



HIV-Related Knowledge and Stigma Among the General Population in the Southeast of Iran

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Abstract

Background: HIV-related stigma is a barrier to effective HIV responses among people living with HIV (PLHIV).

Objectives: The current study aimed at measuring HIV-related stigma, and its associated factors among the general population in the Southeast of Iran.

Methods: The current cross-sectional study was conducted on a convenience sample of 900 individuals in Kerman, Southeast of Iran, from July to September 2016. Data was collected using a self-administered questionnaire, including (I) demographic and background characteristics; (II) HIV-related stigma; and (III) HIV-related knowledge. Data were analyzed with SPSS version 20 using descriptive statistics, as well as bivariable and multivariable linear regressions.

Results: Low, moderate, and high levels of stigmatizing attitudes toward PLHIV were reported by 39.1%, 57.8%, and 3.1% of the participants, respectively. Female sex ($\beta = 0.33$, P value = 0.01) and those not having a history of HIV testing ($\beta = 0.45$, P value < 0.001) had, on average, higher levels of stigmatizing attitudes, while those with a higher level of education ($\beta = -0.97$, P value < 0.001) had, on average, lower levels of stigmatizing attitudes.

Conclusions: Gender-sensitive educational interventions need to be developed to reduce the negative attitude towards PLHIV in Iran.

Keywords: Stigma, Attitude, Knowledge, People Living with HIV, Iran

1. Background

HIV-related stigma is considered one of the main obstacles to an effective response to the HIV epidemic worldwide (1). The Joint United Nations program on HIV/AIDS (UNAIDS) defines HIV related stigma as “a process of devaluation of people either living with or associated with HIV and AIDS” (2). Stigma could be manifested in two ways: (1) internal stigma, which leads to an unwillingness to seek help and access resources; and (2) external stigma, which leads to discrimination by HIV status or association with someone living with HIV/AIDS (3). Stigma and discrimination affect preventive measures of HIV transmission (4-7), and reduce PLHIV’s access to health services, social interac-

tions, and supports (5, 8, 9); issues more pronounced in the context of conservative and Islamic countries (10).

In Iran, with the highest number of known PLHIV in the Middle East (i.e., 35,000), the HIV epidemic is mainly concentrated on people who inject drugs and female sex workers; however, a shift in the primary mode of transmission from drug use to sexual behaviors is evident (11-15). Although the onset of the epidemic in Iran was 33 years ago (1987), PLHIV continue to experience significant HIV-related stigma and are often shunned by the general public. While there is a growing literature on HIV-related stigma worldwide, the understanding of HIV-related stigma among the general population in Iran re-

mains very limited (16,17) and most studies focus on knowledge and attitudes of the general population towards HIV (18-22).

Previous stigma studies mainly investigated the lived experiences of PLHIV and highlighted the high levels of internal and external stigma among them in a variety of contexts. For example, participants mentioned internal stigma such as silence, shame, and feeling miserable; they also reported experiencing external stigma by their families, the community, and the health-care system (3, 23-27).

2. Objectives

Due to the limited understanding of HIV-related stigma among the general population and the limitations of the existing narrow body of evidence in Iran (e.g., small sample size, qualitative study designs), the present study aimed at assessing HIV-related stigma among the general population in the Southeast of Iran in 2016.

3. Methods

3.1. Participants and Setting

The current cross-sectional study was conducted in Kerman (the largest city in the Southeast of Iran with a population of about 750,000 inhabitants) from July to September 2016. Since it was assumed that 50% of the general population had stigmatizing attitudes (28), with a 95% confidence interval and the precision level of 0.07, the sample size of 784 was calculated. Due to the convenience nature of the sample, the questionnaires were distributed among 1045 individuals that 900 of them answered the items (response rate = 86.1%).

Kerman City consists of four urban regions. Therefore, first, the city was divided into four strata. Within each stratum, neighborhoods were considered as clusters, and some neighborhoods were randomly selected. In each cluster, according to the sample size, trained interviewers selected participants from different crowded streets and public places (e.g., shopping centers, parks, transit stations) at different times of the day. According to the results of previous studies in Iran, people are more likely to disclose sensitive information (e.g., sexual health-related topics) in street-based surveys compared with household- or telephone-based surveys (29, 30). Individuals above 18 years old and being able to make verbal communication were eligible to be included in the study. People who had not heard anything about HIV were excluded from the study. The questionnaire was self-administered; however, in case of insufficient literacy, the questionnaire was completed with the interviewer's assistance.

3.2. Ethical Considerations

The study protocol was reviewed and approved by the Ethics Committee of the Kerman University of Medical Sciences (ethical code: IR.KMU.REC.1395.140). Before starting the interview, the participants were provided with information about the objectives of the study; they were also assured of the confidentiality of their information and the anonymity of the data. The participants provided verbal informed consent and could withdraw from the interview at any time.

3.3. Data Collection

Data collection was completed using a three-part researcher-made questionnaire, including (I) demographic and background characteristics; (II) HIV-related stigma; and (III) HIV-related knowledge. The questionnaire collected information on age (< 30 or ≥ 30 years), sex (male or female), marital status (never married or single or ever married), education level (below high school diploma, diploma, or college/university degree), current occupational status (unemployed/housewife, university student, or employed), self-reported knowledge of high-risk behaviors (yes or no), and a history of such behaviors (yes or no), knowledge of HIV (continuous), sources of receiving information about HIV (scientific books, mass media, internet/social networks, family/friends/relatives, healthcare centers, or school/university), the history of HIV testing (yes or no), and the history of history of previous interactions with an individual living with HIV if they knew any (yes or no). Knowledge of HIV transmission was measured using a scale with three items with the following response options: correct, incorrect, and I do not know. The sum of the scores yielded a final score ranging from 0 to 24 and then standardized based on a value from 0 to 20, with higher scores indicating higher knowledge of HIV. Then the standardized scores were categorized as poor (< 10), moderate (10 - 14), and high knowledge (> 14) (21).

HIV-related stigma was measured using the HIV-related stigma index, an 18-item scale with four subscales. The subscales were the patient's social position with five items, social support with four items, social disease perspective with seven items, and social harassment with two items (Table 1). Items were scored based on a five-point Likert scale ranging from completely agree (score 5) to completely disagree (score 1), yielding an overall score ranged from 18 to 90, with a higher score indicating a higher level of HIV-related stigma (i.e., negative perception) towards PLHIV. The psychometric properties of the questionnaire were evaluated using content and

construct validity, and internal consistency and repeatability. To measure the validity of the questionnaire, the comments of 15 experts (i.e., nurses, midwives, social medicals, health education specialists, sociologists, and epidemiologists) were used. The content validity index was 0.98. The construct validity showed that the index had four dimensions: the patient's social position (five items), social support (four items), social disease perspective (seven items), and social harassment (two items). The confirmatory factor analysis showed that the four-dimension index of stigma had suitable fit indices. In addition, the scale had a good internal consistency and stability (Cronbach's alpha coefficient = 0.69 and intraclass correlation coefficient = 0.57).

For the analysis, the scores were standardized based on a value from 0 to 20, higher scores indicating higher HIV-related stigma. Then the standardized scores were categorized as poor (< 6), moderate (6 - 10), and high stigma (> 10).

3.4. Data Analysis

Descriptive statistics were reported for continuous (mean and standard deviation (SD) and categorical (absolute and relative frequencies) measures. To examine the factors associated with HIV-related stigma, first, multiple bivariable linear regression models were run in which HIV-related stigma was the dependent variable of the study, and demographic, background, and HIV knowledge were considered as independent factors. To deal with the issue of bias due to confounding, multivariable linear regression was also performed. A three-stage model-building approach was used to assess the effect of different variables on the stigma score. In the first stage, the correlation analysis of independent variables was conducted to identify pairs of variables that essentially contained the same information and had to be removed due to collinearity. In the second stage, the bivariable analysis was performed to identify variables associated with stigma. During this screening phase, a significance level of 0.25 was used. In the third stage, all variables with $P < 0.25$ were simultaneously inserted into a full model subsequently reduced by backward elimination. The procedure was repeated until all the remaining variables were significant at $P < 0.05$ (31). Data were analyzed using SPSS version 20.

4. Results

4.1. Participants Characteristics

Totally, 900 males and females above 18 years old responded to the items in the questionnaire (response rate =

Table 1. Participants' Responses to HIV-Related Stigma Index in the Southeast of Iran^a

Item	Response		
	Disagree	No Idea	Agree
Dimension I: The patient's social position			
The person living with HIV should be ashamed of his/her disease.	86 (12.3)	91 (13.0)	523 (74.7)
The family of PLHIV should be ashamed of having such a family member.	281 (40.1)	189 (27.0)	230 (32.9)
In our society, PLHIV are rejected and forgotten by their families.	227 (32.5)	198 (28.4)	288 (42.0)
In our society, PLHIV are rejected and forgotten by their close friends.	176 (25.1)	165 (23.6)	359 (51.3)
PLHIV will lose their respect and social status.	173 (24.7)	143 (20.5)	383 (54.8)
Dimension II: Social support			
Physicians, nurses, and other care providers should treat PLHIV like other patients.	52 (7.4)	123 (17.6)	525 (75.0)
PLHIV should be welcomed in social participation.	46 (6.7)	87 (12.4)	566 (80.9)
PLHIV should be allowed to work and cooperate with others.	23 (3.3)	77 (11.0)	599 (75.7)
PLHIV should be treated like anyone else in the society.	227 (32.5)	193 (28.4)	288 (42.0)
Dimension III: Social disease perspective			
All PLHIV are guilty.	10 (1.4)	59 (8.5)	629 (90.1)
PLHIV are disgusting.	560 (80.3)	123 (17.6)	15 (2.1)
Only those who involve in high-risk sexual relationships are at risk of HIV.	466 (66.9)	181 (26.0)	49 (7.1)
PLHIV should be punished.	530 (76.0)	151 (21.6)	16 (2.4)
HIV is a punishment of an individual's behavior in the past.	408 (58.5)	227 (32.6)	62 (8.9)
Quarantine of PLHIV is the best method to control HIV.	413 (59.0)	216 (30.9)	71 (10.1)
We should not buy fruits and vegetables from PLHIV.	395 (56.7)	264 (37.9)	38 (5.4)
Dimension IV: Social harassment			
In our society, PLHIV are verbally assaulted.	159 (22.7)	169 (24.1)	372 (53.2)
PLHIV are physically assaulted in our society.	327 (46.7)	212 (30.3)	160 (23.0)

^aValues are expressed as N (%).

86.1%). Of the overall sample analyzed (n = 900), the mean \pm SD age of participants was 35.89 ± 12 years, 50% were male, 33.8% were single, 57% reported having a university degree, and 63.6% had a job (Table 2).

Table 2. Demographic and Background Characteristics of Participants to Estimate the HIV Knowledge and Stigma in the Southeast of Iran

Variable	N (%)
Age, y	
< 30	316 (35.4)
≥ 30	577 (64.6)
Sex	
Male	450 (50.0)
Female	450 (50.0)
Marital status	
Single	304 (33.8)
Ever married	596 (66.2)
Educational Level	
Below high school diploma	87 (9.7)
Diploma	298 (33.3)
College/university	513 (57.0)
Occupation	
Unemployed/housewife	186 (20.7)
University student	141 (15.7)
Employed	573 (63.6)
Knowing of high-risk behaviors, yes	668 (74.3)
History of being involved in high-risk behaviors, yes	132 (14.7)
Ever tested for HIV	152 (16.9)
Last HIV testing	
Within last year	35 (23.0)
Within 1-2 years ago	34 (22.4)
Before 2 years ago	83 (54.6)
Self-reported sufficient knowledge of HIV, yes	802 (89.8)
Sources of information about HIV^a	
Scientific books	186 (22.2)
Mass media (radio, television, ...)	720 (86.1)
Internet and social networks	404 (48.3)
Family/friends/relatives	236 (28.2)
Healthcare centers	167 (20)
School/university	355 (42.5)
Knowing an individual living with HIV, yes	84 (9.4)
Previous interactions with PLHIV	35 (3.9)
HIV-related knowledge	
High	788 (87.6)
Moderate	105 (11.7)
Low	7 (0.8)
HIV-related stigma	
Low (positive perception)	352 (39.1)
Moderate	520 (57.8)
High (negative perception)	28 (3.1)

^aParticipants could select more than one choice.

Overall, 74.3% of the participants believed that they

were aware of the high-risk behaviors, 14.7% reported involvement in at least one high-risk behavior, and 16.9% reported a history of HIV testing. A significant proportion of the participants (89.8%) assumed they knew about HIV and mass media (radio, television, newspapers, and magazines) was reported as the main source of HIV-related information (86.1%). While knowing an individual living with HIV was reported by 9.4%, only 3.9% had regular communication with such individuals. The mean \pm SD score of HIV-related knowledge was 16.05 ± 2.27 (on a scale ranging from 0 to 20). The high, moderate, and low HIV-related knowledge levels were respectively estimated among 87.6%, 11.7%, and 0.8% of the participants (Table 2).

The mean (\pm SD) score of HIV-related stigma was 7.5 (± 1.94), ranging from 1.11 to 14.72 out of a possible range of 0 to 20. Of the total sample, 39.1% had a low level, 57.8% moderate level, and only 3.1% had a high level of HIV-related stigma towards PLHIV. According to the results of dimension I (patient's social position), about 75% of the participants agreed/completely agreed that "PLHIV should be ashamed of their disease". Also, 55% of them agreed/completely agreed that "PLHIV will lose their respect and social status". According to the results of dimension III (social disease perspective), 90% of the participants agreed/completely agreed that "all PLHIV are guilty". Based on dimension IV (social harassment), 53% of them agreed/completely agreed that "In Iran, PLHIV is verbally assaulted" (Table 1).

In addition, the scores of each dimension were calculated based on a value from 0 to 20. The means (\pm SD) of patient's social position, social support, social disease perspective, and social harassment were $12.02 (\pm 4.38)$ ranging: 0 - 20, $4.12 (\pm 2.95)$ ranging: 0 - 16.25, $12.02 (\pm 4.38)$ ranging: 0 - 20, and $4.59 (\pm 10.23)$ ranging: 0 - 20, respectively. Therefore, the lowest level of stigma belonged to the social support dimension, followed by social harassment.

4.2. Factors Associated with HIV-Related Stigma

Results of the bivariable linear regression showed that higher HIV knowledge, higher education level, and being a university student were associated with lower levels of HIV-related stigma (i.e., more positive perception), while being female, lack of knowledge of high-risk behaviors, and no history of HIV testing were associated with higher levels of HIV-related stigma (i.e., more negative perception). Analysis of the multivariable linear regression demonstrated that individuals with higher levels of HIV knowledge (beta = -0.05, P-value = 0.05), having a high school diploma (beta = -0.64, P-value = 0.006) or higher education (beta = -0.97, P-value < 0.001) had, on average, significantly a lower level

of HIV-related stigma. Conversely, females (beta = 0.33, P-value = 0.01) and those never having HIV testing (beta = 0.45, P-value = 0.009) had, on average, significantly a higher level of HIV-related stigma (Table 3).

5. Discussion

In the current study, a high proportion of either moderate (57.8%) or high (3.1%) level of HIV-related stigma was documented in the study population, indicating negative perceptions or attitudes towards PLHIV. Interestingly, it was found that females had more negative perceptions. In addition, higher stigma was associated with not having had an HIV test, while higher HIV knowledge and a higher level of education were associated with lower HIV-related stigma. Consistent with the current study results, other research also reported a high level of HIV-related stigma. For example, a study on stigma against PLHIV among migrant females living in Shanghai, China, reported that 80% of the participants were afraid of PLHIV and above half of them had a discriminative attitude towards them (32). In a nationwide study in Iran among young individuals (2016) it was reported that only 20.7% had positive attitudes towards PLHIV (21).

Although previous studies showed a relatively high level of stigma in Iran and it was repeatedly reported that PLHIV experienced stigmatizing practices (3, 17, 23), the current study findings suggested a shift in individuals' attitude toward PLHIV in the past few years probably due to the role of media; nonetheless, moderate levels of stigma were frequent. To support the pivotal role of national media, it was observed that more than 80% of the study participants reported that mass media (radio, television, newspaper, and magazines) was the main source of receiving reliable information about HIV. A national population-based survey among Iranian youth selected by convenience sampling reported that almost 70% of the participants obtained their information about HIV from mass media (21).

Despite the key role of such mass media-based approaches to improve the knowledge of the general population of HIV, and its effect on HIV testing referrals (33), such a high level of stigma within the general population implicated that although the current interventions appeared to be beneficial, they require improvement to effectively reduce the negative attitudes towards PLHIV in Iran. In line with prior studies in Shanghai, China, Vietiane, and Heilongjiang, Northeast China (32, 34, 35), the current study also found a significant inverse association between higher levels of HIV knowledge and lower levels of HIV-related stigma. Therefore, public education

campaigns aimed at improving knowledge and reducing HIV-related stigma in the general population. Such approaches should also enhance communications among patients with HIV and the general population; for example, providing training programs for the general population to increase their awareness in the national AIDS day and other related events. The interventions in which individuals with HIV are involved may reduce the level of HIV-related stigma among the general population; an approach called the contact hypothesis (36) through which prejudice or discriminatory attitudes towards other groups, here people with HIV, can be mitigated via intergroup interactions (37).

Development of the stigma-reduction interventions is particularly imperative among females since the current study found that females had a higher level of HIV-related stigma. Females in Iran historically experience greater social, cultural, and contextual barriers (24, 38) that might impact their knowledge level and attitudes. The current study findings may indicate gender-based interventions in which females' negative attitudes toward HIV can be effectively addressed. It is required that the government and policymakers make more attempts to scale up and implement stigma-reduction strategies such as HIV education and prevention campaigns at the community level, in which cultural and social norms are taken into account (39). Apart from the community-based interventions, other studies proposed a combination of multiple strategies at different levels of individual, interpersonal, organizational, and public policy to address the issue of HIV-related stigma and discrimination better (7).

It was also identified that around one-sixth of the participants reported the history of HIV testing. Subsequently, it was found that individuals reporting HIV testing had a greater level of positive attitudes towards HIV and PLHIV compared with the ones that never did HIV testing. The current study did not explore the reasons for HIV testing among the participants; however, this proportion was consistent with prior studies in Iran (13.6%) (40) and other countries (13.1%) (21). Therefore, stigma reduction strategies may require addressing the importance of HIV testing. While previous studies predominantly focused on the impact of HIV-related stigma on the reduction of individuals' desire to involve in HIV testing (41), the current study identified the other-way-round association. Although such reverse association might be due to the nature of the sampling strategies of the study, this may not impact the importance of both HIV testing and HIV-related stigma and their associations.

Table 3. Correlates of HIV-Related Stigma Among the General Population in the Southeastern of Iran

Variable	Bivariable Linear Regression			Multivariable Linear Regression		
	Beta	95% CI ^a	P Value	Beta	95% CI	P Value
HIV-related knowledge	-0.07	-0.13, -0.02	0.01	-0.05	-0.10, 0.01	0.050
Age, y						
< 30	Ref.					
≥ 30	0.26	-0.01, 0.52	0.06			
Sex						
Male	Ref.			Ref.		
Female	0.34	0.08, 0.59	0.009	0.33	0.08, 0.58	0.010
Marital status						
Single	Ref.					
Married/divorced/widow	-0.17	-0.44, 0.09	0.19			
Education level						
Below high school diploma	Ref.			Ref.		
Diploma	-0.72	-1.19, -0.26	0.002	-0.64	-1.10, -0.19	0.006
College/university	-1.1	-1.53, -0.65	< 0.001	-0.97	-1.40, -0.53	< 0.001
Occupation						
Unemployed/housewife	Ref.					
University student	-0.55	-0.98, -0.13	0.01			
Employed	-0.24	-0.56, 0.08	0.15			
Knowledge of high-risk behaviors						
Enough	Ref.					
Not enough	0.45	0.16, 0.74	0.002			
Reported involvement in high-risk behaviors						
No	Ref.					
Yes	0.14	-0.23, 0.52	0.44			
History of HIV testing						
Yes	Ref.			Ref.		
No	0.6	0.26, 0.94	0.001	0.45	0.11, 0.78	0.009

^aConfidence interval.

5.1. Study Limitations

Authors acknowledge the limitations of the study. The first limitation was that the study was conducted only in Kerman, and the results cannot be generalized to the entire country. However, the authors believe that the study findings in a large urban setting are informative for other provinces of the country. The second limitation was that the study relied on self-reported attitudes and it is therefore subject to reporting bias. Overall, given the scope of the study, the authors believe that the findings have important implications for both research and policy.

5.2. Conclusions

Approximately 60% of the study participants reported experiencing a moderate-to-high level of HIV-related stigma towards PLHIV. Gender-based stigma-reduction strategies and increasing HIV-related knowledge have the potential to reduce negative attitudes toward HIV. While mass media-based strategies can still be considered as one of the main strategies, multiple approaches in which different levels of individual, organizational, and communities are considered can better address HIV-related stigma. Educational and preventive national campaigns in which a broad range of population is covered can

be considered as an important strategy to reduce HIV discrimination and stigma.

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Footnotes

Authors' Contribution: All authors equally participated in the design, implementation, drafting, and revision of the manuscript.

Conflict of Interests: The authors declared no conflict of interest.

Ethical Approval: Kerman University of Medical Sciences reviewed and approved the proposal (reference number: IR.KMU.REC.1395.140).

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Informed Consent: Before starting the interview, the participants were provided with the information that reviewed the objectives of the study and the confidential and anonymous nature of the data. The participant could withdraw from the interview at any time and provided verbal informed consent.

References

- Mahajan AP, Sayles JN, Patel VA, Remien RH, Sawires SR, Ortiz DJ, et al. Stigma in the HIV/AIDS epidemic: A review of the literature and recommendations for the way forward. *AIDS*. 2008;**22** Suppl 2:S67-79. doi: [10.1097/01.aids.0000327438.13291.62](https://doi.org/10.1097/01.aids.0000327438.13291.62). [PubMed: [18641472](https://pubmed.ncbi.nlm.nih.gov/18641472/)]. [PubMed Central: [PMC2835402](https://pubmed.ncbi.nlm.nih.gov/PMC2835402/)].
- Churcher S. Stigma related to HIV and AIDS as a barrier to accessing health care in Thailand: A review of recent literature. *WHO South East Asia J Public Health*. 2013;**2**(1):12-22. doi: [10.4103/2224-3151.115829](https://doi.org/10.4103/2224-3151.115829). [PubMed: [28612818](https://pubmed.ncbi.nlm.nih.gov/28612818/)].
- Seyed Alinaghi SA, Paydary K, Afsar Kazerooni P, Hosseini M, Sedaghat A, Emamzadeh-Fard S, et al. Evaluation of stigma index among people living with HIV/AIDS (PLWHA) in six cities in Iran. *Thrita J Med Sci*. 2013;**2**(2):69-75. doi: [10.5812/thrita.11801](https://doi.org/10.5812/thrita.11801).
- Tavakol M, Nikayin D. Stigmatization, doctor-patient relationship, and curing HIV/AIDS patients. *Bioethics J*. 2012;**2**(5):11-43.
- Satar P, Eslamian A. [The lived experience of social relations in women living with HIV]. *Wom Dev Pol*. 2014;**12**(2):207-28. Persian.
- Turan JM, Nyblade L. HIV-related stigma as a barrier to achievement of global PMTCT and maternal health goals: A review of the evidence. *AIDS Behav*. 2013;**17**(7):2528-39. doi: [10.1007/s10461-013-0446-8](https://doi.org/10.1007/s10461-013-0446-8). [PubMed: [23474643](https://pubmed.ncbi.nlm.nih.gov/23474643/)].
- Stangl AL, Lloyd JK, Brady LM, Holland CE, Baral S. A systematic review of interventions to reduce HIV-related stigma and discrimination from 2002 to 2013: How far have we come? *J Int AIDS Soc*. 2013;**16**(3 Suppl 2):18734. doi: [10.7448/IAS.16.3.18734](https://doi.org/10.7448/IAS.16.3.18734). [PubMed: [24242268](https://pubmed.ncbi.nlm.nih.gov/24242268/)]. [PubMed Central: [PMC3833106](https://pubmed.ncbi.nlm.nih.gov/PMC3833106/)].
- Katz IT, Ryu AE, Onuegbu AG, Psaros C, Weiser SD, Bangsberg DR, et al. Impact of HIV-related stigma on treatment adherence: Systematic review and meta-synthesis. *J Int AIDS Soc*. 2013;**16**(3 Suppl 2):18640. doi: [10.7448/IAS.16.3.18640](https://doi.org/10.7448/IAS.16.3.18640). [PubMed: [24242258](https://pubmed.ncbi.nlm.nih.gov/24242258/)]. [PubMed Central: [PMC3833107](https://pubmed.ncbi.nlm.nih.gov/PMC3833107/)].
- Earnshaw VA, Smith LR, Chaudoir SR, Amico KR, Copenhaver MM. HIV stigma mechanisms and well-being among PLWH: A test of the HIV stigma framework. *AIDS Behav*. 2013;**17**(5):1785-95. doi: [10.1007/s10461-013-0437-9](https://doi.org/10.1007/s10461-013-0437-9). [PubMed: [23456594](https://pubmed.ncbi.nlm.nih.gov/23456594/)]. [PubMed Central: [PMC3664141](https://pubmed.ncbi.nlm.nih.gov/PMC3664141/)].
- Karamouzian M, Madani N, Doroudi F, Haghdoost AA. Improving the quality and quantity of HIV Data in the Middle East and North Africa: Key challenges and ways forward. *Int J Health Policy Manag*. 2017;**6**(2):65-9. doi: [10.15171/ijhpm.2016.112](https://doi.org/10.15171/ijhpm.2016.112). [PubMed: [28812781](https://pubmed.ncbi.nlm.nih.gov/28812781/)]. [PubMed Central: [PMC5287931](https://pubmed.ncbi.nlm.nih.gov/PMC5287931/)].
- Karamouzian M, Mirzazadeh A, Rawat A, Shokoohi M, Haghdoost AA, Sedaghat A, et al. Injection drug use among female sex workers in Iran: Findings from a nationwide bio-behavioural survey. *Int J Drug Policy*. 2017;**44**:86-91. doi: [10.1016/j.drugpo.2017.03.011](https://doi.org/10.1016/j.drugpo.2017.03.011). [PubMed: [28478309](https://pubmed.ncbi.nlm.nih.gov/28478309/)].
- Karamouzian M, Mirzazadeh A, Shokoohi M, Khajehkazemi R, Sedaghat A, Haghdoost AA, et al. Lifetime abortion of female sex workers in Iran: Findings of a National Bio-Behavioural survey in 2010. *PLoS One*. 2016;**11**(11). e0166042. doi: [10.1371/journal.pone.0166042](https://doi.org/10.1371/journal.pone.0166042). [PubMed: [27861487](https://pubmed.ncbi.nlm.nih.gov/27861487/)]. [PubMed Central: [PMC5115696](https://pubmed.ncbi.nlm.nih.gov/PMC5115696/)].
- Shokoohi M, Karamouzian M, Osooli M, Sharifi H, Fahimfar N, Haghdoost A, et al. Low HIV testing rate and its correlates among men who inject drugs in Iran. *Int J Drug Policy*. 2016;**32**:64-9. doi: [10.1016/j.drugpo.2016.03.009](https://doi.org/10.1016/j.drugpo.2016.03.009). [PubMed: [27157980](https://pubmed.ncbi.nlm.nih.gov/27157980/)].
- Shahesmaeili A, Karamouzian M, Shokoohi M, Kamali K, Fahimfar N, Nadji SA, et al. Symptom-based versus laboratory-based diagnosis of five sexually transmitted infections in female sex workers in Iran. *AIDS Behav*. 2018;**22**(Suppl 1):19-25. doi: [10.1007/s10461-018-2130-5](https://doi.org/10.1007/s10461-018-2130-5). [PubMed: [29744768](https://pubmed.ncbi.nlm.nih.gov/29744768/)]. [PubMed Central: [PMC6226376](https://pubmed.ncbi.nlm.nih.gov/PMC6226376/)].
- Sharifi H, Mirzazadeh A, Noroozi A, Marshall BD, Farhoudian A, Higgs P, et al. Patterns of HIV risks and related factors among people who inject drugs in Kermanshah, Iran: A latent class analysis. *J Psychoactive Drugs*. 2017;**49**(1):69-73. doi: [10.1080/02791072.2016.1262568](https://doi.org/10.1080/02791072.2016.1262568). [PubMed: [27937534](https://pubmed.ncbi.nlm.nih.gov/27937534/)]. [PubMed Central: [PMC5586100](https://pubmed.ncbi.nlm.nih.gov/PMC5586100/)].
- Heidary M, Nasiri MJ. Why has HIV/AIDS prevalence increased in Iran? *Clin Infect Dis*. 2016;**63**(6):846. doi: [10.1093/cid/ciw361](https://doi.org/10.1093/cid/ciw361). [PubMed: [27282708](https://pubmed.ncbi.nlm.nih.gov/27282708/)].
- Rahmati-Najarkolaie F, Niknami S, Aminshokravi F, Bazargan M, Ahmadi F, Hadjizadeh E, et al. Experiences of stigma in healthcare settings among adults living with HIV in the Islamic Republic of Iran. *J Int AIDS Soc*. 2010;**13**:27. doi: [10.1186/1758-2652-13-27](https://doi.org/10.1186/1758-2652-13-27). [PubMed: [20649967](https://pubmed.ncbi.nlm.nih.gov/20649967/)]. [PubMed Central: [PMC2919446](https://pubmed.ncbi.nlm.nih.gov/PMC2919446/)].
- Jafari A, Khami M, Yazdani R, Mohammadi M. [Knowledge and attitude of senior dental students towards HIV/AIDS]. *J Dent Med*. 2009;**22**(4):192-8. Persian.
- Shahinfar J, Masrurnia M, Majlesi F. Knowledge, attitudes toward AIDS/HIV and its risk factor in applicant for drivers' health card referred to health center of Bojnurd, Iran 2011. *J North Khorasan Univ Med Sci*. 2013;**5**(1):71-81. doi: [10.29252/jnkums.5.1.71](https://doi.org/10.29252/jnkums.5.1.71).
- Mazloumi MSS, Abbasi SM. Knowledge and attitude survey of high school students of Yazd province of Iran about HIV/AIDS. *Zahedan J Res Med Sci*. 2006;**8**(1):53-6.

21. Shokoohi M, Karamouzian M, Mirzazadeh A, Haghdoost A, Rafierad AA, Sedaghat A, et al. HIV knowledge, attitudes, and practices of young people in Iran: Findings of a National Population-Based Survey in 2013. *PLoS One*. 2016;**11**(9). e0161849. doi: [10.1371/journal.pone.0161849](https://doi.org/10.1371/journal.pone.0161849). [PubMed: [27626638](https://pubmed.ncbi.nlm.nih.gov/27626638/)]. [PubMed Central: [PMC5023173](https://pubmed.ncbi.nlm.nih.gov/PMC5023173/)].
22. Karamouzian M, Shahesmaeili A, Khajehkazemi R, Hooshyar SH, Fallahi H, Haghdoost AA, et al. Awareness of and knowledge about STIs among nonmedical students in Iran. *Int Perspect Sex Reprod Health*. 2017;**43**(1):21-8. doi: [10.1363/43e3217](https://doi.org/10.1363/43e3217). [PubMed: [28930622](https://pubmed.ncbi.nlm.nih.gov/28930622/)].
23. Karamouzian M, Akbari M, Haghdoost AA, Setayesh H, Zolala F. "I am dead to them": HIV-related stigma experienced by people living with HIV in Kerman, Iran. *J Assoc Nurses AIDS Care*. 2015;**26**(1):46-56. doi: [10.1016/j.jana.2014.04.005](https://doi.org/10.1016/j.jana.2014.04.005). [PubMed: [24856436](https://pubmed.ncbi.nlm.nih.gov/24856436/)].
24. Oskouie F, Kashefi F, Raffi F, Gouya MM. Qualitative study of HIV related stigma and discrimination: What women say in Iran. *Electron Physician*. 2017;**9**(7):4718-24. doi: [10.19082/4718](https://doi.org/10.19082/4718). [PubMed: [28894526](https://pubmed.ncbi.nlm.nih.gov/28894526/)]. [PubMed Central: [PMC5586984](https://pubmed.ncbi.nlm.nih.gov/PMC5586984/)].
25. Pourmarzi D, Khoramirad A, Gaeeni M. Perceived stigma in people living with HIV in Qom. *J Fam Reprod Health*. 2017;**11**(4):202-10. [PubMed: [30288167](https://pubmed.ncbi.nlm.nih.gov/30288167/)]. [PubMed Central: [PMC6168756](https://pubmed.ncbi.nlm.nih.gov/PMC6168756/)].
26. Zarei N, Joulaei H, Ghoreishi M, Dianatinasab M. Religious beliefs and HIV-related stigma: Considerations for health-care providers. *J HIV/AIDS Soc Serv*. 2019;**18**(1):90-102. doi: [10.1080/15381501.2019.1588823](https://doi.org/10.1080/15381501.2019.1588823).
27. Zarei N, Joulaei H, Darabi E, Fararouei M. Stigmatized attitude of healthcare providers: A barrier for delivering health services to HIV positive patients. *Int J Community Based Nurs Midwifery*. 2015;**3**(4):292-300. [PubMed: [26448956](https://pubmed.ncbi.nlm.nih.gov/26448956/)]. [PubMed Central: [PMC4591575](https://pubmed.ncbi.nlm.nih.gov/PMC4591575/)].
28. Haghdoost A. [Do you want to gain a profound insight into sample size and statistical power]. *Iran J Epidemiol*. 2009;**5**(1):57-63. Persian.
29. Nasirian M, Karamouzian M, Kamali K, Nabipour AR, Maghsoodi A, Nikaeen R, et al. Care seeking patterns of STIs-associated symptoms in Iran: Findings of a population-based survey. *Int J Health Policy Manag*. 2015;**5**(1):5-11. doi: [10.15171/ijhpm.2015.146](https://doi.org/10.15171/ijhpm.2015.146). [PubMed: [26673644](https://pubmed.ncbi.nlm.nih.gov/26673644/)]. [PubMed Central: [PMC4676971](https://pubmed.ncbi.nlm.nih.gov/PMC4676971/)].
30. Nasirian M, Hosseini Hooshyar S, Haghdoost AA, Karamouzian M. How and where do we ask sensitive questions: Self-reporting of sti-associated symptoms among the Iranian General Population. *Int J Health Policy Manag*. 2018;**7**(8):738-45. doi: [10.15171/ijhpm.2018.18](https://doi.org/10.15171/ijhpm.2018.18). [PubMed: [30078294](https://pubmed.ncbi.nlm.nih.gov/30078294/)]. [PubMed Central: [PMC6077285](https://pubmed.ncbi.nlm.nih.gov/PMC6077285/)].
31. Dohoo I, Martin W, Stryhn H. *Methods in epidemiologic research*. Charlottetown, PE, Canada: VER Inc; 2012.
32. Cao H, He N, Jiang Q, Yang M, Liu Z, Gao M, et al. Stigma against HIV-infected persons among migrant women living in Shanghai, China. *AIDS Educ Prev*. 2010;**22**(5):445-54. doi: [10.1521/aeap.2010.22.5.445](https://doi.org/10.1521/aeap.2010.22.5.445). [PubMed: [20973664](https://pubmed.ncbi.nlm.nih.gov/20973664/)]. [PubMed Central: [PMC3022510](https://pubmed.ncbi.nlm.nih.gov/PMC3022510/)].
33. *Parya has 8 times the rate of AIDS reconnaissance*. 2016, [cited 2019 Mar 25]. Available from: www.tasnimnews.com/fa/news/1395/09/28/1270881.
34. Vorasane S, Jimba M, Kikuchi K, Yasuoka J, Nanishi K, Durham J, et al. An investigation of stigmatizing attitudes towards people living with HIV/AIDS by doctors and nurses in Vientiane, Lao PDR. *BMC Health Serv Res*. 2017;**17**(1):125. doi: [10.1186/s12913-017-2068-8](https://doi.org/10.1186/s12913-017-2068-8). [PubMed: [28183300](https://pubmed.ncbi.nlm.nih.gov/28183300/)]. [PubMed Central: [PMC5301416](https://pubmed.ncbi.nlm.nih.gov/PMC5301416/)].
35. Li X, Yuan L, Li X, Shi J, Jiang L, Zhang C, et al. Factors associated with stigma attitude towards people living with HIV among general individuals in Heilongjiang, Northeast China. *BMC Infect Dis*. 2017;**17**(1):154. doi: [10.1186/s12879-017-2216-0](https://doi.org/10.1186/s12879-017-2216-0). [PubMed: [28212610](https://pubmed.ncbi.nlm.nih.gov/28212610/)]. [PubMed Central: [PMC5316215](https://pubmed.ncbi.nlm.nih.gov/PMC5316215/)].
36. [No author listed]. *The nature of prejudice*. London: Macat Library; 2017. doi: [10.4324/9781912282401](https://doi.org/10.4324/9781912282401).
37. Paluck EL, Green DP. Prejudice reduction: what works? A review and assessment of research and practice. *Annu Rev Psychol*. 2009;**60**:339-67. doi: [10.1146/annurev.psych.60.110707.163607](https://doi.org/10.1146/annurev.psych.60.110707.163607). [PubMed: [18851685](https://pubmed.ncbi.nlm.nih.gov/18851685/)].
38. Utas B. *Women in Islamic Societies*. 1st ed. London: Routledge; 2016. doi: [10.4324/9781315513935](https://doi.org/10.4324/9781315513935).
39. Li L, Liang LJ, Lin C, Wu Z, Rotheram-Borus MJ; Nimh Collaborative HIV/STD Prevention Trial Group. HIV prevention intervention to reduce HIV-related stigma: evidence from China. *AIDS*. 2010;**24**(1):115-22. doi: [10.1097/QAD.0b013e3283313e83](https://doi.org/10.1097/QAD.0b013e3283313e83). [PubMed: [19926963](https://pubmed.ncbi.nlm.nih.gov/19926963/)]. [PubMed Central: [PMC2939905](https://pubmed.ncbi.nlm.nih.gov/PMC2939905/)].
40. Zadeh MN, Jahani Y, Mirzaee M, Sharifi H, Karamouzian M. Correlates of HIV testing among young adults in Iran: Findings from a nationwide population-based survey in 2013. *J Assoc Nurses AIDS Care*. 2018;**29**(6):866-75. doi: [10.1016/j.jana.2018.02.005](https://doi.org/10.1016/j.jana.2018.02.005). [PubMed: [29534855](https://pubmed.ncbi.nlm.nih.gov/29534855/)].
41. Kalichman SC, Simbayi LC. HIV testing attitudes, AIDS stigma, and voluntary HIV counselling and testing in a black township in Cape Town, South Africa. *Sex Transm Infect*. 2003;**79**(6):442-7. doi: [10.1136/sti.79.6.442](https://doi.org/10.1136/sti.79.6.442). [PubMed: [14663117](https://pubmed.ncbi.nlm.nih.gov/14663117/)]. [PubMed Central: [PMC1744787](https://pubmed.ncbi.nlm.nih.gov/PMC1744787/)].