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Prevalence and Clinical Characteristics of Ectopic Pregnancy at a Tertiary Referral Hospital in Zambia: A Prospective Descriptive Study

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Abstract

Background: Ectopic pregnancy (EP) remains a major cause of early pregnancy-related morbidity and mortality, particularly in low-resource settings where late presentation and limited diagnostic capacity prevail. Despite being a preventable cause of maternal death, local data on its burden and clinical characteristics in Zambia remain limited. **Objective:** To determine the prevalence, socio-demographic patterns, clinical characteristics, and outcomes of ectopic pregnancy at Ndola Teaching Hospital (NTH), Zambia. **Methods:** A prospective, descriptive, hospital-based study was conducted among 94 women with surgically confirmed ectopic pregnancies between June 2024 and April 2025. Participants were recruited through purposive sampling. Data were collected using structured questionnaires and review of medical records, then analyzed using IBM SPSS version 27. Descriptive statistics were computed, and associations between categorical variables were tested using the Chi-square test at a significance level of $p < 0.05$. **Results:** Out of 9402 pregnant women managed during the study period, 94 were diagnosed with ectopic pregnancy, yielding a prevalence of 0.99%. The mean age was 28.3 ± 5.8 years, with most participants residing in low-income areas (79.8%) and being married (84%). A prior history of pelvic inflammatory disease (PID) was reported in 57.4%,

while 35.1% had used emergency contraception. The most frequent presenting symptoms were lower abdominal pain (96.8%), amenorrhea (74.5%), and vaginal bleeding (62.8%). At surgery, 88.3% of cases were ruptured, and 41.5% presented in haemorrhagic shock. Abdominal pain showed a statistically significant association with ruptured ectopic pregnancy ($p < 0.001$), while a history of pelvic inflammatory disease was significantly associated with the presence of pelvic adhesions ($p = 0.015$). The case fatality rate was 1.1%. **Conclusion:** Ectopic pregnancy at NTH remains a significant reproductive health challenge, characterized by late presentation, high rupture rates, and severe complications. The findings highlight the need for strengthened early diagnostic capacity, improved access to emergency care, and enhanced reproductive health education, particularly targeting women in low-income communities.

Keywords

Ectopic Pregnancy, Prevalence, Ndola Teaching Hospital, Zambia

1. Introduction

Ectopic pregnancy (EP) refers to the implantation of a fertilized ovum outside the endometrial lining of the uterus. Globally, it accounts for 1% - 2% [1], while Africa has a prevalence of 1% - 4% of all pregnancies [2]. EP remains a life-threatening gynaecological emergency and a significant contributor to early pregnancy-related maternal morbidity and mortality, particularly in low-resource settings [3]. Ruptured EP is especially dangerous, accounting for approximately 2.7% of pregnancy-related deaths in the general population [4], with even higher mortality rates reported in sub-Saharan Africa. In Cameroon, for example, EP was responsible for 12.5% of maternal deaths [5]. The incidence of EP varies widely across regions, influenced by multiple risk factors including advanced maternal age, previous pelvic inflammatory disease (PID), tubal surgery, and a history of ectopic pregnancy [6].

Early clinical suspicion is crucial, as symptoms such as missed menstruation, abnormal uterine bleeding, and recent sexual activity should prompt immediate pregnancy testing [1]. EP typically presents with lower abdominal pain, vaginal bleeding, and amenorrhea. In more severe cases, symptoms like shoulder tip pain or syncope may indicate rupture and necessitate urgent intervention [7]. Suliman *et al.* [8] reported vaginal bleeding in 74.3% of EP cases, identifying it as the second most common presenting symptom, while 40.47% of patients exhibited the classical triad of amenorrhea, abdominal pain, and vaginal bleeding. Adnexal ectopic pregnancies often manifest as unilateral, colicky pelvic or abdominal pain [1], a symptom pattern supported by studies from Chisha [9] at 97.8%. Nevertheless, it is emphasized that these symptoms may not be present in all cases, underscoring the need for vigilant and thorough clinical evaluation [1].

The risk of EP increases with age, particularly in women over 35 years [10], [11]. Moini *et al.* similarly found that the likelihood of EP was significantly higher among women aged 33 - 39 and those over 40, compared to those aged 20 - 24. Certain contraceptive methods, including progestogen-only methods such as Levonorgestrel emergency contraception (LNG-EC) and intrauterine contraceptive devices (IUCDs), are associated with an elevated risk of EP in cases of contraceptive failure, though they do not increase the overall incidence of EP [1]. Supporting this, Shurie [12] demonstrated a statistically significant association ($p < 0.001$) between EP and the use of both IUCDs and LNG-EC [12]. Chisha [9] also reported notable behavioural risk factors, including having had more than one sexual partner (55.6%) or concurrent sexual partners (14.4%), which increased susceptibility to sexually transmitted infections (STIs), a known precursor to PID and EP.

In Zambia, prospective data on EP remain scarce. The only published study to date, conducted at the University Teaching Hospital (UTH) in Lusaka, reported a prevalence of 0.05% [9], but lacked detailed analysis of associated risk factors, clinical profiles, and treatment outcomes. At Ndola Teaching Hospital (NTH), a 2022 internal audit documented 114 EP cases among 8736 pregnancies, corresponding to a prevalence of 1.3%, and included two maternal deaths (NTH, Obstetrics and Gynaecology maternal audit report, 2022). However, due to inadequate documentation, the findings were limited in scope and utility, reinforcing the need for a well-structured, prospective study.

This study was conducted to determine the prevalence and clinical characteristics of ectopic pregnancy at NTH. Specifically, it explores socio-demographic variables, obstetric and gynaecological histories, presenting symptoms and clinical outcomes. The findings aim to inform the development of context-appropriate clinical protocols and enhance early diagnosis and management of EP in resource-constrained settings.

2. Methods and Materials

2.1. Study Site, Study Design and Target Population

This was a prospective, descriptive, hospital-based cross-sectional study conducted at Ndola Teaching Hospital (NTH), the second-largest tertiary referral hospital in Zambia, with a bed capacity of 851 and 91 cots. The hospital has an established Obstetrics and Gynaecology (OBGY) Department and serves as a teaching and training centre affiliated with the Copperbelt University and the Zambia College of Medicine and Surgery, providing postgraduate training in various medical specialties, including obstetrics and gynaecology. NTH is located in Ndola District, Copperbelt Province, along Broadway Road. It receives referrals from across northern Zambia and within Ndola District itself, which had an estimated population of 624,579 as per the 2022 Census [13]. The target population comprised all patients who presented to Ndola Teaching Hospital with a suspected or confirmed diagnosis of ectopic pregnancy during the study period.

2.2. Sample Size Determination

The sample size was calculated using Cochran's formula [14] for an infinite population.

Assumptions:

I. Normal distribution.

II. Confidence Interval at 95%, marginal of error at 5%.

III. Z score of 1.96 at 95% CI.

IV. The global prevalence of ectopic pregnancy is 1% to 2% [1] as indicated in literature review. This prevalence was the same in majority of African countries evidenced by literature review [2]. However, only one study in Zambia evaluated prevalence of ectopic pregnancy at 0.05% [9]. Seeing that the 0.05% prevalence resulted in less than 30 sample size which would have not make the research statistically sound, an estimation of 5% prevalence was made to calculate the sample size using the infinite formula considering the highest global prevalence of 2% [1] and Africa prevalence of 4% [2].

- Sample Size(n) = $\left[z^2 * p(1-p)\right] / e^2$
  - z = z-score.
  - e = margin of error.
  - p = prevalence (estimated).
- $n = [1.96^2 \times 0.05\ (1 - 0.05)]/0.05^2$.
- n = 73 was the actual sample size.

However, 94 participants were recruited in the present study.

2.3. Sampling Technique

The present study employed a purposive sampling technique, a non-probability method in which participants were selected based on having a diagnosis of ectopic pregnancy. All 94 participants had ectopic pregnancy and were included in the study. Purposive sampling is also known as judgmental sampling, which relies on the researcher's discretion to include participants from the target population (*i.e.* ectopic pregnancy). Within purposive sampling, the homogeneous sampling method was used whereby participants with ectopic pregnancy were sampled, a subtype that aligned with the study's objectives. The reason for employing homogeneous sampling was that the target population shared similar characteristics concerning ectopic pregnancy, diagnostic and treatment methods, and presenting at the same hospital.

2.4. Inclusion and Exclusion Criteria

2.4.1. Inclusion Criteria

- All women diagnosed with ectopic pregnancy who provided informed consent to participate.
- For participants aged below 18 years, assent was obtained from the participant, and consent was provided by a parent or guardian.

2.4.2. Exclusion Criteria

- Women who did not provide consent or whose guardians declined participation.
- Patients who had been treated for ectopic pregnancy at other facilities.
- Individuals without a confirmed diagnosis of ectopic pregnancy.

2.5. Data Collection Procedures

Data were collected between 15th June 2024 and 30th April 2025 using a structured questionnaire as adapted from previous studies [9]. Information was obtained directly from consenting participants in private settings to ensure confidentiality. No identifying information such as names or hospital numbers was recorded. The diagnosis of ectopic pregnancy was confirmed through a review of medical records, including clinical findings, laboratory investigations, and imaging results. For participants who had difficulty understanding English, the consent form and questionnaire were translated into a familiar local language to facilitate comprehension and ensure informed participation.

2.6. Data Analysis

Data were entered into Microsoft Excel for cleaning and verification before being exported to IBM SPSS Statistics version 27.0.1 for analysis. Descriptive statistics were computed to summarize the data, including frequencies and percentages. The Pearson Chi-square test was used to assess associations between categorical variables, with statistical significance set at $p < 0.05$ at a 95% confidence interval. Results are presented in tables illustrating frequencies and associations among selected variables.

2.7. Ethical Considerations

Ethical clearance for this study was obtained from multiple authorities. The research proposal underwent initial review and approval by the respective school research committee, followed by ethical approval from the Tropical Diseases Research Centre (TDRC) Ethics Committee (Ref: TDREC125/06/24). Authorization to conduct the study was granted by Ndola Teaching Hospital management through the Office of the Head of Clinical Care, and final approval was obtained from the National Health Research Authority (NHRA) (Ref: NHRA-1623/09/10/2024). All participants were provided with a detailed explanation of the study objectives, procedures, potential benefits, and risks, after which written informed consent was obtained. For participants below 18 years of age, guardian consent and participant assent were secured. Confidentiality and privacy were strictly observed during data collection; interviews were conducted in secluded areas, and data were anonymized during analysis. Participants retained the right to withdraw from the study at any point without consequence. The study did not interfere with the participants' medical management, diagnostic processes, or treatment. The findings will only be applied in clinical practice following validation and approval by the relevant health authorities.

3. Results

3.1. Sociodemographic Characteristics

The mean age of women was 28.33 years (range 17 - 43). Most resided in low-income areas (79.8%) and the majority were married (84%). Secondary education was the most common level attained (51.1%), and nearly half were unemployed (47.9%) (Table 1).

Table 1. Sociodemographic characteristics of women with ectopic pregnancy at Ndola Teaching Hospital.

Characteristic	Category	N	Percentage (%)
Age (years)	Mean (SD)	-	28.33 (±5.81)
	Minimum - Maximum	-	17 - 43
Home Address	Low-income	75	79.8
	High-income	7	7.4
	Outside Ndola	12	12.8
Marital Status	Married	79	84.0
	Single	15	16.0
Level of Education	Primary	31	33.0
	Secondary	48	51.1
	Tertiary	15	16.0
Employment Status	Not working	45	47.9
	Informal	33	35.1
	Formal	16	17.0

Note: SD = standard deviation.

3.2. Prevalence of Ectopic Pregnancy

During the study period, Ndola Teaching Hospital (NTH) managed a total of 9402 pregnant women, of whom 94 were diagnosed with ectopic pregnancy, yielding a prevalence of 0.99%.

3.3. Obstetric Characteristics of Women with Ectopic Pregnancy at Ndola Teaching Hospital

Table 2 shows the obstetric characteristics of women in the study. Regarding obstetric history, 31.9% had one previous birth, while 20.2% were nulliparous. The mean gestational age at presentation was 5.4 weeks (range 4 - 20), with most women presenting between 5 and 8 weeks.

3.4. Gynaecological History of Women with Ectopic Pregnancy at Ndola Teaching Hospital

The history of pelvic inflammatory disease was noted in 57.4%, and 11.7% had

previous abdominal or pelvic surgery. A small proportion reported prior ectopic pregnancy (3.2%) or intrauterine contraceptive device use (2.1%). 35.1% of women used emergency contraception (Table 3).

Table 2. Obstetric characteristics of women with ectopic pregnancy at Ndola Teaching Hospital.

Characteristic	Category	N	Percentage (%)
Parity	0	19	20.2
	1	30	31.9
	2	21	22.3
	3	11	11.7
	4	8	8.5
	5	3	3.2
	6	2	2.1
Gestational Age (weeks)	Mean (SD)	-	5.44 (±3.98)
	Range	-	4 - 20

Table 3. Gynecological history of women with ectopic pregnancy at Ndola Teaching Hospital (N = 94).

Characteristic	Response (s)	N	Percentage (%)
History of abdominal/pelvic Surgery	Yes	11	11.7
	No	83	88.3
Use of emergency contraceptive (Levonorgestrel)	Yes	33	35.1
	No	61	64.9
Use of Intrauterine device (IUCD)	Yes	2	2.1
	No	92	97.9
History of Pelvic Inflammatory Disease	Yes	54	57.4
	No	40	42.6
History of Ectopic Pregnancy	Yes	3	3.2
	No	91	96.8

3.5. Clinical Features of Women with Ectopic Pregnancy at Ndola Teaching Hospital

Abdominal pain was the most common presenting symptom, reported in 96.8% of cases, followed by amenorrhea (74.5%) and vaginal bleeding (62.8%). Abdominal tenderness was present in 74.5%, dizziness in 37.2%, and shock in 21.3% of women. Paracentesis was positive in 14 of 18 women tested, while culdocentesis was positive in 26 of 34 women tested (Table 4).

Table 4. Clinical features of women with ectopic pregnancy at Ndola Teaching Hospital (N = 94).

Clinical Feature	Category	N	Percentage (%)
Lower Abdominal Pain	Yes	91	96.8
	No	3	3.2
Per Vagina Bleeding	Yes	59	62.8
	No	35	37.2
Amenorrhea	Yes	70	74.5
	No	24	25.5
Shock	Yes	20	21.3
	No	74	78.7
Dizziness	Yes	35	37.2
	No	59	62.8
Abdominal Tenderness	Yes	70	74.5
	No	24	25.5
Paracentesis	Positive	14	14.9
	Negative	4	4.3
	Not done	76	80.9
Culdocentesis	Positive	26	27.7
	Negative	8	8.5
	Not done	60	63.8

3.6. Clinical Outcomes and Admission Wards of Women with Ectopic Pregnancy at Ndola Teaching Hospital (N = 94)

Table 5. Clinical outcomes and admission wards of women with ectopic pregnancy at Ndola Teaching Hospital (N = 94).

Outcome	Category	N	Percentage (%)
Intraoperative finding	Ruptured	83	88.3
	Pelvic adhesions	49	52.1
Complications	Haemorrhagic shock	39	41.5
	Death	1	1.1
	None	54	57.4
Admission	Gynaecological ward	73	77.7
	ICU	8	8.5
	GHDU	4	4.3

At surgery, 88.3% of cases had ruptured and 52.1% had pelvic adhesions. Haemorrhagic shock was the most frequent complication, affecting 41.5% of women.

More than half of the patients (57.4%) had no complications, while one record of maternal death (1.1%). Most women had admissions to the gynaecological ward (77.7%), while smaller proportions had admissions to the obstetric high dependency unit (9.6%), the intensive care unit (8.5%), and the gynaecological high dependency unit (GHDU) (4.3%) (Table 5).

3.7. Association between Two Categorical Variables

Table 6 shows the association between categorical variables. The history of pelvic inflammatory disease (PID) was significantly associated with intraoperative finding of pelvic adhesions with $p = 0.015$ and OR 2.833 (1.217 - 6.599), abdominal pain was significantly associated with intraoperative finding of ruptured ectopic pregnancy with $p < 0.001$ with cohort Not ruptured 0.088 (0.045 - 0.170) and tenderness was associated with intraoperative findings of ruptured ectopic pregnancy with $p = 0.019$ and OR 4.333 (1.185 - 15.856).

Table 6. Association between two categorical variables (N = 94).

Categorical variables	Level of significance; *p*-value (<0.05)	Risk estimates		
		values	95%CI	
			Lower	upper
History of PID * Pelvic adhesions	0.015	Odds ratio for history of PID Yes/No; 2.833	1.217	6.599
Abdominal pain * Ruptured ectopic pregnancy	<0.001	For cohort ruptured = No; 0.088	0.045	0.170
Tenderness * Ruptured ectopic pregnancy	0.019	Odds ratio for tenderness Yes/No; 4.333	1.185	15.856

4. Discussion

The prevalence of ectopic pregnancy (EP) observed at Ndola Teaching Hospital (NTH) was marginally higher than the one documented in different studies. For instance, Chisha [9] reported a prevalence of 0.05% at the University Teaching Hospital (UTH) in Lusaka, while Sefogah *et al.* [15] found a rate of 0.08% at Lekma Hospital in Ghana. Berhe *et al.* [16] reported a higher prevalence of 0.5%. However, it remains below the global range of 1% - 2% [15]. Notably, higher prevalence rates have been recorded in other settings, such as 2.1% in Ghana's Volta Region [17], 2% at Bashair Teaching Hospital in Sudan [8], and 1.43% in Cameroon [18]. Such variability in prevalence rates may stem from disparities in diagnostic capabilities, differences in clinical reporting practices, variations in health-seeking behaviour, patient's load in these hospitals and unequal access to healthcare services. These findings underscore the importance of enhanced surveillance mechanisms, like involving referring centres in Ndola district to be vigilant in the recognition of ectopic pregnancy through signs and symptoms and refer them to NTH for further management, and systematic case documentation to more accurately cap-

ture the epidemiological landscape of ectopic pregnancy, particularly in referral institutions like NTH. Accurate capturing of epidemiological data for ectopic pregnancy can be achieved by creating an early pregnancy unit (EPU) at NTH.

Sociodemographic analysis revealed that 79.8% of the women diagnosed with EP resided in low-income areas, 84% were married, 51.1% had attained secondary education, and 47.9% were unemployed. These characteristics are consistent with those reported by Chisha [9], who found 62.2% of affected women from low-income areas, 81.1% married, and 51.1% with secondary-level education. One study [19] also reported a significant proportion (74%) of EP cases among women from low-income backgrounds, with only 26% from higher-income brackets compared to 7.4% in the current study. The consistent association across studies suggests a relationship between socioeconomic disadvantage and increased EP risk.

The mean age in this cohort was 28 ± 5.82 years, ranging from 17 to 43 years, consistent with findings by multiple other studies [9] [16] [18], who all reported peak incidence among women aged 26 - 30 years. Njingu *et al.* [18] similarly observed that the majority of EPs in Cameroon occurred in women aged 20 - 34 years. This reproductive age group is generally more sexually active, which increases their vulnerability to sexually transmitted infections (STIs) and pelvic inflammatory disease (PID), both of which are established risk factors for EP [16] [20].

Obstetric history showed that 31.9% of patients were para one, 22.3% para 2, and 20.2% were primigravida. These findings contrast slightly with Santoso [21], who found the highest EP incidence between second pregnancies (34.3%), followed by primigravida (32.2%), suggesting that EP is not confined to higher-parity women.

The mean gestational age at presentation (5.98 ± 1.15 weeks) was similar to that reported by Khan *et al.* [20]. However, Njingu *et al.* [18] reported a later presentation at 8.42 ± 3.25 weeks, while Suliman *et al.* [8] observed most presentations between 6 and 9 weeks. These differences may reflect variations in diagnostic awareness and healthcare access across settings.

Analysis of gynaecological history revealed that 57.4% of participants had a prior history of PID, confirming its established role in EP pathogenesis [18] [22]-[25]. A statistically significant association was found between PID and pelvic adhesion ($p = 0.015$) whose OR was 2.833 (1.217 - 6.599), suggesting environmental or socioeconomic contributors to infection risk for majority of these patient came from low social income areas (79.8%). These findings support the need for preventative public health interventions.

About 3.2% of participants had history of previous EP, consistent with recurrence trends noted in previous studies. Prasanna *et al.* [26] reported a 6% recurrence, while Wang *et al.* [27] highlighted an increased risk due to pelvic and peritubular adhesions. American College of Obstetricians and Gynaecologists estimates that the recurrence risk may range from 10% to 27%, underscoring the critical need for close surveillance and early diagnostic evaluation in women with

such a history [28]. In the present study, 11.7% of the women had a documented history of pelvic surgery. This observation reinforces the widely acknowledged understanding that previous pelvic or abdominal surgical interventions can predispose women to ectopic pregnancy by disrupting normal tubal anatomy and function [29].

Regarding contraceptive use, 33% of women had used Levonorgestrel emergency contraceptive pills and 2.1% had IUCD. Tarafdari *et al.* [30] identified a significant association between EP and use of intrauterine devices (IUCDs) or emergency contraception ($p < 0.001$), underscoring the need for tailored contraceptive counselling, particularly in high-risk populations. Additionally, Mahajan *et al.* [6] has acknowledged the increased risk of ectopic gestation following contraceptive failure, particularly among women with existing predisposing factors such as a history of pelvic inflammatory disease, tubal surgery, or prior ectopic pregnancy [6].

The predominance of abdominal pain (96.8%), amenorrhea (74.5%), and vaginal bleeding (62.8%) aligns with the classic symptom triad described in the literature [1] [8] [12] [31]. These features remain the cornerstone of early clinical suspicion, particularly in settings where laboratory and imaging support may be limited. Noticed similar trends in studies from Tanzania, reinforcing the universality of these symptoms even in varied clinical environments [32]. Given diagnostic limitations in many low-resource settings, awareness of these symptom patterns is critical for early detection and management as this study reviewed the association between abdominal pain and abdominal tenderness with ruptured ectopic pregnancy *p*-values of 0.001 and 0.019 (4.33 [1.185 - 15.856]) respectively.

In the current study, among women who underwent additional clinical diagnosis, 27.7% demonstrated a positive Culdocentesis while 14.9% had a positive paracentesis. The identification of blood during Culdocentesis was a significant indicator of ruptured ectopic pregnancy, underscoring the strong correlation between hemoperitoneum and tubal compromise [33] [34].

Outcomes at NTH indicated that 57.4% of patients had favourable clinical courses. This aligns with Berhe *et al.* [16] who reported a 62% favourable outcome rate [17]. However, 41.5% developed haemorrhagic shock and 1.1% of cases resulted in mortality similar to the rate reported in Zambia [9]. By contrast, several other studies reported no EP-related deaths [8] [15] [31]. At NTH, 77.7% of patients were managed in general gynaecological bays, reflecting constraints in access to high-dependency or ICU care. As Suresh *et al.* [35] also notes, delayed diagnosis often results in severe outcomes such as salpingectomy, blood transfusions, or hypovolemic shock procedures associated with increased morbidity and health system burden [35].

Ruptured ectopic pregnancy is a serious gynaecological emergency associated with significant maternal morbidity, primarily due to intra-abdominal bleeding which was a key finding of this study was the notably high incidence of ruptured ectopic pregnancies, observed in 88.3% of the cases. Delayed presentation remains

a critical contributing factor. In the current study, a large proportion of women were either referred from peripheral facilities or self-presented only after severe symptoms had developed. This mirrors the findings of Andola and Desai [25], who reported that approximately 80% of patients presented after the EP ruptured. Contributing factors to delayed presentation in this current study include poor awareness of being pregnant (gestational age) where 23.4% of participants were unsure of their last menstrual period and ongoing vaginal bleeding reported in 62.8% of cases, which likely masked the early signs of pregnancy. Moreover, abdominal pain, which was reported by 96.8% of participants, typically only prompted hospital visits once the condition had progressed.

5. Public Health Implications

The observed strong association between ectopic pregnancy (EP) and low-income residential areas highlights the urgent need for targeted public health interventions in underserved communities. These should include comprehensive reproductive health education and robust strategies for the prevention and management of sexually transmitted infections (STIs). With more than half of EP cases linked to a prior history of pelvic inflammatory disease (PID), there is a critical need to expand access to STI screening, treatment, and health education—particularly in low-income and high-burden settings. Additionally, the considerable use of emergency contraception among affected individuals underscores the importance of informed contraceptive counselling. Healthcare providers should ensure that women, especially those at elevated risk, are adequately informed about the potential risks associated with methods such as Levonorgestrel emergency contraception (LNG-EC) and intrauterine contraceptive devices (IUCDs), including the possibility of ectopic implantation. The high incidence of haemorrhagic shock further indicates the necessity of improving emergency triage systems and increasing the availability of high-dependency or intensive care units for gynaecological emergencies. Finally, ongoing surveillance and the collection of region-specific epidemiological data are vital to inform effective policy development and the design of targeted programs aimed at reducing the burden of ectopic pregnancy.

6. Strengths and Limitations

A key strength of this study lies in its prospective design, which allowed for systematic data collection across multiple domains—sociodemographic, clinical, imaging, and surgical—minimizing recall bias and improving data completeness. The relatively large sample size (n = 94) for a single-centre study also contributed.

Being a cross-sectional study led to study limitations:

- It did not determine the cause-effect of independent and dependent variables.
- Generalization of results is not statistically right to the entire population in Ndola district for the research was hospital based (NTH).
- It only focused on the immediate outcomes of ectopic pregnancy leaving out the long-term outcomes like fertility issues.

7. Conclusions

This study provides critical insight into the epidemiology, clinical presentation, and outcomes of ectopic pregnancy (EP) at Ndola Teaching Hospital, highlighting both consistencies and disparities when compared to national, regional, and international data. The slightly elevated prevalence, combined with sociodemographic findings such as a predominance of cases among low-income, unemployed, and relatively young women, underscores the intersection between socioeconomic vulnerability and reproductive health outcomes. The high proportion of cases associated with pelvic inflammatory disease, early gestational presentation, and use of emergency contraception points to identifiable and, in many cases, preventable risk factors.

The significant incidence of haemorrhagic shock and the constraints in accessing high-dependency care further illustrate the challenges faced in resource-limited settings, where delayed diagnosis and limited emergency capacity contribute to maternal morbidity and mortality. These findings reinforce the urgent need for public health strategies that prioritize early diagnosis, improve access to care, enhance sexual and reproductive health education, and strengthen emergency response systems.

Overall, the results of this study emphasize the importance of routine surveillance, context-specific health education, and health system strengthening to reduce the burden of ectopic pregnancy and improve maternal health outcomes in Zambia and similar settings.

Conflicts of Interest

The authors declare no conflict of interest related to the publication of this work.

References

[1] Vadakekut, E.S. and Gnugnoli, D.M. (2025) Ectopic Pregnancy. NCBI. https://www.ncbi.nlm.nih.gov/books/NBK539860/

[2] Njamen, T.N., Tchounzou, R., Nkwele, F.M., Eyong, I.M., Mbi, F.K., Wambo, A.G.S., *et al.* (2025) A Case-Control Study to Assess the Risk Factors of Ectopic Pregnancy in Two Referral Hospitals in Douala, Sub-Saharan Africa. *Open Journal of Obstetrics and Gynecology*, **15**, 831-845. https://doi.org/10.4236/ojog.2025.155068

[3] Mullany, K., Minneci, M., Monjazeb, R. and Coiado, C.O. (2023) Overview of Ectopic Pregnancy Diagnosis, Management, and Innovation. *Women's Health*, **19**, 1-13. https://doi.org/10.1177/17455057231160349

[4] Jiménez-Oliver, K.D., Ortiz, M.I. and Barragán-Ramírez, G. (2023) Ectopic Pregnancy: Incidence Associated with Fertility Treatment. *Clinical and Experimental Obstetrics & Gynecology*, **50**, Article No. 233. https://doi.org/10.31083/j.ceog5011233

[5] Pierre-Marie, T., Gregory, H., Maxwell, D.I., Robinson, E.M., Yvette, M. and Nelson, F.J. (2015) Maternal Mortality in Cameroon: A University Teaching Hospital Report. *Pan African Medical Journal*, **21**, Article No. 16. https://doi.org/10.11604/pamj.2015.21.16.3912

[6] Mahajan, N., Raina, R. and Sharma, P. (2021) Risk Factors for Ectopic Pregnancy: A Case-Control Study in Tertiary Care Hospitals of Jammu and Kashmir. *Iberoamerican Journal of Medicine*, **3**, 293-299. https://doi.org/10.53986/ibjm.2021.0048

[7] Lawani, O., Anozie, and Ezeonu (2013) Ectopic Pregnancy: A Life-Threatening Gynecological Emergency. *International Journal of Women's Health*, **5**, Article No. 515. https://doi.org/10.2147/ijwh.s49672

[8] Suliman, A.A., Ahmed, H.S.I., Adam Hammad, K.M., Alsiddig, I.J.Y., Abdelgader, M.A.E., Elhag, A.O.E., *et al.* (2023) Ectopic Pregnancy Risk Factors Presentation and Management Outcomes. *Clinical Journal of Obstetrics and Gynecology*, **6**, 143-149. https://doi.org/10.29328/journal.cjog.1001143

[9] Chisha, B.S.P. (2016) Epidemiology of Ectopic Pregnancy at the University Teaching Hosipital Lusaka. http://dspace.unza.zm/handle/123456789/492

[10] Zhang, S., Liu, J., Yang, L., Li, H., Tang, J. and Hong, L. (2023) Global Burden and Trends of Ectopic Pregnancy: An Observational Trend Study from 1990 to 2019. *PLOS ONE*, **18**, e0291316. https://doi.org/10.1371/journal.pone.0291316

[11] Ji, J., Liu, L., Huang, H., Chen, H., Xiao, L., Lu, X., *et al.* (2024) The Body Mass Index and the Risk of Ectopic Pregnancy: A 5-Year Retrospective Case-Control Study. *BMC Pregnancy and Childbirth*, **24**, Article No. 143. https://doi.org/10.1186/s12884-024-06319-z

[12] Shurie, S., Were, E., Orang'o, O. and Keter, A. (2018) Levonorgestrel Only Emergency Contraceptive Use and Risk of Ectopic Pregnancy in Eldoret Kenya: A Case-Control Study. *Pan African Medical Journal*, **31**, Article No. 214. https://doi.org/10.11604/pamj.2018.31.214.17484

[13] Central Statistical Office (CSO) (2022) 2022 Census of Population and Housing: National Analytical Report. Central Statistical Office.

[14] Ahmed, S.K. (2024) How to Choose a Sampling Technique and Determine Sample Size for Research: A Simplified Guide for Researchers. *Oral Oncology Reports*, **12**, Article ID: 100662. https://doi.org/10.1016/j.oor.2024.100662

[15] Sefogah, P.E., Oduro, N.E., Swarray-Deen, A., Nuamah, H.G., Takyi, R.B., Nuamah, M.A., *et al.* (2022) Factors Associated with Ruptured Ectopic Pregnancy: A 10-Year Review at a District Hospital in Ghana. *Obstetrics and Gynecology International*, **2022**, Article ID: 1491419. https://doi.org/10.1155/2022/1491419

[16] Berhe, E.T., Kiros, K., Hagos, M.G., Gesesew, H.A., Ward, P.R. and Gebremeskel, T.G. (2021) Ectopic Pregnancy in Tigray, Ethiopia: A Cross-Sectional Survey of Prevalence, Management Outcomes, and Associated Factors. *Journal of Pregnancy*, **2021**, Article ID: 4443117. https://doi.org/10.1155/2021/4443117

[17] Oppong, A.A., Agbemenyah, H.Y., Afeke, I., Jamfaru, I., Attachie, I. and Orish, V.N. (2016) Ectopic Pregnancy in a Referral Hospital in the Volta Region of Ghana West Africa. *OALib*, **3**, e2983. https://doi.org/10.4236/oalib.1102983

[18] Njingu, A.E., Cumber, S.N., Geh, M.M., Edgar, M.M.L., Nkfusai, C.N., Ngunde, J.P., *et al.* (2020) Incidence, Risk Factors, Clinical Presentation and Treatment of Ectopic Pregnancy in the Limbe and Buea Regional Hospitals in Cameroon. *PAMJ Clinical Medicine*, **2**, Article No. 95. https://doi.org/10.11604/pamj-cm.2020.2.95.21279

[19] Shaik, M.V. (2016) A Study on Risk Factors and Clinical Presentation of Ectopic Pregnancy in Women Attending a Tertiary Care Centre. http://iaimjournal.com

[20] Khan, M., *et al.* (2021) Risk Factors and Presenting Complaints of Ectopic Pregnancy at a Tertiary Care Hospital. *Pakistan Journal of Health Sciences*, **15**, 1226-1228. https://www.researchgate.net/profile/Majida-Khan-2/publication/381888329

[21] Santoso, B. (2017) Analisis Faktor Risiko Kehamilan Ektopik. *Jurnal Ners*, **6**, 164-168. https://doi.org/10.20473/jn.v6i2.3986

[22] Huang, C., Huang, C., Lin, S., Chang, C.Y., Lin, W., Chung, C., *et al.* (2019) Association of Pelvic Inflammatory Disease (PID) with Ectopic Pregnancy and Preterm Labor in Taiwan Region: A Nationwide Population-Based Retrospective Cohort Study. *PLOS ONE*, **14**, e0219351. https://doi.org/10.1371/journal.pone.0219351

[23] Lehr, S., Vier, J., Häcker, G. and Kirschnek, S. (2018) Activation of Neutrophils by Chlamydia Trachomatis-Infected Epithelial Cells Is Modulated by the Chlamydial Plasmid. *Microbes and Infection*, **20**, 284-292. https://doi.org/10.1016/j.micinf.2018.02.007

[24] Mpiima, D.P., Wasswa Salongo, G., Lugobe, H., Ssemujju, A., Mumbere Mulisya, O., Masinda, A., *et al.* (2018) Association between Prior *Chlamydia trachomatis* Infection and Ectopic Pregnancy at a Tertiary Care Hospital in South Western Uganda. *Obstetrics and Gynecology International*, **2018**, Article ID: 4827353. https://doi.org/10.1155/2018/4827353

[25] Andola, S., Kumar, R.R., Desai, R.M. and S.A, K. (2021) Study of Risk Factors and Treatment Modalities of Ectopic Pregnancy. *Journal of Family Medicine and Primary Care*, **10**, 724-729. https://doi.org/10.4103/jfmpc.jfmpc_1279_20

[26] Prasanna, B., Jhansi, C.B., Swathi, K. and Shaik, M.V. (2016) A Study on Risk Factors and Clinical Presentation of Ectopic Pregnancy in Women Attending a Tertiary Care Centre. *International Archives of Integrated Medicine*, **3**, 90-96. http://iaimjournal.com/

[27] Wang, X., Huang, L., Yu, Y., Xu, S., Lai, Y. and Zeng, W. (2020) Risk Factors and Clinical Characteristics of Recurrent Ectopic Pregnancy: A Case-Control Study. *Journal of Obstetrics and Gynaecology Research*, **46**, 1098-1103. https://doi.org/10.1111/jog.14253

[28] Petrini, A. and Spandorfer, S. (2020) Recurrent Ectopic Pregnancy: Current Perspectives. *International Journal of Women's Health*, **12**, 597-600. https://doi.org/10.2147/ijwh.s223909

[29] Sivalingam, V.N., Duncan, W.C., Kirk, E., Shephard, L.A. and Horne, A.W. (2011) Diagnosis and Management of Ectopic Pregnancy. *Journal of Family Planning and Reproductive Health Care*, **37**, 231-240. https://doi.org/10.1136/jfprhc-2011-0073

[30] Tarafdari, A., Bandarian, M., Hantoushzadeh, S., Hadizadeh, A., Shahsavari, S. and Razavi, M.A. (2023) Assessing the Risk Factors and Management Outcomes of Ectopic Pregnancy: A Retrospective Case-Control Study. *International Journal of Reproductive BioMedicine*, **21**, 403-414. https://doi.org/10.18502/ijrm.v21i5.13475

[31] Al Naimi, A., Moore, P., Brüggmann, D., Krysa, L., Louwen, F. and Bahlmann, F. (2021) Ectopic Pregnancy: A Single-Center Experience over Ten Years. *Reproductive Biology and Endocrinology*, **19**, Article No. 79. https://doi.org/10.1186/s12958-021-00761-w

[32] Kiwanuka, F. and Anyango Olyet, C. (2018) Knowledge, Attitude, and Beliefs on Epilepsy among Adults in Erute South, Lira District, Uganda. *Epilepsia Open*, **3**, 264-269. https://doi.org/10.1002/epi4.12223

[33] Tang, P., Li, X., Li, W., Zhang, Y. and Yang, Y. (2021) The Risk Factors of Rupture and Abortion of Tubal Pregnancy—A Retrospective Study Based on 2280 Tubal Pregnancy Cases.

[34] Lafans, K. and Kok, S.J. (2024) Culdocentesis. StatPearls. https://www.ncbi.nlm.nih.gov/books/NBK564360/

[35] Suresh, A., Devasia, J.M., Adla, B., Balachandran, A., *et al.* (2019) A Study on Ectopic Pregnancies in a Tertiary Care Centre. *Journal of Evidence Based Medicine and Healthcare*, **6**, 1654-1658. https://doi.org/10.18410/jebmh/2019/334