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Risk factors of pelvic inflammatory disease: A prospective study

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Abstract
Pelvic inflammatory disease (PID) is an ascending infection in which pathogenic micro-organisms spread from the lower genital tract to the upper genital tract of females. It is a disease that affects young, sexually active, reproductive-age women. Exact estimates of the incidence and prevalence of PID are unclear largely because PID is not a reportable disease. Knowledge of pelvic Inflammatory disease and its epidemiology is essential to understand reproductive morbidity in women. This study analyzes the effect of demographic factors and risk factors in pelvic inflammatory disease on women in their reproductive age. This is a prospective study in which 200 patients presenting with definitive diagnosis of pelvic inflammatory disease or presenting with clinical features suggestive of PID and later on diagnosed as acute pelvic infection were included in the study. Their demographic and epidemiological data were recorded. The highest number of women was observed in age group of 25-29 yrs. Maximum number of women were illiterate, belonged to the middle income group and were Muslims. All of them presented with heterosexual orientation and maximum number of females was using barrier methods for contraception. Most of the females in the study were found to be multiparous and all of them confirmed involvement with single partner only, however their husbands replied involvement with more than one partner.

Keywords: Pelvic inflammatory disease, epidemiology, risk factors, reproductive age women

1. Introduction
Pelvic inflammatory disease (PID) is a broad term used to cover upper genital tract infection, i.e. endometritis, parametritis, salpingitis and oophoritis. These infections usually spread from the vagina or cervix through the uterine cavity [1]. The clinical spectrum of PID ranges from subclinical endometritis to frank salpingitis, pelvic peritonitis, periappendicitis and perihepatitis [2, 3] and presents with the history of abnormal vaginal discharge, fever and adnexal tenderness requiring microbiological studies on cervical smear or diagnostic laparoscopy for the diagnosis [4-6]. Pelvic inflammatory disease (PID) is a disease that affects young, sexually active, reproductive-age women [7]. It is considered to be the major source of gynaecological morbidity throughout the world [8]. The actual burden of disease is unknown, but data from the USA suggest that > 10.0% of women of reproductive age have a history of PID [9]. The incidence of PID is correlated strongly with the prevalence of sexually transmitted diseases, although a fraction of the infections might be of endogenous origin. Use of intrauterine contraceptive devices and operations for legal abortions contribute to the increase in incidence [10]. The significant burden of disease attributed to PID comes predominantly from the long-term reproductive sequelae of tubal infection: tubal factor infertility, ectopic pregnancy, and pelvic adhesions, which lead to chronic pelvic pain [11].

2. Material and Methods
This is a prospective study conducted over 1 year from 1 August 2011 to 31 July 2012, in which 200 females visited the OPD of Tibbiya College, Karol Bagh, New Delhi, India with clinical features suggestive of PID and later on diagnosed as acute pelvic infection, or had definitive diagnosis of pelvic inflammatory disease or presenting were included in the study.
Detailed history of all the 200 cases were taken according to the proforma with the age, parity, religion, socio-economic status, age of marriage, sexual behavior, use of contraceptive and were examined in detail.
All patients were investigated with Hb%, TLC, DLC, ESR, Random Blood Sugar, S. Bilirubin, SGOT, SGPT, Alk. Phosphatase, Blood Urea, S.Creatinine, Mantoux Test, PAP smear, VDRL, USG, CXRY-PA view, Urine Routine and Microscopic Examination, Gram`s Staining of the Endocervical Swab.
Risk and complications of the conditions were explained to the patients.

3. Results

Table 1: Distribution of Study Subjects According To Age (n=200)

Age Group (years)	Total No. of patients	Percent. (%)
20-24	58	29
25-29	80	40
30-34	43	21.5
35-40	19	9.5
Total	200	100.0

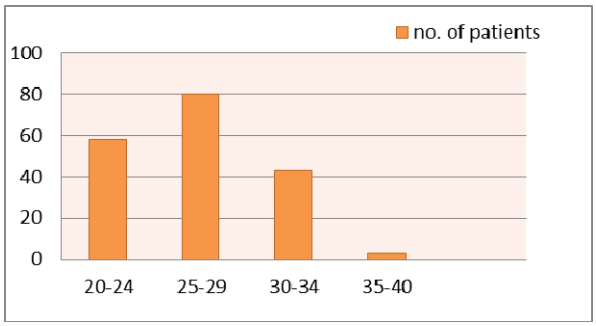

Table 2: Distribution of Study Subjects According To Educational Status (N=200)

Group	Total No. of patients	Percent. (%)
Illiterate	60	30
Primary	50	25
Hr. Sec.	50	25
Sr. Sec.	20	10
Graduate	20	10
Total	200	100.0

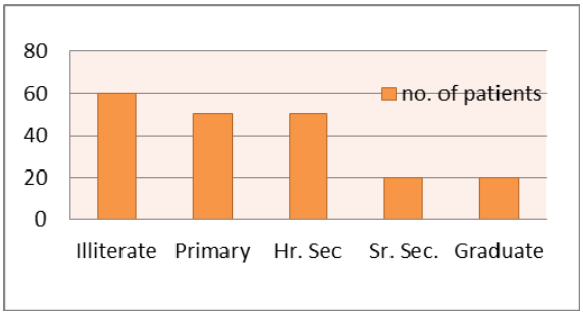

Table 3: Distribution of Study Subjects According To Socio Economic Status (n=200)

Group	Total No. of patients	Percent. (%)
Higher class	46	23
Middle class	113	56.5
Lower class	47	23.5
Total	200	100.0

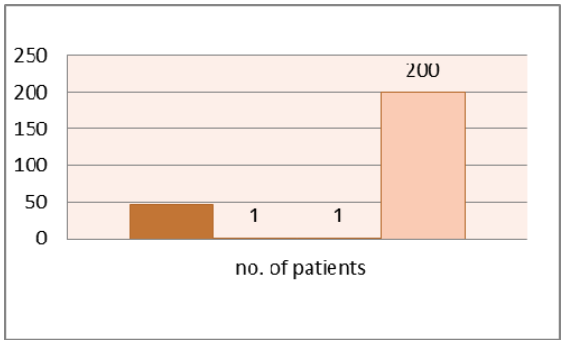

Table 4: Distribution of Study Subjects According To Sexual Behaviour (n=200)

Sexual Behaviour	Total No. of patients	Percent (%)
Heterosexual	200	100
Homosexual	0	0
Bisexual	0	0
Total	200	100.0

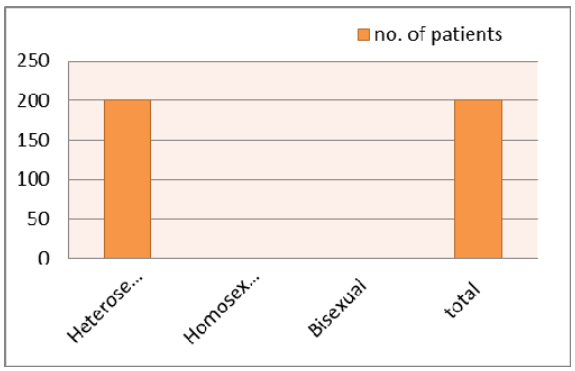

Table 5: Distribution of Study Subjects According To Age of Marriage (N=200)

Age of marriage (in yrs)	Total No. of patients	Percent (%)
Before 20	87	43.5
20-30	80	40
After 30	33	16.5
Total	200	100.0

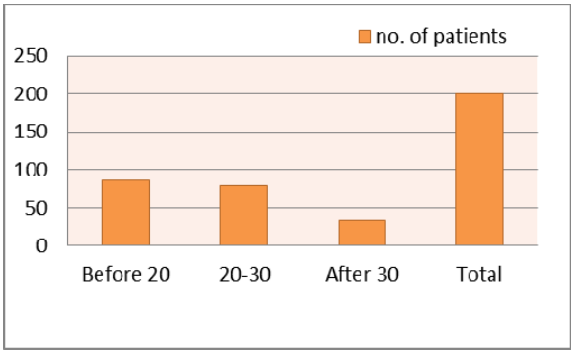

Table 6: Distribution of Study Subjects According To Religion (n=200)

Religion	Total No. of patients	Percent (%)
Islam	143	71.5
Hinduism	48	24
Christianity	9	4.5
Total	200	100.0

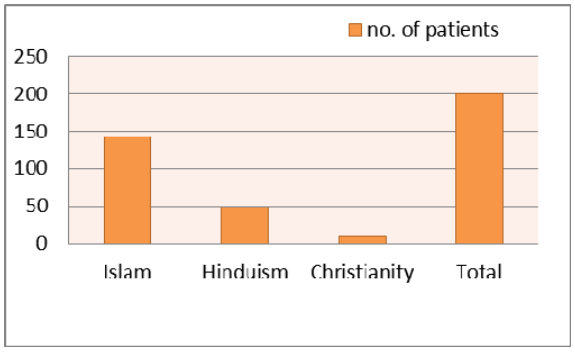

Table 7: Distribution of Study Subjects According To Use of Contraceptives (n=200)

Contraceptive	Total No. of patients	Percent (%)
Oral pill	17	8.5
IUD	37	18.5
Barrier method	71	35.5
Tubal ligation	20	10
None	55	27.5
Total	200	100.0

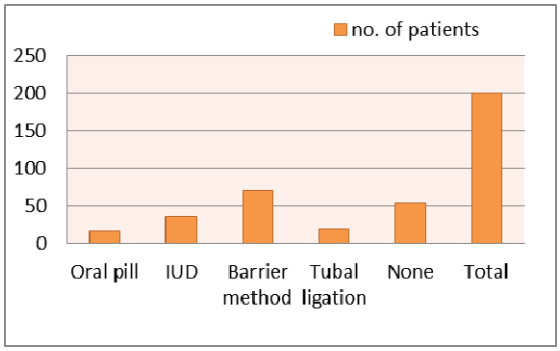

Table 8: Distribution of Study Subjects According To Parity (n=200)

Parity	Total No. of patients	Percent (%)
Nullipara	34	17
Primipara	47	23.5
Multipara	119	59.5
Total	200	100.0

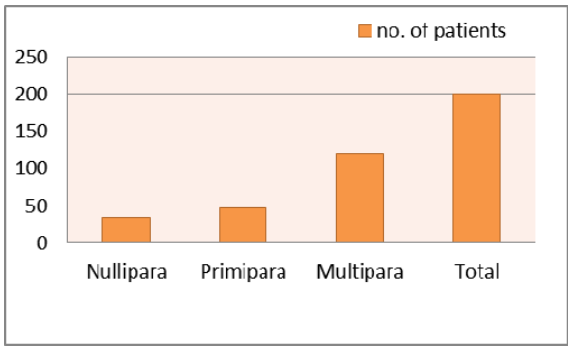

Table 9: Distribution of Study Subjects According To Sexual History (n=200)

Multiple sexual partners of study subjects		
Sexual history	**Total No. of patients**	**Percent. %**
• Yes(1)	0	0
• No(1)	200	100
Total	200	100.0
Multiple sexual partners of husbands of study subjects		
• Yes(1)	57	28.5
• No(1)	143	71.5
Total	200	100.0

4. Discussion

PID is a common infection in reproductive-age women that presents an enormous public health and economic burden. It is responsible for much short and long-term morbidity. Estimation of the true incidence of PID is difficult as subclinical disease is not always identified and the diagnosis may be missed. A crude marker of PID in resource-poor countries can be obtained from reported hospital admission rates, where it accounts for 17% to 40% of gynecological admissions in sub-Saharan Africa, 15% to 37% in Southeast Asia, and 3% to 10% in India. WHO estimates show that in 1995, 150 million new cases of STIs occurred in South East Asia alone [24].

The problem of morbidity and mortality in women due to reproductive tract infections is largely ignored because women themselves are reluctant to discuss the gynecological problems with others. Social stigma attached to an illness is sometimes greater for a woman than a man and therefore a woman is more likely to hide her illness. Some of the reasons for refusing to attend the clinic are socioeconomic factors and fear of internal check–up [25]. The problem of STI morbidity in women is largely due to ignorance, low level of awareness regarding sexual and reproductive health and other social factors like low female literacy, cultural factors and taboos - all withholding the women from seeking health care for RTI/STIs [26].

Total 200 patients were included in the study. Analysis of the results of 200 cases of pelvic inflammatory disease revealed some interesting facts which are discussed in the following lines.

- PID is a very common ailment of married women in India. The disease commonly affects married women of different age groups. In this study maximum number of patients was observed in age group of 25-29 years. These data are in agreement with the findings reported by L Westrom [10].
- This study shows the highest prevalence of PID among Illiterates' group (30%). The prevalence of PID decreased with the level of education and found to be lowest with Senior Secondary level and graduate level of literacy status (10% respectively). This implies the finding that with education, people are better prepared to prevent disease and to use health services effectively [12-13].
- The highest incidence of PID was observed in middle class (56.5%), followed by patients in lower class (23.5%). The link between socioeconomic status and reproductive health has been established before [12], and it is plausible that increased wealth is associated with overall better hygiene resulting in lower susceptibility to PID and other infections.
- During the course of the study subjects, were asked about their sexual behavior and all of them (100%) replied with heterosexual orientation. Probably, because women were unwilling to discuss the sexual history with others due to the social & cultural shyness regarding the disclosure of personal sexual relations or may be due to the relatively small sample size.
- This study shows that about 43.5% of subjects were married before 20 years of age, followed by 40% between 20-30 years. Lower age incurs an increased risk of PID because of biologic and behavioral risk factors. Adolescents tend to have cervical ectopy, which provides large zones of columnar epithelium for the targeted attachment of Chlamydia trachomatis and Neisseria gonorrhoeae [10].
- The prevalence of PID was found to be higher among Muslims (71.5%) than in the other religions. No convincing data is available that demonstrates the distribution of PID among different religious communities in the society. This study, however, reflects a preponderance of Muslims among the patients of pelvic inflammatory disease. The probable reason may be the majority of Muslim patients visiting Tibbiya College Hospital, Karol Bagh, New Delhi as it is a Unani Hospital and Unani Medicine is more popular among Muslim community.
- PID prevalence was higher among women who were

using barrier methods as means of contraception (35.5%), followed by non users (27.5%) and 18.5% of IUCD users. Contraceptives play an important role in predisposing women to acquisition of PID. Non-use of contraception is a risk factor for PID, whereas barrier methods can decrease the risk of STD acquisition and subsequent development of PID [14]. Although use of an intrauterine device traditionally has been believed by most clinicians to confer an elevated risk of PID, the risk seems to be primarily restricted to the first 3 months after insertion, likely because of bacterial contamination at the time of insertion [15-20]. The differences observed are supposed to be due to relatively small sample size of the study.

- Higher prevalence of PID was observed in women having multiple child birth (57.5%). However, one longitudinal study done by Wright demonstrated that there was no relationship between the parity of the patients and the development of PID [21] and delivery in itself is not a risk factor for PID but delivery by untrained person is a risk factor. It is also given that nulliparity was protective against against infection and early age of sexual debut is also one of the risk factor [22].
- All the participating subjects (100%) were engaged sexually with single partner only but (28.5%) of the husbands admitted having sexual relationships with woman other than wives. Though studies have shown that women with multiple sexual partners, especially in the preceding 30 days, have a fourfold elevated risk of acquisition of PID [14, 23]. It can be inferred that female subjects did not give the right information about their sexual activity and the difference may due to the social & cultural apprehension regarding the confession of individual sexual affairs or may be due to the relatively small sample size.

5. Conclusion

Pelvic inflammatory disease is more common among the 25-29 yrs of reproductive women. Risk factors for PID were low socio-economic status, illiteracy, use of intrauterine device, multiple sexual partners and young age of marriage.

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