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Assessing risk factors associated with pelvic inflammatory disease in Iranian women: a study in Tehran

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ABSTRACT

Purpose: Risk factors of pelvic inflammatory disease can be different in different countries because of different sexual behaviors and religious restrictions. This study investigated the risk factors of this disease in Iranian women in Tehran.

Materials and Methods: In this cross-sectional, descriptive study 1104 women with pelvic inflammatory disease were assessed from May 2010 to March 2011. The data were gathered by a questionnaire.

Results: Among the studied women 82.34% were married and 49.37% were 20-30 years old. Of them 54.89% had their first sexual encounter between the ages of 15-20 years old. 98.10% had only one sexual partner and 75.54% had not had any new sexual partner one year before the beginning of study. In 90.22%of cases their spouse had no other sexual partner as well. The number of women experiencing two to three intercourses per week was high (49.37%). Also, 48.46% had one or two previous pregnancies. The most common contraception method was condom (31.06%). Among them, 70.65% had high school diploma or less degrees and 87.04% were in low to middle socio-economic status.

Conclusion: Pelvic inflammatory disease is more common in married Iranian women aged 20 to 30 years old who have had their first sexual encounter before the age of 20 years old.

Keywords: pelvic inflammatory disease; risk factors; prevalence; disease control planning; Tehran.

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INTRODUCTION

Numerous risk factors are listed for pelvic inflammatory disease, but most are based on researches carried out in western countries.Doing local studies on risk factors responsible for pelvic inflammatory disease in Iran is essential. This is because there are distinct sexual behavior patterns as well as religious restrictions and limitations in Iran which are clearly different than those existing in the west and also because the conventional contraception measures in Iran are different. Once researches regarding risk factors for pelvic inflammatory disease are completed in Iran, appropriate planning can be done to reduce future complications and consequences as well as treatment costs.

In a study by Simms and colleagues, 140 patients with pelvic inflammatory disease were compared to 105 healthy women who had referred for closure of their tubes (tubal ligation). In this study the pelvic inflammatory disease risk factors were: having first sexual encounter younger than 20 years old, no children, and a history of sexually transmitted disease, plus being less than 25 years old and non-Caucasian. They also compared the initial group with another group comprised of 136 women who had referred for general medical checkup. Here the pelvic inflammatory disease factors were: being less than 25 years old, single, and exposed to

Chlamydia, having first sexual encounter younger than 15 years old, low socio-economic status, inappropriate past pregnancies, and a history of sexually transmitted disease. They concluded that screening Chlamydia and changes in behavior patterns can result in prevention of pelvic inflammatory disease.[1]

In another study, Viberga and colleagues investigated 51 women suffering from pelvic inflammatory disease and 50 women who had only referred for periodic medical checkups. Their results indicated that patients who had pelvic inflammatory disease were older and they also had a lower socio-economic status. The number of induced abortion was also higher in the group suffering from pelvic inflammatory disease. The women who were healthy had noticeably more routine medical checkups by gynecologists and the number of smokers was clearly less as compared to the other group. Other risk factors were determined to be less significant and no meaningful difference was observed between the two groups. The differences of the two studied groups of this study were: the age of becoming sexually active, number of sexual partners, length of time with the current sexual partner, number of intercourses, number of births, induced abortions, ectopic pregnancy, outcome of last pregnancy and the last pelvic inflammatory disease. The most common method of contraception was the application of intra-uterine device. Also, difference in application of contraception procedures between the two groups was negligible. Finally, they concluded that the only noticeable difference between the groups was socio-demographic status of the ill and healthy individuals. [2]

This study set out to examine pelvic inflammatory disease risk factors in three different socio-economic parts of Tehran to find some of the pelvic inflammatory disease risk factors of Iranian women.

MATERIALS AND METHODS

This cross-sectional and descriptive study was doneon1104 women who had referred to three gynecological centers at northeast, central and southern parts of Tehran from May 2010 to March 2011. Based on the literature, the possible risk factors of pelvic inflammatory disease were derived out and asked from the participants in a questionnaire. Choosing participants from three different parts of Tehran lead to a diverse and broad range of participants with different socio-economic and cultural status. Pearson random sampling was used to choose the number of participants. All women considered in this study were in reproductive age with symptoms of pelvic pain, vaginal discharge, fever and abdominal sensitivity. Having abdominal sensitivity or rebound, sensitivity and pain when moving cervix and uterus, and adnexal sensitivity were essential in diagnosis. Para-clinical and clinical findings applied for diagnosis were as follows:[3-9]

1- The number of white blood cells more than 10 in high power field in cervical smear and discharges.
2- Leukocytosis higher than 10,000/μL.
3- Presence of white blood cells more than 15,000/mm^3 in aspirated discharges from cul de sac in culdocentesis. This number in its natural state is around 1500/mm^3.
4- High erythrocyte sedimentation rate.
5- Observance of discharge at the end of fallopian tubes during laparoscopy (in cases where laparoscopy is required for differential diagnosis of pelvic inflammatory disease due to surgery).

All women who were not in the age range of 15 to 45 years old or who were not sexually active were excluded. Also, women with a weak immune system, suffering from diabetes, using steroids and immuno-suppressants were not included.

The questionnaire included the following items: age, marital status, number of previous pregnancies, educational status, economic status, number of sexual partners, recent change in sexual partner, number of intercourse(s) per week, method of contraception, age at first sexual contact, history of sexually transmitted diseases, history of suffering from pelvic inflammatory disease, recent use of invasive diagnostic procedures and smoking. All the collected data were analyzed and each specific objective of the study was studied separately. The prevalence of every variable was calculated within the target community under review.

RESULTS

The most common age range in all three centers was 20-30 years old, followed by 30-40, 15-20, older than 40 and younger 15 years old in order of commonness. Most women in the three centers were married and had experienced pregnancy once or twice. Some had never had any previous pregnancies and others had experienced three to four pregnancies. Also, there were those who had had experienced pregnancies at least five times.

Most women at the three centers had a high school diploma or less. The number of those with university degrees was low. The average income of participants was less than 4,000,000 Iran Rials in the center from southern Tehran and between 4,000,000 and 10,000,000 Iran Rials in the other two. Only 21 participants had more than one sexual partner simultaneously. Most participants had no new sexual partner (75.54%) (i.e. having sexual contact

with someone new within one year before entering the study). The number of participants who had intercourses two to three times per week was a little higher in all the three centers, but this number was very close to those who only had one intercourse per week.

The most widely used method of contraception was condom (31.06%), followed by natural method at the central and northern centers and intra-uterine device at the southern center. The first sexual contact for patients at the southern and central centers was between 15-20 years old, but for most patients at the northern center it was more than 20 years old. Overall only 43 patients had previously experienced sexually transmitted diseases and the rest did not have a history of such diseases. Most participants (n = 956) had never had any pelvic inflammatory disease with complications and the rest had experienced this disease at some point of their lives. Most participants at the three centers had not used invasive diagnostic procedures one month before their participation and did not smoke or use vaginal douche. The majority of participation answered 'no' to the question of whether their spouse or husband had another sexual partner (**Table 1**).

Table 1. Summary of obtained results.

	Khanevadeh Hospital in central part of Tehran (n = 367)	Shahid Fallahi Clinici n northern part of Tehran (n = 365)	Shahre Rey Treatment Center in southern part of Tehran (n = 372)	Total (n = 1104)
Age (years old)				
Younger than 15	0	7	0	7
15-20	57	35	80	172
20-30	190	194	161	545
30-40	95	94	102	291
Older than 40	25	35	29	89
Marital status				
Young Girls	24	27	29	80
Married Women	305	297	307	909
Single Women	38	41	36	115
Number of pregnancies				
Zero	94	111	80	285
1 or 2	176	151	208	535
3 or 4	65	57	55	177
5 or More	32	46	29	107
Educational status				
High school diploma or Less	235	261	284	780
Undergraduate degree	125	79	73	277
Graduate degree	7	25	15	47
Patient's family income (Iran Rails)				
Less than 4,000,000	182	143	179	504
4,000,000 -10,000,000	146	161	150	457
More than 10,000,000	39	61	43	143
Number of sexual partners				
One	367	347	369	1083
More than one	0	18	3	21
New sexual partner				
Yes	65	114	91	270
No	302	251	281	834
Number of intercourses per week				
Once	151	164	128	443
Two to Three Times	176	165	204	545
Four Times or More	40	36	40	116
Contraception method				
Natural	112	105	84	301
Pill	55	54	65	174
Condom	120	120	103	343
Intra-uterine device	58	43	95	196
Diaphragm	0	0	0	0
Others	22	43	25	90

Table 1. (Continued)

	Khanevadeh Hospital in central part of Tehran (n = 367)	Shahid Fallahi Clinici n northern part of Tehran (n = 365)	Shahre Rey Treatment Center in southern part of Tehran (n = 372)	Total (n = 1104)
Age of first sexual encounter (years old)				
Younger than 15	13	25	40	78
15-20	233	161	212	606
Older than 20	121	179	120	420
History of sexually transmitted disease				
Yes	14	11	18	43
No	353	354	354	1061
History of pelvic inflammatory disease				
Yes	36	61	51	148
No	331	304	321	956
Invasive diagnostic procedures				
Yes	29	39	66	134
No	338	326	306	970
Cigarette use				
Yes	61	89	135	285
No	306	276	237	819
Vaginal douche				
Yes	94	112	98	304
No	273	253	274	800
Patient's spouse has another sexual partner simultaneously				
Yes	36	43	29	108
No	331	322	343	996

DISCUSSION

Different pelvic inflammatory disease risk factors have been mentioned in various reference books of gynecology. However, it seems that pelvic inflammatory disease risk factors in our study are somewhat different.

Most of the patients in this study were married (82.34%), while in the study by Simms and colleagues one of the predisposing factors for pelvic inflammatory disease was being single.[1] It should be pointed out that in the study by Simms and colleagues being single did not mean being sexually inactive. It simply meant that most patients in that study were not married and probably had no fixed sexual partner, i.e. they possibly had more than one sexual partner. This was extremely rare among our participants. Therefore as a predisposing factor for pelvic inflammatory disease, being married in our study does not contradict the results of the study by Simms et al, and being sexually active is the main factor for the emergence of pelvic inflammatory disease in both studies.[3-5] The unmarried participants of our study (single women and young girls) who were suffering from pelvic inflammatory disease were all sexually active.

Most participants (49.37%) in our study were 20-30 years old which is in agreement with other similar studies. In this regard Simms and colleagues had stated being younger than 25 years old as a predisposing factor of pelvic inflammatory disease.[1] This age in most other studies has been 35 years old.[3-5] In our study the most common age of first sexual encounter was 15-20 years old (54.89%), which is consistent with results of other studies. In those studies having first sexual encounter at a young age[3-5] particularly younger than 20 years old[1] was the leading factor of pelvic inflammatory disease.

Most patients in our study had only one sexual partner (98.10%), and had not had any new ones in one year before entering the study (75.54%). In most cases the spouses of participants had no other sexual partners either (90.22%). This is in contrast with previous studies.[1,3-5] One of the predisposing factors of pelvic inflammatory disease in those studies (all of which were performed in western countries) was having several sexual partners. In Iran, devotion of most men and women to the family and religious and cultural restrictions practically prevent people from having more than one sexual partner at the same time. In this country married women are unlikely to have several sexual partners. This is an alien and somehow improbable notion for many single women too. Furthermore, having several wives at the same time is not a common practice among Iranian Muslim men unlike some Muslim Arab men. So having multiple sexual partners is not a predisposing factor for pelvic inflammatory disease in Iran.

Other factors for pelvic inflammatory disease in our study were having 2-3 times intercourses per week (49.37%), and 1-2 previous pregnancies (48.46%). In the study by Simms and colleagues not having any children was indicated as another predisposing factor for the emergence of pelvic inflammatory disease.[1]In another research by Viberga and colleagues no significant association was found between pregnancy, number of intercourses and the emergence of pelvic inflammatory disease.[2] However, many reference books have cited the number of intercourses as a leading factor for pelvic inflammatory disease.[10] Our study showed that apparently with an increase in the number of intercourses per week and an increase in the number of past pregnancies, the emergence of pelvic inflammatory disease actually decreases. This is misleading, since in Iran the women who are sexually active have generally 1-3 intercourses per week and often have had 1-3 previous pregnancies. Same as Simms and colleagues, no relationship was found between pelvic inflammatory disease and number of intercourses and previous pregnancies in our study. Still conducting a separate and more comprehensive study for these two indices seems essential.

The most widely used method of contraception was condom (31.06%) followed by natural method (27.27%), intra-uterine device (17.76%), and anti-pregnancy pills (15.76%). None of the participant used diaphragms. Condom has not been indicated as a predisposing factor for pelvic inflammatory disease in any study; actually it is a preventing device for transferring pelvic inflammatory disease.[10-14] The reason why condom has been the most common contraception method in our study can be that our participants use condom in a specific time during their cycles and not on regular basis, or perhaps they are not familiar with the correct use of condom (from beginning to the end of the intercourse) or probably they use it during intercourse after it has become tainted. Moreover, in many instances it is likely that expired, non-standard, cheap, and non-approved condoms are used. Other possible factors might also exist which should be considered in a more separate thorough research.

Majority of participants (70.65%) had a high school diploma degree or less and often were from low and middle socio-economic status (87.04%). The point that low socio-economic status is a predisposing factors for pelvic inflammatory disease has also been confirmed in previous studies.[1-5] In the study by Viberga and colleagues low level of education, unemployment and socio-demographic status were predisposing factors of pelvic inflammatory disease.[2] Pelvic inflammatory disease is often less prevalent in women who routinely refer for gynecological checkups.[2] In the research performed by Simms and colleagues both low socio-economic status and being non-Caucasian (possibly people in the lower segments of society) have been cited as predisposing factors of pelvic inflammatory disease.[1] Both studies have concluded that proper training and changes in behavioral patterns can play a significant role in preventing the emergence and outbreak of pelvic inflammatory disease.

The history of sexually transmitted diseases was not significant in our study (3.98%). However, in other studies having a history of sexually transmitted disease has been cited as a predisposing factor of pelvic inflammatory disease.[1,3-5,15,16] Sexually transmitted disease often occurs in individuals who have multiple sexual partners or in those whose partner has other sexual partners as well. Since the likelihood of these two factors is extremely low in Iran, the emergence of sexually transmitted disease in married Iranian women is rare. Hence, sexually transmitted disease cannot be considered as a main factor of pelvic inflammatory disease.

Having a history of pelvic inflammatory disease (13.41%) was also low and most participant were experiencing it for the first time. However, in other studies [3-5] having a history of pelvic inflammatory disease has been repeatedly cited as a predisposing factor of this disease. Except the study by Viberga and colleagues which found no direct link between the emergence of the last pelvic inflammatory disease and the one currently occurring,[2] most other studies have found an association. Our results are consistent with Viberga and colleagues' results.

In our study widespread use of invasive diagnostic procedures was low (12.14%). Nevertheless in some other studies using invasive diagnostic procedures like hysterosalpingography, dilatation and curettage, endometrial biopsy and induced abortions were generally cited as leading factors of pelvic inflammatory disease.[2,6,7] Perhaps lack of widespread use of these procedures in all medical centers in Iran is the reason for the lower prevalence of these factors among our participants. Another reason may be the high cost of such procedures which is not affordable for the majority of low-income people. It is also advisable to review the impact of these procedures as sole predisposing factors on increased number of patients with pelvic inflammatory disease. Therefore, more studies are needed on this issue.

Only 25.82% of our participants were smokers. Nonetheless regular cigarette smoking has been cited as a predisposing factor of pelvic inflammatory disease

in other studies.[2-3] Since many Iranian women do not smoke, the number of smokers of our study was low. Only 27.54% of our participants used vaginal douche. However, in many reference books vaginal douche has been cited as a predisposing factor of pelvic inflammatory disease.[3] Since application of vaginal douche is not common among Iranian women, its clear effect on the emergence of pelvic inflammatory disease cannot be firmly established and more researches are needed.

CONCLUSION

The risk factors of pelvic inflammatory disease among Iranian women are being married, 20-30 years old, having first sexual encounter younger than 20 years old, plus having an active sexual life style, and low educational and socio-economic status. Such women can be the target group for an objective health planning. Most patients have only one sexual partner and their spouses do not usually have another sexual partner.

A new study must be carried out to investigate the link between susceptible predisposing factors like smoking, vaginal douche, invasive diagnostic procedures, contraception method, and the emergence of pelvic inflammatory disease. It is recommended that in any study on pelvic inflammatory disease, the participants be grouped according to socio-economic status.

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