

Epidemiology of ectopic pregnancy: A cross sectional study in a sub urban teaching hospital of West Bengal

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ABSTRACT

Objectives: To understand the epidemiology, prevalence of high risk factors, the mode of treatment in ectopic pregnancy (EP) cases over a largely unevaluated population.

Methods: An observational, descriptive, cross-sectional study was conducted from January 2012 to December 2012 in a teaching hospital of Kalyani, West Bengal. History was taken post-operatively in all patients diagnosed with EP according to the pre designed schedule after obtaining informed verbal consent. The data was analysed using statistical formula as applicable. During this period we noted 62 cases diagnosed having ectopic pregnancy intra-operatively. The mean, standard deviation along with the p value were calculated by using SPSS 16.0 software. **Results:** The mean age of study population was 28.53 years, most of them were Hindus. Nearly two thirds of women were in 18 to 30 years age-group. Every four out of five study subjects were from the lower or lower middle socio-economic class. Right side of the tube was affected in 59.2% patients. The occurrence of ectopic among different religion, social class, period of gestation, gravida, last child birth was significant ($p < 0.05$). Significant risk factors associated with ectopic pregnancy were as follows: past history of miscarriage, use of oral contraceptive pill, pelvic and or abdominal surgery, pelvic-inflammatory disease, infertility, ectopic pregnancy, sexually transmitted infections, use of intrauterine contraceptive devices, OCP use at the time of the present conception. **Conclusions:** The results pointed an increase in number of EP cases among middle aged women, Hindus, lower socio economic class, multigravida, more than four weeks of gestation suggesting that its importance as a public health problem had not diminished in these intervening years.

Key words: Ectopic pregnancy, Cross sectional study, Epidemiology, Informed verbal consent, Intra operatively

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INTRODUCTION

Ectopic pregnancy (EP) is defined as a pregnancy in which implantation occurs outside the endometrium and endometrial cavity that is in the cervix, uterine tubes, ovaries, abdominal or pelvic cavities. It is the one of the most life threatening emergency in pregnancy. The real concerns are its increase in incidence and impairment in fertility. The surge of ectopic pregnancies has decreased over the last ten years in spite of that over the past decade its rate has dramatically increased. The incidence of EP with contraception is decreasing in present days while the

incidence of EP without contraception is increasing in contrast.¹ Worldwide the estimated prevalence of ectopic pregnancy is 1-2%.² There has been fourfold increase in the incidence over the couple of decades, whereas the mortality has been reduced to nearly 80%.³ EP is an important cause of maternal mortality in addition to infertility, till date. Ectopic pregnancy still accounts for 4-10% of pregnancy-related deaths along with the complications associated with the increased demand of blood transfusion.⁴ Nearly 10-15% of maternal deaths in 1st trimester are attributed to ectopic pregnancy globally.⁵ One out of every three cases may die at home in spite of prior consultation with obstetricians

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attributed to various clinical complications.⁶ The prime objectives of the present study were to understand the epidemiology, important risk factors as well as the mode of treatment of EP cases.

MATERIALS AND METHODS

In 2009, a new medical college named as College of Medicine and Jawaharlal Nehru Memorial Hospital was established under the umbrella of West Bengal University of Health Sciences. This hospital was situated in the Suburbs of Kalyani under Nadia district. This medical college started to run its undergraduate course 2010 onwards. There were 13 teaching medical colleges in West Bengal in 2011. By simple random sampling method, we select this college as representative of other teaching hospitals. The total study was done for one year from January 2012 to December 2012. The period was divided into three phases. Initial one month was spent on review of literature, finalisation of proforma and establishment of objectives. Next ten months were kept entirely for collection of data. Last one month was kept for analysis and report writing. An observational, descriptive epidemiological study using cross-sectional survey design was conducted in the gynaecology and Obstetrics (G & O) ward of the hospital. Two researchers of this study were from same unit of G & O department of the study hospital. Their admission day each week was chosen as the day of data collection. Patients brought in the ward with symptoms of ectopic were taken into notice of researchers of the concerned department. All the cases diagnosed intra operatively as ectopic pregnancy (EP) were considered as final study population and included in the study. After the patient became stable, history taken post-operatively as per pre designed and semi structured proforma. Any patient, who died in the operation theatre or prior to giving interview were excluded from the study. During this period a total of sixty four (64) cases diagnosed having EP intra-operatively. Two patients died during or after operation and they were excluded from the study. Therefore the final study population was 62. Information on various aspects focussing on the epidemiology, socio demographic profile, presence or absence of risk factors for EP, were collected either from the patient or from the accompanying relative. Prasad's modified socio economic scale (SES) 2013⁷ was used for Socio economic status classification. Researchers, themselves noted the mode of operation in each patient. Informed verbal consent was obtained from each of the willing participant or from their accompanying person. No pressure was there for participation in the study. Epidemiological variables like age, religion, number of family members, monthly family income, per capita income (PCI) as well as obstetrical variables such as gravida, parity, last child birth, last menstrual period were considered

for this study. Information on past history of pelvic inflammatory disease (PID), sexually transmitted infection (STI), ectopic pregnancy, infertility, any surgery, medical illness, abortion, use of oral contraceptive pill (OCP), use of OCP at conception were gathered. Data was also collected on some other parameters like mode of operation in case of present EP, date of admission and operation. After collection of data, they were entered in an excel sheet and analysed using statistical formula as applicable. The mean, proportion, standard deviation and chi-square test along with the P value were obtained by using SPSS 22.0 (licensed) software. P value of <0.01 considered as significant. Fisher's exact value was considered if any cell value is less than 5.

RESULTS

The study comprised of a total of sixty two (62) participants. The study population ranged between the age-group of 18 years to 44 years. We divided age group into 4 sub-groups i.e. ≤25 years, 26 to 30 years, 31 to 35 years and 36 to 45 years. The mean age of study population was 28.53 years ± SD 5.69 years. It was seen that majority (63.6%) of women were in the middle age group that is 18 to 30 years, was attributed to the fact that it was actually the child bearing age group in India. Hinduism followed by 87.1% of the subjects and the rest were followers of Islam. Every four out of five cases with EP were either from the lower middle or from lower socio-economic class as per modified Prasad's scale. The mean PCI was Rs. 1117.30 +/SD Rs. 959.28/-. Only one woman was from upper socio-economic class indicating the economic disparity in the society. The total members in the family were 4 or less in thirty six (36) subjects. Here concept of nuclear family having 4 members, parents and two child norm, was considered. Most of the patients (77.4%) were multigravida. Fourteen (14) patients had parity of one. Five patients had history of ligation in past. Desired birth spacing was observed in nineteen (19) mothers. There were only four patients who presented within 12 months of their previous pregnancy event. The period of gestation was divided in two groups as per desire of the researchers, associated with the study. Fifty nine (95.2%) of the 62 patients presented with amenorrhoea for more than 4 weeks, while 3 came immediately following their missed period that was within or less than 4 weeks of the last menstrual period. Right side of the tube was more commonly affected (Table 1). Right and left salpingectomy carried out in thirty six (36) and seventeen (17) patients respectively. Three patients, who had completed their family, salpingectomy of the healthy side was also done. In six patients, salpingo-oophorectomy was done. It was also noted that two third of the patients got operated on the day of operation while in nearly 25% cases, operation

carried on next day. Risk factors analysis revealed that, there was a past history of induced and spontaneous miscarriage in 17.7% and 16.1% cases respectively. One, out of three patients gave past history of oral contraceptive pill (OCP) use. Earlier history of any pelvic and or abdominal surgery, pelvic-inflammatory disease (PID) and infertility was obtained from twenty one (33.9%), nineteen (30.6%) and eleven (17.7%) patients respectively. Past history of ectopic pregnancy was present in six cases. Two patients gave past history of sexually transmitted infection while three subjects used intrauterine contraceptive devices in past and OCP during the time of the present conception. Six patients complained of some sort of past illness like tuberculosis, typhoid, endometriosis, urinary bladder stone (Table 2). Difference of statistical significance was observed in the occurrence of ectopic pregnancy related with variables like religion, social class, period of gestation, parity and last child birth ($P < 0.01$) (Table 3).

DISCUSSION

This study was probably the first to be conducted in the Nadia district of West Bengal. All the cases of ectopic pregnancy had been registered with a regional register of ectopic pregnancy kept in the study hospital. It included 62 total cases of ectopic pregnancy out of 7,800 total deliveries. We got an overview of epidemiology as well as the risk factors of ectopic pregnancy.

The mean age of study population was 28.53 years. One-third (33.9%) of ectopic occurred among 26 to 30 years age-group corresponding to several other studies⁸⁻¹⁰ closely followed by the under 25 years group (30.6%).

The average income of the family was Rs. 4935.80/- per month, with an average per capita income being Rs. 1117.30/- per month. This data was nearly four times less than the national demographic data of Rs. 5130/- per month.¹¹ In our study, the frequency of ectopic pregnancy was much higher than that seen in developed countries. Even this figure was fallaciously low as many mothers died in the outskirts still due to ignorance and failure of diagnosis, lack of transport, blood, medical support as well as dearth of health care practitioners. Transvaginal ultrasound scan is the best test to diagnose ectopic pregnancy² but there are villages where no ultrasound scan machine was available. Most of the diagnoses of EP were clinically based and often many cases were missed, misdiagnosed or ignored due to lack of ancillary laboratory and ultrasound facilities. The ultrasound machine with expertise was not available in the study hospital twenty four X seven days and as many patients came in night therefore, the facility was not present during that time. Moreover,

Table 1: Population characteristics (N=62)

Variables	Frequency (%)
Age group (years)	
≤25	19 (30.6)
26-30	21 (33.9)
31-35	15 (24.2)
36-45	7 (11.3)
Religion	
Hindu	54 (87.1)
Muslim	8 (12.9)
Social class	
Upper	1 (1.6)
Upper middle	3 (4.8)
Middle	7 (11.3)
Lower middle/lower	51 (82.2)
No. of family members	
≤4	36 (58.1)
>5	26 (41.9)
Gravida	
Primi	14 (22.6)
2 nd gravida onwards	48 (77.4)
Period of gestation (week)	
≤4	3 (4.8)
>4	59 (95.2)
Last child birth	
≤12 months	4 (6.5)
13-36 months	20 (32.3)
>36 months	19 (30.6)

Table 2 : Risk factor distribution (N=62)

Risk factors	Frequency (%)
History of PID	19 (30.6)
History of STI	2 (3.2)
Past use of IUD	3 (4.8)
OCP use at conception	3 (4.8)
Past use of OCP	22 (35.5)
H/O of spontaneous abortion	10 (16.1)
H/O of induced abortion	11 (17.7)
H/O prior Ectopic pregnancy	6 (9.7)
Infertility	11 (17.7)

Table 3: Study statistics

Variables	Statistics
Age group (years)	Mean±SD=28.53±5.69 $\chi^2=7.41$, df=3, P=0.060
Religion	$\chi^2=34.12$, df=1, P=0.000
Social class	$\chi^2=59.29$, df=4, P=0.000
No of family members	$\chi^2=1.61$, df=1, P=0.253
Gravida	$\chi^2=18.64$, df=1, P=0.000
Period of gestation (week)	$\chi^2=50.58$, df=1, P=0.000
Last child birth	$\chi^2=33.12$, df=2, P=0.000

other causes of delay reported by the patients, as found in a study² and was similar to what we grossly found in our set up like, majority of patients were not aware of the pregnancy, few had been seen by health provider but reassured and fewer regarded the symptoms not serious enough to ask for care.¹²

In our study, majority (77.4%) had parity of 2 or more and some presented in shock due to rupture. A study¹³ revealed that, a small number of nulliparous presented with tubal rupture compared to the majority with tubal rupture having greater parity. 62.9% had their last child birth more than one year ago. The first pregnancy was diagnosed as EP in only 22.6% of the patients studied. Present study found significant association between the proportions of social class, family size and parity, although few studies differed as they^{8,9} found ectopic pregnancy prevalent in patients with low parity, and usually in primigravidas. Maternal education, parity and history of subfertility had associated significantly with ruptured ectopic.¹² There were only less than five percent patients, almost immediately reported following their missed period. This finding was not statistically significant, but could imply the dawning of some health awareness in a small segment of the population.

In thirty six (36) patients, right salpingectomy was done as main mode of treatment. The domination of right sidedness in ectopic pregnancy had been hypothesised to infection and adhesions in and near the appendix, due to the proximity of the tube. The majority of patients from developing countries were diagnosed post rupture of the tube. Ruptured ectopic was associated with various complications, like nearly 20% would need transfusion and hospitalization for 6-7 days or more. In our study, one mother died due to neurogenic and hypovolemic shock. The factors contributing to her death was delayed referral from a distant village due to delay in diagnosis, getting transport to reach the tertiary care centre along with delay in initiation of treatment.

The risk factors had been tabulated in Table 2. In the present study, twenty two (22) patients used OCP in past, twenty one (21) had history of abortion. The incidence of EP was less in those who had had a previous ectopic pregnancy as well as medical illness in the past (9.7%). Also, among the study subjects with past episode of any abdominal or pelvic surgery, more than half gave a history of caesarean section. Therefore, we can conclude that previous caesarean section might predispose to ectopic pregnancy. This finding corroborated with some earlier studies.^{14,15} However, a recent meta-analysis found no evidence of association between prior caesarean section and the occurrence of subsequent ectopic pregnancy.¹⁶ Therefore, the deduction of a potential association between mode of delivery and subsequent ectopic pregnancy would need more refined and structured research.

Prevalence of primary infertility was 4.3% in one study in comparison to 17.7 % in the recent study and nearly 40% of the self-reported causes of infertility were due

to ovulation problems.¹⁷ The reporting of important risk factors to reproductive health clinics would of great help in determining infertility and EP that indirectly would suggest measures to combat them both.¹⁸ There was no evidence of association between previous medical and EP rather some studies depicted the safety of the medical abortion regimen.^{19,20}

At present times, great advancements had taken place in radiographic investigations like ultrasonography, particularly transvaginal imaging and sensitive beta human chorionic gonadotropin assay. All these were of immense help in identification and treatment of EP cases. However, surgical treatment still remains the main mode of management.²⁰

Many women without risk factors could develop ectopic pregnancy^{8,21} like in our study, where about 21% patients with EP had no risk factors.

There was more number of EP cases during the summer and autumn season, especially in April to October, in the present study, as opposed to the increased number in winter and spring reported by Goldenberg et al.²¹ This could be hypothesized to the fact that Hindu majority got married at this time of the year, therefore indirectly lead to conception, increasing the odds of occurrence of an EP case. This had been seen in our study. But for the multi gravidas, who happened to be the majority, it may be postulated that reproduction was seasonal, depending on temperature, and varied with different latitudes. Therefore, our study deviated as a result of the differences in the seasonal rhythmicity's attributable to different location.

Finally, to conclude, this paper had been useful in identifying the population, presented with ectopic pregnancy along with the existing risk factors that were predominant in the population of Kalyani and its outskirts. This paper would also help in implementing preventive measures to combat the risk factors as well as impart education and awareness amongst health workers in the grass root level. Early identification and prompt management of EP cases is the need of hour.

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Authors Contribution:

GB – Designed the study, helps in entry, analysis and interpretation of data, searching of literature and making the final manuscript after all modification; **JR** – Collects data, helps in data entry and searching literature to make the first draft of the discussion part of the manuscript; **CC** – Conceived and designed the study, helps in data entry; **MP** – Helps in study design and data collection.

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