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Ectopic Pregnancies in a Tertiary Hospital in Nigeria: A 10-Year Retrospective Experience

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Abstract ***Background:*** Maternal morbidity and death have been linked to ectopic pregnancy, particularly in sub-Saharan Africa. Because of early presentation, diagnosis, and treatment, the death rate from it has decreased in high-income countries, but this is not the case in low- and middle-income countries. Given this, it is crucial that we periodically review it in our setting. ***Objectives:*** To determine the prevalence, associated risk factors, and treatment modalities of ectopic pregnancy during the study period. ***Materials and Methods:*** This is a retrospective cross-sectional study of all cases of ectopic pregnancy at Nnamdi Azikiwe University Teaching Hospital (NAUTH), Nnewi, Nigeria, between January 1, 2012, and December 31, 2021. The case files of patients who had ectopic pregnancy during the study period were retrieved from the medical records department of the hospital to extract relevant information. A structured proforma was used to collect socio-demographic and clinical data on the subjects. Ethical approval was obtained from the NAUTH Ethics Committee. The data were analysed using Statistical Package for Social Sciences (SPSS) version 25. ***Results:*** There were a total of 8194 deliveries, 5892 gynaecological admissions, and 113 ectopic pregnancies. However, only 98 case files of ectopic pregnancies were available with complete information for the study (retrieval rate of 86.7%) and were used for further analysis. This gave a prevalence of 1.38% of total deliveries and 1.92% of gynaecological admissions. The mean age of the patients was 29.07 ± 5.20 years. The average gestational age of the patients at the time of presentation was 7.6 weeks. The most common associated risk factors included previous pelvic inflammatory disease (29.6%), multiple sexual partners (25.5%), and previous termination of pregnancy (23.5%). The treatment modality for all cases in the study was surgical, with total salpingectomy (75.5%) being the most commonly performed surgery. There were 3 (3.1%) maternal deaths due to late presentation and delayed intervention. ***Conclusion:*** Ectopic pregnancy remains a major gynaecological problem associated with significant mortality and morbidity. A high prevalence of pelvic inflammatory disease and unsafe abortions result in a high incidence of ectopic pregnancy in our environment. Laparotomy and total salpingectomy also remain the main treatment modality in our environment. Therefore, early diagnosis and timely intervention will go a long way in reducing the morbidity and mortality associated with ectopic pregnancy.

Keywords: *ectopic pregnancy, prevalence, risk factors, ruptured ectopic pregnancy, salpingectomy, treatment modalities, treatment outcomes*

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1. Introduction

The implantation of a fertilised ovum or blastocyst somewhere other than the uterine endometrial cavity is referred to as ectopic pregnancy [1]. With its associated maternal morbidity and mortality, ectopic pregnancy is a recognised life-threatening gynaecological emergency, particularly in Sub-Saharan Africa.

It has been noted that the prevalence of this potentially fatal condition varies from 0.67 percent in Western

nations to 1.2–2.7 percent in Nigeria [2]. Despite an increase in incidence, ectopic pregnancy-related mortality has declined in high-income countries; however, this is not the case in low- and middle-income countries, where it continues to be a significant cause of maternal mortality [3,4]. The concerning discrepancy between affluent and low- or middle-income nations can be attributed, in part, to the tendency of women in low- and middle income countries to seek out unconventional and dangerous remedies for their ailments, which results in delayed hospital presentation. Paucity of early diagnosis tools, including transvaginal ultrasonography (TVS) and the β-hCG test, is another factor [2,3].

Women with low parity are more commonly affected. Almost 95% of ectopic pregnancies that take place in the fallopian tube [1,5]. The other sites are the cervix, abdominal cavity, broad ligament, ovaries, and caesarean scar. While heterotopic pregnancy—a hybrid of intrauterine and extrauterine pregnancy—occurs in as few as 1 in 3000 spontaneous pregnancies, it can happen in as many as 3% of assisted reproduction cases [1,6,7].

Ectopic pregnancy risk has been associated with several factors. Interference with fallopian tube function [6] is the most common mechanism of action among these risk factors. The most common cause of ectopic pregnancy in the general population is pelvic inflammatory illness. [7,8]. Other aetiological factors that have been reported include endometriosis, prior tubal surgery, infertility, and therapies for infertility. The aetiology of ectopic pregnancy has also been related to prior caesarean sections, congenital mullerian abnormalities, tubal spasm, congenital fallopian tube anomalies, psychological and emotional problems [3,5,6,9,10].

The unique clinical presentation of ectopic pregnancy makes it a challenging diagnosis for gynaecologists to make. Not every patient will exhibit the classic trio of vaginal bleeding, abdominal pain, and amenorrhoea; therefore, a high index of suspicion is necessary. Sometimes, pregnant women present with nonspecific symptoms or even hypovolemic shock.

Surgery is a viable management option in most situations. Depending on the patient's condition, the availability of equipment, and the surgeon's experience, the surgical procedure could be either by laparotomy or by laparoscopy. Nonetheless, ectopic pregnancy therapy has come a long way in the last several years. Consequently, a number of non-surgical options have surfaced to address an illness that was previously thought to only be treated by surgery [9]. Quantitative β-hCG and transvaginal ultrasonography can lead to an early diagnosis. This reduces the risk of a false positive diagnosis, raises the likelihood that medical intervention will be successful, and lessens the morbidity, death, and financial strain this health issue causes [2].

Thus, this study will identify the associated risk factors for ectopic pregnancy and investigate the existing treatment modalities in order to discover methods to reduce the incidence, morbidity, and mortality associated with ectopic pregnancy in Nnewi, Nigeria.

2. Materials and Method

Study Design

This is a 10-year cross-sectional retrospective study of cases of ectopic pregnancies.

Study population

The study was conducted among women who had ectopic pregnancies within the study period.

Study settings

Over a ten-year period, from January 1, 2012, to December 31, 2021, the study was carried out in the gynecology section gynecologic sections of Nnamdi Azikiwe University Teaching Hospital (NAUTH), Nnewi, South-East Nigeria. The facility is a 400-bed tertiary hospital supported by the Federal government of Nigeria and offers first-rate emergency obstetrics and gynaecology care round the clock. It acts as a referral facility for adjacent states in addition to offering specialised services to the host community and the entire state. The hospital acts as a training institution for undergraduate and postgraduate medical education. As a training institution, it has a large number of consultants, junior and senior resident doctors, and other supporting medical staff.

Eligibility criteria

Those eligible for the study were women who presented and were managed for ectopic pregnancy at NAUTH from January 1st, 2012, to December 31st, 2021.

Sampling Technique and Sample Size Determination

The sampling method used was a non-random sampling technique. The sample size was an all-population base study. During the study period, all case files of ectopic pregnancies were obtained, and pertinent data was extracted.

Study procedure

The registers of the gynaecology ward, operating room, and emergency unit were used to identify cases of ectopic pregnancy managed within the study period. Their case files were obtained from the hospital's medical records division. Relevant information were obtained from the case files including gestational age at presentation, highest level of education, age, parity, and marital status. The identifiable risk factors, clinical presentations, treatment modalities, intraoperative findings, outcomes of the cases ectopic pregnancy, and duration of hospital admission were among the additional data that was retrieved. The acquired data were expressed as means, standard deviations, and percentages. The Nnamdi Azikiwe University Teaching Hospital's Ethics Committee gave its approval for this study in Nnewi, Nigeria. Version 25 of the Statistical Package for Social Sciences (SPSS) was used for data processing and analysis.

3. Results

Up to 8194 deliveries, 5892 gynaecological hospitalisations, and 113 ectopic pregnancies occurred during the study period. Only 98 case files (retrieval rate of 86.7%) of ectopic pregnancies were accessible for the study and could be used for additional analysis. This resulted in an incidence of 1.92% of gynaecological admissions and 1.38% of overall deliveries. The age range was 20 to 42 years, with 29 years being the mean; the modal age group (42.9%) was 25 to 29 years. The

majority (77.6%) were married, and the majority of 69 (70.4%) had completed tertiary education. The prevalence of ectopic pregnancy was highest among the secundigravida (27.6%) and primigravidas (24.5%). This is shown in Table 1.

Table 1. Socio-demographic characteristics of patients

Variable	Options	Frequency n (%)
Age (years)	<25	17 (17.3)
	25-29	42 (42.9)
	30-34	21 (21.4)
	≥ 35	18 (18.4)
Parity	0	24 (24.5)
	1	27 (27.6)
	2	19 (19.4)
	3	12 (12.2)
	4	9 (9.2)
	5	5 (5.1)
	8	2 (2.0)
Marital status	Single	19 (19.4)
	Married	76 (77.6)
	Divorced/widow	3 (3.1)
Booking status	Booked	3 (3.1)
	Unbooked	95 (96.9)
Education	No formal	3 (3.1)
	Primary	11 (11.2)
	Secondary	15 (15.3)
	Tertiary	69 (70.4)
Occupation	House wife	10 (10.2)
	Trader	53 (54.1)
	Civil servant	22 (22.4)
	Artisan	7 (7.1)
	Student	6 (6.1)
Husband's occupation	Trader	54 (55.1)
	Civil servant	34 (34.7)
	Artisan	10 (10.2)

According to the study's clinical characteristics, almost all of the ectopic pregnancy patients (93.9%) felt lower abdomen pain when they first presented. Additional presenting complaints included amenorrhoea (74.5%), vaginal bleeding (49.0%), and episodes of fainting or collapsing (42.9%). Seventeen patients (17.3%) presented in shock. This is shown in Table 2.

The most often occurring associated risk factors are pregnancy termination (23.5%), multiple sexual partners (25.5%), and poorly treated STDs or pelvic inflammatory illnesses (29.6%). Additionally, 5.1% of the cases had prior ectopic pregnancies as a risk factor. In 38.8% of the patients, no risk factor was found. Of those that presented, 82.7% were not in shock, while just 17.3% were in shock. Two percent had ovarian ectopic pregnancies, and ninety-eight percent had tubal ectopics. This is shown in Table 3.

Two patients (2.0%) had an unruptured tubal ectopic pregnancy, whereas 96 patients (98.0%) had a ruptured tubal ectopic pregnancy. In 60.2% of cases, the ectopic pregnancy was on the right side; the remaining 39.8% were on the left. The ampulla was the site in 55.1% of tubal ectopic cases. Blood transfusion was given in 93.9% of the patients for their care, 6.1% of patients did not receive blood transfusion. See Table 4.

All cases in the research were treated surgically, with total salpingectomy (75.5%) being the most common procedure. In 72.4% of the instances, senior registrars performed as the surgeons; consultants performed as the surgeons in 24.5% of the cases; and registrars performed the surgery in 3.1% of the cases. Thirty-nine (40.0%) of the 98 cases reviewed in the study were discharged from the hospital within 8 days of their admission, whereas 59 (60.0%) were discharged after 8 days. Three (3.1%) of the 98 women who presented with an ectopic pregnancy died as a result of delayed diagnosis and treatment. Of these ladies, sixty-six (67.3%) exhibited varied degrees of anaemia Table 4 illustrates this.

Table 2. Clinical features of patients at presentation

Variable	Options	Frequency n (%)
Presenting complaints	Abdominal pain	92 (93.9)
	Amenorrhoea	73 (74.5)
	PV bleeding	48 (49.0)
	Weakness	58 (59.2)
	Dizziness	62 (63.3)
	Abdominal swelling	44 (44.9)
	Collapse	42 (42.9)
In shock	Yes	17 (17.3)
	No	81 (82.7)
Investigations done	Hb/PCV	98 (100)
	Ultrasound	87 (88.8)
	PT	98 (100)
	RVS	98 (100)
	HBsAg/HCV	14 (14.3)

Hb = haemoglobin, HBsAg = Hepatitis B surface antigen, HCV = Hepatitis C virus, PCV = packed cell volume, PT = pregnancy test, PV = per vaginam, RVS = retroviral disease screening

Table 3. Associated Risk factors of ectopic pregnancy

Variable	Options	Frequency n (%)
Previous history of ectopic pregnancy	Yes	5 (5.1)
	No	93 (94.9)
Risk factors	Multiple sexual partners	25 (25.5)
	Previous ectopic pregnancy	5 (5.1)
	Previous induced abortion	23 (23.5)
	Previous pelvic surgery	3 (3.1)
	Previous pelvic infection	29 (29.6)
	None	38 (38.8)

Table 4. Treatment modalities & intra operative findings

Variable	Options	Frequency n (%)
Treatment modality	Total salpingectomy	74 (75.5)
	Partial salpingectomy	16 (16.3)
	Cornual resection	8 (8.2)
Location of ectopic gestation	Cornual	21 (21.4)
	Isthmic	18 (18.4)
	Ampullary	54 (55.1)
	Fimbrial	3 (3.1)
	Ovarian	2 (2.0)
Status of the ectopic gestation	Ruptured	96 (98.0)
	Unruptured	2 (2.0)
Side	Left	39 (39.8)
	Right	59 (60.2)
Need for blood transfusion	Yes	92 (93.9)
	No	6 (6.1)
Maternal complication	Anaemia	66 (67.3)
	Maternal demise	3 (3.1)
	None	29 (29.6)
Cadre of Surgeons	Registrar	3 (3.1)
	Senior Registrar	71 (72.4)
	Consultant	24 (24.5)
Days on admission	≤8	39 (40.0)
	>8	59 (60.0)

The mean diagnosis-intervention interval, estimated blood loss and the average duration of surgery are shown in Table 5. The average time between diagnosis and intervention was 173 minutes, with a range of 55–370 minutes. The mean estimated intraoperative blood loss in millilitres and the mean number of units/pints of blood transfusion were 255 ml and 2.5 pints, respectively. On average, each surgery lasted for 77 minutes. (Table 5).

Table 5. Diagnosis-Intervention Interval (DDI) & Blood Requirement

Variable	Minimum	Maximum	Mean ± SD
Time between diagnosis and intervention (min)	55.00	370.00	172.92 ± 85.06
Degree of haemoperitoneum (ml)	200.00	5000.00	1960.20 ± 1171.44
Estimated blood loss (ml)	100.00	500.00	255.10 ± 105.64
Transfusion (pint)	0	6.00	2.53 ± 1.24
Duration of surgery (min)	25.00	216.00	77.04 ± 35.54

4. Discussion

Ectopic pregnancy is a life-threatening emergency in gynaecology and remains an important contributor to maternal morbidity and mortality. This is one of the most common causes of first-trimester maternal deaths [11]. The prevalence of ectopic pregnancy in this study was 1.38% of all deliveries, which is consistent with the incidence reported in similar studies [2,9,12] but much lower than the 2.05%–3.30% found in other studies both in Nigeria and outside Nigeria [3,13,14,15]. The difference in incidence within the same country may illustrate different risk factors associated with the regions and zones.

In our centre, 1.92% of all gynaecological admissions were due to ectopic pregnancy. The high percentage (98%) of ruptured ectopic pregnancies reported in this study could probably be attributed to the poor health-seeking behaviour and delayed presentation of individuals residing in impoverished nations such as Nigeria [15]. Additionally, the lack of awareness by these women could be a factor.

The age group of 25 to 29 years old was the greatest age of incidence; these results are in line with those of John et al. [15], Udigwe et al. [4], and other studies conducted in the nation [2,14]. It was not surprising that the age group of 25–29 years old had a relatively high prevalence of ectopic gestation, as this is the age of peak sexual activity and reproduction. Furthermore, the married patients in our study had the highest prevalence of ectopic pregnancy (78.2%), which is consistent with the 77.8% and 82.2% of cases reported by Udigwe et al. [4] and Bello et al. [16] in Nigeria. Ugboma et al. [14], however, noted that single (unmarried) women predominated in their study. Given that married women are more likely than single women to become pregnant, this increased occurrence among married women may be the result of this.

Low parity constitutes a high-risk group for ectopic pregnancy. Our study showed that more than half of the women who had ectopic pregnancy were either primigravida 24 (24.5%) or secundigravida 27 (27.6%), which is comparable to findings from some other health institutions [2,14]. This may be because majority of young unmarried people with unintended pregnancies often procure unsafe abortions, which may predispose them to having an ectopic gestation in future pregnancies.

Various risk factors have been implicated as key to the recent incidence of ectopic pregnancy. In this study, a previous history of pelvic inflammatory disease (PID) and induced abortion were the major risk factors. Similar findings have been reported by other studies [11,12,3]. This may be due to a higher incidence of unprotected sexual activity with multiple sexual partners and poor contraceptive uptake among the younger age group. Moreso, unlike previous studies [9,17] that had induced abortion as the foremost associated risk factor, this study, like some other recent studies, points to PID as the leading risk factor. This may not be far from the fact that significant efforts have been made to reverse the morbid trend of unsafe-induced abortion and its sequelae through measures like post-abortion care, while most of our reproductive-aged women living with chronic PID are either not treated or poorly treated. This then predisposes them to the risk of ectopic pregnancy.

Abominal pain, amenorrhoea, and dizziness were the most common presenting symptoms in patients. Other clinical presentations include vaginal bleeding, fainting attacks, and shock, which are often secondary to rupture and late diagnosis or presentation. These occur due to complications associated with ruptured ectopic pregnancy, which may be life-threatening without prompt and effective interventions. During the period under review, the majority of the patients had ruptured ectopic pregnancies, and our diagnosis was mainly based on history and physical examination. Pregnancy tests were used as supportive diagnostic investigations, with diagnosis confirmed using a transabdominal ultrasound scan by documenting the presence or absence of an intrauterine pregnancy at a discriminatory zone of about 6,500 mIU/mL of beta human chorionic gonadotropin (β-hCG) [1,15]. It also excludes the differential diagnosis of ectopic pregnancy. The ampullary region of the fallopian tube was the most common site of ectopic pregnancy in our study (55.1%), which has also been reported as the most common site in other studies [2,9,14].

When patients present with ruptured ectopic pregnancies and cardiovascular compromise from massive blood loss, this often results in life-threatening morbidity or mortality if left unattended. For such patients in shock, immediate surgery after resuscitation is both diagnostic and therapeutic. This involves immediate resuscitation of such patients with intravenous fluid and blood, emergency laparotomy with salpingectomy, and conservation of the ovaries, as was done for the majority of our cases. Emergency surgical interventions remain the mainstay of treatment in developing countries like Nigeria, where the majority of patients present after rupture. This is in contrast to developed countries, where less invasive treatment by minimal-access surgery or medical means is the main treatment modality [15]. In our centre, laparoscopy is not readily available for emergencies; open surgery (laparotomy) has remained the traditional approach to surgical care. Salpingectomy was the most common life-saving surgical procedure performed for patients in our study, since most of them presented with ruptured ectopic pregnancies and hemoperitoneum. Patients with ruptured ectopic pregnancies had more morbidities. This may be due to the delay in seeking treatment and diagnosis and may have contributed to the longer duration of hospitalisation for the majority (60%), as was seen in this study. Anaemia was the most common (67.3%) complication in this study. The majority of the patients (93.9%) had blood transfusions; none had autologous transfusions. This places an extra burden on the already-limited health resources in our center. Moreso, delays in commencing definitive intervention (surgery)

after diagnosis, which further lengthen the diagnosis-intervention time, as was noted in this study, worsen the outcome. Maternal mortality due to ectopic pregnancy reported in various studies is between 0% and 3.0% [2,9,15]. This figure may even represent an underestimation because, in developing countries, maternal deaths are often underreported, especially those that occur before arrival at the hospital. The case fatality rate of 3.1% recorded in this study is similar to the case fatality rates recorded in previous studies [18,19]. Two of the three deaths recorded resulted from massive blood loss from a ruptured interstitial or cervical ectopic pregnancy, occasioned by late referral or presentation and delays in getting blood for transfusions from the hospital blood bank. This emphasizes the need for established protocols for prompt response to these emergency cases in tertiary centres like ours.

This study has some limitations. One limitation of the study was its retrospective design and the organisational constraints existing in our centre, involving the lack of exhaustive registers for all maternity units and the lack of detailed health statistics at the emergency units. The case notes of some of the patients within the study period were not available due to misplacement during record keeping. Moreso, the incidence of repeat ectopic pregnancy and intrauterine pregnancies could not be assessed because most of the women were lost to follow-up. A prospective study will better assess the outcomes of subsequent pregnancies among women with previous ectopic pregnancies in our locality. Nevertheless, the merit of the study is that it provided an appraisal of the level of care available for ectopic pregnancy in our centre, highlighting the challenges and areas where adjustments should be made to optimise outcomes.

5. Conclusion

Ectopic pregnancy still remains a major gynaecological problem associated with significant mortality and morbidity. The unchecked trend of pelvic inflammatory disease and unsafe abortions results in a high prevalence of ectopic pregnancy in our environment. Therefore, early diagnosis, identifying risk factors, and timely intervention in the form of medical or surgical treatment will go a long way in reducing the morbidity and mortality associated with ectopic pregnancy.

Author Contribution

EC. Egwuatu, CG. Okafor, and GU. Eleje were involved in conceptualization, manuscript writing, and revision. OS. Umeononihu and CC. Okoro were involved in supervision, manuscript writing, and revision. TK. Njoku, CB. Oguejiofor, CC. Okafor, JE. Mamah, and CF. Okeke, CA. Ogabido were involved in manuscript writing and revision. CL. Olisa, HI. Obiagwu, CP. Ilika, OK. Nnabuchi, NP. Obiegbu, CM. Agbanu, SC. Egbogu, EB. Akosa, and CI. Enechukwu were involved in manuscript revision, data collection, and analysis. All authors proofread the work for final submission to the journal.

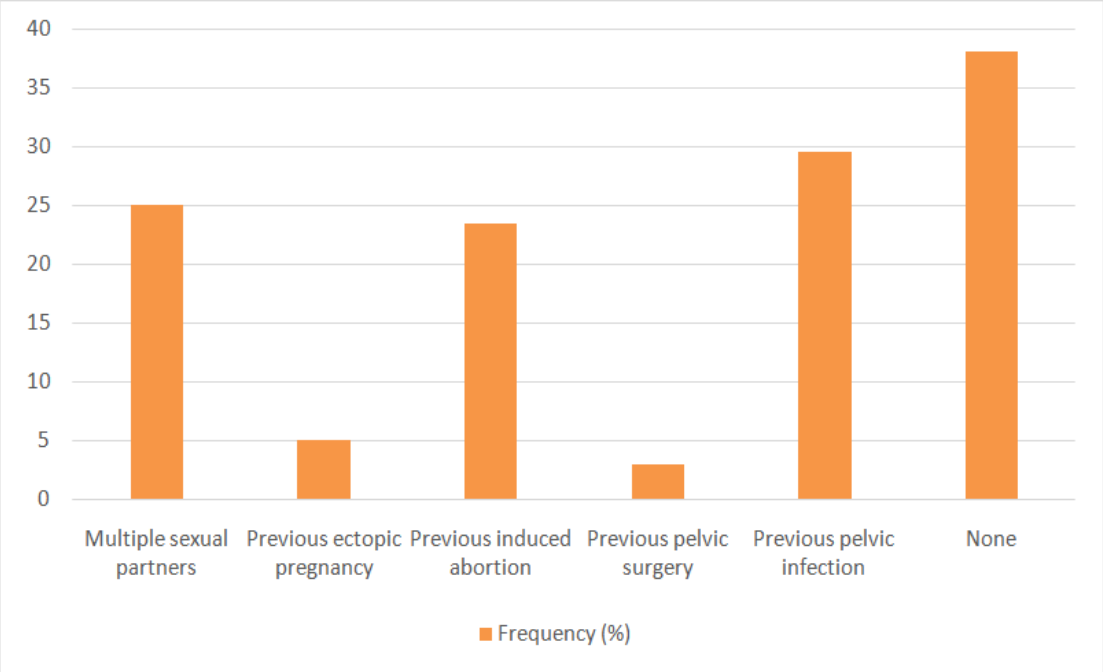

Figure 1. Risk factors for Ectopic Pregnancy

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Disclosure Statement for Publication

This work has not been submitted to any journal for consideration for publication. The conceptualization, design,

writing, and critical editing of the article, data collection, and analysis were all greatly aided by the efforts of each author. The submission of this work to a journal for consideration was approved in full by the authors.

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Declaration of Conflicting Interest

The authors declare no conflict of interest.

Ethical Approval

Ethical clearance for the study was sought and obtained from the Nnamdi Azikiwe University Teaching Hospital (NAUTH) ethics review committee on July 5, 2022, with approval reference number NAUTH/CS/66/VOL.15/VER.3/106/2022/066. The research was conducted according to ethical principles for human scientific research according to the Helsinki Declaration.

Consent to Participate

This is not applicable as this is a retrospective study.

Consent for Publication

This is not applicable.

Abbreviations

β-hCG = beta-human chorionic gonadotropin
DDI = diagnostic decision interval
Hb = haemoglobin
HBsAg = Hepatitis B surface antigen
HCV = Hepatitis C virus
ml = millilitre
NAUTH = Nnamdi Azikwe University Teaching Hospital
PCV = packed cell volume
PID = pelvic inflammatory disease
PT = pregnancy test
PV = per vagina
RVS = retroviral disease screening
SPSS = Statistical Package for Social Sciences
STD = standard deviation
TVS = transvaginal ultrasonography

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