



(RESEARCH ARTICLE)



Prevalence and presentation of ectopic pregnancy in a tertiary hospital in Enugu south-east Nigeria: A 10-year retrospective study

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Abstract

Background: Ectopic pregnancy is a leading cause of maternal mortality in the first trimester. The prevalence rate varies with time and with the population under study. While the mortality rate appears to be on the decline, most cases in this part of the world still present in ruptured state necessitating invasive management through open laparotomy.

Aim: The aim of this research is to assess the prevalence and the pattern of presentation of ectopic pregnancy at the Enugu State University Teaching Hospital (ESUTH) Parklane, Enugu Nigeria.

Methodology: This is a 10-year retrospective study from 31st December 2022 to 1st January 2013. Data was collected from ward admission and discharge records, case notes and theatre operation registers of all ectopic pregnancy-related cases during the study period. Information related to patients' age, pattern of presentation, nature of treatment given, and the outcome of such treatment were obtained in a prepared proforma. Data was analyzed using IBM SPSS version 24 and the results presented in frequency tables and charts.

Results: A total of 16,100 deliveries and 4,704 gynaecological admissions were recorded during the study period. There were 172 ectopic pregnancies giving a prevalence of 1.1% of total deliveries and 3.7% of all gynaecological admissions. The peak age incidence was 26-30-years and 86% of the patients presented in ruptured state while open laparotomy with salpingectomy was the only mode of treatment for tubal ectopic pregnancies. No mortality was recorded during the study period.

Conclusion: The Prevalence of ectopic pregnancy is still relatively high in our environment and ruptured ectopic pregnancy remains a major cause of maternal morbidity and mortality. Even though our study did not record any maternal death in the past 10 years, serious maternal morbidities still persist. Strategies to sensitize women and ensure timely diagnosis and management of ectopic pregnancy will reduce these related morbidities.

Keywords: Prevalence; Presentation; Ectopic Pregnancy; Enugu

1. Introduction

Ectopic pregnancy is a dire gynaecological emergency, and a major contributor to maternal mortality and morbidity. Rupture of ectopic pregnancy is the leading cause of maternal mortality in the first trimester of pregnancy at a rate of between 9-14%, and accounting for 5-10% of all pregnancy-related deaths¹⁻⁴. Outside the endometrial cavity the growing gestational sac risks overshooting its enclave and ultimately ruptures with attendant torrential haemorrhage, shock, and ultimately maternal death.

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The rate of occurrence of ectopic pregnancy varies widely from region to region, country to country and even within the same geographical area depending on the prevailing risk factors within the study population. Representative studies from the United Kingdom and the United States of America showed an incidence of between 6.4 - 20.7 per 1000 pregnancies^{2,5,6}. Across Africa, a prevalence rate of 0.5-2.3% of all live births was reported⁷⁻⁹ with most of the studies being institutional hospital-based studies. In Nigeria, the prevalence of ectopic pregnancy is between 1.1–3.8% of all deliveries¹⁰⁻¹⁶.

Recent studies show increasing prevalence of ectopic pregnancy worldwide and more so in the middle and low-income regions especially Sub-Saharan Africa¹⁷⁻²⁰. This global trend is attributable to advances in Assisted Reproductive Technology (ART), increasing risks of pelvic infections, tubal surgeries and sterilizations, use of intrauterine contraceptive devices, and improvements in diagnostic techniques leading to early detection of cases that otherwise would have resolved without causing symptoms. For middle and low-income countries particularly those from Sub-Saharan Africa with inadequate health facilities for intensive care and blood transfusion services, the public health implications of the rising prevalence are better imagined. The two most commonly identified risk factors from Nigerian studies include a history of previous induced abortions^{10,15,21} and pelvic infections²¹⁻²³. One of such studies found pelvic adhesions intraoperatively in 42.1% of the ectopic pregnancy patients despite no history of previous abdominal or pelvic surgery, suggesting high prevalence of pelvic infections²³.

The clinical presentations of patients with ectopic pregnancy vary widely and are related to the gestational age, location of the gestational sac, and whether or not the gestational sac has ruptured at the time of diagnosis. The classical diagnostic triad of ectopic pregnancy including amenorrhoea, abdominal pain, and vaginal bleeding are found in less than 40% of patients with interstitial or cornual ectopic pregnancies²⁴. This reflects the challenges of making definitive diagnosis of ectopic pregnancy prior to rupture. Majority of the cases eventually present in ruptured state^{8,12,13,22} when definitive diagnosis is made intraoperatively^{25,26}.

The case fatalities from ectopic pregnancy in many developed countries have been on the decline due mainly to improved diagnostic techniques especially the use of transvaginal ultrasonography and prompt interventions employing medical and or new surgical management approaches^{8,27}. These newer interventions are not readily available in low resource settings like ours where the exact burden of ectopic pregnancy is unclear due to shortcomings in documentation and reporting, delays in seeking or reaching healthcare facilities, difficulty in making diagnosis or outright misdiagnosis, and the use of different denominators for reporting ectopic pregnancy rates^{8,28-31}. Open laparotomy and salpingectomy still remained the commonest treatment modality for tubal ectopic pregnancy in our region^{8,15,29}.

This study was meant to develop the first basic and original data on ectopic pregnancy in our centre, being the first retrospective study on this subject matter since the institution became a teaching hospital.

The objectives of this study were to determine the total number of gynaecological admissions and how many of them were due to ectopic pregnancy, to determine the total number of deliveries in the past 10 years, to determine the prevalence of ectopic pregnancy in ESUT Teaching Hospital Enugu, to determine the proportion of ectopic pregnancies that presented in ruptured and unruptured states, and to determine the treatment modalities offered as well as the maternal mortalities associated with ectopic pregnancy during the study period.

2. Material and methods

2.1. Study population

This included the records of all ectopic pregnancy-related cases admitted and managed at the obstetrics and gynaecology wards of Enugu State University Teaching Hospital Parklane, Enugu in the past 10 years.

2.2. Inclusion criteria

All confirmed and complete case records of ectopic pregnancies managed in the past 10 years and all the labour ward delivery records in the past 10 years

2.3. Exclusion criteria

All incomplete case records or missing folders.

2.4. Study design and procedure

This is a retrospective study of all ectopic pregnancy-related cases admitted and managed at the gynaecology wards of ESUTH Parklane over the past 10 years spanning December 31st 2022 to January 1st 2013. A predesigned proforma was used to obtain data from the patients’ case notes, ward admission and discharge registers and theatre records. The data is related to patients’ age, number of ectopic pregnancy cases seen each month, pattern of presentation in terms of ruptured or unruptured state, and the type of treatment given in terms of open laparotomy, laparoscopic surgery, or medical management. Data was also collected on the management outcomes in terms of case mortalities while the records of deliveries on monthly basis were obtained from the labour ward delivery registers.

2.5. Data analysis

Data from the completed Proforma was entered electronically into the computer and analyzed using Statistical Package for Social Sciences [IBM SPSS] software version 24.0 (IBM, Armonk, NY, USA).

3. Results

In the past 10 years, there were a total of 16,100 deliveries, 4,704 gynaecological admissions, and 172 ectopic pregnancies recorded (Table 1). This gave a prevalence of 1.1% or 11 per 1000 deliveries and 3.7% of all gynaecological admissions.

Table 1 The yearly trends of ectopic pregnancy

Yearly Trends of Ectopic Pregnancy at ESUT Teaching Hospital Parklane Enugu											
Year:	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	Total
Total deliveries	1301	1397	1474	1781	1853	1933	1920	1628	1431	1328	16100
Total Gynae Admissions	389	374	575	553	488	541	585	428	346	425	4704
Number of Ectopics	13	15	14	20	20	21	18	21	05	25	172

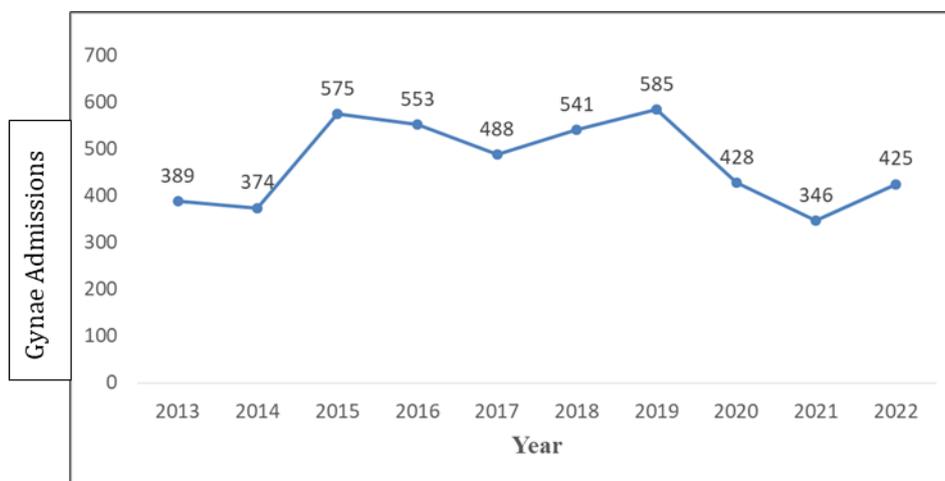


Figure 1 Total number of gynaecological admissions in 10 years

The trend shows a rise and fall of gynaecological admissions every 2 years on the average. There has been an average of 470 gynaecological admissions in 10 years.

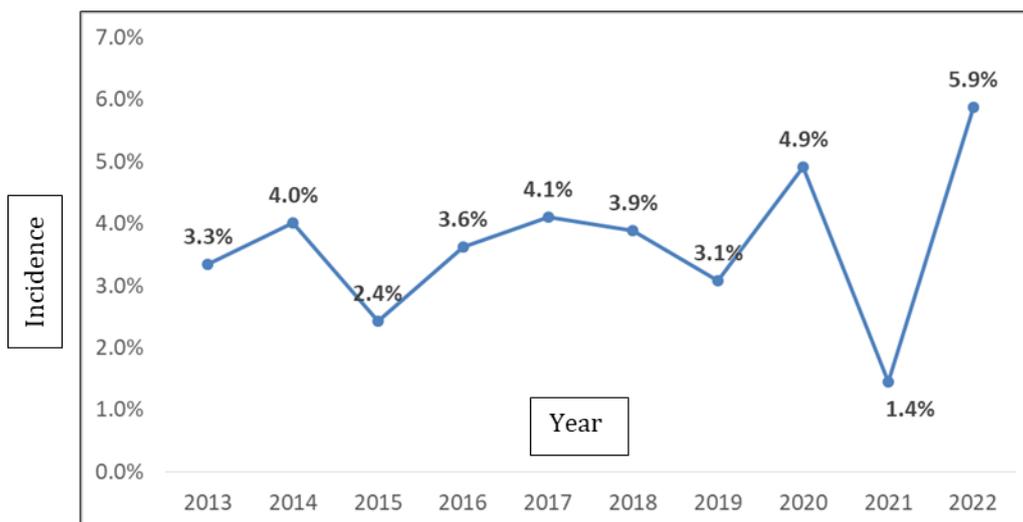


Figure 2 Yearly incidence of ectopic pregnancy

The incidence of ectopic pregnancy was highest in 2022 (5.9%) and lowest in 2021 (1.4%). The prevalence of ectopic pregnancy is 3.7%.

Table 2 Age distribution of women that had ectopic pregnancy from 2013 – 2022

Year	Age bracket						Total ectopic	*Mean ± SD
	16 – 20 n (%)	21 – 25 n (%)	26 – 30 n (%)	31 – 35 n (%)	36 – 40 n (%)	41 – 45 n (%)		
2013	0 (0.0)	5 (38.5)	5 (38.5)	1 (7.7)	1 (7.7)	1 (7.7)	13 (100.0)	28.23 ± 6.25
2014	3(20.0)	2 (13.3)	7 (46.7)	2(13.3)	0 (0.0)	1 (6.7)	15 (100.0)	27.20 ± 6.42
2015	1 (7.1)	4 (28.6)	6 (42.9)	3 (21.4)	0 (0.0)	0 (0.0)	14 (100.0)	27.57 ± 5.00
2016	0 (0.0)	7 (35.0)	8 (40.0)	2 (10.0)	3 (15.0)	0 (0.0)	20 (100.0)	27.70 ± 4.93
2017	0 (0.0)	6 (30.0)	6 (30.0)	7 (35.0)	1 (5.0)	0 (0.0)	20 (100.0)	28.50 ± 4.51
2018	0 (0.0)	5 (23.8)	13 (61.9)	1 (4.8)	2 (9.5)	0 (0.0)	21 (100.0)	27.81 ± 4.50
2019	0 (0.0)	6 (33.3)	6 (33.3)	1 (5.6)	5 (27.8)	0 (0.0)	18 (100.0)	29.09 ± 5.27
2020	1 (4.8)	4 (19.0)	9 (42.9)	6 (28.6)	1 (4.8)	0 (0.0)	21 (100.0)	26.60 ± 5.13
2021	0 (0.0)	3 (60.0)	0 (0.0)	2 (40.0)	0 (0.0)	0 (0.0)	5 (100.0)	28.44 ± 6.61
2022	2 (8.0)	7 (28.0)	9 (36.0)	4 (16.0)	1 (4.0)	2 (8.0)	25 (100.0)	28.26 ± 5.43

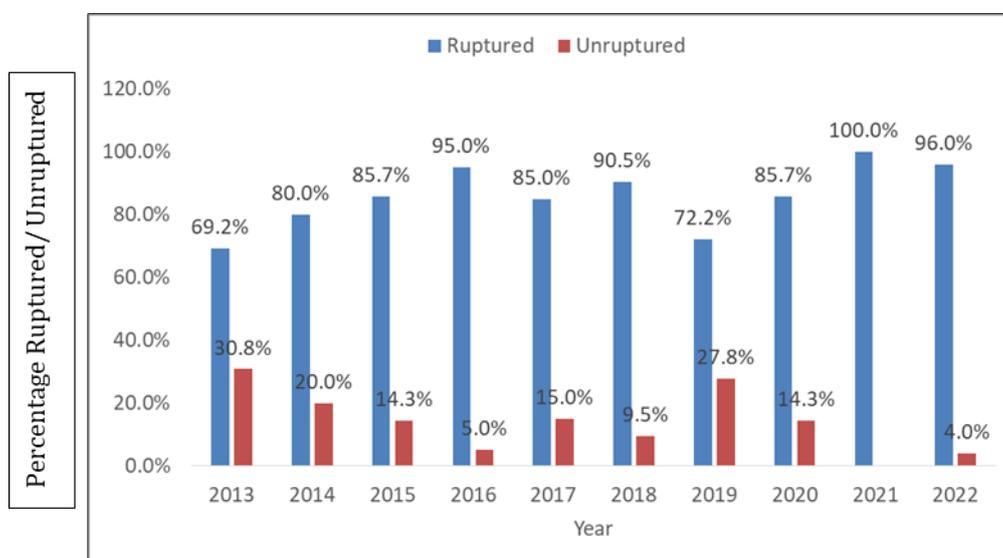
*F = 0.398, p = 0.935

The mean age of women with ectopic pregnancy was 27.94 years in 10 years. The mean ages of the women were not significantly different between the years (F = 0.398, p = 0.935). In the past 10 years the age group most affected was 26 – 30 years.

Table 3 Pattern of presentation of ectopic pregnancy in Enugu (Ruptured/Unruptured)

Year	Ruptured n (%)	Unruptured n (%)	Total ectopic n (%)
2013	9 (69.2)	4 (30.8)	13 (100.0)
2014	12 (80.0)	3 (20.0)	15 (100.0)
2015	12 (85.7)	2 (14.3)	14 (100.0)
2016	19 (95.0)	1 (5.0)	20 (100.0)
2017	17 (85.0)	3 (15.0)	20 (100.0)
2018	19 (90.5)	2 (9.5)	21 (100.0)
2019	13 (72.2)	5 (27.8)	18 (100.0)
2020	18 (85.7)	3 (14.3)	21 (100.0)
2021	5 (100.0)	0 (0.0)	5 (100.0)
2022	24 (96.0)	1 (4.0)	25 (100.0)

Table 3 shows that 86% (148/172) of women with ectopic pregnancy presented in ruptured state in the past 10 years. All the 5 (100%) cases seen in 2021 were ruptured at the time of presentation.

**Figure 3** A clustered bar chart showing at a glance the pattern of presentation of ectopic pregnancy in Enugu (Ruptured/Unruptured)

Further analysis also showed that all cases of ectopic pregnancy was treated by open laparotomy. All ruptured cases (100%) and 91.7% (22/24) of unruptured cases were treated by emergency exploratory laparotomy and salpingectomy and or cornual resection including two cases of heterotopic pregnancies. Two unruptured cases (8.3%) were abdominal pregnancies.

There was no maternal mortality recorded from ectopic pregnancies in the past 10 years in our study centre.

4. Discussion

This study has shown that the prevalence of ectopic pregnancy in ESUT Teaching Hospital Enugu is 1.1% of total deliveries and 3.7% of all gynaecological admissions in the past 10 years (Table 1). Ectopic pregnancy is more prevalent among 26-30-year age bracket and most of the cases present in ruptured state. All cases of ectopic pregnancy were treated by open laparotomy and there was no maternal death from ectopic pregnancy during the study period.

The prevalence rate of 1.1% is the same as that reported in the United Kingdom (UK)^{1,5} and from the Nnamdi Azikiwe University Teaching Hospital (NAUTH) Nnewi, Nigeria by Igwegbe et al¹⁰. The similarity with the UK report may appear surprising considering the wide disparity in socio-economic and healthcare indices between both countries. However, it has to be documented that while this study is a single, retrospective, hospital-based study, the UK report is a national population-based report which is a more representative and generalizable report. When compared with the study from Nnewi, both studies were retrospective in design, hospital-based, and both spanned across a 10-year period. Again, both study institutions share the same geopolitical zone and the populations have similar socio-cultural and religious lifestyles. These characteristics may explain the similarity in both results even though the study from Nnewi is more than a decade (2002-2011) older than our study. The prevalence is also comparable with a prevalence of 1.3% reported by Udigwe et al³² from a 5-year (2002-2006) retrospective study in the same institution in Nnewi. A prevalence of 1.5% of all deliveries reported by Panti et al¹³ in another 10-year retrospective study in Usman Danfodiyo University Teaching Hospital, Sokoto is also comparable with our result. Even though Sokoto and Enugu are socio-culturally different, the comparable prevalence rates may be related to the study design. Our prevalence rate of 1.1% is clearly less than that reported in some other studies in Nigeria. Musa et al³³ in Jos North-Central Nigeria reported 1.74% in 2009, Awoleke et al¹⁵ in Ekiti South-West Nigeria reported an incidence of 1.8% in 2017, while Eke et al¹⁶ in Umuahia South-East Nigeria reported 1.9% in 2022. This shows progressive rising prevalence of ectopic pregnancy across Nigeria even though the timing and the duration the studies vary and may have affected the results. While the study from Jos was a 4-year retrospective study conducted over 2 decades ago (1997-2000), that from Ekiti was a 6-year retrospective study conducted over 9 years ago. Both Anorlu et al¹⁹ and Adewunmi et al¹² reported prevalence rates of 2.3% in just 6 months and 3.9% over 2 years respectively and both studies are from Lagos South-West Nigeria. These comparatively high prevalence reports may be related to both the designs and the durations of the studies. The study by Anorlu et al¹⁹ is a cross-sectional, multi-centre study where only a hundred women were studied. Again, and more importantly, the study was conducted over 24 years ago. Though a retrospective, institution-based report, the study by Adewunmi et al¹² spanned across 2 years only compared with 10 years in our study. The prevalence rate from our study is comparatively higher than that reported from some studies within Nigeria^{11,21}, as well as those reported from some African countries. In Ethiopia, Berh et al⁹ reported a prevalence of 0.52% of all deliveries in 2021 whereas Leke et al⁷ in Yaounde, reported 0.79% in a population-based study in 2004. Thonneau et al⁸ in Guinea reported an incidence range of 0.41%-1.5% over a 4-year period in 2002. These lower prevalence rates apart from been affected by the study design and duration, may be a reflection of gradual improvements in maternal health care.

With regards to the total number of gynaecological admissions, the prevalence rate of 3.7% is more than 1.4% reported by Eke et al¹⁶ in Umuahia, but comparable to the 4.1% by Panti et al¹³ in Sokoto. It is however less than 4.5% reported by Lawani et al²² in Abakiliki in 2013, 5.2% and 6.5% respectively reported by Igwegbe et al¹⁰ and Udigwe et al³² both from Nnewi, and far less than 48.5% reported by Anorlu et al¹⁹ in Lagos. The relatively lower prevalence rate in our study compared with most of the reports documented above can be explained from the perspectives of the differences in the study durations and techniques as explained earlier.

A look at the trends in the yearly incidence of ectopic pregnancy in the past 10 years (Figure 2) shows close fluctuations within 2% in the first 7 years of the study. The fall in 2019 and the lowest annual rate of 1.4% recorded in 2021 may be related to the effects of Covid-19 pandemic. The lockdowns occasioned by Covid-19 restricted patients' movements and many patients were reluctant to access hospital services for fear of contracting or spreading the infection and being isolated as a consequence. The restrictions also means that couples may have more time been together which may explain the highest rates recorded in 2020 and 2022.

The mean age of the women presenting with ectopic pregnancy is 27.94 years. The age distribution (Table 2) of patients shows that the age group mostly affected is 26-30 years bracket. This is in agreement with some Nigerian studies^{10,13,16,21}. This age group represents the peak age of sexual experimentation and motherhood as more women tend to defer childbearing in pursuit of higher education. However, this does not agree with the peak age incidence of 20-24 years reported by Lawani et al²² and Udo et al¹¹ in Abakiliki and Calabar respectively. This lower age group may be related to socio-economic and cultural factors that encourages early sexual debut, polygamy, and unhealthy lifestyles that may increase the risks of sexually transmitted infections. Some other studies agreed that the risk of ectopic pregnancy increases with increasing maternal age³⁴ for similar reasons in addition to increasing needs for Assisted Reproductive Techniques.

The pattern of presentation of ectopic pregnancy (Table 3; Figure 3) shows that 86% of women with ectopic pregnancy presented in ruptured state. This result is comparable with the 86.9% reported by Musa et al³³ in Jos and 84% by Eke et al¹⁶ but higher than the 70% reported in Sokoto.¹³ It is lower than the 93%, 93.5%, 95.6%, 99.2%, 100% reported by Thonneau et al⁸, Ali et al²⁸, Lawani et al²², Adewunmi et al¹², and Udigwe et al³² in Sudan, Guinea, Abakiliki, Lagos, and Nnewi respectively. These very high prevalence rates of ruptured ectopic pregnancy illustrate the clear risks and the

challenges of management of ectopic pregnancy in Sub-Saharan Africa. It calls to question the health seeking behaviours of African women especially in early pregnancy when symptoms and signs of pregnancy are still vague. It has been shown that some women may not be aware that they are pregnant yet while some may underestimate the seriousness of their symptoms prior to the rupture of the ectopic gestation^{28,29}. Even with early presentation, late diagnosis and sometimes outright misdiagnosis may compound the situation and increase the risk of rupture³¹.

Interestingly, there is no case of maternal mortality from ectopic pregnancy in the past 10 years. This is similar to the findings in the two studies from Nnewi^{10,32}. This also agrees with the reports from the United States of America and other developed nations that ectopic pregnancy maternal mortality has been on the decline³⁵. While this is a very encouraging finding, there is still strong racial disparities as ectopic pregnancy mortality ratio is 6.8 times higher in African Americans than in Whites and 3.5 times higher in women above 35 years than those less than 25years old³⁵. The zero maternal mortality in our study despite most cases presenting in ruptured states may be related to timely surgical interventions usually emergency exploratory laparotomy, improving availability of blood transfusion services and blood salvage techniques, and effective use of antibiotics for prevention of post operative wound infections. when compared with our study, the high maternal mortality reported in Lagos by Anorlu et al¹⁹ where 4 maternal deaths were recorded in just 6 months of study may be related to the time the study was conducted. Over 24 years ago when the study was conducted there was still paucity of both manpower and improved management facilities compared with the past 10 years. Again, the study was cross-sectional in design and multi-centred with a small sample size and hence low power.

Open laparotomy (with salpingectomy, and or cornual resection) was the only treatment method used for all cases of ectopic pregnancy both ruptured and unruptured. This use of open laparotomy regardless of the state of whether ruptured or not may be related to the clear dilemma occasioned by the fear of poor compliance to and the unpredictability of medical treatments of ectopic pregnancy. Again, and more importantly, there is still paucity of both facilities and skills for laparoscopic minimal access surgery for the treatment of haemodynamically stable patients with ectopic pregnancy in our centre unlike what obtains in most developed countries³⁶.

5. Conclusion

Ectopic pregnancy remains a serious gynaecological emergency with high risk of maternal morbidity and mortality. Majority of cases still present late and in ruptured state often necessitating emergency radical surgeries. Strategies to sensitize women and ensure timely diagnosis and management of ectopic pregnancy using newer surgical and medical techniques will reduce the related morbidity and mortality.

Compliance with ethical standards

Acknowledgments

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Disclosure of conflict of interest

There is no conflict of interest to disclose.

Statement of ethical approval

Ethical clearance was obtained from the Ethics and Research Committee of ESUT Teaching Hospital Parklane, Enugu and the permission to conduct the research also obtained from the Head, Department of Obstetrics and Gynaecology ESUTH Parklane Enugu.

Statement of informed consent

Informed consent was obtained from Head of department of Obstetrics and Gynaecology and other relevant authorities to carry out this research work.

References

- [1] Houser M, Kandalaft N, Khati NJ. Ectopic pregnancy: a resident's guide to imaging findings and diagnostic pitfalls. *Emerg Radiol* 2022, 29(1): 161–172.
- [2] Togas T. Ectopic pregnancy: epidemiology, risk factors and anatomic site. *J Obstet Gynaecol India*. 2015, 65(4):284–285. [Google Scholar]
- [3] Poonam Y, Uprety D, Banerjee B. Ectopic pregnancy- two years' review from BPKIHS, Nepal. *Kathmandu University Medical Journal*. 2005, 3: 365-369. Link: <https://goo.gl/xaXLnT>
- [4] Tenore JL. Ectopic pregnancy. *American Family Physician*. 2000, 61: 1080-1088. Link: <https://goo.gl/mdgVq9>
- [5] Cantwell R, Clutton-Brock T, Cooper G, Dawson A, Drife J, Garrod D, et al. Saving mothers' lives: reviewing maternal deaths to make motherhood safer: 2006–2008. *BJOG* 2011, 118:1–203.
- [6] Centres for Disease Control and Prevention (CDC). Ectopic pregnancy – United States, 1990–1992. *MMWR Morb Mortal Wkly Rep* 1995, 44:46–48.
- [7] Leke RJ, Goyaux N, Matsuda T, Thonneau PF. Ectopic pregnancy in Africa: a population-based study. *Obstet Gynecol*. 2004 Apr, 103(4):692-697. doi: 10.1097/01.AOG.0000120146.48098.f2. PMID: 15051561.
- [8] Thonneau P, Hijazi Y, Goyaux N, Calvez T, Keita N. Ectopic pregnancy in Conakry, Guinea. *Bull World Health Organ*. 2002, 80(5):365-70. PMID: 12077611, PMCID: PMC2567787.
- [9] Berhe ET, Kiros K, Hagos MG, Gesesew HA, Ward PR, Gebremeskel TG. Ectopic Pregnancy in Tigray, Ethiopia: a cross-sectional survey of prevalence, management outcomes, and associated factors. *J Pregnancy*. 2021 Nov 30, 2021:4443117. doi: 10.1155/2021/4443117. PMID: 34888104, PMCID: PMC8651379.
- [10] Igwegbe A, Eleje G, Okpala B. An appraisal of the management of ectopic pregnancy in a Nigerian tertiary hospital. *Ann Med Health Sci Res* 2013, 3:166–170.
- [11] Udo A, Ekott M, Ekanem E, Iklaki C, Udofia O, Udoma E. Incidence of ectopic pregnancy in Calabar, Nigeria: two halves of the last decade compared. *Glob J Community Med* 2009, 2:27–32.
- [12] Adewunmi A, Adewunmi K, Tayo A, Aletan O. Ectopic pregnancy in Lagos State University Teaching Hospital, Ikeja Lagos, Nigeria. *Niger Med Pract* 2010, 58:13–16.
- [13] Panti A, Tanko B, Yakubu A, Egondou S, Ikechukwu N, Lukman O. Ectopic pregnancy at Usmanu Danfodiyo University Teaching Hospital Sokoto: a ten-year review. *Ann Niger Med* 2012, 6:87.
- [14] Akaba GO, Agida TE, Onafowokan O. Ectopic pregnancy in Nigeria's federal capital territory: a six-year review. *Niger J Med* 2011, 21:241–245.
- [15] Awoleke JO, Akintayo AA. The Use of abdominal paracentesis in the diagnosis of ectopic pregnancy in a resource – limited setting. *J Gynecol Res Obstet* 2017, 3(2): 019 -024.
- [16] Eke EO, Ekeleme CN, Ezirim EO, Onwuka JC, Eke KO. Ectopic Pregnancy: a 10 -year review of cases in a tertiary health institution in Umuahia, South East, Nigeria. *European Journal of Medical and Health Sciences* 2022, 4(4) [www.ejmed.orgDOI: http://dx.doi.org/10.24018/ejmed.2022.4.4.1395](http://dx.doi.org/10.24018/ejmed.2022.4.4.1395)
- [17] Arup KM, Niloptal R, Kakali SK, Pradip KB. Ectopic pregnancy: an analysis of 180 cases. *J Ind Med Assoc* 2007, 105: 308-314. Link: <https://goo.gl/5GZ3M84>.
- [18] Rajkhowa M, Glass MR, Rutherford AJ, Balen AH, Sharma V, Cuckle HS. Trends in the incidence of ectopic pregnancy in England and Wales from 1966-1996. *Br J Obstet Gynaecol* 2000, 107: 369-374. Link: <https://goo.gl/HcSGGN5>.
- [19] Anorlu RI, Oluwole A, Abudu OO, Adebajo S. Risk factors for ectopic pregnancy in Lagos, Nigeria. *Acta Obstet Gynecol Scand* 2005, 84: 184-188. Link: <https://goo.gl/Ar209H>
- [20] Cates W, Rolfs RT, Aral SO. Sexually transmitted diseases, pelvic inflammatory disease and infertility: an epidemiology update. *Epidemiol Rev*. 1990, 12:199–220. [PubMed]
- [21] Okoror CEM, Uhumwangho BO, Idemudia O. Ectopic pregnancy at a teaching hospital in Nigeria: an analysis of presentation and risk factors. *Menoufia Med J*. 2020, 33:415–418
- [22] Lawani OL, Anozie OB, Ezeonu PO. Ectopic pregnancy: a life-threatening gynecological emergency. *Int J Womens Health* 2013, 5:515–521.

- [23] Uzoho C, Jido T, Itodo A, Zakari T. Ectopic pregnancy: Aminu Kano Teaching Hospital experience. *Nig J Basic Clin Sco* 2004, 1:10–20.
- [24] Timor-Tritsch IE, Monteagudo A, Materna C, Veit CR. Sonographic evolution of cornual pregnancies treated without surgery. *Obstet Gynecol.* 1992, 79:1044–1049 [PubMed] [Google Scholar]
- [25] Ali AA, Abdallah TM, Siddig MF. Diagnosis of ruptured ectopic pregnancy is still a challenge in Eastern Sudan. *Afri J Reprod Health.* 2011, 15(4):106-108.
- [26] Ikeme AC, Ezegwui HU. Morbidity and mortality following tubal ectopic pregnancies in Enugu, Nigeria. *J Obstet Gynaecol.* 2005, 25(6):596-598. doi:10.1080/01443610500239552. PMID: 16234149.
- [27] Morcau JC, Rupari L, Dionne P, Diouf A, Diouf F, Boye CS, et al. Epidemiological and anatomo-clinical features of extra-uterine pregnancy at the Dakar University Hospital Centre. *Dakar Medicine.* 1995, 40: 175-179. Link: <https://goo.gl/pv2rXA7>.
- [28] Diari J, Darido J, Bouzid N, Elhadad C, Derouiche Y, Grevoul-Fesquet J, et al. A Case Report: Misdiagnosed ectopic cornual rupture with positive fetal heart at 13weeks gestation. *Gynecol Reprod Health.* 2020, 4(3): 1-5.
- [29] Hamura NN, Bolnga JW, Wangnapi R, Horne AW, Rogerson SJ, Unger HW. The impact of tubal ectopic pregnancy in Papua New Guinea – a retrospective case review. *BMC Pregnancy and Childbirth.* 2013, 13: 86. Link: [Shttps://goo.gl/NG4x6H9](https://goo.gl/NG4x6H9). de
- [30] Rosnay P, Irvine LM. Reporting rates of ectopic pregnancy: are we any closer to achieving consensus? *J Obstet Gynaecol.* 2012, 32: 64-67. Link: <https://goo.gl/bMfBXe10>.
- [31] Nevo CO, Omeke CA, Onyekpa IJ, Odugu BU. Misdiagnosed ruptured cornual ectopic pregnancy: case report and literature review. *WJARR* 2023,19(1):631-37. Doi:10.30574/wjarr.2023.19.1.1343 url:<https://doi.org/10.10.30574/wjarr.2023.19.1.1343>
- [32] Udigwe GO, Umeononihu OS, Mbachu II. Ectopic pregnancy: a 5-year review of cases at Nnamdi Azikiwe University Teaching Hospital (NAUTH) Nnewi. *Niger Med J* 2010, 51:160-3.
- [33] Musa J, Daru PH, Mutahir JT, Ujah IA. Ectopic pregnancy in Jos Northern Nigeria: prevalence and impact on subsequent fertility. *Niger J Med.* 2009 Jan-Mar, 18(1):35-38. PMID: 19485145.
- [34] Nybo-Andersen AM, Wohlfahrt J, Christens P, Olsen J, Melbye M. Maternal age and fetal loss: population-based register linkage study. *BMJ.* 2000 Jun 24, 320(7251):1708-1712. doi: 10.1136/bmj.320.7251.1708. PMID: 10864550, PMCID: PMC27416.
- [35] Creanga AA, Shapiro-Mendoza CK, Bish CL, Zane S, Berg CJ, Callaghan WM. Trends in ectopic pregnancy mortality in the United States: 1980-2007. *Obstet Gynecol.* 2011 Apr, 117(4):837-843. doi: 10.1097/AOG.0b013e3182113c10. PMID: 21422853.
- [36] Tulandi T, Saleh A. Surgical management of ectopic pregnancy. *Clin Obstet Gynaecol* 1997, 42: 31-5.