

# Evaluation of Risk Factors Associated with Ectopic Pregnancy in Our Sociodemographic Setup: A Prospective Observational Study

Saima Sadiq<sup>1</sup>, Heena Mir<sup>2</sup>

<sup>1</sup>Department of Obstetrics and Gynaecology, GMC Jammu

<sup>2</sup>Medical Officer, J and K Health Services, Jammu & Kashmir

Corresponding Author: Heena Mir

DOI: <https://doi.org/10.52403/ijrr.20230185>

## ABSTRACT

**Background:** Women in this region may have a different risk factor profile for ectopic pregnancy compared to women from other countries because they have specific characteristics (such as cultural, religious, and traditional values), socio-demographic determinants, sexual behavior and beliefs, and a preference for contraception. The present study has been objectively conducted to assess the various risk factors of ectopic pregnancy among women of Jammu region.

**Methods:** This was a one year prospective observational study conducted in the department of obstetrics and gynaecology, SMGS Hospital, GMC Jammu with effect from February 2022 to November 2022. The patient provided written, fully informed consent. A total of 120 patients were included in the study in which 60 patients were cases and 60 were controls.

**Results:** The risk of ectopic pregnancy was also found to increase with a number of risk factors, such as patients with lower socioeconomic status (56% vs 13.3%; p-value=0.001), patients with history of abortions (23.3% vs. 8.3%; p-value=0.024\*), patients with tuberculosis (13.3% vs. 1.7%; p-value <0.001\*), patients with endometriosis (11.7% vs. 1.7%; p-value=0.028), patients with infertility (18.3% vs. 3.3%; p-value=0.008\*), patients with IUCD (13.3% vs 1.7% ; p-value=0.015) and patients with previous ectopic pregnancy (11.7% vs. 1.7%; p=0.028).

**Conclusion:** The current study showed that the primary risk factors for the incidence of ectopic pregnancies among women of Jammu region

include advanced maternal age, low socioeconomic position, prior ectopic pregnancies, usage of IUCDs, history of abortions, and infertility

**Keywords:** Ectopic pregnancy, risk factor for ectopic pregnancy, contraception, women of Jammu region

## INTRODUCTION

When a blastocyst implants anywhere other than the uterine endometrium, the condition is known as an ectopic pregnancy.<sup>1</sup> A flaw in human reproductive physiology causes the conceptus to implant outside the typical endometrial cavity, which, in the absence of prompt diagnosis and treatment, can be fatal. It is the main factor in maternal mortality in the first trimester of pregnancy and is responsible for 10% of all deaths linked to pregnancy. In addition, it raises the likelihood of infertility and the incidence of subsequent ectopic pregnancy.<sup>2</sup> The prevalence of EP is rising globally. A number of factors contribute to the rising rate of EP. Some of these include the rising prevalence of sexually transmitted diseases (STDs), identification through earlier diagnosis, the popularity of contraception that increases the risk of ectopic pregnancy when contraception fails, tubal sterilization techniques that increase the risk of ectopic pregnancy when contraception fails, assisted reproductive technology, and tubal surgery.<sup>3-6</sup> Despite the fact that the risk

factors for ectopic pregnancy have been identified in earlier research, the major risk factors vary by country due to variations in social, cultural, and cultural norms. Women in this region may have a different risk factor profile for ectopic pregnancy compared to women from other countries because they have specific characteristics (such as cultural, religious, and traditional values), socio-demographic determinants, sexual behavior and beliefs, and a preference for contraception. The present study has been objectively conducted to assess the various risk factors of ectopic pregnancy among women of Jammu region.

## MATERIAL & METHODS

This was a one year prospective observational study conducted in the department of obstetrics and gynaecology, SMGS Hospital, GMC Jammu with effect from February 2022 to November 2022. The patient provided written, fully informed consent. A total of 120 patients were included in the study in which 60 patients were cases and 60 were controls. Beta-human chorionic gonadotropin (HCG) levels, transvaginal sonography, and laparoscopy/laparotomy were used to diagnose ectopic pregnancy, and an equal number of non-ectopic pregnancies were used as controls. These women were those who gave birth to a single term live-born neonate via vaginal or abdominal delivery following an index case of EP in the same centre after meeting certain socioeconomic and sociodemographic criteria.

Women's menstrual cycles have occasionally been skipped or postponed in the past. Initial symptoms included an amenorrhic period, stomach pain or tenderness, and sudden vaginal bleeding with or without it. Diffuse or sharp new-onset pain that was either widespread or limited to one location was noted. Additionally, they expressed concern about sporadic or irregular vaginal bleeding. Early physical examination results showed cervical motion pain and abdominal tenderness on abdominal palpation. After

obtaining written informed consent, a thorough history was gathered from cases and controls using a proforma. The history covered the following information: age, place of residence, occupation, socioeconomic status (modified BG Prasad scale), parity, prior abortions, prior ectopic pregnancies, post-abortive and puerperal febrile illnesses, tubal corrective surgeries, tubal sterilisation, use of intrauterine contraceptive devices (IUCDs), oral contraceptive pills, post-coital pills, documented tubal pathology, history of infertility, history of assisted reproductive techniques, history of pelvic inflammatory disease, history suggestive of endometriosis, history of sexual transmitted diseases and prior caesarean delivery.

## Statistical Methods:

The recorded data was compiled and entered in a spreadsheet (Microsoft Excel) and then exported to data editor of SPSS Version 20.0 (SPSS Inc., Chicago, Illinois, USA). Continuous variables were expressed as Mean±SD and categorical variables were summarized as frequencies and percentages. Graphically the data was presented by bar diagrams. Student's independent t-test or Mann-Whitney U-test, whichever feasible, was employed for comparing continuous variables. Chi-square test or Fisher's exact test, whichever appropriate, was applied for comparing categorical variables. Odds ratio along with 95% Confidence interval was also reported. A P-value of less than 0.05 was considered statistically significant.

## RESULTS

In this section, the results of the study will be described:

Age (Years)	Cases		Controls		P-value
	No.	%age	No.	%age	
20-24 Years	7	11.7	19	31.7	<0.001*
25-29 Years	14	23.3	25	41.7	
30-34 Years	17	28.3	11	18.3	
≥ 35 Years	22	36.7	5	8.3	
Total	60	100	60	100	
Mean±SD (Range)	31.5±3.72		27.2±4.19		

\*Statistically Significant Difference (P-value<0.05)

We observe that there was a significant between the cases and controls with respect to age distribution. Evidently the mean age of cases was significantly higher compared to controls (31.5±3.72 vs. 27.2±4.19; p

<0.001). The majority of patients in cases (36.7%) were aging 35 years or above while as the commonest age group in controls was 25-29 years, accounting for 41.7% as shown in the table 1.

**Table 2: Distribution of study subjects according to various risk factors**

Risk factor	Cases		Controls		P-value	OR (95% CI)
	No.	%age	No.	%age		
Age ≥ 30 Years	39	65.0	16	26.7	<0.001*	5.11 (2.34-11.15)
Low socioeconomic status	34	56.7	8	13.3	<0.001*	8.5 (3.45-20.97)
Smoker	4	6.7	2	3.3	0.402	2.1 (0.36-11.78)
Multigravida	41	68.3	32	53.3	0.092	1.9 (0.89-3.97)
History of abortions	14	23.3	5	8.3	0.024*	3.4 (1.12-9.98)
PID	10	16.7	4	6.7	0.089	2.8 (0.83-9.49)
Tuberculosis	8	13.3	1	1.7	0.015*	9.1 (1.09-75.06)
Endometriosis	7	11.7	1	1.7	0.028*	7.8 (0.93-65.47)
Infertility	11	18.3	2	3.3	0.008*	6.5 (1.38-30.81)
Barrier contraception	4	6.7	8	13.3	0.361	0.46 (0.13-1.63)
Post coital pill	2	3.3	1	1.7	1.000	2.03 (0.17-23.07)
OCP	4	6.7	9	15.0	0.241	0.41 (0.12-1.39)
IUCD	8	13.3	1	1.7	0.015*	9.1 (1.09-75.06)
Previous ectopic	7	11.7	1	1.7	0.028*	7.8 (0.93-65.47)

\*Statistically Significant Difference (P-value<0.05); OR: Odds Ratio; CI: Confidence Interval

We note that the majority of patients in cases were older than controls by at least 30 years (65% vs. 26.7%; p-value 0.001\*), indicating that the risk of ectopic pregnancy increased with ageing. The risk of ectopic pregnancy was also found to increase with a number of risk factors, such as patients with lower socioeconomic status (56% vs 13.3%; p-value 0.001), patients with history of abortions (23.3% vs. 8.3%; p-value=0.024\*), patients with tuberculosis (13.3% vs. 1.7%; p-value <0.001\*), patients with endometriosis (11.7% vs. 1.7%; p-value=0.028), patients with infertility (18.3% vs. 3.3%; p-value=0.008\*), patients with IUCD (13.3% vs 1.7% ; p-value=0.015) and patients with previous ectopic pregnancy (11.7% vs. 1.7%; p=0.028)

## DISCUSSION

The present study found that the age is the risk factor for EC because we noted that the majority of patients in cases were older than controls by at least 30 years (65% vs. 26.7%; p-value 0.001\*), indicating that the risk of ectopic pregnancy increased with ageing. This is consistent with Gandotra et al, Bouyer et al and Sivalingam et al, who reported in their studies that one of the risk factors EC is the increasing age.<sup>8,9</sup>

However, there are some studies that have yielded contrasting findings in this area.<sup>10-12</sup> Thus, it is unclear how advanced maternal age affects the risk of ectopic pregnancy physiologically.<sup>8</sup> It is quite unlikely that advancing maternal age will cause a rise in chromosomal abnormalities in the trophoblastic cells.<sup>13,14</sup> According to reports, age-related alterations in tubal function might cause ovum transport to be delayed, which can result in tubal implantation. These theories have yet to be proven, though. Additionally, according to Coste et al. (1991), this link refers to the likelihood of exposure to the majority of risk variables, which rises with age.<sup>15</sup> Contrarily, according to another study, age is a greater risk factor than other risk variables.<sup>16</sup> The risk of ectopic pregnancy was also found to increase among patients with lower socioeconomic status (56% vs 13.3%; p-value 0.001), which is consistent with multitude of studies due to Gandotra et al, Yuk et al and Aboyeji et al, who reported that lower socio-economic status was more prevalent among patients with ectopic pregnancies.<sup>7,17,18</sup> In the present study, we found that patients with history of abortions were more common in cases compared to controls (23.3% vs. 8.3%; p-value=0.024\*),

which infers that history of abortions play a significant role in the development of ectopic pregnancies. Much similar observations have been reported by Gandotra et al, Tharaux-Beneux et al and Bouyer et al, who reported a significant association between history of abortions and ectopic pregnancies.<sup>7,8,19</sup> Consistent to this; Gandotra et al in their study reported that the main risk factors for ectopic pregnancy were history of tuberculosis (TB) (odds ratio (OR)=12.11).<sup>7</sup> Both Mol et al. and Bouyer et al. have noted the similar kind of association. TB was found in 10% of cases compared to only 0.9% of controls with OR of 12.11.<sup>8,20</sup> Additionally, ectopic pregnancies have been linked to tuberculosis by Ghosh et al. and Shah et al.<sup>21,22</sup> We observed that patients with endometriosis were more prevalent in cases (11.7% vs. 1.7%; p-value=0.028), indicating that endometriosis has an association with ectopic pregnancy, which is in consonance with study of Jobspira N et al, Gandotra et al and Hunter RHF.<sup>7,23,24</sup> In the present study, we found that infertility was more common among patients with ectopic pregnancies (18.3% vs. 3.3%; p-value=0.008\*), Tuomivaara and Ronnberg have assessed 929 infertile couples with regard to ectopic pregnancy in a follow-up investigation. Their research revealed rates of 46% for conception and 9% for ectopic pregnancies, respectively.<sup>25</sup> This indicates that, as compared to women with primary infertility, there is a stronger link between a current ectopic pregnancy and a prior ectopic pregnancy (9.9-fold risk).<sup>25</sup> Ankum et al. observed a 2.5–23-fold higher incidence of ectopic pregnancy in a meta-analysis study, suggesting a link with a history of infertility.<sup>26</sup> The association between EP and infertility and ovulation induction has been established. Infertility has also been identified as a risk factor for EP in studies by Malak et al and Ankum et al.<sup>26,27</sup> Ectopic pregnancy and ovulation induction have been linked, according to authors like Karaer et al. and Fernandez et al.<sup>28,29</sup> In the present study, we found that

previous ectopic pregnancy was significantly associated with EP (11.7% vs. 1.7%; p=0.028). Other studies, which support our findings, also found a 7-9-fold greater risk in women with a history of prior ectopic pregnancy.<sup>30</sup> Additionally, Karaer et al. reported a significant correlation between ectopic pregnancy and prior ectopic pregnancies, which is consistent with our results.<sup>28</sup> They came to the conclusion that a woman who had a previous ectopic pregnancy due to a damaged fallopian tube or another intrinsic reason had a higher propensity to have another one.<sup>28</sup> We found a link between IUD use and the risk of ectopic pregnancy (13.3% vs. 1.7%; p-value=0.015), which is consistent with research from Parashi et al. and Chow et al. that found oral contraception reduces the risk of ectopic pregnancy while the use of contraceptive methods like IUD and TL significantly increases the risk.<sup>2,31</sup> In their meta-analysis, Mol et al reported that women who use an IUD and become pregnant have a higher risk of having an ectopic pregnancy.<sup>32</sup> IUD may play a causal effect in the occurrence of ectopic pregnancy, according to Bouyer et al.<sup>8</sup> Similar outcomes were observed in a second case-control study conducted in Turkey. The fact that IUDs do not stop ovulation means that they are more successful at preventing intrauterine pregnancy than extrauterine pregnancy, which highlights the higher risk of ectopic pregnancy.<sup>28</sup>

## CONCLUSION

The current study showed that the primary risk factors for the incidence of ectopic pregnancies among women of Jammu region include advanced maternal age, low socioeconomic position, prior ectopic pregnancies, usage of IUCDs, history of abortions, and infertility. These results might make it easier to identify ectopic pregnancies early and pursue effective medical care rather than unnecessary surgery. However, the present study was confined to a single health care facility center; therefore comprehensive multi-



centric studies are warranted to further validate our findings.

### **Declaration by Authors**

**Ethical Approval:** Approved

**Acknowledgement:** None

**Source of Funding:** None

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

### **REFERENCES**

1. Rivillas F, Gómez JG, Jaramillo D. Embarazo ectópico. In: Rivillas F, Gómez JG, Jaramillo D, editors. Series Pretest medicina Obstetricia y Ginecología. Primera Edición. Medellín, Colombia: Editorial Universidad de Antioquia; 2001. pp. 10–12. [Google Scholar]
2. Chow WH, Daling JR, Cates W Jr, Greenberg RS. Epidemiology of ectopic pregnancy. *Epidemiol Rev.* 1987;9:70–94. [PubMed]
3. Cunningham FG, Leveno KJ, Bloom SL, Hauth JC, Rouse DJ and Spong CY. Ectopic pregnancy in William obstetrics, 23rd edition. 2010;10:238-9.
4. Kumar P, Malhotra N. In Jeffcoates principles of Gynaecology, 7th Edition revised and updated by Kumar P and Malhotra N. 2008;9:142-51.
5. Farguhar CM. Ectopic pregnancy *Lancet.* 2005;366(9485):583-591.
6. Cunningham FG, Mac Donald PC and Norman FG. Ectopic pregnancy. In William obstetric, 18th Edition. Appleton and Lanse; 1989;511-532.
7. Gandotra N, Zargar S. Risk factors associated with ectopic pregnancy in our sociodemographic setup. *Int J Reprod Contracept Obstet Gynecol* 2020;9:4150-4.
8. Bouyer J, Coste J, Shojaei T, Pauly JC, Fernandez H, Gerbaud L and Job-Spira N. Risk factors for Ectopic pregnancy: A comprehensive analysis based on a large case control, population-based study in France. *American Journal of Epidemiology.* 2003;157(3);185- 1.94.
9. Sivalingam VN, Duncan WC, Kirk E, Shephard LA and Andrew W. Diagnosis and management of ectopic pregnancy. *Journal of family planning and reproductive health care.* 2011;37(4):231-40.
10. Weström L, Bengtsson LP, Mardh PA. Incidence, trends and risks of ectopic pregnancy in a population of women. *Br Med J (Clin Res Ed)* 1981;282(6257):15–18. [PMC free article] [PubMed] [Google Scholar]
11. Atrash HK, Hughes JM, Hogue CJ. Ectopic pregnancy in the United States, 1970-1983. *MMWR CDC Surveill Summ.* 1986;35(2):29SS–37SS. [PubMed] [Google Scholar]
12. Egger M, Low N, Smith GD, Lindblom B, Herrmann B. Screening for chlamydial infections and the risk of ectopic pregnancy in a county in Sweden: ecological analysis. *BMJ.* 1998;316(7147):1776–1780. [PMC free article] [PubMed] [Google Scholar]
13. Goddijn M, van der Veen F, Schuring-Blom GH, Ankum WM, Leschot NJ. Cytogenetic characteristics of ectopic pregnancy. *Hum Reprod.* 1996;11(12):2769–2771. [PubMed] [Google Scholar]
14. Coste J, Fernandez H, Joyé N, Benifla J, Girard S, Marpeau L, et al. Role of chromosome abnormalities in ectopic pregnancy. *Fertil Steril.* 2000;74(6):1259–1260. [PubMed] [Google Scholar]
15. Coste J, Job-Spira N, Fernandez H, Papiernik E, Spira A. Risk factors for ectopic pregnancy: a case-control study in France, with special focus on infectious factors. *Am J Epidemiol.* 1991;133(9):839–849
16. Pulkkinen MO, Talo A. Tubal physiologic consideration in ectopic pregnancy. *Clin Obstet Gynecol.* 1987;30(1):164–172
17. Yuk JS, Kim YJ, Hur JY and Shin JH. Association between socioeconomic status and ectopic pregnancy rate in the republic of Korea. *Int. J. Gynaecol Obstet.* 2013; 122(2):104-7.
18. Aboyeji AP. Trends in Ectopic pregnancy in Ilorin, Nigeria. *Nigeria Medical Practitioner.* 2000;38:4-6.
19. Tharaux-Beneux C, Bouyer J, Job-Spira N, Coste J and Spira A. Risk of ectopic pregnancy and previous induced abortion. *Am J Public Health.* 1998;88(3):401-5.
20. Mol BWJ, Ankum W M, Van deer Veen F, and Bossuyt PMM. Risk indicators for ectopic pregnancy: a meta-analysis *Contraception* 1995; 52: 337-41. *Obstetric and Gynecological Survey.* 1996;51:363-4. *Fertility and Sterility.* 1996;65:1093-9.

21. Ghosh K, Chowdhury JR. Tuberculosis and female reproductive health. *Journal of postgraduate medicine*. 2011;57(4):307-13.
  22. Shah N, Khan NH. Ectopic pregnancy: presentation and risk factors. *Journal of the college of physicians and surgeons Pakistan: JCPSP*. 2005;15(9):535-8.
  23. Jobsipira N, Collect P, Coste J, Bremond A and Laumon B. Risk factors for ectopic pregnancy. Result of a case control Study in the Rhone – Alpes region. *Contracept Fertile Sex*. 1993;21(4):307-12.
  24. Hunter RHF. Tubal ectopic Pregnancy: A pathophysiological explanation involving endometriosis. *Oxford Journals, Medicine, Human Reproduction*. 2002;17(7):1688-91.
  25. Tuomivaara L, Rönnerberg L. Ectopic pregnancy and infertility following treatment of infertile couples: a follow-up of 929 cases. *Eur J Obstet Gynecol Reprod Biol*. 1991;42(1):33–38. [PubMed] [Google Scholar]
  26. Ankum WM, Mol BW, Van der Veen F, Bossuyt PM. Risk factors for ectopic pregnancy: A meta-analysis. *Fertil Steril*. 1996;65(6):1093–1099.
  27. Malak M, Tawfeeq T, Holzer H and Tulandi T. Risk factors for Ectopic pregnancy after In vitro Fertilization Treatment. *J Obstet Gynaecol Can*. 2011;33(6):617-9.
  28. Karaer A, Avsar FA and Batioqlu S. Risk factors for Ectopic Pregnancy: A case – Control Study. *Australian and New Zealand Journal of Obstetrics and Gynaecology*. 2006;46(6):521-7. 27
  29. Fernandez H, Coste J and Job-Spira N. Controlled Ovarian hyper stimulation as a risk factor for Ectopic Pregnancy. *Obstet Gynaecol*. 1991;78(4):656-9.
  30. Pisarska MD, Carson SA, Buster JE. Ectopic pregnancy. *Lancet*. 1998; 351 (9109): 1115–1120.
  31. Parashi, S., Moukhah, S., & Ashrafi, M. (2014). Main risk factors for ectopic pregnancy: a case-control study in a sample of Iranian women. *International journal of fertility & sterility*, 8(2), 147–154.
  32. Mol BWJ, Ankum WM, Bossuyt PM and Van der Veen F. Contraception and the risk of ectopic pregnancy: Meta-Analysis. *Contraception*. 1995;52:337-41.
- How to cite this article: Saima Sadiq, Heena Mir. Evaluation of risk factors associated with ectopic pregnancy in our sociodemographic setup: a prospective observational study. *International Journal of Research and Review*. 2023; 10(1): 738-743.  
DOI: <https://doi.org/10.52403/ijrr.20230185>

\*\*\*\*\*