, lack of knowledge, long-distance marriage and polygamy were commonly cited as factors associated with intra-vaginal tobacco powder use. The main analysis in the quantitative study focused on the subset of 287 women who demonstrated awareness of intra-vaginal tobacco practices. The findings of the study revealed a lifetime prevalence of 23.7% (n=68) of intra-vaginal tobacco powder use among Gambian women, with 63.2% currently using it. Most of the women were married and within the age range of 30 to 39 years. Women aged 40 years and above (aOR = 3.20; 95% CI = 1.26–8.13; p = 0.015), from Farafenni and satellite villages (aOR = 2.20; 95% CI = 1.17-4.12; p = 0.014), had non-formal education (aOR = 2.23; 95% CI 0.64-7.79; p=0.210) and expressed perceived benefits (aOR = 16.50; 95% CI 6.10-44.50; $p<0.001$) have the greatest odds of using intra-vaginal tobacco powder. **Conclusion:** Intra-vaginal tobacco powder use is practised in the Gambia and is highest in rural areas. There is an urgent need for interventions, such as raising awareness to mitigate this practice.

Keywords: Tobacco powder, Tabaa, intra-vaginal insertion, sexual enhancement, prevalence, risk factors, The Gambia.

Corresponding Author:

Mr. Musa Jaiteh
Farafenni, North Bank Region, The Gambia
Phone Number: (+220) 2569991
mjaiteh1993@gmail.com

INTRODUCTION

Intra-vaginal tobacco is a mixture of powdered tobacco and other substances that women insert vaginally for some perceived benefits.[1,2] Although a few records reference the use of intra-vaginal tobacco powder, it is considered a form of intra-vaginal practice (IVP) among women in Sub-Saharan Africa (SSA)[3] Intra-vaginal tobacco powder is available in a variety of forms and is known by different names in different countries.[3] It is locally known as 'Tabaa' in The Gambia and is a combination of powdered tobacco, caustic soda, and other ingredients that women use vaginally, mainly for sexual enhancement.[1,2]

In Zambia, tobacco powder is popularly called 'Insunko' and is widely used for snuffing, while females also use it for vaginal tightening and warmth during sexual intercourse, thus increasing the sexual pleasure of the male partner.[4] Media reports have it that intra-vaginal insertion of tobacco powder has become a popular fad in West Africa due to the false claims that it can increase sex drive, tighten the vagina, and make one fertile.[5] Like other types of IVPs (douching, vaginal sildenafil, and Intra-vaginal cosmetic insertion), they are motivated by perceived benefits such as physical and medical factors, as well as sociocultural factors.[6-10] Several studies have found that most IVPs expose women to sexually transmitted infections (STIs), cervical and ovarian cancer, and other gynaecological issues.[11-15] In addition, tobacco substances are heavy in nicotine, highly addictive and contain various carcinogens.[16]

Despite the paucity of scientific evidence on the effects of intra-vaginal tobacco, Nigerian physicians have recently issued a warning to women about the dangers of intra-vaginal tobacco powder use and suggested that the practice could be associated with numerous effects like cancer, problems during birth and the natural flow of menstruation.[17] Women advocacy groups and the Ministry of Health of The Gambia have also suggested that the practice could be linked to gynaecological issues. Intra-vaginal tobacco powder use among Gambian women is of considerable concern. Yet, no relevant documented data was found to measure the extent of its usage, factors associated with it, and its consequences.

This study aimed to investigate the prevalence and factors associated with intra-vaginal tobacco powder use among women in The Gambia. The findings of the study would provide baseline information for future studies. Understanding the factors that promote the usage of intra-vaginal tobacco powder would help health service managers and policymakers to design interventions and policies that will discourage the practice.

MATERIALS AND METHODS

Study Design and Setting

A sequential exploratory mixed study was used to determine the prevalence and factors associated with intra-vaginal tobacco powder insertion among women in The Gambia. The information from the initial qualitative study was used to develop tools for the quantitative study. The study was carried out in two areas of The Gambia: one urban (Banjul) and one rural (Farafenni). The entire study was held from March 2022 to August 2022. The qualitative part was a combination of a community-based and health facility-based survey, and the following facilities were involved: Edward Francis Small Teaching Hospital (EFSTH), Farafenni General Hospital and Farafenni Reproductive, Maternal, Neonatal, Child, and Adolescent Health Centre (RMNCAH). The quantitative study was purely a community-based study.

Study Participants

The qualitative aspect of the study consisted of 30 participants from Farafenni and Banjul who were men, women, community leaders, women group leaders, religious leaders, gender advocates, and health workers such as nurses/midwives, gynaecologist, reproductive health specialists at the ministry of health. Participants who were believed to have information about Intra-vaginal tobacco powder use, aged 18 years and above, and agreed to participate in the study were purposively selected.

The quantitative study included 400 women aged 18 years and above who were residing in Banjul and Farafenni, The Gambia and agreed to participate in the study. The study excluded those who were not residents of the selected sites, were less than 18 years old, and refused to participate in the study.

Sampling, Data Collection and Analysis

A purposive sampling technique was used in the qualitative study. Two Focus Group Discussions (FGDs) and in-depth interviews (IDIs) were used to recruit 30 participants from the two study sites. Face-to-face and WhatsApp IDIs were used to obtain information from healthcare professionals such as nurses, midwives, gynaecologists, community health workers, and women who use intra-vaginal tobacco powder. Fourteen (14) healthcare workers consisting of nurses, midwives, community health nurses and gynaecologists, (6) women who practised intra-vaginal tobacco powder use were interviewed. Thematic content analysis guided the qualitative data analysis.

The quantitative aspect consisted of 400 women from both regions, and the sample size was

calculated using a formula $n = \frac{Zx^2P(1-P)}{d^2}$ adopted from Arya et al. (2012),[18] where n denotes the sample size, Z refers to the statistics (1.96) at 95% confidence interval, d for the precision (5%) and p designates the assumed prevalence (50%). The calculated sample size was 384, adjusted to 400 for a representative sample size.

A multistage sampling technique was used to select a representative sample size (400) in the quantitative study. Two regions (urban and rural) were chosen at random from the six Gambian regions, followed by two districts and then two towns. The number of households was chosen using systematic sampling, while the study participants were chosen using simple random sampling in Banjul and Farafenni. An interviewer-administered structured questionnaire was used to collect the quantitative data. The findings of the qualitative data were used to develop the questionnaire. Some relevant information from other studies [13,19,20] guided questionnaire formation. The questionnaire reviewed and validated was divided into four sections. The first part captured the information on the socio-demographic variables. The second part was used to determine the prevalence of intra-vaginal tobacco powder use by women, the third part focused on the reasons for usage and the fourth part addressed the perceived benefits. The factors associated with intra-vaginal tobacco powder use were determined by the test of association between independent variables and the outcome variable.

SPSS version 22 was used for the data entry and the file was exported to STATA version 18 for data cleaning and analysis. The chi-square (χ^2) test was used to test the association between intra-vaginal tobacco powder use and the independent variables, with a significance level set at $p<0.05$. A multivariate logistic regression analysis was done to identify the factors predicting the utilization of intra-vaginal tobacco powder. This analysis utilized the Adjusted Odds Ratio (aOR) with a significance level of $p<0.05$ and a 95% confidence interval (CI). The following assumptions of logistic regression were applied during the analysis: (1) The dependent (intra-vaginal tobacco use) variable was binary"yes" was coded as 1 and "no" was coded as 0; (2) multicollinearity test was done, and independent variables that were highly correlated with each other were removed. This was measured by a VIF score >10, and marriage type, stay with husband/partner and duration husband stays away were all removed due to this assumption (table 5a). This also applies to table 5b, where the duration the husband stays away has a VIF score >10, so it was removed; (3) Religion was removed from table 5a because it was a perfect predictor.

Ethical Consideration

The study protocol, consent forms, and participant information materials were reviewed and approved by the University of Ibadan/University College Hospital Ethics Committee (UI/EC/0765). The University of the Gambia Research and Publication Committee and the EFSTH Research and Ethics Committee (EFSTH_REC_2022_036) both conducted further reviews and gave their approval. Additional approval was obtained from the Regional Health Directorate of North Bank Region East, Farafenni RMNCAH Centre, and Farafenni General Hospital.

Written informed consent to participate in the study was sought after the aims and objectives of the study had been thoroughly explained to the participants. The participants were recruited into the study after signing or thumb-printing the Informed Consent form, indicating their willingness to participate. The illiterate participants' informed consent was translated and explained in local languages with the assistance of a close relative or a caregiver who understood both English and the local language used. They were made to fully understand what the study entails in very simple terms before signing or thumb-printing the consent form. There was no financial reward for participating. The participant's contact details were not recorded, and they were interviewed individually to ensure privacy and confidentiality.

RESULTS

Socio-demographic Characteristics of the Participants in the Qualitative Study

All 30 participants from the selected regions were included in the analysis. The findings of the study show that most (36.7%; n=11) of the respondents were between the age category of 30-39, 63.7% (n=19) were females, 70.0 % (n=20) attended tertiary education and 36.7% (n=11) were Nurses by occupation. Eighty-three per cent of them (n=24) were married, 93.3% (n=28) were Muslims by religion, and 40% (n=12) belonged to the Mandinka tribe.

Factors Promoting Intra-vaginal Tobacco Powder Use in the Qualitative Study

Several sociocultural factors were perceived to be associated with the use of intra-vaginal tobacco powder use among women in The Gambia and the themes developed based on the findings of the qualitative data are presented below:

Perceived Benefits (Physical Factors)

Sexual Enhancement

Sexual enhancement was highly mentioned as a reason why women use intra-vaginal tobacco powder. Intra-vaginal tobacco powder, like other sexual enhancement products, was perceived by respondents to give women sexual pleasure. A male midwife stated that "according to the findings I got from small research I conducted, most of the women explained to me that they have pleasure when they apply intra-vaginal tobacco powder during the nighttime" (Nurse 002, age 48). A gender activist also mentions in a FGD that "Most women use it for sexual satisfaction" (FGD 001, 63 years).

Vaginal Tightening

Some participants stated that older women (multiparous) use intra-vaginal tobacco powder for vaginal tightening to make them feel younger and provide enough sexual satisfaction to their husbands. This was attributed to the perception that women who have given birth many times develop vaginal laxity, having sex less pleasurable to their partners. Such women are said to be using substances that constrict their vaginas to please their husbands. A male OPD nurse disclosed, *"the reason that I heard why women use 'Tabaa' is to be able to satisfy their husbands during sex. According to them, it makes the sex sweeter, and also it constricts the vagina so that the man can enjoy himself"* (Nurse 004, age 29). A participant in a FGD stated, *"some use it to tighten their vagina because some people believed that the more tied a woman's vagina is, the more she enjoys the sex that's why many women are using 'Tabaa'"* (FGD 003, 33 years).

Perceived Benefits (Medical Factors)

It is a Medicine.

Some respondents perceived that intra-vaginal tobacco powder is a good medicine for genital infections (STIs and UTIs), infertility and other conditions. A woman disclosed, *"I was feeling some abnormalities in my body but since I started using "Tabaa" the abnormalities disappeared"* (UIDI 003, 32 years).

Treatment for Genital Infections

Some women are believed to use intra-vaginal tobacco powder to treat STIs such as candidiasis, genital warts, and other genital infections and recommend it to other women. Healthcare professionals and gender activists, refute this claim, although it remains a strong belief among some women. A woman stated, *"*my aunt told me that 'tabaa' is very effective against candidiasis that was when I started using it" (UIDI 002, 24 years). Another woman stated, "I used to feel certain abnormalities in my body which I couldn't understand, and then I was told by a friend to test 'Tabaa' and see since I have tried different medicines, and they couldn't cure it. She mentioned that 'Tabaa' has cured many people and advised me to try it to see if it'll resolve my health issue. Since I have started using 'Tabaa', those problems disappeared; however, I can't guarantee that what 'Tabaa' does to me will be applied to other people because our bodies react differently to substances" (UIDI 001, 30 years).

Treatment for Infertility

A woman stated, *"I know a woman who sat for many years without having a child, but she started having children after using 'Tabaa'"* (FGD 008, 28 years).

Fasten the Duration of Labour

The findings suggested that pregnant women, when in labour, apply intra-vaginal tobacco powder with the belief that it helps to shorten the duration of labour. A female midwife stated, *"I once assessed a woman at the labour ward and realized that she applied 'Tabaa', when asked why she did it, she told me that a woman told her that 'Tabaa' fasten labour which was why she applied it"* (Nurse 001, 26 years).

Treatment for Bedwetting

Participants expressed that some parents apply intra-vaginal tobacco powder to their kids in order to prevent bedwetting. A women group leader said, *"even children are on 'Tabaa' now. Some parents believe that 'Tabaa' is good for bed wetting; they use it on their children*" (FGD 001, 63 years).

Weight Control

It was perceived that some women use intra-vaginal tobacco powder to control weight / reduce belly fat. A participant said, *"my friend also told me that 'Tabaa' would help to reduce the size of my belly"* (UIDI 004, 27 years).

Marital Factors

Long-distance Marriage

The long-distance relationship was greatly viewed as a factor associated with intra-vaginal tobacco powder use among women. Women whose husbands live abroad for a long period without physical

intimacies are at higher risk of using intra-vaginal tobacco powder, according to the findings. It was stated that such women would want to satisfy their sexual urges without being engaged in extramarital affairs with other men, so the only option for them is to use intra-vaginal tobacco powder to gain sexual pleasure. A participant said, *"*my husband went to America a few months after our marriage, and it has been 2 years now I have not set my eyes on him. I have really struggled to maintain myself because I do not want to have any affairs outside my marriage. A friend of mine introduced 'Tabaa' to me that was when I started using it*"* (UIDI 004, 27 years).
Another woman stated, *"*I know a lady whose husband lives abroad, she used to insert candle to satisfy herself, but she was later introduced to 'Tabaa' and she claims that 'Tabaa' is more satisfactory than a man" (FGD 001, 63 years).

Polygamy

The theme 'polygamy' came up as a factor since it is thought that many Gambian women in polygamous marriages compete with one another to impress their husbands. Given that intra-vaginal tobacco powder has a vaginal tightening effect; it has been proposed that women in polygamous marriages use it to satisfy their husbands during sex. A male nurse said, *"*Some women want to become the best in the eyes of their husband than the other wives, and they apply 'Tabaa' to make themselves feel young when having sex with their husband" (Nurse 009, 29 years).

Others, on the other hand, asserted that when a woman in a polygamous marriage experiences problems with her husband and feels ignored, she might use intra-vaginal tobacco powder to enhance her sexual arousal while her husband is with his other wives. A woman stated, "I am used to 'Tabaa' now, that is why sometimes when my husband is with his other wife I use 'Tabaa' to satisfy myself" (UIDI 003, 36 years).

Sociocultural Factors

False Beliefs

The findings suggested that many women use intra-vaginal tobacco powder because of the false claims that the product has medicinal benefits. A participant reported, *"*and the false beliefs that it can cure vaginal candidiasis is causing women all this trouble*"* (nurse 004, 29 years).

Religious Belief

In The Gambia, where the majority are Muslims, it is considered to be highly sinful for a woman to have sex outside marriage. Therefore, unmarried women or those in long-distance relationships would prefer using intra-vaginal tobacco powder for sexual enhancement rather than having unlawful sex. A women group leader said, *"because they believe that having sex with men when they're not married to is sinful,* 'Tabaa' becomes their secret husbands*"* (FGD 001, 63 years).

A religious leader in a focus group discussion narrated, *"*you know fornication is sinful, that is why some women use 'Tabaa' to satisfy themselves, but 'Tabaa' use is also sinful because it is a drug and it allows women to play with their private parts*"* (FGD 005, 68 years).

Female Genital Mutilation (FGM)

Shreds of evidence suggest that painful sexual intercourse is one of the long-term effects of FGM.[21] This was reflected in the study as some respondents believed that the painful sexual intercourse experienced by women who underwent FGM, prevents them from attaining libido when they're with their husbands. Thus, they use intra-vaginal tobacco powder to gain sexual pleasure. A male midwife stated, *"*my observation is that many women who have undergone FGM especially type 3 experience painful sexual intercourse which could be a reason why they use 'tabaa' to gain sexual pleasure (Nurse 003, 36 years).

Lack of Knowledge of the Effects

Lack of knowledge was highly rated as a factor that contributed to the use of intra-vaginal tobacco powder. Majority of women who use intra-vaginal tobacco powder are unaware of its negative consequences, according to the findings. A midwife stated, *"*Another factor could also be knowledge deficit because many women who apply intra-vaginal tobacco don't know the effects*"* (midwife 004, 48 years).

Peer Influence

The findings suggested that many women are persuaded family members and friends to use intra-vaginal tobacco powder. A woman disclosed, *"I had never heard of 'Tabaa' but it was recommended to me by a friend before I began to use it"* (UIDI 003, 32 years). A community health nurse said, *"*Some of them are due to peer influence because some of them will tell their friends that if you use 'Tabaa' it makes you very active when having sex with your husband*"* (Nurse 010, 30 years).

Economic Factors

Economic factors emerged as a theme as participants expressed that intra-vaginal tobacco powder use is

rampant because the sellers are generating money from it, and they deceive women into buying the product. A gender activist mentioned, *"women who sell 'Tabaa' are very wise. They will use different* kinds of sweet words to other women only because they gain a lot of money from it*"* (FGD 004, 38 years).

Table 1: Participants' Socio-demographic Characteristics (n=400)

Variable	N	(%)
Age in Years		
< 20	25	6.3
20 – 29	131	32.8
30 – 39	135	33.8
40 years or more	109	27.3
Area of residence		
Rural	185	46.3
Urban	215	53.8
Tribe of participants		
Mandinka	149	37.3
Wollof	95	23.8
Fula	87	21.8
Others	69	17.3
Religion		
Islam	384	96.0
Christianity	16	4.0
Education Level		
Primary	55	13.8
Secondary	110	27.5
Tertiary	67	16.8
Non-formal education	168	42
Occupation		
Civil servant	73	18.3
Business	57	14.2
Skilled work	20	5.0
Student	37	9.3
Housewife / Unemployed	213	53.3
Marital status		
Married	264	66.0
Single	105	26.3
Divorce / Widow	31	7.8
Marriage type		
Monogamy	219	54.8
Polygamy	49	12.3
Not Married	132	33.0
Stay with husband or partner		
Yes	220	55.0
No	48	12.0
Not married	132	33.0
Duration husband stays away		
< 1 week /Always around	197	49.3
< 1 month	16	4.0
< 6 months	21	5.3
12 months or more	34	8.5
Not Married	132	33.0
Undergone FGM		
Yes	219	54.8
No	181	45.3

The findings of the study showed that all 400 participants from the selected regions were included in the analysis. The findings of the study show in Table 1 that most (33.8%; n=135) of the respondents were between the age of 30-39 years, 53.8% (n=215) were from the urban area, 37.3% (n=149) belonged to the Mandinka tribe and were Muslims. Forty-two per cent (n=168) of the participants attended non-formal education, and most (53.3%; n = 213) of them were housewives/unemployed. Sixty-six per cent of them (n = 264) were married, out of which 54.8% (n = 219) were in monogamous marriages, 55% (n=220) stayed with their husbands/partner, and 8.5% (n=34) stated that their husbands stayed away for 12 months or more when they travelled. Only 45.3% (n= 181) of the women did not undergo FGM/C out of the 400 participants.

2: Participants' Awareness of Intra-vaginal Tobacco Powder Use and their Sources of Information

Variable	N	%
Aware of intra-vaginal tobacco powder (n=400)		
Yes	287	71.8
No	113	28.2
Source of information (n=287)		
Family	143	49.8
Friends	98	34.1
Media	46	16.0

Table 2 showed that most (71.8%; n=287) of the participants were aware of intra-vaginal tobacco powder use, out of which 49.8% (n=143) heard it from family members while only 14% (n=41) heard it from a different source of media outlets. However, 28.2% (n=113) of the participants had never heard of intra-vaginal tobacco powder use among women.

Table 3: Frequency Distribution of Participants According to Intra-Vaginal Tobacco Powder Use

Variable	Frequency n	%
Ever use of intra-vaginal tobacco powder (n=287)		
Yes	68	23.7
No	219	76.3
Last time used intra-vaginal tobacco powder (n=68)		
< 1 week	43	63.2
< 12 months	8	11.8
> 12 months	17	25
Current use of intra-vaginal tobacco powder		
Yes	43	63.2
No	25	36.8
The average number of times used per day		
Once	64	94.1
Twice	4	5.9
The average number of times used per week		
Once	26	38.2
2 – 4 times	33	48.5
5 times or more	9	13.2
Duration of usage		
< 6 months	22	32.4
6- 12 months	8	11.8
> 12 months	31	45.6
Used only once in a lifetime	7	10.3

Among the 287 women who were aware of intra-vaginal tobacco powder use, 23.7% (n= 68) used it at least once in a lifetime. Out of the 68 participants who had ever used intra-vaginal tobacco powder, most of them (63.2%; n=43) used it within the week of the interview, while 36.8% (n=25) reported that they had stopped using it. Most (94.1%; n=64) of the intra-vaginal tobacco powder users said

that they use it once a day, a few (13.2%; n=9) of them use it 5 times or more per week and 45.6% (n=31) used it more than 12 months (Table 3).

Table 4: Participants' Reasons for Using Intra-Vaginal Tobacco Powder (n=68)

Reason	Frequency (n=68) Yes n (%)	No n (%)
Sexual enhancement / Vaginal tightening	25 (36.8)	43 (63.2)
Weight control	6 (8.8)	62 (91.2)
Energizer	9 (13.2)	59 (86.8)
Experimentation	3 (4.4)	65 (95.5)
Treat genital infections	63 (92.6)	5 (7.4)
Bedwetting	4 (5.9)	64 (94.1)
Fasten labour	8 (11.8)	60 (88.2)
Peer influence	19 (27.9)	49 (72.1)
Addiction	21 (30.9)	47 (69.1)
Treat infertility	17 (25.0)	51 (75.0)

Note: Most of the participants gave more than one reason for using intra-vaginal tobacco.

Table 4 showed that the majority (92.6%; n=63) of the 68 participants who had ever used intra-vaginal tobacco powder claimed that it was done so to treat genital infections (STIs, candidiasis, and genital warts). The second highest most frequently cited reason for using intra-vaginal tobacco was for vaginal tightening and/or sexual enhancement (36.8%; n=25). The other reasons for using it include weight control (8.8%, n=6), energizer (13.4%, n=9), peer influence (27.9%, n=19), experimentation (4.4%; n=3), addiction (30.9%; n = 21), treatment for bedwetting (5.9%; n = 4), fasten labour (11.8%; n = 18) and infertility treatment (17%; n = 25). These findings further confirm the findings of the qualitative aspect of this study.

Table 5a presents the results of a χ^2 test and a multivariate logistic regression examining the relationship between women's sociodemographic characteristics and intra-vaginal tobacco powder use (aOR with a significance level of $p<0.05$ and a 95% CI were used). The results show that there is a statistically significant association between age and intra-vaginal tobacco use (p = 0.001). Women aged 40 and above have an aOR of 3.20 (p = 0.015), indicating they are 3.20 times more likely to use intra-vaginal tobacco compared to women aged below 30 years, with a 95% CI (1.26 - 8.13). In addition, the area of residence is statistically significantly associated with intra-vaginal tobacco use (p = 0.026). Women resid-

Table 5a: Risk Factors Associated with Intra-vaginal Tobacco Powder Use

Factor	Intra-vaginal Tobacco Use N= 287 Yes n (%)	No n (%)	Total	χ2 (p-value)	aOR	P-value	95% CI
Age in years				13.7825 (0.001) *			
30-39	18 (20.0)	72 (80.0)	90		1.38	0.475	0.57– 3.29
40 and above	34 (37.0)	58 (63.0)	92		3.20	0.015*	1.26 – 8.13
<30 years	16 (15.2)	89 (84.8)	105		Ref		
Residence				4.9683 (0.026) *			
Farafenni	40 (26.7)	95 (70.4)	135		2.20	0.014*	1.17 – 4.12
Banjul	28 (18.4)	124(81.6)	152		Ref		
Education				8.9423 (0.030) *			
Primary	6 (16.2)	31 (83.8)	37		1.18	0.825	0.27 – 5.25
Secondary	13 (19.7)	53 (80.3)	66		1.87	0.299	0.57 – 6.11
Non-formal	41 (31.8)	88 (68.2)	129		2.23	0.210	0.64 – 7.79
Tertiary	8 (14.5)	47 (85.5)	55		Ref		
Occupation				2.4337 (0.4337)			
Business	10 (5.6)	44 (94.4)	54		0.28	0.036*	0.84 – 0.92
Student	3 (14.3)	18 (85.7)	21		0.78	0.765	0.16 – 3.90
Housewife / unemployed	40 (26.1)	113 (73.9)	153		0.63	0.374	0.23 – 1.73
Civil Servant	15 (25.4)	44 (74.6)	59		Ref		
Marital Status				7.1495 (0.028)*			
Married	46 (23.6)	149 (76.4)	195		0.87	0.800	0.30 – 2.53
Divorce/widow	12 (41.4)	17 (58.6)	29		2.42	0.208	0.61 – 9.57
Single	10 (15.9)	53 (84.1)	63		Ref		
Ethnicity				1.0226 (0.796)			
Wollof	14 (22.2)	49 (77.8)	63		0.35	0.114	0.09 – 1.29
Fula	19 (26.8)	52 (73.2)	71		1.02	0.958	0.43 – 2.41
Others	9 (19.1)	38 (80.9)	47		0.38	0.141	0.10 – 1.38
Mandinka	26 (24.5)	80 (75.5)	106		Ref		
FGM				0.3458 (0.556)			
Yes	37 (22.4)	128 (77.6)	165		0.39	0.074	0.14 – 1.10
No	31 (25.4)	91 (74.6)	122		Ref		

(*) = significant p-value ($p < 0.05$) aOR = Adjusted Odds Ratio CI = Confidence Interval

ing in Farafenni (rural area) have an aOR of 2.20 (p = 0.014), meaning they are 2.20 times more likely to use intra-vaginal tobacco compared to those in Banjul (urban), with a 95% CI (1.17 - 4.12). Moreover, there is a statistically significant association between women's education and intra-vaginal tobacco use (p = 0.030). The odds of using intra-vaginal tobacco powder are 2.23 times higher among women who attended non-formal education compared to women who attended tertiary education. However, none of the specific education categories (Primary, Secondary, Non-formal) show significant aOR when compared to the reference category (Tertiary). While there is no overall statistically significant association (p = 0.4337), some specific occupations show significant aOR. Business owners have lower odds of intra-vaginal tobacco use (aOR = 0.28, p = 0.036). Students, housewives/unemployed, and civil servants do not show significant aOR. There is a statistically significant association between marital status and intra-vaginal tobacco use (p = 0.028). Divorced/widowed individuals have an aOR of 2.42 (p = 0.208), indicating a non-significant

trend towards higher tobacco use compared to single individuals. There is no statistically significant overall association (p = 0.796) between ethnicity and intra-vaginal tobacco use. None of the specific ethnicities show significant aOR when compared to the reference category (Mandinka). There is no statistically significant association (p = 0.556) between FGM and intra-vaginal tobacco use.

Table 5b: Risk Factors Associated with Intra-vaginal Tobacco Powder Use

Factor	Intra-vaginal Tobacco Use N= 217			χ2 (p-value)	aOR	P-value	95% CI
	Yes n (%)	No n (%)	Total				
Marriage Type				6.5767(0.0037)*			
Polygamy	18	22	40		2.52	0.078	0.90 – 7.06
Not Married	22	40	62		0.69	0.561	0.20 – 2.42
Monogamy	28	87	115		Ref		
Stay with husband/partner				31.3977(0.000)*			
Yes	24	100	124		0.15	0.001*	0.05 – 0.47
No	22	9	31		Ref		
Not married	22	40	40				
Source of info				11.5817(0.003)*			
Family	44	72	116		1.09	0.838	0.47 – 2.54
Friends	24	57	81		Ref		
Media	0	20	20				
Perception				67.5133(0.000)*			
Good Practice	43	16	59		16.50	0.001*	6.10 – 44.50
Bad practice	25	114	139		Ref		
Don't know	0	19	19				
Sexual Enhancement				3.6052 (0.058)			
Yes	53	131	184		1.71	0.368	0.53 – 5.53
No	15	18	33		Ref		
Weight Control				0.4697 (0.493)			
Yes	16	29	45		0.51	0.382	0.11 – 2.31
No	52	120	172		Ref		
Treat genital Infections				6.0631 (0.014) *			
Yes	67	132	119		3.57	0.374	0.22 – 58.73
No	1	17	18		Ref		
Treat bedwetting				3.3245 (0.068)			
Yes	23	33	56		2.64	0.154	0.69 – 10.08
No	45	116	161		Ref		
Fasten labour				0.4536 (0.501)			
Yes	33	65	98		1.44	0.493	0.51 – 4.12
No	35	84	119		Ref		
Peer Influence				0.0549 (0.185)			
Yes	25	48	71		1.46	0.579	0.39 – 5.48
No	45	101	146		Ref		
Treat Infertility				0.0897 (0.297)	1.21	0.661	0.52 – 2.80
Yes	50	99	149		0.65	0.443	0.21 – 2.00
No	18	50	68		Ref		

(*) = significant p-value (p < 0.05) aOR = Odds Ratio CI = Confidence Interval

In summary, the results indicate that age, residence, education, occupation, and marital status are associated with intra-vaginal tobacco use, with statistically significant associations in some cases. However, ethnicity and FGM do not appear to be significantly associated with intra-vaginal tobacco use in this analysis (Table 5a).

Table 5b presents the results of a χ^2 analysis and aOR for the relationship between various factors and intra-vaginal tobacco use. There is a statistically significant association between marriage type and intra-vaginal tobacco use (p = 0.0037). Women in polygamous marriages have an adjusted aOR of 2.52 (p = 0.078), indicating a non-significant trend towards higher intra-vaginal tobacco use compared to women in monogamous marriages. There is a highly statistically significant association between staying with a husband/partner and intra-vaginal tobacco use (p < 0.001). Women who stay with their husband/partner have significantly lower odds of tobacco use (aOR = 0.15, p = 0.001) compared to those who do not stay with a husband/partner. There is a statistically significant association between the source of information and intra-vaginal tobacco use (p = 0.003). However, none of the specific source categories (Family, Friends, Media) show significant aOR compared to the reference category (Friends). The association between women's perception and intra-vaginal tobacco powder use is highly statistically significant (p < 0.001). Women with a perception of "Good Practice" have significantly higher odds of 16.50 (p < 0.001) for intra-vaginal tobacco use compared to those with a perception of "Bad Practice." Moreover, there is a statistically significant association between treating genital infections and intra-vaginal tobacco use (p = 0.014). Women who use intra-vaginal tobacco to treat genital infections have an aOR of 3.57 (p = 0.374), indicating a non-significant trend towards higher tobacco use compared to those who do not use it to treat genital infections. However, sexual enhancement (p = 0.058), weight control (p = 0.493), fastening labour (p = 0.501), peer influence (p = 0.185), treating bedwetting (p = 0.068), and treating infertility (p = 0.297) are not statistically significantly associated with intra-vaginal tobacco use.

In summary, the results indicate that marriage type, staying with a husband/partner, source of information, and perception are associated with intra-vaginal tobacco use, with statistically significant associations in some cases. Other factors, such as sexual enhancement, weight control, and infertility treatment, do not show significant associations with intra-vaginal tobacco use in this analysis.

DISCUSSION

The findings of the study revealed a lifetime prevalence of 23.7% of intra-vaginal tobacco powder use among Gambian women, with 63.2% currently using it. It is essential to note that this prevalence may be underestimated due to the clandestine nature of this practice among women. Often, those involved in this behavior are hesitant to admit it openly and may instead claim knowledge of someone who uses it. This hesitancy may be attributed to societal stigma or cultural norms that discourage Gambian women from discussing issues related to their genital health openly. These findings align with a study conducted by Brody et al. in 2021, which similarly identified that many women engage in various intra-vaginal

practices discreetly within their homes, driven by a fear of social stigma.[22] Additionally, most of the women who had ever engaged in intravaginal tobacco powder use typically used it once a day and 2-4 times per week. In contrast, a study conducted in Nigeria reported a different pattern, with most women using intra-vaginal products up to twice daily and between 8 to 14 times per week.[20] This variance in usage patterns could be attributed to the distinctive properties and effects of intra-vaginal tobacco powder compared to other intra-vaginal products.

The main factors associated with intra-vaginal tobacco powder revealed in the qualitative study are as follows: "sexual enhancement," "treating genital infections," "hastening labor," "weight control," "religion," "polygamy," "long-distance marriage," "peer influence," "economic factors," and "treating infertility and bedwetting." Among these factors, the most cited motivations for women's intra-vaginal tobacco powder use are sexual enhancement and treating genital infections. These findings align with those of a systematic review conducted by Rullo et al. in 2018, which found that the primary reasons women engage in intra-vaginal practices are to enhance their sexual experiences and for medicinal purposes.[23] However, the quantitative study results displayed disparities compared to the qualitative aspect. Factors such as age, place of residence, education level, occupation, marital status, involvement in polygamous marriages, staying with a husband/partner, sources of information, individual perceptions, and the treatment of genital infections were found to have statistically significant associations with the use of intra-vaginal tobacco powder in the quantitative study. Because the quantitative results relied on statistical analysis, in contrast to the qualitative findings that were rooted in participants' perceptions of intra-vaginal tobacco powder use, it's evident that discrepancies between the two studies emerged.[24]

The study revealed that there was a statistically significant association between women's age and intravaginal tobacco powder use ($p = 0.001$). Women aged 40 and above have an aOR of 3.20 ($p = 0.015$), indicating they are 3.20 times more likely to use intra-vaginal tobacco compared to women aged below 30 years, with a 95% CI (1.26 - 8.13). This could be attributed to the common belief that older women are prone to vaginal laxity, making sexual intercourse less pleasurable to their partners.[25] In addition, such women (40 years and above) are also more likely to have co-wives. The Gambia Demographic and Health Survey 2019-2020 shows that more than half of women aged 40-45 (53%) and 45-49 (58%) have one or more co-wives, in contrast to women aged 20-25 (18%) and 25-29 (25%).[26] Polygamy emerged as a factor associated with intra-intra-vaginal tobacco powder use in both the qualitative and quantitative ($p=0.0037$) study. A male nurse said, "Some women want to become the best in the eyes of their husband than the other wives and they apply 'Tabaa' to make themselves feel young when having sex with their husband" (Nurse 009, 29 years). Given that women in polygamous marriages compete with one another to win their husbands' favour or attention and older women are perceived to have vaginal laxity, it is assumed that they (women aged 40 years and above) use intra-vaginal tobacco powder for vaginal tightening to make them feel younger and provide enough sexual satisfaction to their husbands.[25]

More to this, it is obvious that women in polygamous marriages are often pinned to situations where they miss their husband during the days when he is with his other wives. These women may encounter issues with their husbands in the worst circumstances and feel ignored. Consequently, they turn to the use of intra-vaginal tobacco powder to experience sexual pleasure while their husbands are with the other wives. It is asserted that intra-vaginal tobacco powder can enhance sexual satisfaction for women without requiring physical intimacy. This assertion is corroborated by a statement from a female participant in the qualitative research who expressed, "I am used to 'Tabaa' now, that is why sometimes when my husband is with his other wife I use 'Tabaa' to satisfy myself" (UIDI 003, 36 years).

The usage of intra-vaginal tobacco powder among women is significantly influenced by their geographical location and level of education. As a relatively compact nation, the Gambia displays a degree of uniformity among its population. Still, a noticeable gap exists in educational attainment between residents of urban and rural areas.[26] This difference can be attributed to the uneven distribution of quality educational resources in urban centers, a phenomenon consistent with the study's findings (where most participants hail from rural areas with limited formal education). The research reveals a statistically significant association between both residence and education level and the use of intra-vaginal tobacco powder. Women living in Farafenni (a rural area) are 2.20 times more likely to use intra-vaginal tobacco compared to those in Banjul (an urban area), with a 95% confidence interval of 1.17 to 4.12. Similarly, women with non-formal education have a higher likelihood of using intra-vaginal tobacco powder compared to those who have tertiary education. Women from rural areas with limited access to formal education often face greater vulnerability to harmful traditional practices due to their lack of awareness regarding the negative consequences.[27] This contrasts with the findings of Smit et al. (2011),[28] which suggested that intra-

vaginal practices were similar among rural and urban populations. A study conducted in the United States titled "Motivations for Intra-vaginal Product Use among a Cohort of Women in Los Angeles" also disagrees with the findings of this study, indicating that most of the participants had attended college, and there was no significant association between education level and intra-vaginal practices.[15] This discrepancy may be attributed to the United States being a more developed country with fewer disparities between rural and urban women.

Whether a woman stays with her husband or not also determines if a woman uses intra-vaginal tobacco powder. Women who stay with their husband/partner have significantly lower odds of tobacco use (aOR = 0.15, p = 0.001) compared to those who do not stay with a husband/partner. Moreover, women's usage of intra-vaginal tobacco powder was significantly associated with the length of time their husbands were absent from them. Women asserted that intra-vaginal tobacco powder may satisfy their sexual needs even in the absence of direct physical touch with men. Therefore, women who miss their husbands for a specific amount of time and do not wish to indulge in extramarital affairs utilize intra-vaginal tobacco powder to satiate their sexual needs. A woman said, *"*my husband went to America a few months after our marriage, and it has been 2 years now I have not set my eyes on him. I have really struggled to maintain myself because I do not want to have any affairs outside my marriage. A friend of mine introduced 'Tabaa' to me that was when I started using it*"* (UIDI 004, 27 years). This does not correlate with the findings of Smit et al. (2011). [28]

Furthermore, a key element strongly connected with intra-vaginal practices is women's perceptions. [12,15] According to the findings of this study, the association between women's perception and intra-vaginal tobacco powder use is highly statistically significant ($p < 0.001$). Women with a perception of "Good Practice" have a significantly higher odds ratio of 16.50 ($p < 0.001$) for intra-vaginal tobacco use compared to those with a perception of "Bad Practice." Perceived medical benefits, such as treating genital infections, are also highly associated with this. Nevertheless, it is crucial to note that the Ministry of Health of The Gambia, together with healthcare professionals, refute the notion that intra-vaginal tobacco powder can effectively treat genital infections, citing a lack of scientific evidence to support such claims.[2,3] Studies from Zambia and other African countries reported similar findings.[11,12,13,15,29]

Study Limitations

This study, like any other study, was faced with some limitations during the research process. The research topic was very sensitive, making it challenging to get enough accurate information from some participants. In addition, there is limited data on intra-vaginal tobacco powder use because not many studies were found in the literature searches. Another limitation was that the study did not conduct laboratory investigations to examine the gynaecological effects of intra-vaginal powder.

Strengths of the Study

The use of a sequential exploratory mixed study design was useful in generating sufficient information about intra-vaginal tobacco powder use. Secondly, the qualitative study results were used to develop the questionnaire for the quantitative study. Furthermore, the inclusion of rural and urban areas aided in determining where intra-vaginal tobacco powder use was more prevalent in The Gambia. The study's findings will also serve as a baseline for future research since it is believed to be the first study that examines the prevalence and factors associated with intra-vaginal tobacco powder use among women in The Gambia.

CONCLUSION

The study concluded that intra-vaginal tobacco powder was practised by women in the Gambia and highest in rural areas. Socio-demographic variables were significantly associated with the use of intra-vaginal tobacco powder. The study also showed that women with low levels of education and those with poor perception have the greatest odds of using intra-vaginal tobacco powder. Moreover, intra-vaginal tobacco powder use was more common among women aged 40 years and above. Therefore, awareness creation, including sex education, is the most important intervention to mitigate this practice. A case-control study that includes laboratory investigations should also be conducted among users and non-users of intra-vaginal tobacco powder to determine its negative effects on Gambian women. Further studies across Africa are needed to find out if intra-vaginal tobacco powder is used in other African countries.

Competing interests

The authors declare that they have no competing interests.

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Authors' contributions

MJ conceived the research idea, designed the study, and collected the data. MJ, HTB, and JWJ analysed the data. OAA and HTB supervised the research. OAA and HTB reviewed the data. MJ, OAA, and HTB conducted the literature review. MJ wrote the first draft of the manuscript. All authors reviewed, revised, and approved the final manuscript.

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ERRATUM

This case Report published in the Vol. 39 No. 3 (2023) of Tropical Journal of Obstetrics & Gynaecology, contained errors of mis-spelled names, omissions & wrong institution addresses which have been corrected in the present issue of the journal

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Case Report

Vulvar Schistosomiasis: An Important but Uncommon Diagnosis: "A Near Miss"

* Eze IO[1], Ugbem TI,[2] Archinbong EI[3], Elegbua CO[3], Afolayan ST[3]

1. Department of Obstetrics and Gynaecology, Nigerian Navy Reference Hospital Ojo, Lagos Nigeria. Email:docinno.ie@gmail.com;Phone:+2348064838836
2. Department of Pathology, University of Calabar Teaching Hospital, Calabar Nigeria.
3. Department of Obstetrics and Gynaecology, Nigerian Navy Reference Hospital Calabar, Nigeria

Correspondence
Eze, Innocent Okafor
Department of Obstetrics and Gynaecology, Nigerian Navy Reference Hospital, Calabar, Cross River State, Nigeria
docinno.ie@gmail.com;

Phone: +2348064838836

ABSTRACT

Background: Vulvar schistosomias, part of the spectrum of female genital schistosomiasis (FGS), is an important tropical disease with far-reaching negative impact on female reproductive health. However, this disease is rarely diagnosed and reported in clinical setting even in endemic tropical Africa like Nigeria due to poor awareness and low index of suspicion among the physicians in the tropics. This could result in avoidable morbidities. **Case report**: We report a successfully managed case of vulvar schistomsomiasis that was long misdiagnosed and mismanaged by unsuspecting physicians and was nearly misdiagnosed by us. **Conclusion**: Female genital schistosomiasis, an important tropical disease, is rarely diagnosed in clinical setting even in the endemic regions resulting in avoidable morbidities. This case report calls attention of the physicians especially in the tropics to think outside the usual in their approach to diagnosis and management of female genital pathologies. The need for biopsy of any suspicious lesion was also underscored.

INTRODUCTION

Schistosomiasis is a water borne parasitic disease caused by a trematode worm of the genius Schistosoma. Also referred to as bilharziasis or snail fever, the disease was first described in Egypt by Theodor Bilharz in 1851.[1] Schistosomiasis is said to be the third most devastating tropical disease in the world, being a major source of morbidity and mortality for developing countries.[1] The major schistosome species include Schistosoma haematobium, which is the most widespread in Sub-Saharan Africa and responsible for urinary schistosomiasis, while Schistosoma mansoni, S. intercalatum, S. japonicum and S. mekongi are all responsible for intestinal schistosomiasis.[2]

About 230 million people in 74 countries (90% of whom in Africa) are infected worldwide and at least 600 million are at risk of infection.[3,5] An estimated 120 million suffer severe consequences of the infection with an estimated annual mortality rate of about 20,000 worldwide.[3] An estimated 30 million Nigerians need to be treated annually for the disease.[4]

The geographic distribution and etiology of schistosomiasis reflect the unique life cycle of Schistosoma species. Schistosomes infect susceptible freshwater snails in endemic areas, usually with specific species of schistosomes infecting specific species of

snails. The infected snails release cercariae 4-6 weeks after infection. They can survive in fresh water up to 72 hours, during which time they must attach to human skin or to that of another susceptible host mammal or die.[5]

Schistosomiasis can affect the skin by three mechanisms. In schistosome dermatitis (swimmer's itch), cercariae, usually of avian species, penetrate the skin, causing a localised allergic reaction. Itchy papules and urticaria occur within one to two hours of swimming in fresh or salt water.[6] Secondly, mature worms may be associated with erythematous itchy macules at the time of release of a large number of eggs due probably to a systemic hypersensitivity reaction to schistosome antigens.[6] Thirdly and most commonly, skin diseases usually around the genitalia results from a chronic inflammatory reaction to the deposition of ova in the skin.[7]

Female genital schistosomiasis (FGS), including vulvar schistosomiasis, is a frequent complication in women with urinary or systemic schistosomiasis, particularly in geographic areas where the disease is endemic.[3, 8] Nigeria is one of the schistosomiasis endemic zones in tropical Africa but there are not many reported cases of FGS in clinical setting.[14] This is despite the far-reaching negative impact of FGS on the female reproductive health. The authors believe lack of awareness and low index of suspicion could account for low diagnosis and reportage of this important but neglected tropical disease. This underscores the need for the case report. It calls attention of the physicians to think outside the usual in their approach to diagnosis and management of female genital pathologies.

We report a successfully managed case of vulvar schistomsomiasis in a young woman that was long misdiagnosed and mismanaged and was nearly missed by us. Patient consent was obtained, and approval given by hospital ethical committee to report the case.

CASE SUMMARY

Patient was a 23-year-old graduate who presented with 6 months history of vulvar itching and swelling. Itching was intermittent but intense, causing her significant discomfort and occasional embarrassment. There was no known aggravating factor but temporarily relieved by scratching. Scratching could be vicious, a times leading to bruising. Vulva swelling was noticed about the same period, prior to presentation. Swelling was insidious in onset, located around the labia minora. It felt rubbery, occasionally rough but was not painful. There was no associated abnormal vaginal discharge or odor. No urinary symptoms was reported by patient. Her developmental milestone and puberty were normal. Patient, at presentation, was at her ovulatory cycle.

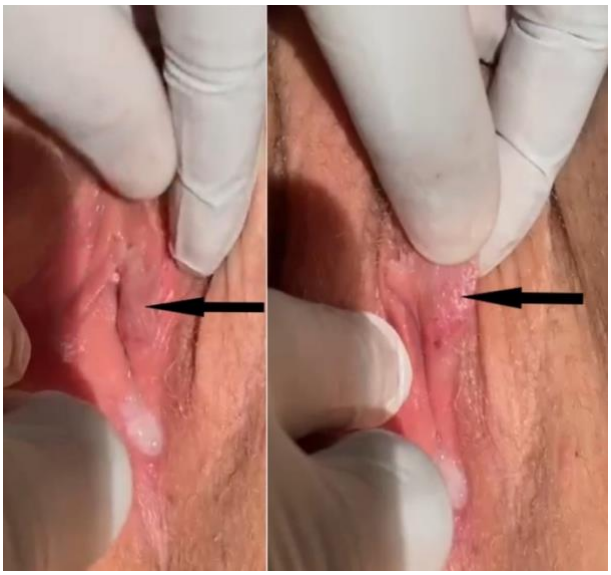

Figure 1. Clinical photograph of the warty papillomatous vulvar lesion

She was single, and had not engaged in penetrative vaginal intercourse, though she admitted to occasional oral sex and superficial genital contact with her male partner. Patient social class could be placed as above average. She recently graduated from a tertiary institution where she lived with 2 other students in a self-contained one room apartment in the northern part of Nigeria. No history of travel to a high endemic schistosomiasis zone.

She had indulged in self-medication with a lot of topical creams and vaginal inserts to no avail. She also patronized laboratories for investigations involving blood, urine and vaginal fluid samples. Patient had seen a few gynaecologists who made impressions ranging from "pruritus vulvae" "genital wart" to "psychologically related causes". Medications, both oral and topical including counselling were offered to patient with no good result. She came to a reference hospital in southern Nigeria for test of medical fitness and was referred from the general outpatient department to the gynecologist on account of her symptoms, and thus she presented to the gynaecology clinic.

On examination at presentation, she was generally a healthy looking but worried young woman. All vital signs were within normal limits. Secondary sexual characteristics were normal for age. Examination of the external genitalia revealed a fleshy, partly warty and papillomatous lesion on the upper lip of the left labia minora extending to the left lower base of the clitoris. Minor bruises were noted on the lesion (possibly due to scratching).

The contralateral labia and other parts of the

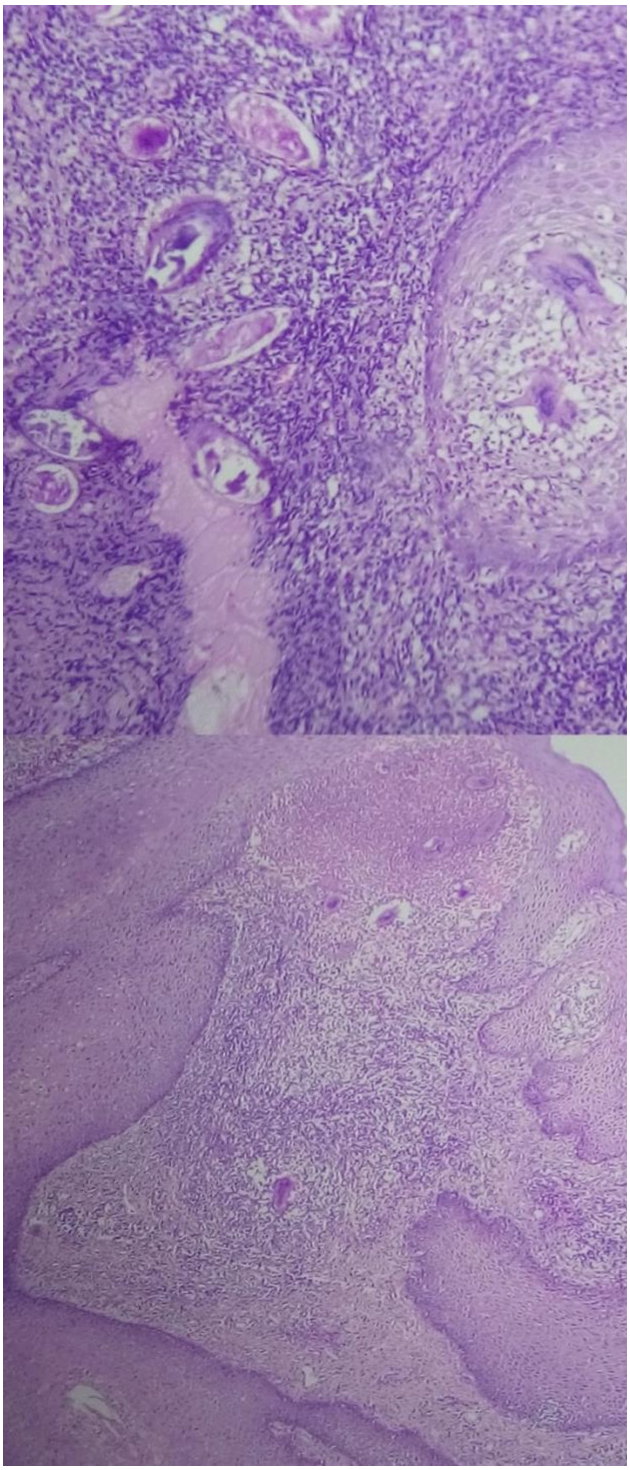

Figure 2. Photomicrograph of the histology of the vulvar lesion.

external genitalia were essentially normal. The hymen was grossly intact. Mucoid (probably ovulatory) discharge was noted on the vaginal introitus. An impression of vulva wart was made, and plan was to place patient on topical podophylin cream. However, based on history and suspicious findings, decision was taken for biopsy. This was done under local anesthesia. Histological report revealed "intense mixed inflammatory infiltrates consisting of mononuclear cells mainly lymphocytes, plasma cells and numerous eosinophils. Numerous ova of schistosomes also noted within collections. The overlying stratified squamous epithelium displays acanthotic changes and papillomatosis with mild koilocytosis. No dysplasia noted. Diagnosis was "granulomatous inflammation consistent with schistosoma granuloma." Urine analysis and microscopy were essentially normal

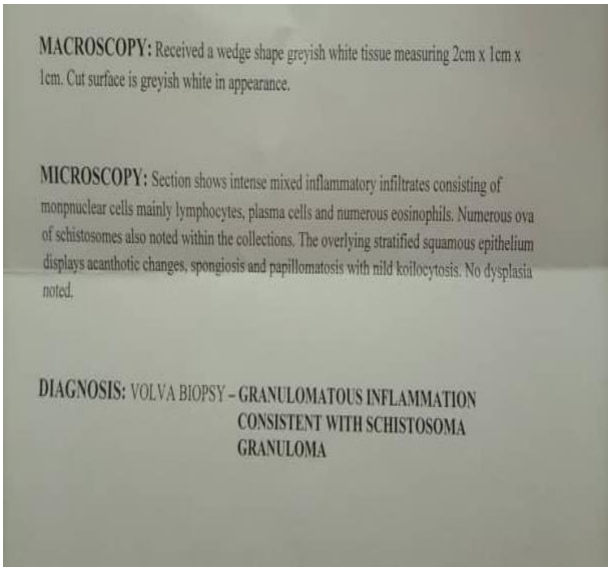

Figure 3. Histology Report

The patient was counseled on findings. She was started on oral praziquantel 40mg/kg in 3 divided doses. Patient reported very significant relief of symptoms 2 weeks on follow up. The vulvar lesion also had markedly resolved. She was given a repeat dose and a 4-week appointment, but she didn't show up.

DISCUSSION

Vulvar schistosomiasis is not a common diagnosis even in endemic regions.[1, 4] It is part of the spectrum of female genital schistosomiasis (FGS) defined as the presence of ova and/or a characteristic pathology in female reproductive organs.[9] FGS remains highly prevalent and under-diagnosed due to a low index of suspicion among health-care professionals.[10, 11]

Female genital schistomiasis is a manifestation mainly of the species S. haematobium infection. Several studies have strongly associated FGS to pathologies of the female reproductive system including subfertility, infertility, and ectopic pregnancies, pregnancy complications (abortion, still-birth and preterm delivery

and low birth weight).[1] Tubo-ovarian adnexae masses, both benign and malignant associated with schistosomiasis have been described in several histopathological series[3, 12]

The uterine cervix is the female genital organ most frequently affected by schistosomiasis.[3, 11] Several clinical signs and symptoms have been significantly associated with cervical schistosomiasis such as low abdominal pain, irregular menstruation, cervical contact bleeding, abnormal vaginal discharge, dysparunia, cervical polyps, chronic cervicitis.[12]

Vulvo-vaginal pathology due to schistosomiasis has been reported for over a century. Indeed, the first FGS reported in 1899 was a case of a warty prominent mass in the vagina of an Egyptian woman.[3] Vulvar schistosomiasis lesions can be easily confounded with condyloma acuminata (genital warts due to Human Papilloma Virus (HPV)), and polypoid/papillomatous tumours, in the vagina and vulva, can be considered to be pathognomonic for FGS in the absence of HPV infection or syphilis.[3, 12]

Our index patient presented with vulvar lesion grossly consistent with vulvar wart the possible reason for the misdiagnosis even by unsuspecting gynaecologists. We nearly missed the diagnosis but for more indebt history (which was not strongly suggestive of HPV infection), thinking outside the usual, and timely decision to biopsy the lesion for histology. It could be possible that the primary infection, FGS, being a risk factor for HPV infection[12], may have possibly predisposed the patient to genital wart due to HPV infection. However, low risk of HPV infection by history, non-response to typical treatment to genital wart, rapid response to praziquantel treatment, and the histology report resolves the primary diagnosis in favor of FGS.

The clinical appearence of vulval schistosomisais includes progressive and relapsing swelling, painful or painless ulceration, papules, nodules, pruritus, a hypertrophic clitoris with an eroded granular surface and papillomatous lesions forming masses resembling condylomata.[10,11] Some of these clinical features were present in our index patient.

For over 2 decades, strong associations between HIV and HPV infections and FGS have been made in several studies.[12,13 15] FGS increases susceptibility to HIV infection through disruption of the vaginal and cervical epithelium caused by erosion or inflammation. As in trauma or ulcerative sexually transmitted diseases, neovascularisation and disruptions in the integrity of the epithelial barrier are associated with an increased risk for HIV infection. The friable epithelium and bleeding during coitus in women with FGS facilitates access to deeper genital cell layers by HIV in semen. Schistosomiasis also can alter the immune responses to HIV. The immunoregulatory responses associated with helminth infection downregulate the T-helper-1-type immune response associated with control of viral infections. HIV replicates more readily in the T-helper-2-type cells associated with helminth infections.[15] Controlling schistosomiasis may reduce risk of HIV among women and contribute to controlling the HIV epidemic in sub-Saharan Africa.

The relationship between FGS (especially cervical schistosomiasis) and cancer of the cervix is not far-fetched. A recent longitudinal study showed that the development of high-grade squamous intraepithelial neoplasia was significantly associated with FGS of a minimum of 5 years duration.[12]

The association of FGS and numerous obstetrics and gynaecological pathologies has been highlighted in medical case reports for over a century. The vast majority are from women living in schistosomiasis endemic countries or from individual cases of tourists who acquired FGS in sub-Saharan countries and were diagnosed in the well-equipped health care facilities of western countries.[12]

Few cases of FGS in clinical setting have been diagnosed and reported from schistosomiasis endemic regions including Nigeria. This could be attributed to low index of suspicion among physicians, lack of reliable diagnostic facilities and trained personnel, lack of integrated approach to diagnosis and treatment. Hence, a lot of such cases may have been neglected, misdiagnosed and mismanaged as other common genital pathologies that physicians are used to. This could result to significant but avoidable morbidities and mortalities.

CONCLUSION

Female genital schistosomiasis is an important but neglected tropical disease. Clinical diagnosis and reportage are few even in an endemic zone like Nigeria possibly due to poor awareness and low index of suspicion. The authors believe this case is one of numerous cases of FGS that may have been missed, misdiagnosed and mismanaged, and hence calls attention for high index of suspicion. It also emphasizes the need to biopsy every suspicious lesion without which this case would have been missed.

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