

AIDS Risk Perception and its related factors in Women with High-Risk Behaviors in Iran

Mahin Tafazoli (MSc)^{1,2}, Mona Larki (MSc)^{3*}, Robab Latifnejad Roudsari (PhD)^{4,2}, Mohamad Taghi Shakeri (PhD)⁵, Ali Babaei (GP)⁶

¹ Lecturer, Evidence-Based Care Research Center, Mashhad University of Medical Sciences, Mashhad, Iran

² Department of Midwifery, School of Nursing and Midwifery, Mashhad University of Medical Sciences, Mashhad, Iran

³ MSc in Midwifery, Department of Midwifery, School of Nursing and Midwifery, Mashhad University of Medical Sciences, Mashhad, Iran

⁴ Associate Professor, Evidence-Based Care Research Center, Mashhad University of Medical Sciences, Mashhad, Iran

⁵ Professor, Department of Biostatistics and Epidemiology, Mashhad University of Medical Sciences, Mashhad, Iran

⁶ General Practitioner, Applied Sciences Education Center in District 6- Prison Organization, Mashhad, Iran

ARTICLE INFO	ABSTRACT
<p><i>Article type:</i> Original article</p>	<p>Background & aim: AIDS is one of the major public health challenges all over the world. Perceived risk is a significant predictor of high-risk behaviors related to AIDS. Women constitute more than half of the HIV patients, and the rate of female sex workers with AIDS is more than the rest of female population. Therefore, the present study aimed to evaluate AIDS risk perception and its related factors in females with high-risk behaviors in Mashhad, Iran.</p> <p>Methods: This descriptive study was performed on 58 women who were arrested on prostitution charges and imprisoned in Mashhad Vakil Abad Prison in 2013. The data were collected using self-designed questionnaires assessing knowledge regarding AIDS as well as sexual activities and also perceived risk of HIV questionnaire. One-way ANOVA, independent samples t-test, linear regression, and Chi-square tests were run, using SPSS version 16.</p> <p>Results: The mean score of HIV risk perception was 18.43 ± 5.92, which was average. There was a significant relationship between the mean score of perceived risk of HIV and knowledge regarding AIDS ($P=0.005$), alcohol consumption ($P=0.04$), history of addiction ($P=0.008$), using contraceptive methods ($P=0.01$), condom use during intercourse ($P=0.02$), voluntary HIV testing ($P=0.001$), and follow-up of HIV test ($P=0.009$).</p> <p>Conclusion: The findings of the present study revealed that knowledge, alcohol consumption, history of addiction, contraceptive methods, the rate of condom use during intercourse, as well as voluntary HIV testing and follow-up were associated with perceived risk of HIV infection. Therefore, taking the necessary steps towards health promotion through appropriate training and interventional approaches seems to be mandatory for reducing high-risk behaviors in populations with low risk perception.</p>
<p><i>Article History:</i> Received: 15-Jun-2015 Accepted: 17-Dec-2015</p>	
<p><i>Keywords:</i> AIDS High-risk behaviors Perceived risk</p>	

► Please cite this paper as:

Tafazoli M, Larki M, Latifnejad Roudsari R, Shakeri MT, Babaei A. Evaluation of AIDS Risk Perception in Women with High-Risk Behaviors in Mashhad. Journal of Midwifery and Reproductive Health. 2016; 4(2): 582-591. DOI: 10.22038/jmrh.2016.6578

Introduction

AIDS is one of the major public health challenges across the world (1). According to a report by the Joint United Nations Program on HIV-AIDS (UNAIDS), approximately 34 million people are infected with HIV worldwide (2). Studies indicated that almost five million new cases of HIV infection occur annually (3) and

based on the current trend, HIV/AIDS is estimated to become the third leading cause of mortality in low- and middle-income countries by 2030 (4). Unlike most regions of the world, HIV epidemic in the North African and Middle Eastern countries such as Iran is on a growing trend (5).

* Corresponding author: Mona Larki, MSc in Midwifery, Department of Midwifery, School of Nursing and Midwifery, Mashhad University of Medical Sciences, Mashhad, Iran. Email: mona.larki66@gmail.com

Based on the reports of medical universities and health services until March 21, 2015, 29414 HIV patients are living in Iran, 88% of whom are male and 12% female (6). In the recent years, there has been some evidence regarding the growing role of sexual transmission in the spread of HIV in Iran, and the rate of recorded cases attributed to sexual transmission is steadily growing (7); moreover, the prevalence of HIV among female sex workers is much higher than the rest of female population (3).

According to the data obtained from 14 Asian countries, HIV prevalence in females aged 15-49 years was 0.18%, while it was 5.2% in sex workers, indicating that the risk of having HIV is 29 times greater in this population. The data demonstrated that female sex workers are at particularly high risk of infection (8).

In a study by Mirzazadeh performed in 14 cities of Iran, HIV prevalence in female sex workers was estimated to be 4.5% (5). Due to prevalence of HIV in this population, AIDS 2012 Conference highlighted the need for particular attention to planning interventions for female sex workers (9).

Centers for disease control and prevention interventions such as HIV testing and counseling were established to enhance perception of HIV risk (10).

Risk perception is a complex multi-factorial concept built on the experiences a person undergoes during the course of life, which are both directly or indirectly influenced by socioeconomic, political, and cultural factors (2). Behavioral models suggest that behavioral change is associated with perception of the risk of disease infection and its serious consequences (11). Thus, for individuals who exhibit high-risk behaviors, perceiving susceptibility is necessary for changing high-risk behaviors; otherwise, explaining benefits of safe sexual behavior would be ineffective (12).

Perceived risk of HIV infection can be considered as a strong predictor of low level of risk behaviors associated with HIV/AIDS (13), and low HIV risk perception is related to high-risk sexual behaviors (14, 15). Although risk perception is not sufficient for behavioral change, it is the first step toward modifying unhealthy behaviors to healthy ones (11, 16, 17). Darbes (2008) performed a review of

behavioral interventions for diminishing HIV risk behaviors, 15 out of 38 studies accentuated the importance of examining or enhancing perceived risk and emphasized that development of AIDS risk perception can be considered as a preventive strategy (10)(18).

Thato (2003) found that men with low AIDS risk perception were more likely to commit high-risk sexual behaviors (19). Luna stated that vulnerable and marginalized groups do not have enough control over their lives, and even feel the need to numerous things for survival, which may lead to low HIV risk perception (20).

Given the reports regarding the need for evaluating awareness of women with high-risk behaviors and scarcity of studies on this issue in Iran (14,15), we aimed to evaluate AIDS risk perception and its related factors in females with high-risk behaviors in Mashhad.

Materials and Methods

This descriptive study was performed in 58 women, who were detained on the charge of prostitution in the Central Prison of Mashhad, Iran, 2013. The inclusion criteria were as follows: having Iranian nationality, giving written consent to participate in the study, having basic reading and writing skills, having no psychological disorders (e.g., bipolar disorder, attention deficit, and depression) according to their health records. The exclusion criteria included unwillingness to continue participating in the study.

The data collection instrument was demographic and sexual behaviors information questionnaire consists of three parts as follows: part I: demographic information including eight questions (age, educational level, income level, marital status, history of opioid addiction, alcohol consumption, and escape from home, and age at first drug use); part II: information regarding sexual behaviors and AIDS, which included eight questions (age at the first voluntary sexual intercourse, the number of intercourses to earn income during a week, contraceptive method, the rate of condom use during intercourse, history of abortion, history of rape, as well as voluntary HIV testing and follow-up); and part III: HIV/AIDS knowledge was assessed in this part using six questions; one point was given to correct answers, while

wrong answers and "I did not know" scored no points. The minimum and maximum possible scores in this section were zero and six, respectively.

A self-designed questionnaire was used to measure AIDS risk perception, which consists of eight items including individual feeling about likelihood of getting infected with HIV (ranging from extremely unlikely to extremely likely), concern about getting infected with HIV (ranging from not concerned to extremely concerned), thinking about getting infected with HIV (ranging from never thought about to often think about), individual fear and shame of getting infected with HIV (ranging from very low to very high), unlikely to get infected with HIV (ranging from strongly disagree to strongly agree), chance of getting infected with HIV (ranging from zero to very high), and self-image of getting HIV (ranging from very easy to very hard). The respondents rated the items using a 6-point Likert scale, and the minimum and maximum possible scores were 0 and 40, respectively. Scores ranging from 0 to 13.33 indicated poor risk perception, 13.34 to 26.67 moderate, and 26.68 to 40 appropriate, with higher scores indicating greater HIV risk perception.

The content validities of the AIDS awareness and HIV risk perception questionnaires were confirmed by 10 faculty members of Mashhad and Tehran universities of medical sciences and reproductive health PhD candidates as a group of subject matter experts. Afterwards, they were asked to rate the questionnaires for their relevance to the study objectives using a 4-point Likert type scale, ranging from perfectly appropriate to completely inappropriate.

The content validities of HIV/AIDS knowledge and HIV risk perception were 0.93 and 0.84, respectively. The reliabilities of HIV/AIDS knowledge and HIV risk perception questionnaires were established using the test-retest method, ($r=0.83$ and $r=0.72$, respectively). After obtaining approval of the Ethics Committee of Mashhad University of Medical Sciences and being introduced to authorities of Vakil Abad Prison of Mashhad, Iran, the researcher attended the prison during office hours and after explaining the importance, objectives, and how to apply the results to the eligible women, their oral and written consents

were obtained. Thereafter, the questionnaires were given to the samples and they were assured of the confidentiality of the personal information.

Data were collected through face-to-face method in the library, which lasted approximately 10-15 minutes. Thereafter, Kolmogorov-Smirnov and Shapiro-Wilk normality tests, Pearson and Spearman coefficient tests, linear regression, One-way ANOVA, independent samples t-test, and Chi-square tests were run, using SPSS version 16.

Results

The results of this study showed that the mean age of the participants was 28.4 ± 5.4 years (age range: 20-44 years). With respect to educational level, 39.7% ($n=23$) had high school diploma and above, and based on subjective measures of poverty, 44.28% ($n=26$) had less than sufficient income. Moreover, 74.13% ($n=43$) were divorcees, and age at the first voluntary sexual intercourse was 15.5 ± 3.1 years, the mean age at the first drug abuse was 17.09 ± 5.5 years, and the mean scores of HIV/AIDS knowledge and HIV risk perception were 3.79 ± 1.56 and 18.43 ± 5.92 , respectively. The Pearson correlation test results showed a significant relationship between the level of HIV/AIDS knowledge and HIV risk perception ($r=0.82$, $P=0.005$).

Based on the results of independent t-test, there was a statistically significant difference between the mean score of HIV risk perception and history of opioid addiction ($P=0.008$), alcohol consumption ($P=0.04$), voluntary testing for HIV ($P=0.001$), and HIV testing follow-up actions ($P=0.009$). Thus, participants without history of opioid addiction, alcohol consumption, as well as voluntary testing for HIV and follow-up actions had greater HIV risk perception.

There was a significant relationship between HIV risk perception and contraceptive methods ($P=0.01$) and the rate of condom use during intercourse ($P=0.02$). However, Pearson correlation coefficient reflected no significant correlation between age and HIV risk perception ($r=0.15$, $P=0.73$). In addition, according to Spearman correlation coefficient analysis, it was found that age at the first voluntary sexual intercourse was not significantly related to HIV

Table 1. Evaluation of the relationship between demographic and sexual behavior characteristics variables and AIDS risk perception in the participants

Characteristics of the participants	No.(percent)	AIDS risk perception (mean±SD*)	Test P-value
Educational level			
Ability to read and write	3(5.2)	15.43±3.92	One-way ANOVA P=0.15
Elementary school	10(17.2)	15.24±2.12	
Middle school	22(37.9)	16.16±2.92	
High school and above	23(39.7)	16.32±2.36	
Income level (based on subjective measures of poverty)			
Less than enough	26(44.8)	18.32±2.36	One-way ANOVA P=0.34
Enough	23(39.7)	18.32±2.36	
More than enough	9(15.5)	17.32±2.36	
Marital status			
Married	7(12.06)	22.7±8.3	Chi-square P=0.46
Single	8(14.2)	21.9±11.4	
Divorced	43(74.13)	21.3±9.2	
Widow	0(0)	-	
History of opioid addiction			
Yes	35(60.3)	8.3±5.2	Independent t-test P=0.008
No	23(39.7)	23.3± 6.5	
History of alcohol consumption			
Yes	30(51.7)	10.3±3.2	Independent t-test P=0.04
No	28(48.2)	26.3±6.3	
History of escape from home			
Yes	20(34.4)	17.5±4.2	Independent t-test P=0.73
No	38(65.6)	18.2±3.8	
The number of intercourses to earn income during a week			
1-2	28(48.3)	18.6±3.4	One-way ANOVA P=0.53
2-3	16(27.6)	17.2±4.2	
>3	14(24.1)	16.2±4.3	
Contraceptive method			
Withdrawal	26(44.8)	14.6±5.7	Chi-square P=0.01
Condom	18(31.0)	21.3±2.4	
Intrauterine device	6(10.3)	17.8±3.6	
Oral contraceptive pills	6(10.3)	19.2±4.7	
Injection contraceptives	2(3.4)	15.3±3.4	
Rate of condom use during intercourse			
Never	13(22.41)	12.6±5.3	One-way ANOVA P=0.02
Sometimes	30(51.72)	19.2±1.6	
Quite often	10(17.24)	18.3±2.7	
Always	5(8.62)	22.6±3.2	
History of abortion			
Yes	11(18.96)	16.4±1.4	Independent t-test P=0.68
No	47(81.03)	17.6±2.4	
History of rape			
Yes	21(36.2)	16.2±4.3	Independent t-test P=0.43
No	37(63.7)	17.4±5.4	
Voluntary human immunodeficiency virus (HIV) testing			
Yes	35(60.3)	29.6±2.4	Independent t-test P=0.001
No	23(39.7)	18.6±3.4	
HIV testing follow-up actions			
Yes	21(60.0)	27.6±4.4	Independent t-test P=0.009
No	14(30.0)	18.6±5.4	

*Standard deviation

risk perception ($r=0.11$, $P=0.97$).

Additionally, the results showed that the overall mean score of risk perception in married participants was higher than single (22.7 ± 8.3 vs. 21.9 ± 11.4) and divorced ones (21.3 ± 9.2), but there was not a statistically significant difference between the mean score for HIV risk perception and marital status ($P=0.46$).

There was not a statistically significant difference between history of escape ($P=0.73$), abortion ($P=0.68$), and rape ($P=0.43$) as well as number of intercourses to earn income during a week ($P=0/53$) with mean score of HIV risk perception.

HIV risk perception was associated with HIV/AIDS knowledge, history of opioid addiction, alcohol consumption, contraceptive method, the rate of condom use during intercourse, as well as voluntary HIV testing and HIV follow-up actions. To control for the aforementioned variables, they were entered

into general linear regression model. At the first step, the results of regression analysis showed that history of opioid addiction ($P=0.04$) and the rate of condom use during intercourse ($P<0/001$) were significantly able to predict HIV risk perception ($R^2=0.659$).

At the second step, considering the results of regression analysis, the variables of opioid addiction history and the rate of condom use during intercourse were found to be predictors of HIV risk perception ($R^2=0.574$). At the third step, which only included the rate of condom use during intercourse, it was observed that this variable was a predictor of the HIV risk perception ($R^2=0.508$).

Review of absolute estimate of effect of the variables showed that the rate of condom use during intercourse was the strongest predictor of HIV risk perception, that is, one unit increase in the rate of condom use during intercourse was associated with a 0.713 unit increase in the HIV risk perception (Table 2).

Table 2. Regression coefficients in the prediction of HIV risk perception

redictor variable*	Unstandardized coefficients**		Standardized coefficients***			R ²
	B	SE	Beta	t	P-value	
Constant	6.006	5.68	-	1.05	0.295	
The first step						
Knowledge	0.774	0.612	0.117	1.26	0.212	
History of opioid addiction (No)	3.976	1.883	0.209	2.111	0.04	
History of alcohol consumption (No)	1.745	2.00	0.093	0.872	0.387	
Contraceptive method	-0.250	0.776	-0.028	-0.322	0.749	0.65
The rate of condom use during intercourse	5.118	1.134	0.466	4.514	<0.001	9
Voluntary human immunodeficiency virus (HIV) testing (No)	-2.589	2.07	-0.135	-1.251	0.217	
HIV testing follow-up actions (No)	-2.939	2.205	-0.151	-1.33	0.189	
The second step						
Constant	-2.742	2.803	-	-0.978	0.332	
History of opioid addiction (No)	5.260	1.804	0.277	2.916	0.005	0.57
The rate of condom use during intercourse	6.689	1.042	0.609	6.418	<0.001	4
The third step						
Constant	2.286	2.353	-	0.972	0.335	0.50
The rate of condom use during intercourse	7.825	1.029	0.713	7.60	<0.001	8

***Unstandardized coefficients **Standardized coefficients *Predictor

Discussion

The results of this study demonstrated that despite having high-risk sexual behaviors and unprotected intercourse, the mean score of HIV risk perception was moderate. This population did not have appropriate HIV risk perception, which was similar to findings of studies conducted by Ford (2000) in Indonesia and Tran (2005) in Vietnam (21, 22).

Qualitative studies conducted in high-risk groups such as female prostitutes and drug users in Iran, demonstrated poor protective behaviors in sexual relations and suggested that these groups perceived themselves to be at no risk for AIDS. Therefore, to increase knowledge and improve perceived HIV risk, establishing AIDS Information Programs and training interventions seems to be mandatory (20, 23).

In the present study, among the individual characteristics variables, the only significant difference was observed between HIV risk perception and history of drug and alcohol consumption. In this study, more than half of the participants had history of drug and alcohol consumption. Li (2010) conducted a review on alcohol consumption in female sex workers during 1980-2008, it was concluded that there was an association between alcohol consumption in women and their physical and mental health, violence experience, sexual abuse, and drug exposure (24).

Center for Disease Control and Prevention stated that there was a strong association between sex work and drug and alcohol use. Drug and alcohol use were reported as coping mechanisms in response to stressful conditions that female sex workers have in their life (25). Drug abuse was both directly and indirectly related to transmission of HIV across the world (26), as the majority of drug users rarely used condom during legitimate and illicit sexual relations (27). In a study by Shiferaw (2014) conducted in Ethiopia to evaluate perception of HIV risk and factors associated with risk perception among university students, it was concluded that early onset drug and alcohol use was significantly correlated with perception of HIV risk (28).

According to former studies, use of alcohol and drugs such as marijuana is an important risk factor for HIV infection, that is, AIDS is

highly prevalent among drug abusers (29). In the current study, there was not a significant relationship between the factors associated with sexual activity characteristics and perception of HIV risk.

However, in a study by Nunn (2011), conducted in a predominantly Afro-American population, it was concluded that individuals with more than five sexual partners were more likely to perceive their HIV risk as zero or low (30). A study by Kalichman (2005) showed that individuals with several sexual partners and unprotected sexual relations during the past three months had significantly lower perception of HIV risk (31). This difference could be related to the larger sample size and classification method based on the number of sexual partners as zero, less than five, and more than five, which caused a significant difference.

The other results of the current study showed that there was a significant association between contraceptive method as well as the use of condom and HIV risk perception, that is, condom users had higher level of HIV risk perception. Several studies reflected that high HIV risk perception was the most powerful predictor of condom use (32).

This finding was in line with the results of Khaniya study (2004), which found that female sex workers with high HIV risk perception were more likely to use condom in their sexual relations (33). This finding is comparable to similar studies (34, 35); the results of regression analysis showed that the rate of condom use during intercourse was the most powerful predictor of HIV risk perception.

In the current study, a significant association was observed between voluntary HIV testing and HIV risk perception. This finding was in line with the results of the Tran (2013) and Dandona (2005) studies (13, 36).

Voluntary HIV testing is the most important measurement tool that can be used for controlling disease epidemic in different countries. Klein suggested that high level of vulnerability could increase an individual's chance of testing for HIV (37). In the present study, 60.3% (n=35) of the cases voluntarily tested for HIV, while in studies by Hong (2012) in China, Tran (2013) in Vietnam, and Dandona (2005) in India, 48%, 32.7%, and 8%

of female sex workers were voluntarily tested for HIV, respectively (13, 36, 38). This difference could be attributed to the imprisonment of the samples, sexually transmitted disease testing advertisement, which was held in the Triangular Clinic of the prison, and low-cost testing. The current study showed that there was a statistically significant correlation between HIV testing follow-up actions and perceived HIV risk, but this correlation was not observed in the study by Tran (2013) (13).

HIV testing follow-up actions can help non-infected individuals to have low-risk behaviors and aid HIV positive patients to prevent transmission of the virus to others.

The results of the present study indicated that HIV/AIDS knowledge score was higher than average. In a study by Qaderi (2011), it was found that female addicts had relatively high knowledge about AIDS and its transmission (39); however, in a study by Valadez (2013) in Libya, female sex workers had poor knowledge about HIV (40). Also, a study by Vian (2012) indicated that female sex workers had low knowledge about prevention and transmission of sexually transmitted diseases than other women did, but this difference was not significant (41). In the present study, there was a significant relationship between HIV/AIDS knowledge and HIV risk perception.

Knowledge is a construct in the model of information, motivation, and behavioral skills to reduce HIV risk behaviors that was proposed by Fisher in 1998. Information about prevention methods and transmission is the primary determinant of sexually transmitted disease/HIV prevention behaviors (42). Studies performed in America showed that education was more effective on health than job and income, and inadequate knowledge could lead to unfavorable attitudes toward health (43).

Studies performed in various parts of Asia indicated that there was an association between high-risk behaviors, inadequate knowledge, and low perception of HIV risk in female sex workers. Thus, training could improve their perception of HIV risk, reduce high-risk behaviors, and result in higher rate of condom use (13).

However, some studies demonstrated that

knowledge does not necessarily lead to behavioral change and promotion of risk perception of sexually transmitted diseases. A study by Sutton (2011), carried out in Afro-American students, showed that the majority of students had an average to high HIV knowledge and attended programs related to HIV testing, and perceived themselves to be at low risk for HIV infection. Nonetheless, more than 50% of the students reported two or more partners in the previous 12 months, with inconsistent condom use; this finding suggests a poor relationship between HIV knowledge and increase in HIV risk perception and prevention of high-risk sexual behaviors (44).

The limitations of our study include the total sample size smaller than similar studies and performing the study only on detained female sex workers; thus, the results may be different from those of female sex workers in public. The participant's emotional and psychological characteristics could affect their perception of risk and the researcher was not able to control this factor. All the confounding variables such as the status of HIV infection in the participants, the availability of condom, and its use method were not measured; hence, our study could not accurately assess all the factors responsible for HIV risk perception. In the current study, the rate of condom use during intercourse was evaluated by a self-designed questionnaire that might influence the results due to personal bias and interests; moreover, the main strength of this study was novelty in research conduct.

Conclusion

Our findings indicated that there was a significant difference between the variables related to individual characteristics (e.g., knowledge, drug abuse, as well as alcohol consumption) and sexual behaviors (e.g., contraceptive methods, the rate of condom use during intercourse, voluntary HIV testing, and HIV testing follow-up actions) and HIV risk perception.

The rate of condom use during sexual intercourse was an effective predictor of HIV risk perception. Our results accentuate the need for training and prevention programs as well as

basic counseling in prisons and for high-risk groups. Therefore, we should take appropriate measures for health promotion by developing appropriate training and interventional approaches to reduce high-risk behaviors in populations without sufficient risk perception. It is recommended to conduct further studies on perceived HIV risk in other populations in different regions of the country, while taking further variables into account

Acknowledgements

This study was extracted from a master's thesis approved by Deputy of Research and Technology of Mashhad University of Medical Sciences (MUMS) (approval code: 911145). The authors would like to thank the authorities of MUMS and School of Nursing and Midwifery, Ethics Committee of MUMS, head and staff of the gynecology ward of the Central Prison of Mashhad. We are also grateful to the participants who kindly volunteered to participate in this study.

Conflicts of Interest

The authors declare no conflicts of interest.

References

1. Joint United Nations Programme on HIV/AIDS, & World Health Organization. Geneva, Switzerland: World Health Organization; 2008. P. 1-36.
2. Auli NC, Mejía-Lancheros C, Berenguer A, Mayans MV, Lasagabaster MA, Pujol-Ribera E. Risk perception of sexually transmitted infections and HIV in Nigerian commercial sex workers living in Barcelona: a study protocol. *BMJ Open*. 2013; 3(7):e003345.
3. Kabbash IA, Abdul Rahman I, Shehata YA, Omar AA. HIV infection and related risk behaviours among female sex workers in greater Cairo, Egypt. *Eastern Mediterranean Health Journal*. 2012; 18(9):920.
4. Nasirian M, Doroudi F, Gooya MM, Sedaghat A, Haghdoost AA. Modeling of human immunodeficiency virus modes of transmission in Iran. *Journal of Research in Health Sciences*. 2012; 12(2):81-87.
5. Mirzazadeh A, Nedjat S, Navadeh S, Haghdoost A, Mansournia MA, McFarland W, et al. HIV and related risk behaviors among female sex workers in Iran: bias-adjusted estimates from the 2010 national bio-behavioral survey. *AIDS and Behavior*. 2014; 18(1):19-24.
6. The latest statistics of people with AIDS in Iran in 2014. Islamic Republic of Iran AIDS Progress Report. Available at: URL: <http://aids.ir/post/823/%D8%A2%D8%AE%D8%B1%D9%8A%D9>; 2015 (Persian).
7. Progress report control AIDS in Islamic Republic of Iran 2014. UNAIDS. Available at: URL: http://www.unaids.org/en/dataanalysis/knowyourresponse/countryprogressreports/2014countries/IRN_narrative_report_2014_fa.pdf; 2015 (Persian).
8. Pebody R. Female sex workers have 14 times the risk of having HIV as other women. HIV & AIDS sharing knowledge, changing lives. Available at: URL: <http://www.aidsmap.com/Female-sex-workers-have-14-times-the-risk-of-having-HIV-as-other-women/page/2457223/>; 2012.
9. Overs C, Loff B. The tide cannot be turned without us: sex workers and the global response to HIV. *Journal of the International AIDS Society*. 2013; 16(1):18459.
10. Napper LE, Fisher DG, Reynolds GL. Development of the perceived risk of HIV scale. *AIDS and Behavior*. 2012; 16(4):1075-1083.
11. Kayiki SP, Forste R. HIV/AIDS related knowledge and perceived risk associated with condom use among adolescents in Uganda. *African Journal of Reproductive Health*. 2011; 15(1):57.
12. Glanz K, Rimer BK, Viswanath K. Health behavior and health education, theory, research, and practice. 4th ed. New Jersey: John Wiley & Sons; 2008.
13. Tran BX, Nguyen LT, Nguyen NP, Phan HT. HIV voluntary testing and perceived risk among female sex workers in the Mekong Delta region of Vietnam. *Glob Health Action*. 2013; 6:1-7.
14. Ankomah A, Omoregie G, Akinyemi Z, Anyanti J, Ladipo O, Adebayo S. HIV-related risk perception among female sex workers in Nigeria. *HIV/AIDS Research and Palliative Care*. 2011; 3:93-100.
15. Koh KC, Yong LS. HIV risk perception, sexual behavior, and HIV prevalence among men-who-have-sex-with-men at a community-based voluntary counseling and testing center in Kuala Lumpur, Malaysia. *Interdisciplinary Perspectives on Infectious Diseases*. 2014; 2014:1-6.
16. Prata N, Morris L, Mazive E, Vahidnia F, Stehr M. Relationship between HIV risk perception and condom use: evidence from a population-based survey in Mozambique. *International Family Planning Perspectives*. 2006; 32(4):192-200.
17. Jeffers A. Perceived risk for HIV among high risk individuals: a comparison of adolescents and adults. [Master Thesis]. Atlanta, USA: Georgia State University; 2012.
18. Darbes L, Crepaz N, Lyles C, Kennedy G, Rutherford G. The efficacy of behavioral

- interventions in reducing HIV risk behaviors and incident sexually transmitted diseases in heterosexual African Americans. *AIDS*. 2008; 22(10):1177-1194.
19. Thato S, Charron-Prochownik D, Dorn LD, Albrecht SA, Stone CA. Predictors of condom use among adolescent Thai vocational students. *Journal of Nursing Scholarship*. 2003; 35(2):157-163.
 20. Lotfi R, Ramezani TF, Yaghmaei F. Social support and HIV prevention among women at risk: a qualitative study. *Payesh*. 2013; 12(5):467-478 (Persian).
 21. Ford K, Wirawan DN, Reed BD, Muliawan P, Sutarga M. AIDS and STD knowledge, condom use and HIV/STD infection among female sex workers in Bali, Indonesia. *AIDS Care*. 2000; 12(5):523-534.
 22. Tran TN, Detels R, Long HT, Van Phung L, Lan HP. HIV infection and risk characteristics among female sex workers in Hanoi, Vietnam. *Journal of Acquired Immune Deficiency Syndromes*. 2005; 39(5):581-586.
 23. Fallahi H, Tavafian SS, Yaghmaie F, Hajizadeh E. Perceived susceptibility to AIDS in men living with HIV: a qualitative research. *Payesh*. 2014; 13(3):357-365 (Persian).
 24. Li Q, Li X, Stanton B. Alcohol use among female sex workers and male clients: an integrative review of global literature. *Alcohol and Alcoholism*. 2010; 45(2):188-199.
 25. Centers for Disease Control and Prevention (CDC). HIV risk among adult sex workers in the United States. Retrieved March. 2013; 6:2014.
 26. Sebele MK. A comparative study on high risk sexual behavior of male student's elite athletes, male student non-athletes and male students recreational sport participants at the University of Botswana. [Magister Thesis]. South Africa: University of the Western Cape; 2009.
 27. Etemad K, Eftekhari Ardabili H, Rahimi A, Gouya MM, Heidari A, Kabir MJ. Attitudes and knowledge of HIV positive persons and high risk behaviors groups in Golestan, Iran. *Iranian Journal of Epidemiology*. 2011; 7(1) 23-31 (Persian).
 28. Shiferaw Y, Alemu A, Assefa A, Tesfaye B, Gibermedhin E, Amare M. Perception of risk of HIV and sexual risk behaviors among University students: implication for planning interventions. *BMC Research Notes*. 2014; 19(7):162.
 29. Essien EJ, Ogungbade GO, Ward D, Ekong E, Ross MW, Meshack A, et al. Influence of educational status and other variables on human immunodeficiency virus risk perception among military personnel: a large cohort finding. *Military Medicine*. 2007; 172(11):1177-1181.
 30. Nunn A, Zaller N, Cornwall A, Mayer KH, Moore E, Dickman S, et al. Low perceived risk and high HIV prevalence among a predominantly African American population participating in Philadelphia's Rapid HIV testing program. *AIDS Patient Care STDS*. 2011; 25(4):229-235.
 31. Kalichman SC, Cain D. Perceptions of local HIV/AIDS prevalence and risks for HIV/AIDS and other sexually transmitted infections: preliminary study of intuitive epidemiology. *Annals of Behavioral Medicine*. 2005; 29(2):100-105.
 32. Onuoha FN, Munakata T. Correlates of adolescent assertiveness with HIV avoidance in a four-nation sample. *Adolescence*. 2005; 40(159):525-532.
 33. Joshi AB. Sexual behaviour and risk perception of HIV/AIDS among female sex workers (FSWs) in Kathmandu city, Nepal. *Journal of Nepal Health Research Council*. 2004; 2(2):60-61.
 34. Haque MR, Soonthornhdada A. Risk perception and condom-use among Thai youths: findings from Kanchanaburi demographic surveillance system site in Thailand. *Journal of Health Population and Nutrition*. 2009; 27(6):772-783.
 35. Prata N, Morris L, Mazive E, Vahidnia F, Stehr M. Relationship between HIV risk perception and condom use: evidence from a population-based survey in Mozambique. *International Family Planning Perspectives*. 2006; 32(4):192-200.
 36. Dandona R, Dandona L, Kumar GA, Gutierrez JP, McPherson S, Bertozzi SM. HIV testing among female sex workers in Andhra Pradesh, India. *AIDS*. 2005; 19(17):2033-2036.
 37. Kline A. The effects of HIV/AIDS knowledge during adolescence: the role of this knowledge in predicting sexual behaviors and outcomes. [Doctoral dissertation]. Ann Arbor, USA: Psychology from the University of Michigan; 2014.
 38. Hong Y, Zhang C, Li X, Fang X, Lin X, Zhou Y, et al. HIV testing behaviors among female sex workers in southwest China. *AIDS and Behavior*. 2012; 16(1):44-52.
 39. Ghaderi S. The study of high-risk sexual behavior in addicted prostitution referred to treatment centers in Tehran. Tehran: Allameh Tabatabaie; 2011.
 40. Valadez JJ, Berendes S, Jeffery C, Thomson J, Othman HB, Danon L, et al. Filling the knowledge gap: measuring HIV prevalence and risk factors among men who have sex with men and female sex workers in Tripoli, Libya. *PLoS ONE*. 2013; 8(6):e66701.
 41. Vian T, Semrau K, Hamer DH, Loan LT, Sabin LL. HIV/AIDS-related knowledge and behaviors among most-at-risk populations in Vietnam. *The Open AIDS Journal*. 2012; 6(1):259-265.
 42. Rahmati NF, Niknami S, Amin SF, Ahmadi F, Tavafian S, Hajizadeh E. Individual factors

- predisposing HIV/AIDS high risk behaviors: a qualitative study. *Payesh*. 2011; 10(2):205-215 (Persian).
43. Karimi MA, Ghofranipor F, Heidarnia A. The effect of health education based on health belief model on preventive actions of AIDS on addict in Zarandieh. *Journal of Guilan University of Medical Science*. 2009; 18(70):64-73 (Persian).
44. Sutton MY, Hardnett FP, Wright P, Wahi S, Pathak S, Warren-Jeanpiereet L, et al. HIV/AIDS knowledge scores and perceptions of risk among African American students attending historically black colleges and universities. *Public Health Reports*. 2011; 126(5):653-663.