Awareness About Sexually Transmitted and Other Infections of the Reproductive Tract, Risk Factors and Other Predictors in Women

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Background: Genital tract infection is one of the major causes of morbidity and complications in both women and men.
Objectives: This study aimed to determine the level of awareness about risk factors and other predictors of sexually transmitted and other infections of the genital tract.
Patients and Methods: This analytic cross-sectional study was carried on 584 women aged 15-49, who had referred to health care centers of Tabriz, Iran during 2013. Multi-stage cluster sampling was performed and the data-collecting tool was a questionnaire, for which validity and reliability were determined. Descriptive and inferential statistics (independent t-test, one-way ANOVA, and univariate and multivariate analysis) were used to analyze the data using the SPSS 17 software.
Results: The mean ± SD score of awareness about non-sexual infections was 9.69 ± 3.2 with a range of 0 to 15. The mean ± SD score of awareness on sexually transmitted infections was 17.08 ± 7.42 with a range of 0 to 37. Multivariate analysis adjusting for potential confounding factors showed a statistically significant relationship between awareness score of non-sexual infections and variables of "sex only with husband", "anal, oral, anal-oral sex" and "marriage more than once". There was also a significant relationship between awareness of sexually transmitted infections with "anal, oral, anal-oral sex", "marriage more than once" and "history of blood transfusion in husband". Thus, the awareness score of the following women was higher than others (P < 0.05), those whose sex was not limited to their husband, had sex in unusual ways, reported a history of husband's blood transfusion, married only once.
Conclusions: The results of this study revealed that knowledge and understanding of subjects about sexual diseases is undesirable. So to increase awareness, women and girls must be sensitized to the importance of this issue.

Keywords: Reproductive Tract Infections; Risk Factors; Awareness; Women; Iran

1. Background

Sexually transmitted diseases (STDs) are a major health problem affecting mostly young people not only in developing, but also in developed countries (1) and all sexually active people are exposed to the risks of these diseases (2). Sexually transmitted diseases include diseases that are transmitted from one person to another during sexual (genital-anal-oral or pharyngeal) contact. There are more than 30 pathogens known to be transmitted sexually (3-5), which may be contaminated by viruses (genital herpes, human papilloma virus (HPV) or genital warts, hepatitis B and HIV), bacteria (gonorrhea, chancroid, syphilis and chlamydia) or parasites (pubic lice) (6). Some are associated with pain, ulcers and discharge, but most remain without any signs for a long time, and may be transmitted to others through unprotected sex and cause pelvic inflammatory disease (PID) and infertility, and consequently lead to ectopic pregnancy (6-8). Some of these diseases (gonorrhea, syphilis, chlamydia and trichomoniasis) can be cured, however their incidence has increased by about 11% between 2008 and 2005; others STDs (hepatitis B, HIV, herpes simplex virus (HSV) and HPV) are not curable (2, 9-12). These diseases are a major cause of illness, infertility, long-term morbidity and mortality associated with serious physical and psychological effects in women, men and their infants (13). Some sexually transmitted infections (STIs) can increase the risk of HIV by three or more times (14). Certain STIs, such as syphilis, gonorrhea, HIV infection, hepatitis B and chancroid, are most concentrated within "core populations" characterized by high rates of partner change, multiple concurrent partners, or high connection to "dense", sexual networks (15). The age group of 15 to 49 years has the greatest prevalence of sexually transmitted diseases, where nearly half of the infections occur in young adults and adolescents aged 14-24 years (1, 16). These data suggest the need for emergency prevention (15). The declining age at first sexual intercourse has been proved to be a possible explanation for the increase in the number of STDs (17, 18) and

the reluctance of adolescents to use condoms is another possible explanation (19-21). According to the statistics collected from medical universities and health services of Iran, until 2013, a total of 26125 individuals infected with HIV/AIDS have been identified. Among those registered, 89.8% were male and 10.2% were female and about half of the patients were aged between 25 and 34 years. The causes of HIV infection among cases that have been registered from 1986 to the present date are respectively, shared needles by injecting drug users (69.6%), sexual contact (12%), receiving blood and blood products (1%), and transmission from mother to child (1%). Although the number of people with AIDS is low in Iran, based on the current data, the World Health Organization (WHO) has reported that AIDS is seriously increasing in this country especially in women. More than 90% of women with HIV are infected through their husbands without being aware (22). In 2013, 33% of HIV transmissions were thorough sexual contact. However, in 2002, only 10% of HIV cases had become infected through sex. Talking about AIDS in Iran is accompanied by moral and secular restrictions. Also talking about puberty, sexual health and sexually transmitted diseases in families is still limited. Expression of disease may result in moral stigma from family, friends and the community. Therefore, these diseases spread secretly and hard to control (23). By considering religious and ethical issues, teachings and warnings should be provided at the basic level. Education and consultation about STIs should be a priority for health policy makers and should include all groups of adolescents, women, men, and health sector employees (24). The role of health workers, including midwives in training is very important. According to the Ministry of Health guidelines, training, tips and counseling on a variety of health issues, including sexual and sexually transmitted diseases is one of the important tasks of midwives (25). Recognizing the community's educational needs can be helpful for improving public health (26).

2. Objectives

With regards to the increase of STIs in Iran, this study was performed with the aim of determining risk factors and other predictors of awareness on sexually transmitted and other infections of the genital tract in women who had referred to health centers of Tabriz.

3. Patients and Methods

This analytic cross-sectional research, investigated risk factors and other predictors of awareness about sexually transmitted and other infections of genital tract in women who had referred to health centers of Tabriz, Iran, during the year 2013. The population consisted of all women who had referred to health centers of Tabriz. Inclusion criteria were: referral to Tabriz health centers and having records, having more than elementary school literacy, willingness to participate in the research, not

being single, age range of 15 to 49. The exclusion criteria were: individuals' refusal to participate in the study and not filling more than 20% of the questionnaire. The sample size was primarily estimated as 384 individuals by using the formula for calculating proportion; considering that P = 50%, z = 1.96, and d = 0.05 and that the design effect equaled 1.5, the sample size was calculated as 584. At first, a list of all the health care centers and sub-centers of Tabriz (totally 65 centers and sub-centers) was obtained from the Health Center of Tabriz. Then, sampling was done in two stages by the multistage cluster sampling method. Randomly 22 centers and sub-centers (nine centers and 13 sub-centers) were selected among 27 centers and 38 health sub-centers. During the next stage, regarding the sample size, 25-30 health records were randomly selected from all the records of women and after phoning these women and explaining the study, they were invited for an interview on a specific day. Sampling during both stages was done randomly through the following website www.randomizer.org. Firstly, 621 eligible women were selected, of whom 37 declined to participate and 584 consented. The data collecting tool of this study was a researcher-regulated questionnaire which was designed according to information in books and articles. This questionnaire consisted of two parts: the first part was related to questions about awareness on STIs and non-sexual genital infections and risk factors while the second part was related to the socio-demographic characteristics and patient's history of midwifery and reproduction. The validity of the tool was determined using comments provided by ten academic members of Tabriz University of Medical Sciences through content validity. Content validity reliability (CVR) and content validity index (CVI) indices were 0.72 and 0.81, respectively. The reliability was determined through the test and re-test method on 30 subjects. It was assessed by the Cronbach's alpha coefficient which was r = 0.81. After approval of the proposal and scientific confirmation of the questionnaire, permission was obtained from the ethical committee of research of Tabriz University of Medical Sciences. The questionnaire was completed by subjects, after the researcher introduced the study objectives and explained the differences between natural secretions of the genital system and infections. In order to identify the level of awareness, score 1 was given to "right" answers and zero was given to "wrong" or "I don't know" answers and the total score for each individual was calculated. The total score for each individual, according to the number of awareness questions about non-sexual genital infections was between 0-15. Knowledge score of < 5 was considered as weak, 6-10 as average and 11-15 as good. Also, the total score for each individual according to the number of awareness questions on STIs was between 0-37. Knowledge score of < 12 was considered as weak, 13-24 as average and 25-37 as good. It should be noted that from 37 questions, 14 questions were related to awareness regarding HPV. Before data collection, ethical satisfaction form

was given to the study subjects and written consent was obtained and voluntariness and confidentiality of the information were emphasized. The participants could express that they had no satisfaction and willingness. It was emphasized that the questionnaire should be answered carefully in order to arrange educational programs and promote health-related knowledge of all the members of the society. This study was approved by the research deputy of Tabriz University of Medical Sciences (code: 91101).

3.1. Statistical Analysis and Statistical Software

After collecting the questionnaires, the data were analyzed by using the SPSS software (ver.17). Descriptive statistics were used to examine the frequency distribution, mean and 95% confidence interval (CI) of the mean. In order to answer the questions of the research, independent t-test, Mann-Whitney, Kruskal-Wallis and one-way ANOVA were used and in order to control the confounding factors and identify their effect, univariate and multivariate statistics were used. Before conducting the multivariate analysis, assumptions of the regression were studied, including the normality of the residuals, the homogeneity of the residual variance, the multicollinearity of independent variables, and the independence of the residuals. The variables with $P < 0.1$ were entered in the model. In this study, $P < 0.05$ was considered significant.

4. Results

Most of the participants (48.3%) and their husbands (33%) had high school diplomas. Most of the individuals (56.1%) were aged 20 to 29 years (90.2%), were housewives and had sufficient income (59.4%). The mean ± SD score of awareness about non-sexual infections was 9.69 ± 3.2 with a range of 0 to15, and therefore there was an average level of awareness in this regard. The mean ± SD score of awareness on sexually transmitted infections was 17.08 ± 7.42 with a range of 0 to 37 and thus there was poor to moderate level of awareness in this regard. The median (min, max) of the individuals' scores regarding knowledge about HPV was three (0, 13) and thus was very low (Table 1). There was a significant relationship between the score of individual awareness on sexual and non-sexual infections and age, education and occupation ($P < 0.05$). Individuals aged less than twenty years, had the least score of awareness. The score of awareness was higher in participants with higher level of education (both herself and her husband) and in those working outside their home (Table 2). In relation to risk factors, almost half of the participants had a history of genital tract infections. There was a statistically significant relationship between "sex only with husband", "oral, anal, and vaginal-oral sex", and "history of marriage more than once" and the score of awareness on sexual and non-sexual infections (Table 3). Regarding questions about non-sexual infections, the lowest number of correct answers was given

to the following phrases, "long-term use of antibiotics, may predispose patients to genital tract infections" (18.9%) and "pregnant women or women with diabetes are more susceptible to genital infections" (35.2%). Also, the least accurate answers for questions on sexually transmitted infections, belonged to "HPV is not treated with antibiotics" (6.4 %) and "there is a vaccine to prevent HPV" (8.4%), respectively. The most correct answers for questions about non-sexual infections belonged to the following phrases, "rapid diagnosis and treatment of some genital tract infections can prevent their risks" (90.1%), With regard to sexually transmitted infections, the most accurate answers were given for the following phrases, "itching or burning of genitalia is one of the symptoms of STIs" (92.6 %) and " burning or pain when urinating is one of the symptoms of STIs" (86.9%). Multivariate analysis adjusting for potential confounders showed a significant statistical relationship between awareness score and age. So that, the highest scores for questions on non-sexual infections and STIs belonged to 40-49 (β = 4.58, 95% CI = 1.21 -7.95) and 20-29 (β = 2.05, 95% CI = 0.325 -3.781) years-old participants, respectively. Also, there was a significant statistical relationship between awareness score and educational level. Awareness score in people with elementary education was significantly less than people with university degrees regarding non-sexual infections (β = -1.56, 95% CI = -2.82 to -0.29) and STIs (β = -4.67, 95% CI = -7.61 to -1.73). Besides, there was a similar statistical relationship between awareness score and husband's educational level. Multivariate analysis indicated a statistically significant relationship between awareness score of non-sexual infections and variables of "sex only with husband" (β = 2.08, 95% CI = 0.58-3.57), "anal, oral, and anal-oral sex" (β = -2.10, 95% CI = -3.65 to -0.56) and "marriage more than once" (β = 2.195, 95% CI = 0.909-3.481). There was also a significant relationship between awareness of STIs and "anal, oral, anal-oral sex" (β = -3.83, 95% CI = -7.445 to -0.226), "marriage more than once" (β = 4.493, 95% CI = 1.490-7.497), and "history of blood transfusion in husband" (β = -1.78, 95% CI = -5.95-2.39). So that, awareness scores of the following women was higher than the rest, those whose sex was not limited to their husband, had sex in unusual ways, those who reported a history of husband's blood transfusion, and those that had married only once (Table 4).

Table 1. Awareness on Sexual and Non-Sexual Transmitted Infections [a]

Awareness Level	Non-Sexual Infections	Sexually Transmitted Infections
Weak	61 (10.8)	162 (28.2)
Average	254 (45.1)	313 (54.4)
Good	248 (44)	100 (17.4)

[a] Data are presented as No. (%).

Table 2. The Association of Socio-Demographic Characteristics and Awareness on Infections [a,b]

Socio-Demographic Characteristics	Frequency	Awareness on Non-Sexual Infections	P Value	Awareness on STIs	P Value
Age group, y			0.001		0.001
< 20	19 (3.3)	8.54 ± 3.32		13.10 ± 4.89	
20-29	327 (56.1)	9.33 ± 3.21		16.57 ± 7.34	
30-39	198 (34)	10.33 ± 3.03		18.54 ± 7.55	
40-49	39 (6.6)	10.27 ± 3.23		18.28 ± 7.23	
Education level			< 0.001		< 0.001
Primary school	63 (10.8)	8.87 ± 3.36		13.23 ± 6.37	
Secondary school	85 (14.6)	8.72 ± 3.14		14.53 ± 6.23	
High school	63 (10.8)	8.76 ± 3.78		16.15 ± 8.39	
Diploma	282 (48.3)	9.83 ± 2.99		17.23 ± 7.86)	
Academic	91 (15.6)	11.36 ± 2.57		22.26 ± 7.30	
Employment status			0.027		0.001
Housewife	525 (90.2)	9.61 ± 3.18		16.73 ± 7.29	
Working at home	21 (3.6)	9.39 ± 3.36		18.71 ± 6.51	
Working out of the home	36 (6.2)	11.07 ± 3.11		21.41 ± 8.61	
Income			0.98		0.08
Sufficient	330 (59.4)	9.74 ± 3.17		17.63 ± 7.49	
Insufficient	226 (40.6)	9.74 ± 3.15		16.50 ± 7.41	
Husband's education			< 0.001		< 0.001
Illiterate	8 (1.4)	8.12 ± 3.72		11.09 ± 3.39	
Primary school	70 (12)	9.43 ± 2.89		15.19 ± 6.96)	
Secondary school	138 (23.7)	8.57 ± 3.52		14.26 ± 6.79	
High school	70 (12)	9.47 ± 3.26		17.04 ± 6.95	
Diploma	192 (33)	10.05 ± 2.93		17.97 ± 7.33	
Academic	104 (17.9)	11.03 ± 2.72		21.09 ± 7.13	

[a] Data are presented as No. (%) or Mean ± SD.
[b] Minimum score of awareness about non-sexual infections was zero and maximum was 15. Minimum score of awareness on sexual infections was zero and maximum was 35.

Table 3. Frequency of Risk Factors and Their Association With Awareness on Infections [a]

Risk Factors	Yes, No. (%)	No, No. (%)	Don't Know	P Value	
				Non Sex	Sex
Have you ever had a genital tract infection (vagina, uterus and pelvis)?	263 (45.7)	313 (54.3)	-	0.02	0.2
Do you have a history of going to prison?	1 (0.2)	580 (99.8)	-	< 0.001	1
Does your partner have a history of going to prison?	9 (1.6)	553 (95.5)	17 (2.9)	< 0.001	0.001
Has your husband traveled abroad alone?	67 (11.7)	503 (87.5)	5 (0.9)	0.22	< 0.001
Are you a drug addict?	1 (0.2)	578 (99.8)	-	0.99	1
Does your husband have a drug addiction?	5 (0.5)	571 (98.6)	3 (0.9)	1	1
Do you have a history of blood transfusions?	4 (0.7)	572 (99.1)	1 (0.2)	0.99	1
Does your husband have a history of blood transfusions?	12 (2.1)	551 (95.2)	16 (2.8)	0.13	0.19
Do you have warts, blisters or sores on the genitalia, anus, or surrounding areas?	11 (1.9)	569 (98.1)	-	0.005	0.99
Does your husband have warts, blisters or sores on the genitalia, anus, or surrounding areas?	8 (1.4)	571 (98.6)	-	0.03	0.004
Do you have oral, anal, and vaginal-oral sex?	40 (6.9)	515 (88.9)	24 (4.1)	0.27	0.52
Do you have a history of marriage more than once?	27 (4.7)	549 (95.3)	-	< 0.001	< 0.001

[a] Independent t-Test, one-way ANOVA.

Table 4. Predictive Value of Potential Confounding Variables for Awareness Determined Using the General Linear Model [a]

Variable	Awareness on Sexually Transmitted Infections		Awareness on Non-Sexual Genital Infections	
	β (CI 95%)	P Value	β (CI 95%)	P Value
Education				
Academic	Ref		Ref	
Primary school	-4.674 (-7.614-1.733)	0.002 [a]	-1.556 (-2.815-0.297)	0.016 [a]
Secondary school	-4.693 (-7.302-2.085)	< 0.001 [a]	-1.541 (-2.658-0.423)	0.007 [a]
High school	-1.144 (-3.886-1.598)	0.413	-0.591 (-1.765-0.584)	0.323
Diploma	-2.942 (-4.957-0.927)	0.004 [a]	-0.869 (-1.732-0.006)	0.049 [a]
Age, y				
20 >	Ref		Ref	
20-29	3.163 (-0.872-7.197)	0.124	2.053 (0.325-3.781)	0.02 [a]
30-39	3.338 (0.070-6.605)	0.045 [a]	0.702 (-0.698-2.101)	0.325
40-49	4.579 (1.205-7.953)	0.008 [a]	1.478 (0.034-2.923)	0.045 [a]
Wife education				
Academic	Ref		Ref	
Illiterate	-6.149 (-12.100-0.199)	0.043 [a]	-2.716 (-5.265-0.167)	0.037 [a]
Primary school	-3.047 (-5.666-0.429)	0.023 [a]	-0. 724 (-2.658-0.423)	0.205
Secondary school	-3.728 (-5.933-1.522)	0.001 [a]	-1.128 (-2.073-0.183)	0.019 [a]
High school	-2. 542 (-4.977-0.107)	0.041 [a]	-0.886 (-1.929-0.157)	0.096
Diploma	-1.209 (-3.106-0.687)	0.211	-0.222 (-1.034-0.590)	0.592
Anal, oral, Anal-oral sex				
Yes	Ref		Ref	
No	-3.835 (-7.445-0.226)	0.037 [a]	-2.103 (-3.649-0.557)	0.008 [a]
Don't know	0.520 (-1.802-2.842)	0.66	0.480 (-0.515-1.474)	0.343
Sex only with husband				
Yes	Ref		Ref	
No	0.927 (-2.559-4.412)	0.602	2.077 (0.585-3.570)	0.006 [a]
Husband blood transfusion				
Yes	Ref		Ref	
No	-4.841 (-10.652-0.97)	0.102	-0.754 (-3.243-1.735)	0.552
Don't know	-1.780 (-5.950-2.389)	0.0402 [a]	-0.824 (-2.610-0.961)	0.365
Genital infection				
Yes	Ref		Ref	
No	-0.913 (-2.127-0.302)	0.140	-0.596 (-1.116-0.076)	0.025 [a]
Marriage more than once				
Yes	Ref		Ref	
No	4.493 (1.490-7.497)	0.003 [a]	2.195 (0.909-3.481)	0.001 [a]

[a] R Squared (non-sexual genital infections) = 0.206 (Adjusted R Squared = 0.157); R Squared (Sexually Transmitted Infections) = 0.240 (Adjusted R Squared = 0.193).

5. Discussion

In this study, awareness about genital infections was moderate. In a review study on genital tract infections studying the time frame between 1990 and 2010, among adolescents in European countries, awareness about the genital tract infections was reported average and below average with the exception of HIV/AIDS that was over 90% (1), which is consistent with the results of the present study. The mean ± SD score of awareness about STIs was 17.08 ± 7.42 with a range of 0 to 37, so subjects had poor to moderate level of awareness. In the study done

by Mohammadi et al. mean scores were moderate on the nine-point STI/HIV/AIDS scale (3.86; SD = 2.13) and the three-point condom awareness index (1.50; SD = 1.20) (27). Kolahi et al. in their study on a female at-risk population showed that most subjects knew that AIDS currently has no cure (81.2%) and no vaccine (73.4%). Most also knew that HIV is transmissible from people who do not know they are HIV positive (59.4%), and that proper condom use (78.1%) and having a single sexual partner (68.8%) can reduce the possibility of infection. Of the participants, 43.4% knew that an HIV-positive person can seem perfectly healthy (28). Shiferaw and colleagues in their study in Ethiopia showed that students' knowledge about some aspects of STD was low and only half of them knew that HIV is untreatable, and HIV can be transmitted through sex. Also knowledge about STIs was low (29). In another study in Pakistan, 25% of people were aware about the ways of transmission and prevention of HIV (30). Zhang et al. in a study on Chinese university students showed that students had limited knowledge and awareness about common STIs, symptoms and complications. Most students had misconceptions about transmission and prevention of STIs. The internet was the main information resource for 76% of students (31). It should be noted that in our study, 14 out of 37 questions were related to awareness on HPV and the mean score was very low. There is much concern regarding low awareness and poor control of sexually transmitted diseases. We don't know the exact transmission modes of these diseases in the community. This indicates the poor performance of the healthcare system regarding sex-related complications. Moreover, because of embarrassment and shame in our society, general information about sexual diseases and rate of genital infections, especially amongst youth, as a high-risk group, is low in Iran. Obtaining accurate data directly is difficult and researchers can only rely on indirect information (32). However, introducing community-based education and giving the required information while considering moral and religious beliefs is necessary. Training programs should provide information about complications of genital infections in people including infertility, ectopic pregnancy, pelvic inflammatory disease, cervical cancer and adverse pregnancy outcomes such as spontaneous abortion, fetal death creation, delivery and postpartum infections. Such information may stop many people from having risky behaviors. In the present study, the score of awareness increased with enhancement of education. In addition, awareness score among employed women was more than housewives. Promotion of individual's educational level may increase their motivation and willingness to use a variety of educational resources, participate in educational programs and make use of past experiences. The positive and multiplier effects of education and general literacy on population health, particularly women's health, are well known and researched. Health literacy as a discrete form of literacy is becoming increasingly important for

social, economic and health development (33). In a study on Indian railway employees and their family members by Chauhan et al. there was a significant correlation between level of education and knowledge (34). Also in another study by Das and colleagues in India, this relationship was confirmed (35). These studies are consistent with the results of the present study. Health education and prevention remain to be the main health care priorities in AIDS prevention (36). The results of this study showed that the awareness score of women in whom sex was not limited to their husband, had sex in unusual ways, reported a history of husband's blood, were higher than others. These results revealed that having risk factors of disease could lead to increasing awareness. Therefore, in order to raise awareness and improve behavior, women and girls must be sensitized to the importance of this issue. In this study, subjects were selected randomly from different regions and different social-economical levels. One of the limitations of this study was that the sample only included women who had referred to Tabriz health care centers, and therefore the results may not be generalized for all women. Also, due to the nature of the questions, there was a possibility of incorrect answers, which was partly controlled by emphasizing confidentiality and questionnaires not requiring the names of the participants. In this study, the data-collecting questionnaire was self-administered and so illiterate women were not studied. It is suggested that other similar studies on other groups of the society especially younger people, adolescents and school students should be performed, investigating their awareness level about genital infections in order to design necessary programs and achieve the goal of first level prevention for avoidance of risky behaviors. Genital tract infections are one of the major causes of morbidity and complications in both women and men. Therefore, primary prevention of these infections should be a health priority. Training courses about genital infections must be conducted for school-age adolescents and before marriage. Health educators must be complied with this strategy. This requires the promotion of awareness and knowledge to control the spread of sexually transmitted infections (including HIV/AIDS) among young people. Therefore, the need for more research on the awareness and education of the public about reproductive tract infections is necessary. Despite the importance of disease prevalence in the community, knowledge and understanding of women about sexual diseases and prevention methods is weak. Sexually transmitted disease clinics established to meet the needs of screening, treatment; health education and STD-related concepts are helpful. Furthermore, education programs must include the public and also health care providers.

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Authors' Contributions

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