International Scholars Journals

International Journal of Obstetrics and Gynecology ISSN: 2736-1594 Vol. 10 (2), pp. 001-004, February, 2022. Available online at www.internationalscholarsjournals.org © International Scholars Journals

Full Length Research Paper

Prevalence of infection with *Nisseria Gonorrhoeae* and *Chlamydia Trachomatis* in women visitors of gynecology and obstetrics clinics in Zanjan Province of Iran

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Accepted 19 August, 2021

***Neisseria gonorrhoeae* (NG) and *Chlamydia trachomatis* (CT) are two of the major causes of sexually transmitted infections (STIs) in many countries. There is little information about the prevalence of STIs in Zanjan Province of Iran. This study determines the prevalence of CT and NG cervical infection in women visitors of gynecology and obstetrics clinics in Zanjan. In this descriptive study, three hundred and twenty eight vaginal samples were collected from women referred to gynecology and obstetrics clinics in Zanjan, Iran from 1 to 29 April, 2009. NG was diagnosed by direct Gram staining and inoculation on modified Thayer Martin (MTM) agar with final identification, using commercial API NH kit and CT. This was done measuring serum IgM antibodies to *C. trachomatis* by commercial enzyme immunoassay (EIA). Prevalence of recent chlamydia and gonorrhea cervical infections at enrollment was 10.3 and 0.9%, respectively. Among sexual risk behaviors, only education was significantly associated with incident of CT. Variables not associated with the risk of CT cervical infection included age, method of contraception and number of sexual partners. These findings emphasize conduction of comprehensive and scheduled program of prevalence survey, aimed at reducing prevalence rate of STIs in the entire Zanjan**.

Key word: *Neisseria gonorrhoea*, C*hlamydia trachomatis*, sexually transmitted infections (STIs), prevalence.

INTRODUCTION

Chlamydia trachomatis (CT) and *Neisseria gonorrhoeae* (NG) are two of the major causes of sexually transmitted infections (Srifeungfung et al., 2009). In developing countries STIs are the main causes of reproductive morbidity and mortality and their high prevalence facilitates HIV transmission (Sopheab et al., 2008). In women, sexually transmitted infections (STIs) are often chronic and present with little or no symptoms, but eventually may lead to severe sequels, such as chronic pelvic inflammatory disease, ectopic pregnancy, and infertility (Oliveira et al., 2007). The majority of women with a cervical infection are asymptomatic and their infection cannot be detected by the syndromic approach, using the vaginal discharge syndrome (VDS) (Romoren et al., 2007). Gonorrhoea, a bacterial infection caused by NG, is a highly communicable STI and, due to a short incubation period, may serve as an indicator of recent risky sexual behavior in symptomatic patient (Jakopanec et al., 2009). *Chlamydiae* are obligate intracellular bacteria with a unique biphasic developmental cycle (Hobolt-Pedersen et al., 2009). CT is a major threat to the

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Table 1. Frequency distribution of age group and causative agent.

Age	No. of patients	Patients with positive test			
		N. gonorrhoea		*C. trachomatis*	
		N	%	N	%
15-24	122	1	0.8	14	11.5
25-34	149	2	1.3	17	11.4
35-44	52	0	0	3	5.7
>45	5	0	0	0	0
Total	328	3	0.9	34	10.3

reproductive health of women (Lyytikäinen et al., 2008) and is frequently asymptomatic in nature (Wolff et al., 2008). Compared to HIV that is a lifelong infection, curable bacterial STIs are biological markers that are more likely to reflect recent risk behavior. While high STI prevalence indicates frequent risky sexual practice and a poor provision or uptake of services, low STI prevalence reflects the improvement in provision of care services or change in risky behaviors (Sopheab et al., 2008). Therefore the present study was carried out to determine the current prevalence rates of chlamydial and gonorrhea infections, in selected sample of female adolescents in Zanjan, Iran.

MATERIALS AND METHODS

Study design and study population

Prior to the initiation of the experiment, permission was obtained from the Ethical Committee of Zanjan University of Medical Science. All participants were informed about the aim of the study and a written consent was obtained from them. Except charges for visit and treatment, all laboratory diagnostic procedures were free for all participants. Practical part of the study was performed according to the scheduled timetable.

In this descriptive study, 328 pregnant and non pregnant women, between the ages of 15 and 45 years, referred to all nine privet gynecology and obstetrics clinics in Zanjan, from 1 to 29 April 2009, were selected. Zanjan City is situated in northwest part of Iran with population of nearly 354616 people, in which 7 gynecology and obstetric clinic are actively engaged.

Bacteriological and serological assays and statistical analysis

Socio-demographic characteristics were obtained in privacy using structured questionnaires followed by specimen collection. A questionnaire was designed on socio-demographic characteristics including questions on age, method of contraception, number of sexual partners and education. Following physical examination by in charged physician in each clinic, two calcium–alginate swabs from endocervix, for bacteriologic diagnosis of NG, and venous blood sample, for serologic diagnosis of CT, were collected from study participants. At the site, first swab was immediately inoculated on Modified Thayer Martin Media (MTM) and second one for smear preparation. After transmission of cultured media, smears and blood samples to diagnostic medical laboratory, and the rest of diagnostic procedures were performed there. The ethanol fixed smears were Gram stained and examined by experienced microbiologists for the presence of intra and/or extra cellular Gram negative diplococci. Inoculated swab specimen on MTM agar was incubated at 37^{O}C in a candle jar for isolation of NG. Morphologically distinctive cultures were stained by Gram and tested for oxydase. Further identification of NG was done using commercial identification kit API NH (Jakopanecn et al., 2008). All positive smears showed positive culture but same thing did not happen for positive cultures, in which some of them showed negative smear, in direct microscopic examination. Since positive culture is a goal standard for NG diagnosis, it was considered as basic reference for present study.

Serum IgM antibodies to CT were analyzed by commercial Enzyme Immune Assay (ELISA, Chlamydia Trachomatis IgM**,** Calbiotech, Inc.)

SPSS (Statistical Package for social Sciences, Version 11) software package was used for statistical processing, and chi-square test for data analysis.

RESULTS

Of 328 women eligible for the analysis at baseline, 37 women had positive results for either CT or NG. Prevalence of chlamydia and gonorrhea cervical infections at enrollment was 10.4 and 0.9%, respectively.

Detail information on frequency distribution of age, number of affected individual and causative organism and information regarding methods of contraception and educational status is shown in Tables 1 and 2, respectively. In our study, all patients reported to have only one sexual partner.

Statistical analysis showed no significant association between age, educational status, method of contraception and sexual partner with CT cervical infection.

Due to the small number of affected patient with NG infection, no significant statistical association could be found between gonorrhea and above mentioned variables.

DISCUSSION

According to the World Health Organization (WHO) data, some 250,000,000 new cases of STDs are recorded

Table 2. Frequency distribution of contraception method and educational status.

	Patients with positive test			
	N. gonorrhoea		*C. trachomatis*	
	N	%	N	%
Method of contraception				
Pill	1	1.4	9	12.7
IUD	1	0.9	10	9.2
Vasectomy	0	0	5	13.5
Condom	0	0	0	0
Tubectomy	0	0	4	12.1
No method	1	2.2	5	11.1
Educational status				
Illiterate	1	3	7	21.2
Primary school	1	0.8	13	10.4
Secondary school	1	1.4	8	11.2
High secondary school	0	0	6	6.5
University	0	0	0	0
Total	3	0.9	34	10.3

worldwide every year (Ujević et al., 2009). Prevalence of CT and NG may vary depending on various factors like geographical distribution, method of diagnosis and type of study population. In comparison with other similar studies, the prevalence of cervical infection with CT and NG (CT 10.3%, NG 0.9%) in our study was considered to be slightly higher but also, in some cases, lower prevalence.

There is little information about the prevalence and risk factors for NG and CT in Iran. In a study performed in Babol, North of Iran, the prevalence of NG and CT was 0.2 and 11.6%, respectively (Bakhtiari and Firoozjahi, 2007). In women attending gynecology and obstetrics clinics in Tehran, prevalence of CT was reported as 12.3% (Chamani et al., 2006) whereas in similar study conducted in Ahvaz, this value was reported as 16.3% (Samarbaf-Zadeh et al., 2007). In a cross-sectional study conducted among women attending antenatal care clinics (ANCs) in Tete Province, Mozambique, prevalence of CT and NG was reported as 4.1 and 2.5%, respectively (Luján et al., 2008). In Croatia NG was isolated in three women (0.8 %) and CT in 58 women (9.4 %). Fifty-six of the CT-positive patients were nullipara and only two were unipara. All NG-positive patients were also nullipara (Ujević et al., 2009). In a study performed on three thousand and three women in Brazil, infection prevalence of chlamydia and gonococcus was 9.4 and 1.5 respectively (Jalil et al., 2008). In a study regarding risk factors for chlamydial and gonococcal cervical infections in women attending family planning clinics in Thailand the prevalence of CT and NG was reported as 5.5 and 0.6%, respectively (Rugpao et al., 2010). Identification of CT and NG among women who access services from a women's health clinic in rural Haiti, found a prevalence of CT of 6.2% and NG of 1.7% (Smith Fawzi et al., 2006). In investigating the prevalence of RTIs among married women in a rural district of Vietnam, and analyzing the influence of socioeconomic, socio demographic, and other determinants possibly related to RTIs, prevalence of CT and NG was 4.3 and 0.7%, respectively (Lan et al., 2008).

Among various socio demographic factors and sexual behaviors that were studied, age is one of the disputable issues. It is believed that younger age is a significant risk factor for cervical infections (Jalil et al., 2008; Rugpao et al., 2010; Fernandeset al 2009) but our study contradicts this finding. Among different method of contraception, there is a controversy on the use of condom and its effect on cervical infection. Some study shows significant association between these two (Kucinskiene et al., 2006; Plitt et al., 2005) but some report, in consistent with our finding, contradict this finding (Rugpao et al., 2010).

Educated people can be instructed and trained better and well communicated with their surroundings. Certain finding showed significant association between CT cervical infection and educational status (Luján et al., 2008; Jindal et al., 2009), but our finding contradicts this issue (Willers et al., 2008). Among various sexual behaviors that were studied, acquiring a new sexual partner was not found to be significantly associated with CT cervical infection in this study, which is not in consistent with other similar findings (Ujević et al., 2009; Rugpao et al., 2010). Regarding non significant association between multiple sex partners and

prevalence of cervical infection, it should be mentioned that the entire participants in this study were Moslem and married. And due to certain religious restriction and legislative prohibition, married women in Moslem community can not have sexual relation with anyone except their husbands and in case of committing such activity, nobody will disclose it. So we could not claim any confident and reliable analysis on this issue.

Conclusion

These findings emphasize conduction of comprehensive and scheduled program of prevalence survey, aimed at reducing the prevalence of STIs in Zanjan. The main limitation in this study was that, since the risk factors were self reported, it is possible that there was under- reporting and misclassification of risk behaviors.

ACKNOWLEDGEMENTS

We gratefully acknowledge the Zanjan Medical University for their financial support.

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