

Original Article



Preventive Behaviors of Iranian Women Toward Sexually Transmitted Infections: A Perspective of Motivation Protection Theory

Sara Kazemi¹ , Fatemeh Zarei¹ , Alireza Heidarnia¹, Fatemeh Alhani²

¹Department of Health Education and Health Promotion, Faculty of Medical Sciences, Tarbiat Modares University, Tehran, Iran

²Department of Nursing, Faculty of Medical Sciences, Tarbiat Modares University, Tehran, Iran

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*Corresponding author:

Fatemeh Zarei,

Email: f.zarei@modares.ac.ir

Abstract

Background: Sexually transmitted infections (STIs) are frequently unreported, representing implied public health concerns, especially for women and in more vulnerable communities. This study aimed to determine the STI preventive behavior of Iranian women and related factors in protection motivation theory (PMT).

Methods: A cross-sectional online survey was conducted on a convenience sample from 20 January to 21 March 2021 in Iran. Women who were 18-35 years old with marital status were eligible to participate (N=600). The collected variables included demographic characteristics and STI-related behaviors regarding constructs of PMT: knowledge, perceived vulnerability, perceived self-efficacy, and preventive intention. A Persian version of the Korean four-scale about STI preventive behaviors was used as the assessment tool, and one-way ANOVA and Pearson correlation tests were used for analysis.

Results: A significant difference was observed between knowledge, perceived vulnerability, perceived self-efficacy, and preventive intention with sociodemographic variables. STI-perceived vulnerability and STI-knowledge with mean scores of 62.37 and 42.52 were the highest and lowest perceived constructs of preventive behavior, respectively. STI knowledge of Iranian women was low, and STI-preventive self-efficacy was perceived as a positive predictor for STI protective behaviors.

Conclusion: A theory-based educational intervention is highly recommended to improve STI-protective behaviors.

Keywords: Sexually transmitted diseases, Women, Primary prevention, Behavior



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Introduction

Sexually transmitted infections (STIs) remain a major public health concern all over the world. Every day, more than 1 million treatable STIs have been obtained worldwide, with 376 million new cases reported annually (1). The burden of STIs is excessively higher in low- and middle-income countries, where 75-85% of new cases are estimated to arise worldwide (2,3). According to the available data, the 15-44 age range has a higher risk of STIs (4). Increasing divorce age (5) and subsequent repatterning certainly contribute to STI transmission throughout midlife among those who do not engage in safer sex behaviors such as condom usage or STI testing. In the absence of treatment, STIs can have a severe impact on sexual, reproductive, and maternal-child health, including increased risk of infertility, HIV, pelvic inflammatory disease, ectopic pregnancy, and perinatal infections (6-8).

Iran has a high prevalence of sexually transmitted

diseases (STDs) such as chlamydia, gonorrhea, and HIV. The Ministry of Health and Medical Education has reported relevant statistics regarding the spread of STDs, including increased transmission rates through sexual contact (9). There is also a lack of awareness and education about sexual health and STDs among the general population in Iran (10,11). Research is crucial to better understand the distribution, transmission, and risk factors of these diseases to develop effective prevention and control strategies and to identify knowledge gaps and misconceptions for improving awareness and education (12). Researching the preventive behaviors of Iranian women toward STIs can help develop effective interventions (13). Additionally, there is a stigma associated with STDs in Iran, which makes it challenging for people to seek medical advice and treatment. Research can help address this stigma by promoting acceptance and understanding of STDs as common health conditions that can be treated effectively.



Various individual, social, and cultural factors influence sexual behavior and the choice of preventive behaviors (14). Regardless of clinical factors, controlling STIs is a problematic issue due to the difficulty in changing sexual behaviors formed according to being personal, as well as difficulty in discussing sexual relations influenced by the culture and religion of each region (15). The scientific literature in this field reveals that young Muslim women with a history of premarital sexual intercourse as well as married women whose husbands were not monogamous and even had a history of temporary marriage who had not been infected by STIs before marriage are at risk for poor sexual health knowledge (16). Assured STIs-knowledge is arguably the main construct for changing behavior, and evidence has shown that having sufficient knowledge about condoms does not mean using them (17). It is a truth that the existence of STIs in Iran and other Islamic countries is considered taboo by the government and the general public and has created a state of denial that some refer to as a “health crisis behind the veil” (18-20). In addition, the occurrence of premarital sex has increased over the years (21).

Many studies revealed that behavioral analysis and interventions based on theory and conceptual frameworks are more reliable than similar studies without support and solid theorizing (22, 23). Hence, this study aimed to assess the application of four main constructs of protection motivation theory (PMT) among women aged 18-35 by measuring the theory's constructs (perceived vulnerability, perceived self-efficacy, and perceived intention) to clarify the study participants' STI-preventive behaviors (i.e., early screening for STIs and using a condom). PMT was selected for this study since it implies that fear affects health attitudes and behaviors (24). According to previous studies, this theory has predicted various preventive and protective behaviors, including the reduced risk of AIDS (25), adolescents' reproductive and sexual health, preventive high-risk sexual behaviors (13, 26), and STI preventive behaviors (27, 28). The present study was designed to answer the following research questions:

1. What is the relationship between socio-demographic variables and STI-protection motivation behaviors?
2. What is the relation among the constructs of STI-protective motivation?

Materials and Methods

Study Design, Setting, and Participants

A descriptive-analytical cross-sectional online survey was designed with a convenience sampling technique. Using the Cochran formula with a 2% sampling error, 0.5 proportions, and a confidence level of 0.95, the minimum sample size was estimated to be 400. Considering a 10% sample drop, the sample size was 440. The eligibility criteria for the inclusion of participants included being women aged 18-35 with various marital statuses such as permanent marriage, temporary marriage, divorce, and widowhood. Moreover, all samples should have at least

one sexual relationship experience in the past 6 months.

The online questionnaire was made accessible to participants via social media platforms, including WhatsApp, Telegram, and Instagram in Iran. The recruitment process began with an online announcement inviting individuals to participate in the study through social media apps such as Telegram, WhatsApp, and Instagram. The announcement included the study's purpose, the research team's contact information, and the eligibility criteria. Participants were given 10 days from the announcement date to participate in the study. During the recruitment process, a trained assistant who was not part of the research team facilitated the sampling process. Eligible and interested individuals were provided with a detailed explanation of the study's purpose and were assured that their information would be kept confidential. The informed consent form was sent electronically to eligible individuals via social media and email. From January to March 2021, 600 individuals accepted the invitation link and completed the questionnaire after the online announcement was released.

Conceptual Framework

This study utilized the PMT (29) as part of the conceptual framework. This theory posits that individuals make decisions based on their fear of illness or fear-inducing objects and the cognitive processes that drive them to seek self-protection. Within the PMT framework, we focused on the concepts of perceived vulnerability, perceived self-efficacy, and behavioral intentions. We did not include perceived severity and response efficacy in our analysis as another study found that these factors are not effective in changing behaviors related to STI prevention education (12). Although knowledge is not a construct of PMT, it was evaluated alongside the main constructs of this theory since increasing knowledge and awareness about STIs can be an effective component in promoting self-protection against STIs (10,30). By providing individuals with accurate information about STIs and their transmission, they can make informed decisions about their behaviors and take steps to reduce their risk of infection. Therefore, four constructs were assessed: STI-knowledge, STI-vulnerability, STI-prevention self-efficacy, and STI-prevention intentions.

Measurement

The data tool used in this study consisted of two parts: a sociodemographic variable and a valid questionnaire about protection motivation behavior in STIs. In part one, the sociodemographic variables contained information about age, education, marital status, job, husband's job, economic status, temporary marriage, history of STIs, number of marriages, duration of marriages, and age at the first sexual encounter. This part of the questionnaire aimed to assess STI-related preventive behaviors among Iranian women regarding PMT. It consisted of 40 items with 4 dimensions: STI-perceived vulnerability (4 items e.g., “I

am very healthy and I will never get sexually transmitted infections” and “Sexually transmitted infections can have side effects such as infertility in women”), STI-preventive self-efficacy (4 items; e.g., “I’m sure I can use a condom properly” and “I’m sure I know the risk factors for sexually transmitted infections”), protection motivation (behavioral intent) (4 items; e.g., “I will not have sex with more than one sexual partner” and “I use condoms to prevent sexually transmitted infections”), and STI knowledge (28 items; e.g., “The virus (HIV) that causes AIDS can be transmitted through blood” and “Gonorrhea may have no symptoms”) (13). This tool does not consider a specific grade or cutting level. The scoring criterion is the average of the total scores (31). STIs-knowledge consisted of 28 items with 3 options: correct (2 points), I do not know (1 point), and incorrect (0 points). The total score is between 0-56, and a high score indicates a higher level of knowledge about STIs.

To compare preventive behavioral domains, scores for each domain were normalized based on 0–100. STI-perceived vulnerability was assessed by 4 items with a four-point Likert scale from strongly agree (4 points) to strongly disagree (1 point). The total score for each item was 4-16. A higher score on STI-perceived vulnerability indicates a stronger belief that exposure to STIs increases vulnerability to getting STIs.

STI-preventive self-efficacy also consisted of 4 items with a four-point Likert scale from strongly agree (4 points) to strongly disagree (1 point). The total score for each scale was 4-16. A higher score on the STI-preventive self-efficacy indicates a strong belief in a person’s ability to prevent STIs.

STI-preventive intention also included 4 items with a four-point Likert scale from strongly agree (4 points) to strongly disagree (1 point). The total score for each scale was 4-16. STI-preventive intention included programs to use condoms to prevent infection and to reduce high-risk behaviors related to STIs. A higher score on the STI prevention scale indicates a stronger intention to prevent high-risk behaviors that are known to cause STIs.

The content validity rate and content validity index were calculated for four-scale items, and their values ranged between 0.56 to 1.00 and 0.83 to 1.00, respectively. To assess the instrument’s face validity, the expert panel’s recommendations ($n=10$) and item impact scores were evaluated. All items had an impact score above 1.5. Cronbach alpha and intra-class correlation coefficient of the four-scale tool regarding STI preventive behaviors ranged between 0.66–0.85 and 0.846–0.977, respectively. The total Cronbach alpha for the mentioned tool was 0.87, and Cronbach’s alpha for each domain was as follows: STI knowledge=0.81, STI-perceived vulnerability=0.66, STI-preventive self-efficacy=0.83, and STI-preventive intention=0.85.

Statistical Methods

Data were analyzed using SPSS 16 software. The normality of the variables was tested by the Kolmogorov-Smirnov

test. Variables were analyzed using descriptive statistics (frequency, percent, mean, and standard deviation) and inferential statistics (One-way ANOVA test and Pearson correlation). The significance level was considered less than 0.05.

Results

The mean age of 600 participants was 32.02 ± 5.65 years, 54.5% were permanently married, 40.3% had self-employment, and 87% had a university education. The mean for age duration of marriages was 6.99 ± 6.16 years, and the mean for age at first sexual encounter was 23.62 ± 6.16 years (Table 1).

Table 2 shows the mean, standard deviation, minimum, and maximum values for each variable, as well as their internal consistency measured by Cronbach’s alpha. Table 2 indicates that, on average, participants had moderate levels of knowledge about STIs and moderate levels of perceived vulnerability to STIs but relatively low levels of prevention self-efficacy and moderate levels of preventive intention. Moreover, there was considerable variability in scores among participants for all four variables. STI-perceived vulnerability with a mean score of 62.37 and STIs-knowledge with a mean score of 42.52 had the highest and the lowest mean score among the areas of preventive behavior, respectively (Table 2).

Knowledge had a statistically significant relationship with the job ($P<0.001$), education ($P=0.001$), husband’s education ($P<0.001$), and husband’s job ($P=0.039$), so Tukey pairwise comparisons showed that housewives’ knowledge was significantly lower than that of women with full-time jobs ($P=0.016$) and self-employment women ($P<0.001$). Knowledge in women with a university education was higher than knowledge in women with a diploma education. Tukey pairwise comparisons also demonstrated that knowledge in women whose husbands were self-employed was significantly higher than that in women with husbands without jobs ($P=0.03$).

STI-perceived vulnerability showed a statistically significant relationship with the wife’s education ($P<0.001$) and the spouse’s education ($P=0.003$), so vulnerability was higher in women who had a university-level education.

Spouse occupation also displayed a statistically significant relationship with vulnerability ($P=0.001$), and Tukey pairwise comparisons showed that STI-perceived vulnerability in women whose husbands were unemployed is less than that in women with full-time spouses ($P=0.001$) as well as self-employment women ($P=0.01$).

Economic status was another variable that showed a statistically significant relationship with STI-perceived vulnerability ($P=0.002$), and Tukey pairwise comparisons indicated that vulnerability in women with poor economic status is significantly lower than desirable ($P=0.013$) and very desirable ($P=0.008$).

Furthermore, STI-preventive self-efficacy was statistically and significantly related to marital status ($P=0.006$), occupation ($P=0.005$), education ($P<0.001$),

Table 1. Demographic Characteristics of the Study Subjects and Their Correlation With Prevention Behavior Regarding Protection Motivation (N = 600)

Variables	No. (%)	STIs-Knowledge	STI-Perceived Vulnerability	STI-Prevention Self-efficacy	STI-Preventive Intention
Marital status					
Single	129 (21.5)	11.96 (4.87)	11.38 (1.49)	9.39 (2.42)	11.99 (2.44)
Married	327 (54.5)	12.03 (5.38)	11.63 (1.79)	9.46 (2.59)	11.36 (2.67)
Divorced & widow	119 (19.8)	11.74 (5.90)	11.19 (1.74)	8.76 (2.39)	10.83 (2.44)
Temporary marriage	25 (4.2)	10.72 (3.86)	11.52 (1.73)	8.68 (1.52)	9.32 (1.99)
<i>P</i> value ^a		0.674	0.102	0.006	0.000
Job					
Full-time	206 (34.3)	12.06 (5.6)	11.58 (1.7)	9.74 (2.5)	11.61 (2.62)
Self-employment	242 (40.3)	12.64 (5.52)	11.57 (1.65)	9.37 (2.37)	11.38 (2.53)
Housewife	152 (25.3)	10.51 (4.28)	11.22 (1.83)	8.87 (2.64)	10.78 (2.64)
<i>P</i> value ^a		0.000	0.096	0.005	0.011
Education					
Diploma	78 (13)	19.9 (7.88)	22.42 (2.67)	15.83 (3.4)	19.13 (3.97)
University	522 (87)	24.41 (10.82)	23.24 (3.29)	19.26 (5.01)	23.16 (5.2)
<i>P</i> value ^a		0.001	0.000	0.000	0.000
Spouse's education					
Diploma	185 (30.8)	20.58 (9.62)	21.99 (3.57)	17.38 (4.01)	21.07 (4.53)
University	193 (32.2)	23.65 (10.68)	23.24 (3.68)	19.59 (5.13)	23.08 (5.08)
<i>P</i> value ^a		0.001	0.003	0.000	0.011
Spouse's job					
Full-time	105 (17.5)	11.54 (5.14)	11.88 (1.69)	9.72 (2.72)	11.63 (2.59)
Self-employment	254 (42.3)	11.91 (5.38)	11.46 (1.87)	9.39 (2.45)	11 (2.66)
No job	19 (3.2)	8.73 (3.76)	10.21 (1.08)	7.26 (0.99)	9.74 (1.62)
<i>P</i> value ^a		0.039	0.001	0.000	0.008
Economic status					
Very desirable	23 (3.7)	11.77 (4.91)	12.27 (1.51)	8.45 (1.22)	10.73 (1.03)
Desirable	437 (72.5)	11.74 (5.25)	11.57 (1.67)	9.49 (2.54)	11.54 (2.71)
Undesirable	143 (23.8)	12.43 (5.58)	11.1 (1.85)	9.15 (2.51)	10.69 (2.61)
<i>P</i> value ^a		0.400	0.002	0.084	0.002

Note. STI: Sexually transmitted infection.

^aOne-way ANOVA test.

Table 2. Mean and Standard Deviation of the Preventive Behavior Regarding Protection Motivation (N = 600)

Variable	Cronbach α	Minimum	Maximum	Mean	SD
STIs-Knowledge	0.81	0	100	42.52	19.02
STI-Perceived vulnerability	0.66	0	91.67	62.37	14.38
STI-Prevention self-efficacy	0.83	0	100	44.75	20.88
STI-Preventive intention	0.85	0	100	60.90	21.75

Note. STI: Sexually transmitted infection; SD: Standard deviation.

spouse education ($P < 0.001$), and spouse occupation ($P < 0.001$). However, Tukey pairwise comparisons showed that STI-preventive self-efficacy is statistically significant only in divorced and permanently married women, so STI-preventive self-efficacy was higher in married women ($P = 0.006$). In addition, self-efficacy in housewives was significantly lower than that in women with full-time jobs ($P = 0.003$).

It was also observed that the STI-preventive self-efficacy

of women whose husbands had a university education is higher than those with the diploma level. Women whose husbands were unemployed also had lower self-efficacy compared to women with full-time ($P < 0.001$) and self-employed husbands ($P = 0.001$). Furthermore, STI-preventive intention was significantly related to marital status ($P < 0.001$), occupation ($P = 0.011$), education ($P < 0.001$), spouse education ($P = 0.011$), spouse occupation ($P = 0.008$), and economic status ($P = 0.002$). The Tukey pairwise comparison showed that the behavioral intention in temporarily married women is significantly lower than that in single ($P < 0.001$), permanently married ($P = 0.001$), and also divorced women ($P = 0.037$). Housewives were significantly less than women with full-time jobs ($P = 0.009$).

It was also observed that the STI-preventive intention of women who had a university education themselves and their husbands is higher than that of women with diplomas. The behavioral intention of women whose husbands were unemployed was also lower than that of women with full-

time husbands ($P=0.011$). Furthermore, STI-preventive intention in women with unfavorable economic status was significantly lower than desirable ($P=0.002$), as illustrated in Table 1. Age had a statistically significant positive correlation with STI-preventive self-efficacy ($P<0.001$) and STI-preventive intention ($P=0.001$). In addition, the age of the first relationship had a statistically significant positive correlation with STI-perceived vulnerability ($P=0.002$), STI-preventive self-efficacy ($P<0.001$), and STI-preventive intention ($P=0.007$). Moreover, the duration of marriage had a statistically significant positive correlation with STI-preventive self-efficacy ($P=0.006$) and STI-preventive intention ($P=0.003$), as depicted in Table 3.

All constructs of STI-preventive behavior based on PMT, namely, STI knowledge, STI-perceived vulnerability, STI-prevention self-efficacy, and STI-preventive intention showed a significant correlation with each other. There was a statistically significant positive correlation in knowledge between STI-perceived vulnerability, STI-prevention self-efficacy, and STI-preventive intention ($P<0.001$). Additionally, a positive correlation was detected between STI-perceived vulnerability and STI-preventive self-efficacy as well as between STI-perceived vulnerability and STI-preventive intention ($P<0.001$). Furthermore, STI-prevention self-Efficacy showed a statistically significant positive correlation with STI-preventive intention ($P<0.001$), as illustrated in Table 3.

Discussion

The present study aimed to determine STI preventive behavior of Iranian women and related factors using the PMT. The results of this study supported two concerns: a) the differences between the sociodemographic variables in the constructs of STI-protection motivation behaviors; and b) the relation among constructs of STI-protective motivation.

Differences Between the Sociodemographic Variables in STI-protection Motivation Behaviors

The results of the present study revealed statistically significant differences between STIs-knowledge, STI-perceived vulnerability, STI-preventive self-efficacy, and STI-preventive intention concerning various socio-demographic variables. Specifically, STI knowledge was found to differ significantly in terms of age, education level, job status, economic status, and spouse's education level. Similarly, STI-perceived vulnerability was found to

differ significantly based on education level, economic status, spouse's education level, and spouse's job status. Likewise, STI-preventive self-efficacy was found to differ significantly regarding age, education level, job status, marital status, spouse's education level, and spouse's job status. Finally, STI-preventive intention was found to differ significantly based on age, education level, marital status, economic status, and spouse's job status. The present study found significant differences in all constructs for the level of education. This finding is consistent with previous studies (32-34), which have reported that individuals with higher levels of education tend to have greater knowledge, perceived vulnerability, preventive self-efficacy, and preventive intention. Additionally, the current study found that employed women have higher STI-preventive self-efficacy compared to housewives. This may be attributed to the fact that financial independence enables women to bear the costs associated with doctor's examinations and screening tests. In line with the findings of Moeini et al (33), the current study also found that women with permanent marital status exhibit more protective behaviors than single and divorced women.

Relation Among Constructs of STI-protective Motivation

Our results indicated that the construct of STI-perceived vulnerability and STI-knowledge have the highest and the lowest mean scores, respectively. Additionally, we found a statistically significant positive correlation between preventive behaviors for STIs and the constructs of STIs-knowledge, STI-perceived vulnerability, STI-preventive self-efficacy, and STI-preventive intention. Specifically, higher levels of STI knowledge were associated with greater perceived vulnerability. This may be because individuals often have limited knowledge about these diseases, which reduces their perception of fear (35,36). Furthermore, low levels of STI knowledge, coupled with the asymptomatic and stigmatized nature of STIs, can lead to the underestimation of risk and reduced risk aversion (2,37,38).

In the present study, we found that women primarily associate STIs with HIV/AIDS, yet they demonstrated inadequate knowledge about the types of infection, modes of transmission, and methods of protection. This may be because AIDS awareness programs have been in place for longer than those for other types of STIs. Consistent with other studies, we found that Iranian women have limited knowledge about STIs such as Chlamydia and human papillomavirus (10,39).

Table 3. Pearson Correlations between the Dimensions of Preventive Behavior Regarding Protection Motivation Theory (N=600)

Dimensions	Duration of Marriages	Age at First Sexual Encounter	Age	STI-Prevention Intentions	STI-Prevention Self-efficacy	STI-Vulnerability	STI-Knowledge
STI-Knowledge	0.07	0.075	0.064	0.450**	0.585**	0.366**	1
STI-Vulnerability	0.077	0.126*	0.07	0.462**	0.432**	1	
STI-Prevention self-efficacy	0.126*	0.163**	0.191**	0.612**	1		
STI-Prevention intentions	0.136*	0.111*	0.134*	1			

Note. STI: Sexually transmitted infection.

* $P<0.05$; ** $P<0.001$.

This study also revealed a positive relationship between STI knowledge and prevention self-efficacy. STI-preventive self-efficacy refers to individuals' belief in their ability to control the events that affect their lives. The positive correlation between STI-preventive self-efficacy and STI knowledge suggests that women feel confident that by acquiring appropriate information about STIs, they can engage in preventive behaviors against STIs such as using condoms and seeking screening.

The results also indicated that as STI knowledge increases, STI-preventive intention rises as well. As participants in our study increased their level of knowledge about STIs and became more aware of the consequences of these infections, they were more likely to engage in protective behaviors. This finding is consistent with previous studies, which demonstrated that STI-preventive intention may largely depend on STI-knowledge (40,41). One possible explanation for this relationship is that while other studies have assessed knowledge based on knowledge of the types of STIs, our study assessed knowledge based on the types, symptoms, treatment, and complications associated with STIs.

Additionally, a positive correlation was observed between perceived vulnerability to STIs and prevention self-efficacy. This suggests that when individuals have a strong belief that they can reduce their health risks by adopting healthy behaviors, they are less likely to engage in maladaptive behaviors. Given that perceived vulnerability is influenced by many factors in addition to knowledge (42), it seems that if individuals do not feel vulnerable to health threats, they may be more likely to refuse preventive behaviors. One possible explanation is that controlling STIs presents a challenge due to the difficulty in altering personal sexual behaviors and the cultural and religious influences on discussions about sexual relations, regardless of clinical factors (43). One study by Asef et al supports our result that perceived vulnerability can play a key role in shaping individuals' intentions to adopt and maintain healthy behaviors. According to this study, perceived vulnerability to illness is an important predictor of preventive health behaviors (44). This suggests that when individuals feel vulnerable to illness, they are more likely to engage in behaviors that can help prevent or mitigate its effects.

To sum up, the present study found that an increase in STI-perceived vulnerability leads to a rise in STI-preventive intention. This suggests that when individuals feel vulnerable to illness, they are more likely to engage in protective and preventive behaviors. This finding is consistent with previous research (45), which has identified perceived vulnerability as a key determinant of individuals' willingness to cooperate and adopt health-protective behaviors (46). Perceived vulnerability also influences individuals' psychological and behavioral responses (47).

The present study has both limitations and strengths. Data collection was conducted online during the early

waves of the COVID-19 pandemic in Iran. As such, our sample may have been limited to individuals with computer literacy and/or access to smartphones. However, it is worth noting that many studies have reported a greater willingness among participants to respond to online questionnaires on sensitive topics such as STIs compared to face-to-face questionnaires. Additionally, our data were obtained through self-reporting, which may have introduced bias in the evaluation of the results.

Conclusion

Overall, our study found that STI knowledge was generally lacking among the participants. However, the women in our study exhibited high levels of STI-perceived vulnerability, prevention self-efficacy, and STI-preventive intention. As such, there was a high level of motivation for protective behaviors, and STI-preventive self-efficacy was identified as a particularly relevant construct for promoting protective behaviors. From a practical standpoint, our findings suggest that demographic factors have a significant relationship with prevention behavioral intention as per the PMT. These results indicated that future interventions should aim to increase appropriate knowledge, enhance perceived self-efficacy, and promote intentional protective behavior through skills training.

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Authors' Contribution

Conceptualization: Fatemeh Zarei.

Data curation: Sara Kazemi.

Formal analysis: Fatemeh Zarei.

Funding acquisition: Alireza Heidarnia.

Investigation: Sara Kazemi.

Methodology: Fatemeh Zarei.

Project administration: Fatemeh Zarei.

Resources: Alireza Heidarnia.

Software: Sara Kazemi.

Supervision: Fatemeh Zarei.

Validation: Fatemeh Alhani.

Visualization: Fatemeh Zarei.

Writing—original draft: Sara Kazemi.

Writing—review & editing: Fatemeh Zarei.

Competing Interests

None declared.

Ethical Approval

This study was approved by the Ethical Committee of the Faculty of Medical Sciences, Tarbiat Modares University (IR.MODARES.REC.1400.049). The confidentiality of the participants was preserved by considering the Helsinki Declaration of Ethical Principles for Medical Research. The users completed the questionnaire once, and only the research team had access to the data.

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References

- World Health Organization (WHO). WHO Sexually Transmitted Infections (STIs): Key Facts [Internet]. Geneva: WHO; 2016.
- Anguzu G, Flynn A, Musaazi J, Kasirye R, Atuhaire LK, Kiragga AN, et al. Relationship between socioeconomic status and risk of sexually transmitted infections in Uganda: multilevel analysis of a nationally representative survey. *Int J STD AIDS*. 2019;30(3):284-91. doi: [10.1177/0956462418804115](https://doi.org/10.1177/0956462418804115).
- World Health Organization (WHO). Progress Report on HIV, Viral Hepatitis and Sexually Transmitted Infections 2019: Accountability for the Global Health Sector Strategies, 2016-2021. WHO; 2019.
- Kreisel KM, Spicknall IH, Gargano JW, Lewis FMT, Lewis RM, Markowitz LE, et al. Sexually transmitted infections among US women and men: prevalence and incidence estimates, 2018. *Sex Transm Dis*. 2021;48(4):208-14. doi: [10.1097/olq.0000000000001355](https://doi.org/10.1097/olq.0000000000001355).
- Ghosh K. Divorces in England and Wales: 2018. Office for National Statistics; 2020. p. 1-12.
- Culbreth R, Swahn MH, Salazar LF, Ametewee LA, Kasirye R. Risk factors associated with HIV, sexually transmitted infections (STI), and HIV/STI co-infection among youth living in the slums of Kampala, Uganda. *AIDS Behav*. 2020;24(4):1023-31. doi: [10.1007/s10461-019-02444-5](https://doi.org/10.1007/s10461-019-02444-5).
- Okoboi S, Castelnuovo B, Moore DM, Musaazi J, Kambugu A, Birungi J, et al. Incidence rate of sexually transmitted infections among HIV infected patients on long-term ART in an urban and a rural clinic in Uganda. *BMC Public Health*. 2019;19(1):87. doi: [10.1186/s12889-019-6417-x](https://doi.org/10.1186/s12889-019-6417-x).
- Centers for Disease Control and Prevention (CDC). New CDC Report: STDs Continue to Rise in the US [Press Release]. CDC; 2019.
- Aliakbari F, Emadeddin M, Taghizabet N, Rezaei-Tazangi F, Sadeghzadeh Z, Hosseini J. Prevalence of sexually transmitted diseases in men of 25-60 years in Iran. *Nephrourol Mon*. 2021;13(4):e117767. doi: [10.5812/numonthly.117767](https://doi.org/10.5812/numonthly.117767).
- Taghizadeh Asl R, Van Osch L, De Vries N, Zendejdel K, Shams M, Zarei F, et al. The role of knowledge, risk perceptions, and cues to action among Iranian women concerning cervical cancer and screening: a qualitative exploration. *BMC Public Health*. 2020;20(1):1688. doi: [10.1186/s12889-020-09701-6](https://doi.org/10.1186/s12889-020-09701-6).
- Nasirian M, Baneshi MR, Kamali K, Haghdoost AA. Estimation of prevalence and incidence of sexually transmitted infections in Iran; a model-based approach. *J Res Health Sci*. 2015;15(3):168-74.
- Dehdari T, Hassani L, Hajizadeh E, Shojaeizadeh D, Nedjat S, Abedini M. Effects of an educational intervention based on the protection motivation theory and implementation intentions on first and second pap test practice in Iran. *Asian Pac J Cancer Prev*. 2014;15(17):7257-61. doi: [10.7314/apjcp.2014.15.17.7257](https://doi.org/10.7314/apjcp.2014.15.17.7257).
- Kazemi S, Tavousi M, Zarei F. A mobile-based educational intervention on STI-related preventive behavior among Iranian women. *Health Educ Res*. 2021;36(2):212-23. doi: [10.1093/her/cyaa054](https://doi.org/10.1093/her/cyaa054).
- Toska E, Pantelic M, Meinck F, Keck K, Haghghat R, Cluver L. Sex in the shadow of HIV: a systematic review of prevalence, risk factors, and interventions to reduce sexual risk-taking among HIV-positive adolescents and youth in sub-Saharan Africa. *PLoS One*. 2017;12(6):e0178106. doi: [10.1371/journal.pone.0178106](https://doi.org/10.1371/journal.pone.0178106).
- Lewis R, Mitchell KR, Mercer CH, Datta J, Jones KG, Wellings K. Navigating new sexual partnerships in midlife: a socioecological perspective on factors shaping STI risk perceptions and practices. *Sex Transm Infect*. 2020;96(4):238-45. doi: [10.1136/sextrans-2019-054205](https://doi.org/10.1136/sextrans-2019-054205).
- Alomair N, Alageel S, Davies N, Bailey JV. Sexually transmitted infection knowledge and attitudes among Muslim women worldwide: a systematic review. *Sex Reprod Health Matters*. 2020;28(1):1731296. doi: [10.1080/26410397.2020.1731296](https://doi.org/10.1080/26410397.2020.1731296).
- Kelberga AK, Martinsone B. Differences in motivation to engage in sexual activity between people in monogamous and non-monogamous committed relationships. *Front Psychol*. 2021;12:753460. doi: [10.3389/fpsyg.2021.753460](https://doi.org/10.3389/fpsyg.2021.753460).
- Mohebbi MR. Female sex workers and fear of stigmatisation. *Sex Transm Infect*. 2005;81(2):180-1. doi: [10.1136/sti.2004.010512](https://doi.org/10.1136/sti.2004.010512).
- Handebo S. Sexually transmitted infections related care-seeking behavior and associated factors among reproductive age women in Ethiopia: further analysis of the 2016 demographic and health survey. *BMC Womens Health*. 2020;20(1):274. doi: [10.1186/s12905-020-01145-9](https://doi.org/10.1186/s12905-020-01145-9).
- Amini E, McCormack M. Older Iranian Muslim women's experiences of sex and sexuality: a biographical approach. *Br J Sociol*. 2021;72(2):300-14. doi: [10.1111/1468-4446.12805](https://doi.org/10.1111/1468-4446.12805).
- Nematollahi A, Gharibzadeh S, Damghanian M, Gholamzadeh S, Farnam F. Sexual behaviors and vulnerability to sexually transmitted infections among transgender women in Iran. *BMC Womens Health*. 2022;22(1):170. doi: [10.1186/s12905-022-01753-7](https://doi.org/10.1186/s12905-022-01753-7).
- Glanz K, Bishop DB. The role of behavioral science theory in development and implementation of public health interventions. *Annu Rev Public Health*. 2010;31:399-418. doi: [10.1146/annurev.publhealth.012809.103604](https://doi.org/10.1146/annurev.publhealth.012809.103604).
- Prestwich A, Webb TL, Conner M. Using theory to develop and test interventions to promote changes in health behaviour: evidence, issues, and recommendations. *Curr Opin Psychol*. 2015;5:1-5. doi: [10.1016/j.copsyc.2015.02.011](https://doi.org/10.1016/j.copsyc.2015.02.011).
- Norman P, Boer H, Seydel ER, Mullan B. Protection motivation theory. In: Conner M, Norman P, eds. *Predicting and Changing Health Behaviour: Research and Practice with Social Cognition Models*. 3rd ed. Open University Press; 2015. p. 70-106.
- Sheikhansari N, Abraham C, Denford S, Eftekhari M. A qualitative assessment of the sexual-health education, training and service needs of young adults in Tehran. *BMC Public Health*. 2021;21(1):1386. doi: [10.1186/s12889-021-11371-x](https://doi.org/10.1186/s12889-021-11371-x).
- Yoosefi Lebni J, Khalajabadi Farahani F, Solhi M, Ebadi Fard Azar F. Causes and grounds of childbirth fear and coping strategies used by Kurdish adolescent pregnant women in Iran: a qualitative study. *J Reprod Infertil*. 2021;22(1):47-56. doi: [10.18502/jri.v22i1.4995](https://doi.org/10.18502/jri.v22i1.4995).
- Chambers RS, Rosenstock S, Lee A, Goklish N, Larzelere F, Tingey L. Exploring the role of sex and sexual experience in predicting American Indian adolescent condom use intention using protection motivation theory. *Front Public Health*. 2018;6:318. doi: [10.3389/fpubh.2018.00318](https://doi.org/10.3389/fpubh.2018.00318).
- Maasoumi R, Kazemi S, Haghani S, Zarei F. Motivation for protection in sexual relationship during the COVID-19 quarantine: analysis of the sociodemographic variables of the Iranian population. *BMC Public Health*. 2022;22(1):1052. doi: [10.1186/s12889-022-13475-4](https://doi.org/10.1186/s12889-022-13475-4).
- Rogers RW. A protection motivation theory of fear appeals and attitude change1. *J Psychol*. 1975;91(1):93-114. doi: [10.1080/00223980.1975.9915803](https://doi.org/10.1080/00223980.1975.9915803).
- Gnatou GY, Gbeasor-Komlanvi FA, Sadio AJ, Konu YR, Tchankoni MK, Zida-Compaore WIC, et al. Knowledge and practices of female students at university of Kara regarding sexually transmitted infections in Togo, 2021. *J Public Health Afr*. 2022;13(2):2225. doi: [10.4081/jphia.2022.2225](https://doi.org/10.4081/jphia.2022.2225).
- Kazemi S, Tavousi M, Zarei F. Translation and psychometric properties of the sexually transmitted infection prevention scales in females. 2019;18(2):183-9. [Persian].
- Ezati Rad R, Mohseni S, Kamalzadeh Takhti H, Hassani Azad M, Shahabi N, Aghamolaei T, et al. Application of the protection motivation theory for predicting COVID-19

- preventive behaviors in Hormozgan, Iran: a cross-sectional study. *BMC Public Health*. 2021;21(1):466. doi: [10.1186/s12889-021-10500-w](https://doi.org/10.1186/s12889-021-10500-w).
33. Moeini B, Ezati E, Barati M, Rezapur-Shahkolai F, Mohammad Gholi Mezerji N, Afshari M. Skin cancer preventive behaviors in Iranian farmers: applying protection motivation theory. *Workplace Health Saf*. 2019;67(5):231-40. doi: [10.1177/2165079918796850](https://doi.org/10.1177/2165079918796850).
 34. Barati M, Soltanian A, Emdadi S, Zahiri B, Barzeghar N. Analyzing sexual health-related beliefs among couples in marriage based on the health belief model. *J Educ Community Health*. 2014;1(1):36-45. doi: [10.20286/jech-010136](https://doi.org/10.20286/jech-010136).
 35. Tanton C, Geary RS, Clifton S, Field N, Heap KL, Mapp F, et al. Sexual health clinic attendance and non-attendance in Britain: findings from the third National Survey of Sexual Attitudes and Lifestyles (Natsal-3). *Sex Transm Infect*. 2018;94(4):268-76. doi: [10.1136/sextrans-2017-053193](https://doi.org/10.1136/sextrans-2017-053193).
 36. Jorjoran Shushtari Z, Mirzazadeh A, Seyed Alinaghi S, Hosseini SA, Sajjadi H, Salimi Y, et al. Social support associated with condom use behavior among female sex workers in Iran. *Int J Behav Med*. 2022;29(3):321-33. doi: [10.1007/s12529-021-10017-x](https://doi.org/10.1007/s12529-021-10017-x).
 37. Senior K, Helmer J, Chenhall R, Burbank V. 'Young clean and safe?' Young people's perceptions of risk from sexually transmitted infections in regional, rural and remote Australia. *Cult Health Sex*. 2014;16(4):453-66. doi: [10.1080/13691058.2014.888096](https://doi.org/10.1080/13691058.2014.888096).
 38. Major B, Dovidio JF, Link BG. *The Oxford Handbook of Stigma, Discrimination, and Health*. Oxford University Press; 2018.
 39. Meldrum RM, Liamputtong P, Wollersheim D. Sexual health knowledge and needs: young Muslim women in Melbourne, Australia. *Int J Health Serv*. 2016;46(1):124-40. doi: [10.1177/0020731415615313](https://doi.org/10.1177/0020731415615313).
 40. Nigussie T, Yosef T. Knowledge of sexually transmitted infections and its associated factors among polytechnic college students in Southwest Ethiopia. *Pan Afr Med J*. 2020;37:68. doi: [10.11604/pamj.2020.37.68.22718](https://doi.org/10.11604/pamj.2020.37.68.22718).
 41. Tsadik M, Lam L, Hadush Z. Delayed health care seeking is high among patients presenting with sexually transmitted infections in HIV hotspot areas, Gambella town, Ethiopia. *HIV AIDS (Auckl)*. 2019;11:201-9. doi: [10.2147/hiv.s210977](https://doi.org/10.2147/hiv.s210977).
 42. Zizza A, Guido M, Recchia V, Grima P, Banchelli F, Tinelli A. Knowledge, information needs and risk perception about HIV and sexually transmitted diseases after an education intervention on Italian high school and university students. *Int J Environ Res Public Health*. 2021;18(4):2069. doi: [10.3390/ijerph18042069](https://doi.org/10.3390/ijerph18042069).
 43. National Academies of Sciences. Addressing STI epidemics: integrating sexual health, intersectionality, and social determinants. In: *Sexually Transmitted Infections: Adopting a Sexual Health Paradigm*. Washington, DC: National Academies Press; 2021. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK573147/>.
 44. Asefa A, Midaksa G, Qanche Q, Wondimu W, Nigussie T, Bogale B, et al. Does the perception of HIV risk among female sex workers affect HIV prevention behavior? Application of the health belief model (HBM). *BMC Public Health*. 2022;22(1):1646. doi: [10.1186/s12889-022-14046-3](https://doi.org/10.1186/s12889-022-14046-3).
 45. Oharume IM. Knowledge, sexual behaviours and risk perception of sexually transmitted infections among students of the polytechnic, Ibadan, Oyo state. *Afr Health Sci*. 2020;20(1):39-44. doi: [10.4314/ahs.v20i1.7](https://doi.org/10.4314/ahs.v20i1.7).
 46. Chong YY, Chien WT, Cheng HY, Chow KM, Kassianos AP, Karekla M, et al. The role of illness perceptions, coping, and self-efficacy on adherence to precautionary measures for COVID-19. *Int J Environ Res Public Health*. 2020;17(18):6540. doi: [10.3390/ijerph17186540](https://doi.org/10.3390/ijerph17186540).
 47. Sawyer AT, Harris SL, Koenig HG. Illness perception and high readmission health outcomes. *Health Psychol Open*. 2019;6(1):2055102919844504. doi: [10.1177/2055102919844504](https://doi.org/10.1177/2055102919844504).