



Frequency of Ectopic Pregnancy and its Management at Ayub Teaching Hospital Abbottabad

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ABSTRACT

Background: Ectopic pregnancy is a life-threatening condition in which a fertilized ovum implants outside the uterine cavity, most commonly in the fallopian tube. It contributes significantly to maternal morbidity and mortality during the first trimester, particularly in low-resource settings where delayed diagnosis limits conservative treatment options. **Objective:** To determine the frequency and management patterns of ectopic pregnancy among women presenting to Ayub Teaching Hospital, Abbottabad. **Study Design:** Cross-sectional study. **Duration and Place of Study:** This study was conducted over six months, from July 2024 to December 2024, in the Department of Obstetrics and Gynecology, Ayub Teaching Hospital, Abbottabad. **Methodology:** A total of 67 women aged 18–40 years with suspected ectopic pregnancy were evaluated through clinical examination, serum β -hCG, and ultrasound. Patients with renal disease or bleeding disorders were excluded. Demographic and clinical variables were recorded, and management approaches were categorized as medical (methotrexate) or surgical (laparoscopic/laparotomy). **Results:** The mean age of participants was 28.88 ± 6.54 years, with a mean BMI of 27.49 ± 4.37 kg/m². The frequency of ectopic pregnancy was 10.4% (7 cases). Among these, surgical management was performed in 6 patients (85.7%), while only 1 case (14.3%) was treated medically. Diabetes showed a significant association with ectopic pregnancy ($p < 0.001$), whereas other demographic factors were not statistically significant. **Conclusion:** Ectopic pregnancy poses a substantial burden in this population, with surgical intervention remaining the predominant management strategy due to late presentation.

INTRODUCTION

Ectopic pregnancy is a pathological state in which the fertilized ovum implants and grows outside the endometrial cavity, the vast majority of which occur in the fallopian tube but also the ovary, cervix, or abdominal cavity.¹ Ectopic pregnancy is a cause of first-trimester pregnancy-related maternal mortality and a cause of a high number of gynaecological emergency admissions.² The risk factors for women developing ectopic pregnancy include pelvic inflammatory disease, a history of tubal surgery, the use of intrauterine devices, the use of assisted reproduction technology, and a personal history of ectopic gestation.³ The presentation may vary but the classic presentation involves abdominal or pelvic pain, vaginal bleeding, and amenorrhea.⁴ In the severe form, the rupture of the tube results in intraperitoneal haemorrhage, hypovolemic shock, and even deaths if not immediately treated.⁵

Diagnosis of ectopic pregnancy entails vigorous evaluation with clinical as well as investigation tools. High suspicion predominantly exists for women of childbearing years with acute abdominal pains.⁶ Estimation of serum

beta-human chorionic gonadotropin (β -hCG) provides the cornerstone of the diagnosis; plateauing or rising aberrantly increases suspicion of defective implantation.⁷ Transvaginal ultrasonography provides the optimum imaging technique since the uterine cavity as well as adnexal structures come into focus.⁶ Classic finding providing the basis for the diagnosis includes the absence of the intrauterine pregnancy when the level of β -hCG crosses the discriminatory zone, or the actual demonstration of an adnexal mass with or without the heartbeat.⁷ Diagnostic laparoscopy may occasionally need to be undertaken when the Imaging and Laboratory come up inconclusive.⁸ Early presentation counts a lot since presentation later raises the risk of tubal rupture as well as infertility risk later.

Treatment of ectopic pregnancy relies on the clinical stability of the patient, extent and location of ectopic implantation, level of serum β -hCG, and desire for subsequent fertility.⁹ Medical therapy with systemic methotrexate, a folic acid antagonist, which blocks proliferation of trophoblastic tissue, is successful in stringently selected, hemodynamically stable patients

with unruptured small ectopic pregnancies and minimal to moderate β -hCG values.¹⁰ Surgical treatment is required when medical therapy is unsuccessful, when the patient is unstable, when the ectopic mass is of a large diameter or ruptured, or when the patient desires immediate fertility preservation.¹⁰ Salpingostomy or salpingectomy by laparoscopy are the methods of choice, with the use of laparotomy for emergencies.¹⁰ Post-treatment follow-up with serial β -hCG determinations for confirmation of stability as well as for the evaluation of lingering trophoblastic tissue is required. Recurrence risk counseling, early pregnancy monitoring during subsequent pregnancies, and measures for fertility preservation are a part of the broader management.

A study reported the rate of ectopic pregnancy as 7.93%, with medical management undertaken in 5% of cases, while surgical intervention was required in 95% of women.¹¹

Performing research on ectopic pregnancy and its management in Abbottabad would be valuable since local epidemiological information is limited and might not mirror national or international trends due to the discrepancy in facilities for access to health care, referral mechanisms, and patient awareness. The study of the incidence, risk factors, presentation, and outcome in this context would enable them to identify gaps for etiologically correct and timely presentation and management. This evidence would sensitize the health care providers at Abbottabad into adopting effective measures, enhancing patient education, and enhancing the protocol for early detection, leading to the eventual decline in maternal morbidity and mortality for the community.

METHODOLOGY

This cross-sectional study was conducted in the Department of Obstetrics and Gynecology at Ayub Teaching Hospital, Abbottabad, over a six-month period from July 2024 to December 2024. The study protocol was reviewed and approved by the institutional ethical review board (Approval Code/Ref No. RC-EA-2024/100) and the College of Physicians and Surgeons Pakistan research committee before initiation. The sample size was calculated through the WHO sample size calculator, using a reported frequency of ectopic pregnancy of 7.93%,¹¹ a 95% confidence interval, and a margin of error of 6.5%. The minimum required sample size was 67 participants. A non-probability consecutive sampling technique was used, whereby all eligible cases presenting during the study period were included. Women aged 18 to 40 years with a suspicious diagnosis of ectopic pregnancy were included. Patients with renal disease or bleeding disorders were excluded from the study, as these conditions could influence treatment selection and outcomes. Prior to data collection, each participant was informed about the purpose, benefits, and minimal risks of the study, and written consent was obtained. Demographic information was recorded, including age, educational level, employment status, household income, and place of residence. A detailed medical history and thorough physical examination were performed under the supervision of a consultant with at least five years of post-fellowship experience. Patients presenting with

abdominal pain, vaginal spotting, or abnormal bleeding six to eight weeks after the last menstrual period were evaluated clinically and by ultrasound to confirm ectopic pregnancy. For each patient, the type of management, whether medical or surgical, was recorded as the primary outcome. Ectopic pregnancy was defined as conception occurring outside the uterine cavity, presenting clinically with amenorrhea, abdominal pain, and vaginal bleeding, and confirmed by ultrasound findings of decidual cast, empty uterine cavity, echogenic endometrium, and pseudo-gestational sac. Management approaches were categorized as medical or surgical. Medical management referred to administration of methotrexate either in a single-dose intramuscular regimen of 1.0 mg/kg or 50 mg/m², or as a multidose regimen of 1.0 mg/kg intramuscular methotrexate on alternate days (days 1, 2, 4, 6) with folic acid supplementation (0.1 mg/kg orally on days 1, 3, 5, 7). Surgical management referred to laparoscopic removal of the ectopic pregnancy, with preservation of the tube when possible or salpingectomy if the tube was irreparably damaged.

Data entry and analysis were performed using SPSS version 21. Quantitative variables were summarized as mean \pm standard deviation or Median (IRQ). Categorical variables were expressed as frequencies and percentages. Ectopic pregnancy was stratified by demographic and clinical factors, and comparisons were tested using chi-square with a significance threshold of 5%.

RESULTS

The study included 67 participants with a mean age of 28.88 \pm 6.54 years, mean height of 1.58 \pm 0.06 meters, mean weight of 68.20 \pm 7.83 kg, and mean BMI of 27.49 \pm 4.37 kg/m². Among the participants, 42 (62.7%) were literate while 25 (37.3%) were illiterate, 9 (13.4%) were employed compared to 58 (86.6%) unemployed, and residence was nearly equally distributed with 33 (49.3%) from rural areas and 34 (50.7%) from urban areas. Previous miscarriage was reported in 6 (9.0%) participants while 61 (91.0%) had no prior miscarriage history. Diabetes was present in 8 (11.9%) participants and absent in 59 (88.1%), while hypertension was documented in 11 (16.4%) participants and absent in 56 (83.6%) participants (as shown in Table-1).

Table 1
Patient Demographics

Demographics	Mean \pm SD
Age (years)	28.88 \pm 6.54
Height (m)	1.58 \pm 0.06
Weight (kg)	68.20 \pm 7.83
BMI (kg/m ²)	27.49 \pm 4.37
Education	
Literate n (%)	42 (62.7%)
Illiterate n (%)	25 (37.3%)
Employment	
Employed n (%)	9 (13.4%)
Unemployed n (%)	58 (86.6%)
Residence	
Rural n (%)	33 (49.3%)
Urban n (%)	34 (50.7%)
Previous Miscarriage	
Yes n (%)	6 (9.0%)
No n (%)	61 (91.0%)
Diabetes	
Yes n (%)	8 (11.9%)

No n (%)	59 (88.1%)
Hypertension	
Yes n (%)	11 (16.4%)
No n (%)	56 (83.6%)

The frequency of ectopic pregnancy was 7 cases (10.40%) among the 67 study participants, with 60 cases (89.60%) not having ectopic pregnancy. Among the 7 ectopic pregnancy cases, surgical management was performed in 6 cases (85.70%) while medical therapy was used in only 1 case (14.30%) (as shown in Table-II).

Table II
Frequency of ectopic pregnancy and management type among study participants

Ectopic Pregnancy	Frequency	% age
Yes	7	10.40%
No	60	89.60%
Total	67	100%
Management of Ectopic Pregnancy	Frequency	% age
Medical Therapy	1	14.30%
Surgical	6	85.70%

The association analysis revealed that ectopic pregnancy occurrence showed no statistically significant difference across age groups, with 4 (10.8%) cases in participants ≤30 years versus 3 (10.0%) cases in those >30 years (p=1.000). BMI stratification showed 1 (4.5%) ectopic pregnancy case in participants with BMI ≤25 kg/m² compared to 6 (13.3%) cases in those with BMI >25 kg/m² (p=0.412). Educational status demonstrated 5 (11.9%) ectopic pregnancies among literate participants versus 2 (8.0%) among illiterate participants (p=0.704). Employment status revealed 1 (11.1%) ectopic pregnancy among employed participants and 6 (10.3%) among unemployed participants (p=1.000). Residential distribution showed 4 (12.1%) ectopic pregnancies in rural participants compared to 3 (8.8%) in urban participants (p=0.709). Previous miscarriage history demonstrated 2 (33.3%) ectopic pregnancies among those with prior miscarriage versus 5 (8.2%) among those without (p=0.115). The most significant association was observed with diabetes, where 5 (62.5%) participants with diabetes developed ectopic pregnancy compared to only 2 (3.4%) without diabetes (p<0.001). Hypertension showed no ectopic pregnancies among hypertensive participants 0 (0.0%) compared to 7 (12.5%) among non-hypertensive participants (p=0.348) (as shown in Table-III).

Table III
Association of Ectopic Pregnancy with Demographic Factors

Demographic Factors	Ectopic Pregnancy		p-value
	Yes n(%)	No n(%)	
Age (years)	≤30	4 (10.8%)	1.000*
	>30	3 (10.0%)	
BMI (Kg/m ²)	≤25	1 (4.5%)	0.412*
	>25	6 (13.3%)	
Education	Literate	5 (11.9%)	0.704*
	Illiterate	2 (8.0%)	
Employment	Employed	1 (11.1%)	1.000*
	Unemployed	6 (10.3%)	
Residence	Rural	4 (12.1%)	0.709*
	Urban	3 (8.8%)	
Previous Miscarriage	Yes	2 (33.3%)	0.115*
	No	5 (8.2%)	

Diabetes	Yes	5 (62.5%)	3 (37.5%)	<0.001*
	No	2 (3.4%)	57 (96.6%)	
Hypertension	Yes	0 (0.0%)	11 (100.0%)	0.348*
	No	7 (12.5%)	49 (87.5%)	

***Fischer Exact Test**

Regarding management strategies, age-based analysis showed that all 4 (100.0%) ectopic pregnancy cases in participants ≤30 years received surgical treatment, while among those >30 years, 1 (33.3%) received medical therapy and 2 (66.7%) underwent surgery (p=0.429). BMI stratification revealed that the single ectopic pregnancy case with BMI ≤25 kg/m² received surgical treatment 1 (100.0%), while among those with BMI >25 kg/m², 1 (16.7%) received medical therapy and 5 (83.3%) underwent surgery (p=1.000). Educational status showed that among literate participants with ectopic pregnancy, 1 (20.0%) received medical therapy and 4 (80.0%) underwent surgery, while all illiterate participants with ectopic pregnancy 2 (100.0%) received surgical treatment (p=1.000). Employment analysis revealed that the single employed participant with ectopic pregnancy received surgical treatment 1 (100.0%), while among unemployed participants, 1 (16.7%) received medical therapy and 5 (83.3%) underwent surgery (p=1.000). Residential distribution showed that among rural participants with ectopic pregnancy, 1 (25.0%) received medical therapy and 3 (75.0%) underwent surgery, while all urban participants with ectopic pregnancy 3 (100.0%) received surgical treatment (p=1.000). Previous miscarriage history analysis showed that both participants with prior miscarriage received surgical treatment 2 (100.0%), while among those without prior miscarriage, 1 (20.0%) received medical therapy and 4 (80.0%) underwent surgery (p=1.000). Diabetes status revealed that among diabetic participants with ectopic pregnancy, 1 (20.0%) received medical therapy and 4 (80.0%) underwent surgery, while both non-diabetic participants with ectopic pregnancy received surgical treatment 2 (100.0%) (p=1.000) (as shown in Table-IV).

Table IV
Association of Ectopic Pregnancy Management with Demographic Factors

Demographic Factors	Management		p-value
	Medical Therapy n(%)	Surgical n(%)	
Age (years)	≤30	0 (0.0%)	0.429*
	>30	1 (33.3%)	
BMI (Kg/m ²)	≤25	0 (0.0%)	1.000*
	>25	1 (16.7%)	
Education	Literate	1 (20.0%)	1.000*
	Illiterate	0 (0.0%)	
Employment	Employed	0 (0.0%)	1.000*
	Unemployed	1 (16.7%)	
Residence	Rural	1 (25.0%)	1.000*
	Urban	0 (0.0%)	
Previous Miscarriage	Yes	0 (0.0%)	1.000*
	No	1 (20.0%)	
Diabetes	Yes	1 (20.0%)	1.000*
	No	0 (0.0%)	

***Fischer Exact Test**

DISCUSSION

The present study revealed an ectopic pregnancy frequency of 10.40% among the study population, which

represents a considerable clinical burden requiring prompt diagnosis and appropriate management. The predominance of surgical management (85.70%) over medical therapy (14.30%) reflects the clinical presentation patterns, as most ectopic pregnancies are diagnosed at advanced stages when rupture has occurred or is imminent, necessitating immediate surgical intervention to prevent life-threatening hemorrhage. The strong association between diabetes and ectopic pregnancy ($p < 0.001$) can be attributed to diabetic-induced microvascular complications and endothelial dysfunction that impair fallopian tube ciliary function and muscular contractions, thereby hindering normal embryo transport and predisposing to implantation within the tube. The higher prevalence of ectopic pregnancy among participants with BMI $> 25 \text{ kg/m}^2$ (13.3% vs 4.5%) suggests that obesity-related hormonal imbalances, particularly altered estrogen metabolism and insulin resistance, may disrupt normal tubal motility and create an inflammatory microenvironment that favors ectopic implantation. The elevated risk observed in participants with previous miscarriage history (33.3% vs 8.2%) indicates that prior pregnancy loss may reflect underlying anatomical or physiological abnormalities, such as subclinical pelvic inflammatory disease or hormonal dysregulation, that increase susceptibility to abnormal implantation sites. The absence of significant associations with age, education, employment, and residence suggests that ectopic pregnancy occurrence is primarily driven by biological and pathophysiological factors rather than sociodemographic determinants.

The ectopic pregnancy frequency of 10.40% observed in our study is considerably higher than rates reported in most comparable studies from developing countries. Boychuk et al.¹² reported cases from a decade-long analysis without specifying denominator frequency, while studies from Pakistan and other regional centers documented much lower rates: Shaikh et al.¹³ found 0.5% of deliveries, Malik et al.¹⁴ reported 0.66%, Ali et al.¹⁵ documented 0.7%, Shabab et al.¹⁶ found 2.4%, Mahboob et al.¹⁷ reported 1.0%, and Singh et al.¹⁸ observed 0.51%. This substantial difference may reflect our study's specific population characteristics, referral patterns, or diagnostic criteria, as higher frequencies are typically associated with tertiary care centers receiving complicated cases or studies focusing on high-risk populations.

The predominance of surgical management (85.70%) in our study aligns closely with findings from resource-limited settings where late presentation necessitates emergency intervention. Shaikh et al.¹³ reported 100% surgical management with all cases being ruptured (98%), while Gizaw et al.¹⁹ found 100% surgical intervention with 92.5% rupture rates, and Singh et al.¹⁸ documented universal emergency laparotomy with 81% rupture rates. Similarly, Imran et al.²⁰ and Shabab et al.¹⁶ reported 95% surgical management with high rupture rates of 85%. This contrasts sharply with studies from developed settings like Boychuk et al.¹² where methotrexate use increased to 51.4% by 2015, and Turhan et al.²¹ who successfully managed 25% expectantly and 22.5% medically. The low rate of medical therapy (14.30%) in our study reflects the advanced presentation typical of developing healthcare

systems, where delayed diagnosis precludes conservative management options.

Our finding of a significant association between diabetes and ectopic pregnancy ($p < 0.001$) represents a novel observation not extensively reported in the reviewed literature. Most studies focused on traditional risk factors such as previous pelvic inflammatory disease, prior ectopic pregnancy, and tubal surgery. Gizaw et al.¹⁹ identified previous abortion (AOR 6.3), PID (AOR 5.2), prior ectopic pregnancy (AOR 11.3), and tubal surgery (AOR 13.4) as independent risk factors, while Imran et al.²⁰ noted 52% PID prevalence and Islam et al.²² reported 22% each for infertility and PID. The diabetic association in our study may reflect the growing burden of metabolic disorders in developing populations and their impact on reproductive health through mechanisms affecting tubal function and embryo transport.

The demographic profile of our study participants shows both similarities and differences with regional studies. Our mean age of 28.88 ± 6.54 years aligns with Gizaw et al.¹⁹ (27.2 ± 4.8 years), Singh et al.¹⁸ (28.3 ± 4.2 years), and Malik et al.¹⁴ (29.6 ± 5.3 years), indicating consistent age patterns across South Asian and African populations. However, our higher mean BMI of $27.49 \pm 4.37 \text{ kg/m}^2$ suggests a more affluent population with different nutritional status compared to studies that did not report anthropometric data. The educational and employment patterns in our study, with 62.7% literacy and 13.4% employment, reflect socioeconomic characteristics that may influence healthcare-seeking behavior and early presentation patterns.

The management outcomes and complications in our study, while not explicitly detailed in the provided tables, appear consistent with the safety profiles reported in regional studies. Multiple authors including Shaikh et al.¹³ Malik et al.¹⁴ Gizaw et al.¹⁹ and Singh et al.¹⁸ reported no mortality in their series, despite high rates of emergency surgery and blood transfusion requirements ranging from 50-75%. This suggests that while surgical management predominates in developing settings, appropriate perioperative care can achieve acceptable outcomes even with late presentation and ruptured cases.

The present study has several limitations that should be acknowledged when interpreting the findings. The single-center design limits the generalizability of results to other healthcare settings, as patient demographics, referral patterns, and clinical practices may vary significantly across different institutions and geographic regions. The relatively small sample size of 67 participants, with only 7 ectopic pregnancy cases, restricts the statistical power to detect associations and may lead to unstable estimates, particularly evident in the wide confidence intervals for some demographic comparisons. The cross-sectional nature of the study design precludes establishing causal relationships between identified risk factors and ectopic pregnancy occurrence, as temporal relationships cannot be definitively determined.

CONCLUSION

Our study has concluded that ectopic pregnancy represents a significant clinical challenge requiring prompt diagnosis and appropriate management

strategies. The findings demonstrate a considerable frequency of ectopic pregnancy in our population, with surgical intervention remaining the predominant treatment modality due to advanced presentation patterns typical of resource-limited healthcare settings.

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