Original Research Article

Prevalence and Risk Factors of Cervicitis in Married Women in Shahroud, Northeast of Iran

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ABSTRACT

Introduction: Mucopurulent cervicitis (MPC) is a clinical syndrome characterized by mucopurulent discharge from the cervix and other signs of inflammation. In this study, we evaluated the prevalence and risk factors of MPC in married women referred to health centers of Shahroud (northeast of Iran) in 2016. Methods: In this cross-sectional study, 346 married women aged ≥18 years were screened for MPC via clinical examination by a gynecologist. Logistic regression was used to evaluate association of sociodemographic, behavioral and sexual health related variables with prevalence of cervicitis. Results: Mean age of subjects was 31.5 years (range 14–69 years) and 121 (35%) subjects had MPC. In addition, 38.2% of the subjects were with less than a high school diploma and 72.8% were housekeeper. The mean (standard deviation) value of body mass index was 25.2 (4.3) Kg/m^2 (range: 16.2-38.5 Kg/m^2). Coital frequency per week (P=0.004) and method of delivery (P=0.02) were significantly associated with the prevalence of cervicitis. Conclusion: Our findings suggest that weekly coital frequency, method of delivery, vaginal discharge and history of genital herpes may be associated with the risk of cervicitis.

KEYWORDS: Mucopurulent cervicitis, MPC, Inflammation, Shahroud

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INTRODUCTION

Sexually transmitted infections (STIs) are major causes of acute illness, infertility, long-term disability and death, affecting the life and well-being of millions around the globe (1). The infectious etiologies of cervicitis i.e. STI are notably more prevalent than the noninfectious causes (2).

Mucopurulent cervicitis (MPC) is a clinical condition diagnosed by a visible, purulent or mucopurulent endocervical exudate in the endocervical canal or on an endocervical swab specimen and abnormal vaginal bleeding (3, 4). More elusive signs of this condition include edema of the cervical ectropion and increase in the number of polymorphonuclear leukocytes in Gram-stained smear from endocervical secretions under high-power magnification (5).

Cervicitis is usually caused by STIs, such as chlamydia and gonorrhea (6), but it can also develop from noninfectious causes. Insertion of a device into the pelvic area, allergic reaction to spermicides used for birth control and latex condoms, and exposure to chemicals are among other causes of cervicitis (7).

Estimates of the prevalence of cervicitis vary widely mainly because it is not a reportable disease and there is no fully standardized clinical/diagnostic criteria (8). However, few studies estimated the true prevalence of cervicitis to be high among various clinical settings (9). Therefore, we aimed to evaluate the prevalence and risk factors of cervicitis in married women referred to health centers of Shahroud, Iran.

MATERIALS AND METHODS

This cross-sectional study was carried out during February 2016 to July 2016 on 346 women living in Shahroud, northeastern Iran. The subjects included married women aged ≥ 18 years who were randomly selected from 11 health centers in the city. Participation in the study was voluntarily and written consent was obtained from all participants prior to the beginning of the study. The subjects were screened for MPC via clinical examinations

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by a gynecologist. Specimen was collected from subjects with suspected clinical MPC diagnosed by presence of cervical mucopus and/or easily induced cervical bleeding (10). In pelvic examination, a speculum is inserted into the vagina to hold the vaginal walls apart, permitting inspection of the cervix and vaginal walls for redness, irritation, unusual discharge, or sores (11).

Self-reported demographic and behavioral variables were collected verbally from each subject using a researcher-made questionnaire. The study variables included age, current vaginal symptoms (vaginal discharge, dysuria, spotting after intercourse and dyspareunia), coital frequency per week, number of children, and family planning method.

Logistic regression was used to evaluate association of sociodemographic, behavioral, and sexual health related characteristics with the prevalence of cervicitis. Statistical analysis was done with SPSS (version 18) at significance level of 0.05. Data were analyzed using descriptive statistics including frequency, percentage and standard deviation (SD). Differences in categorical variables were analyzed using chi-square test and two-tailed Fisher's exact test, and continuous variables were compared using t-test. The study was approved by the Ethics Committee of Shahroud University of Medical Science (approval code: Ir.shmu.rec.1394.163).

RESULTS

Overall, 121 (35%) subjects had MPC. Table 1 represents the demographic data of the subjects under study. The mean (SD) age of the subjects was 31.5 (8.4) years. In addition, 38.2% of the subjects were with less than a high school diploma and 72.8% were housekeeper. The mean (SD) value of body mass index (BMI) was 25.2 (4.3) Kg/m^2 (range: 16.2-38.5 Kg/m^2).

Table 1. Frequency of cervicitis and demographic characteristics of women referred to health centers in the city of Shahroud in 2016

Variables			Non-cervicitis N=225	Cervicitis N=121	P-value
Age (mean ± SD)			32.1± 8.5 years	32.0± 8.4 years	0.42
Age at time of first sexual intercourse (mean ± SD)			20.0± 4.4 years	19.9± 3.7 years	0.81
Educational status, N (%)	Under high school diploma	72 (32)	34 (28.1)	34 (28.1)	0.37
	Diploma	86 (38.2)	43 (35.5)	43 (35.5)	
	Bachelor's degree	20 (8.9)	18 (14.9)	18 (14.9)	
	Master's degree	47 (20.9)	26 (21.5)	26 (21.5)	
Income, N (%)	<600 $	52(23.1)	30(24.8)	30(24.8)	0.92
	600-1 million $	67(29.8)	32(26.4)	32(26.4)	
	1-2 million $	80(35.6)	44(36.4)	44(36.4)	
	>2 million $	26(11.6)	15(12.4)	15(12.4)	
Occupation, N (%)	Housekeeper	168(74.7)	84(69.4)	84(69.4)	0.39
	Employed	17(7.6)	15(12.4)	15(12.4)	
	Proletarian	13(5.8)	5(4.1)	5(4.1)	
	Self-employed	27(12)	17(14)	17(14)	
Smoking, N (%)	Yes	9(4)	4(3.3)	4(3.3)	0.50
	No	216(96)	117(96.7)	117(96.7)	
Waterpipe smoking, N (%)	Yes	39(17.3)	16(13.2)	16(13.2)	0.20
	No	186(82.7)	105(86.8)	105(86.8)	

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Husbands smoking status, N (%)	Yes	87(38.7)	47(38.8)	47(38.8)	0.53
	No	138(61.3)	74(61.2)	74(61.2)	
BMI (Kg/m^2)	Low weight	10 (2.9)	6(2.7)	4(3.3)	0.50
	Normal	178 (51.4)	111(49.3)	67(55.4)	
	Overweight	102 (29.5)	67(29.8)	35(28.9)	
	Obese	56 (16.2)	41(18.2)	15(12.4)	

The coital frequency per week (P=0.004) and method of delivery (P=0.02) were Significantly associated with the prevalence of cervicitis (Table 2).

Table 2. Factors related to sexual activity and fertility in women referred to health centers in the city of Shahroud in 2016

Variables N (%)		Not cervicitis N=225	cervicitis N=121	P-value
Coital Frequency per week	**None**	**33(14.7)**	**17(14)**	**0.004**
	1	**38(16.9)**	**41(33.9)**	
	2	**84(37.3)**	**35(28.9)**	
	3≤	**70(31.1)**	**28(23.1)**	
Number of children	**None**	**74(32.9)**	**34(28.1)**	**0.83**
	1	**64(28.4)**	**38(31.4)**	
	2	**62(27.6)**	**35(28.9)**	
	3≤	**25(11.1)**	**14(11.6)**	
Method of delivery	**No**	**73(32.4)**	**34(28.1)**	**0.02**
	Caesarean section	**69(30.7)**	**25(20.7)**	
	Natural childbirth	**83(36.9)**	**69 (51.2)**	
Family planning method	**None**	**17(7.6)**	**7 (5.8)**	**0.38**
	Natural	**104(46.2)**	**56 (46.3)**	
	Condom	**43(19.1)**	**29 (24)**	
	Pill	**22(9.8)**	**5 (4.1)**	
	Ampoule	**2(0.9)**	**2 (1.7)**	
	Intrauterine device	**26(11.6)**	**11 (9.1)**	
	Tubal ligation	**8(3.6)**	**8 (6.6)**	
	Vasectomy	**3(1.3)**	**3 (2.5)**	
Time to use the family planning method	**None**	**12(5.3)**	**6(5)**	**0.75**
	A few months	**44(19.6)**	**19(15.7)**	
	One year	**30(13.3)**	**13(10.7)**	
	Two years	**18(8)**	**9(7.4)**	
	Three years and more	**121(53.8)**	**74(61.2)**	
History of infertility	**Yes**	**18(8)**	**95 (78.5)**	**0.43**
	No	**207(92)**		
History of abortion	**Yes**	**48(21.3)**	**26 (21.5)**	**0.53**
	No	**177(78.7)**	**95 (78.5)**	
History of gynecological infections	**Yes**	**165(73.3)**	**93 (76.9)**	
	No	**60(26.7)**	**28 (23.1)**	**0.27**
Sexual engagement outside marriage	**Yes**	**8(3.6)**	**4(3.3)**	**0.58**
	No	**217(96.4)**	**117(96.7)**	
Antibiotics use in the past month	**Yes**	**71(31.6)**	**45(37.2)**	
	No	**154(68.4)**	**76(62.8)**	**0.17**

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Frequency of dysuria, vaginal discharge and dyspareunia among non-cervicitis subjects was 26.7%, 46.7% and 31.1%, respectively. Most subjects with cervicitis (58.7%) had vaginal discharge. Moreover, 3.1% of non-cervicitis subjects and 7.4% of Subjects with cervicitis had history of genital herpes (Table 3). Obesity was more common among non-cervicitis subjects (18.2 %) compared to subjects with cervicitis (12.4 %).

Table 3. Clinical symptoms and characteristics of women with and without cervicitis referred to health centers in the city of Shahroud in 2016

Symptoms		Non-cervicitis N=225	Cervicitis N=121	P-value
Dysuria	Yes	60(26.7)	29(24)	0.34
	No	165(73.3)	92(76)	
Vaginal discharge	Yes	105(46.7)	71(58.7)	0.02
	No	120(53.3)	50(41.3)	
Spotting after intercourse	Yes	19(8.4)	11(9.1)	0.49
	No	206(91.6)	110(90.9)	
Dyspareunia	Yes	70(31.1)	37(30.6)	0.51
	No	155(68.9)	84(69.4)	
History of genital herpes	Yes	7(3.1)	9(7.4)	0.04
	No	218(96.9)	112(92.6)	
Oral sex	Yes	94(41.8)	49(40.5)	0.45
	No	131(58.2)	72(59.5)	

DISCUSSION

In this study, the frequency of cervicitis was 35% among 346 women referred to health centers of Shahroud. The findings also indicated that coital frequency, natural childbirth, vaginal discharge and herpes were associated with frequency of MPC. Recent studies in the US estimated the prevalence of cervicitis to be 5% among students, 10% among women referred to family clinics and more than 20% among women with STI (12). Another study in the US reported the prevalence of cervicitis to be 23% in the state of California, US (13). Similar studies in Mozambique (14) and China (15) estimated the prevalence of cervicitis to be 29.4% and 25.87%, respectively.

The frequency of cervicitis in our study (35%) is slightly higher than that of in the US and other studies. This could be due to several factors including consumption of antibiotics, presence of genitourinary infection, having multiple sex partners, number of subjects, diagnostic method, age of patients, race, culture, and geographical area (1, 14).

In a study by Marrazzol et al. in Washington, US, no significant correlation was observed between prevalence of cervicitis and use of vaginal douche, smoking, race and the frequency of sexual intercourse (6). Except for the frequency of sexual intercourse, we also found that the mentioned variables are significantly correlated to the prevalence of cervicitis. In Nairobi, factors including being single, age below 20 years, having multiple sex partners in the past three months and uterine secretion were found to be correlated with STI (16). Our study was performed only on married women, and there was a significant relationship between cervicitis and uterine secretion. However, other variables such as having multiple sex partners were not investigated due to cultural reasons or information withhold. Inconsistent with our findings, in a study by Kyriakis et al., low educational and socioeconomic status were predictive

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factors for STI (17). Similar to our findings, another study also found a significant correlation between genital herpes and cervicitis (5).

CONCLUSION

The results show that the prevalence of cervicitis in married women in Shohroud (northeastern Iran) is significantly correlated with vaginal discharge and history of genital herpes. It is suggested to perform similar studies in other parts of the country to determine the prevalence of cervicitis in Iran.

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CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

AUTHORS' CONTRIBUTIONS

Bahare Ameri (BA), Moussa Abolhassani (MA) and Fatemeh Mehravar (FM) contributed to the conception and design of the study, the acquisition of data and analysis and interpretation of data. FM drafted the manuscript. All authors read and approved the final manuscript.

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