

# Determinants of High-Risk Behaviors Among Vulnerable Adolescents: A Mixed-Methods Study in Southwest Iran

Hassan Joulaei<sup>1</sup>, PhD; Nooshin Zarei<sup>2</sup>, MSc; Shohreh Beheshti<sup>2</sup>, MD; Robert Farnam<sup>2</sup>, PhD; Mahmood AminiLari<sup>2</sup>, PhD; Morteza Mehraeen<sup>2</sup>, MSc; Alireza Nazari<sup>3</sup>, PhD; Sima Afrashteh<sup>4\*</sup>, PhD

<sup>1</sup>Health Policy Research Center, Institute of Health, Shiraz University of Medical Sciences, Shiraz, Iran

<sup>2</sup>HIV/AIDS Research Center, Institute of Health, Shiraz University of Medical Sciences, Shiraz, Iran

<sup>3</sup>Sociology Department of Iran, Islamic Azad University of Bushehr, Bushehr, Iran

<sup>4</sup>Department of Biostatistics and Epidemiology, Faculty of Health and Nutrition, Bushehr University of Medical Sciences, Bushehr, Iran

\*Corresponding author: Sima Afrashteh, PhD; 2<sup>nd</sup> floor, Voluntary Counseling and Testing Center, Lavan Ave, Delavaran-e Basij Blvd, Khatoun Sq, Shiraz, Iran. Tel/Fax: +98-71-37386272; Email: sima.afrashte3@gmail.com

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## Abstract

**Background:** Living in marginalized areas with challenging socio-economic contexts can make teenagers vulnerable. This study aimed to investigate high-risk behaviors and their determinants amongst teenage students living in marginalized areas of Southwest Iran.

**Methods:** This was a cross-sectional study with mixed-method design, in which 421 students completed a questionnaire in September 2018, and seven focused group discussions were conducted from October 2018 to January 2019 in a marginalized district of Shiraz, Southwest of Iran. Descriptive statistics were used to describe the data, and multiple logistic regression was used for statistical analysis. Quantitative data were analyzed using STATA14 (Stata Corporation, College Station, TX, USA) software, and qualitative data analysis was done using comparative content analysis. The risk behaviors examined in this study were tobacco, alcohol, sexual relations, and substance use.

**Results:** In total, 34.7% of the participants were engaged in at least one of the high-risk behaviors. Based on multiple logistic regression analysis, parents' marital status ( $OR_{\text{Divorced\&Dead/Living together}}=3.50, P=0.016$ ), fathers' job ( $OR_{\text{Unemployment/Employment}}=6.61, P=0.004$ ), family history for addiction ( $OR_{\text{Yes/No}}=2.62, P=0.001$ ), and friendship with the opposite sex ( $OR_{\text{Yes/No}}=2.56, P<0.001$ ) were among the observed risk factors for high-risk behaviors. Qualitative results indicated that family-related conflicts, personal characteristics, and environmental challenges are predisposing determinants for involving in high-risk behaviors among teenagers.

**Conclusion:** High-risk behaviors are mostly prevalent among adolescents living in marginalized areas. To combat and mitigate the consequences of these behaviors, policymakers must focus on reducing social injustice, improving teenagers' resiliency and family solidarity, and creating a safe environment.

**Keywords:** Adolescent, Sexual behavior, Alcohol drinking, Drug use, Slums

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## 1. Introduction

Adolescence is a time of remarkable biological and personal development, and in some cases, poor behavioral risk-taking can be accompanied by the experience of mental disorder and drug or alcohol use (1). In fact, adolescence is a fateful bridge from childhood to adulthood, with distinctive characteristics and behaviors. This period could open a window of opportunity toward establishing a successful and fulfilling adult life, or it can be a starting point for exposure to high-risk behaviors and their consequences (2). Prevalence of tobacco and alcohol use in adolescents was reported to be 5.1% and 26.1%, respectively (3).

Previous research showed the effect of familial

factors on adolescents' tendency toward high-risk behaviors (4). For instance, evidence indicated that those adolescents who observed their parents' risky behavior might ultimately choose to replicate it. Following that, cognitive, behavioral, and social problems, as well as their consequences, could also affect them (5). Besides, peers play a significant role in risk-taking behaviors, such as using alcohol, tobacco, and having unsafe sex (6). Accordingly, these behaviors are usually initiated as recreational but then become lifelong habits (7).

During adolescence, due to a lack of experience, having unprotected sex and consuming no contraceptive pills is more prevalent. Following unfamiliarity with preventive methods, these people are at the risk of early pregnancy and

sexually transmitted diseases (STDs) (8-10), such as HIV infection (11). A study in the USA showed that 39% of students had experienced alcohol consumption (more than several sips), and 18% of them had alcohol abuse more than once, which would have a strong relationship with their recent sexual intercourse (12).

Sexual intercourse and the number of sexual partners among Turkish male students were higher than among females, but feeling guilty after intercourse was more common among girls. Additionally, condom use during first sexual contact was low, and smoking in both genders was related to sexual relationships (13). A study in Thailand showed that alcohol use in the year prior to the study, within 30 days, and alcohol abuse rates to get drunk were 25.5%, 9.5%, and 17.3% among male students and 14.5%, 3.7%, and 7.2% among females, respectively (14). In a study conducted on adolescents in Tehran, 28% of students had experienced sexual intercourse and more than 50% of them had done so before the age of 15 (15).

In addition to the teenage crisis, marginalization itself can be considered a risk factor that increases the likelihood of high-risk behaviors. The risks of using alcohol and substances, as well as the crimes related to them, are more prevalent in adolescents who are pushed to the margins due to factors such as ethnicity (16, 17). Marginalization is linked with sexual intercourse, having more sexual partners, and having less knowledge about STDs among young people (18). Therefore, the rate of STDs is higher in such districts (19). It is predicted that by 2030, approximately 43% of urban dwellers in low- and middle-income countries will live in marginalized areas (20).

Despite significant achievements in the development of slum areas in Iran, such as access to tap water, primary health care, and social services, the country still faces inequality between the slum population and that of other areas. For instance, poverty levels, unemployment rates, and maternal mortality rates are higher in slums compared to those in urban areas. The higher rate of high-risk behaviors in these areas compared to other areas makes their residents more susceptible to communicable diseases, such as HIV, hepatitis B or C, and other sexually transmitted diseases (20). Therefore, due to insufficient evidence to show the extent and factors affecting this health

issue, especially among adolescents in the outskirts of cities, we conducted this study to evaluate the prevalence of high-risk behaviors as well as their determinants among middle school students in the marginalized district of Shiraz, Iran.

## 2. Methods

### 2.1. Study Design

This was a cross-sectional study with mixed-method design conducted in two parts - quantitative and qualitative sections. The study was implemented from October 2018 to January 2019. The quantitative phase aimed to assess the prevalence of high-risk behaviors among the participants, while the qualitative phase aimed to explore the socio-economic and environmental determinants of high-risk behaviors among them.

### 2.2. Study Setting and Participants

This study was conducted in a marginalized district of Shiraz, located in the Southwest of Iran. Shiraz is a large city with a population of around 1,800,000, of whom about 20% live in underdeveloped areas (21). To implement this study, we selected one of the most underdeveloped populated areas named "Ghal'eh No", with almost 38,000 people (based on the annual census of its local health center in 2016). The study population consisted of all students (818 males and females) aged between 12 and 15 years old, who studied at three middle schools located in this region, including two schools for boys and one school for girls. Participants in both the quantitative and qualitative phases of the study were selected from the same schools to ensure comparability of the results from the two phases.

### 2.3. Quantitative part

#### 2.3.1. Study Sampling

The total number of included students from the middle school was 818 individuals. Of these, 473 were boys and 346 were girls. According to Cochran's formula, there was a 25% increase to account for the possibility of low response. Due to the sensitivity of the subject matter, the sample size was calculated as 254 for boys and 167 for girls.

In September 2018, 421 participants who met

the study criteria were selected through systematic random sampling. Inclusion criteria were age between 12 and 15 and residing in Ghale-no, while exclusion criteria were their parents' or their own reluctance to participate. Skilled and trained interviewers collected data through interviews using a standardized questionnaire. To protect the privacy of students, data were collected in a discreet environment without the presence of any teacher.

The criterion for sexual high-risk behavior was having at least one sexual intercourse (oral, anal, or vaginal) during the past six months. Moreover, the criterion for high-risk individuals was using substances, tobacco, and/or alcohol at least once during the last month.

### 2.3.2. Survey Administration

To collect data, we used the High-Risk Behaviors Questionnaire (HRBQ) (22), with some modifications in line with the aims of our study. In fact, subscales such as high-risk driving, food consumption, sleep, and exercise were excluded because we focused on high-risk behaviors related to smoking, sexual activity, and drug use. Besides, information and communication technology (ICT) was evaluated through four two-choice questions that asked about the use or non-use of mobile phones, computers, the Internet, and satellite programs. Before fully implementing the questionnaire, a committee consisting of psychologists, a public health specialist, an HIV/AIDS specialist, and a demographer approved its content and face validity using quantitative methods. In addition, its reliability was assessed through a pilot study with 53 participants using Cronbach's alpha, which was equal to 0.792. The questionnaire had 31 items for evaluating four domains as follows: 1) Demographic information, 2) Experience of high-risk sexual behaviors, 3)

Experience of using any type of substances, and 4) Knowledge and viewpoints of the students about sexual diseases, which consisted of 26 yes/no questions.

### 2.3.3. Data Analysis

Univariate analysis was conducted to calculate unadjusted associations between the study variables and high-risk behaviors. To measure the adjusted association of each independent variable with the risk of high-risk behaviors, a multiple logistic regression model was fitted to the data using the backward variable selection strategy. Statistical analysis was performed using STATA version 14.0 (Stata Corporation, College Station, TX, USA).

## 2.4. Qualitative Part

### 2.4.1. Participants and Sampling Method

Since high-risk behavior is a sensitive subject, a Focus Group Discussion (FGD) method was used for conducting interviews. A total of seven FGDs, consisting of 10 to a maximum of 15 participants, were conducted, including two FGDs for male students, two FGDs for female students, two FGDs for school staff, and one FGD for local trustees (Figure 1). Participants were selected for the qualitative part using a purposeful sampling method. It is worth noting that participants in each FGD were from the same class.

### 2.4.2. Qualitative Survey Administration

FGD interviews were conducted from October 2018 to January 2019 by two expert interviewers of the same sex as the students. During the interviews, the interviewers asked the students to discuss their experiences with sexual behaviors, drug use, or cigarette smoking either by themselves or by their

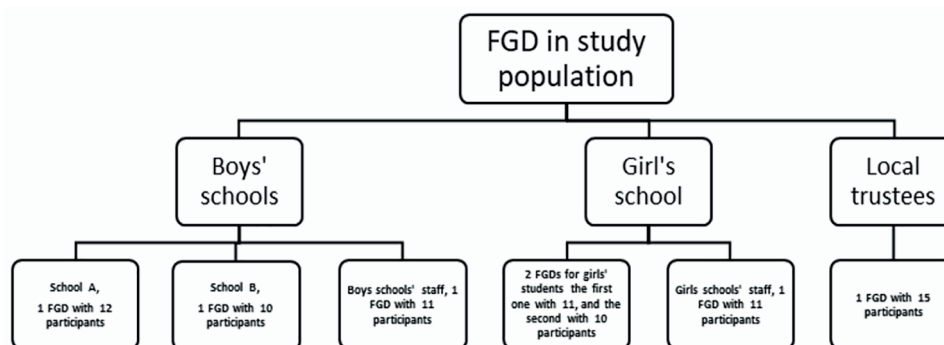


Figure 1: The figure shows the CONSORT diagram of Focus Group Discussions.

peers. They were also asked about the availability of any drugs or alcohol in their neighborhood. The interviewers then asked them to talk about the driving factors or determinants that influenced high-risk behaviors in individuals of their age. In the trustees' and parents' FGDs, the focus was on exploring predisposing factors and their experiences with adolescents' high-risk behaviors. All interviews were recorded using a voice recorder after obtaining the participants' permission. Each FGD lasted an average of 1.5 hours and followed all the ethical items of Shiraz University of Medical Sciences, including anonymity, confidentiality, and autonomy to withdraw from the study at any point during the interview.

#### 2.4.3. Qualitative Data Analysis

The data was analyzed using the comparative content analysis method. Initially, the researchers thoroughly read each interview transcript to gain a comprehensive understanding of the collected data. Next, the research team refined the codes to ensure consistency. These codes were then presented to the participants, and new codes were generated after resolving any inconsistencies. The coding scheme was updated accordingly, and the transcripts were re-read and re-coded.

#### 2.4.4. Qualitative Findings Rigor

As recommended by Schwandt and colleagues, the current study's trustworthiness was assessed based on four criteria: credibility, confirmability, transferability, and dependability (23). To establish credibility, semi-structured interviews, field notes, and extensive engagement with the subject matter were utilized. The leading researcher conducted thorough reviews to gather ideas and concepts from other researchers and maintained relevant study documents to ensure confirmability. The transferability of the findings was confirmed by offering a comprehensive description of the subject, participants, data gathering, and data analysis. The dependability of the study was reinforced through the in-depth description of the research process in the manuscript, which can be used by other researchers to reproduce and expand the study.

### 3. Results

#### 3.1. Quantitative Results

The sample consisted of 421 middle school

students (from the seventh, eighth, and ninth grades), among whom 254 subjects were boys with an average age of  $14.0 \pm 1.16$ , and 167 subjects were girls with an average age of  $14.22 \pm 0.86$  years old. In total, 34.1% of the boys and 34.3% of the girls reported experiencing addiction in their family. Notably, tobacco use was more prevalent among boys compared to girls (37.0% vs. 29.3%). The prevalence of high-risk behaviors in this study was 56.8%. Of these, 34.7% (146 persons) were engaged in only one risky behavior, and 22.1% of them in two or more behaviors. Also, having relationships with the opposite sex was more common in boys than in girls (Table 1).

In terms of the students' knowledge about HIV/AIDS, 38.2% of the boys and 21.0% of the girls were completely unaware, 55.9% of the boys and 71.9% of the girls had a low level of knowledge, and only 5.9% and 7.2% of these boys and girls had a high level of knowledge about HIV. We also found a significant difference in terms of the level of knowledge about HIV according to gender, which indicated that the average score of girls' knowledge ( $2.45 \pm 1.66$ ) was higher compared to boys' knowledge ( $2.00 \pm 1.80$ ) ( $P=0.009$ ). According to the univariate analysis, there was also a significant relationship among gender, family history of addiction, parents' marital status, parents' education, parents' job, and friendship with the opposite sex and high-risk behaviors among these students ( $P<0.05$ ).

The results of logistic regression analysis (with a backward selection strategy) provided adjusted relationships between the study factors and the risk of high-risk behaviors (Table 2). Accordingly, the results showed that parents' marital status ( $OR_{\text{Divorced\&Dead/Living together}}=3.50$ , 95%CI: 1.26-9.73,  $P=0.016$ ), father job ( $OR_{\text{Unemployment/Employment}}=6.61$ , 95%CI: 1.85, 23.61,  $P=0.004$ ), family history of addiction ( $OR_{\text{Yes/No}}=2.62$ , 95%CI: 1.51, 4.54,  $P=0.001$ ) and friendship with the opposite sex ( $OR_{\text{Yes/No}}=2.56$ , CI95%: 1.56-4.20,  $P<0.001$ ) were among the observed risk factors for high-risk behaviors. On the other hand, fathers with a high school diploma ( $OR_{\text{Diploma\&above/ Illiterate}}=0.24$ , CI95%: 0.08-0.70,  $P=0.009$ ) and girls' sex ( $OR_{\text{Female/Male}}=0.44$ , CI95% :0.27-0.74,  $P=0.002$ ) were shown to be protective

#### 3.2. Qualitative Results

The theme "context-based socio-behavioral

**Table 1:** Demographic and behavioral characteristic of the studied students (N=421)

Variables	Categories	Boys (n=254)	Girl (n=167)	Total (n=421)
		N (%) / Mean (SD)	N (%) / Mean (SD)	N (%) / Mean (SD)
Age		14.0±1.16	14.22±0.86	14.09±1.05
Education Grade	Seventh	85 (33.6)	12 (7.3)	97 (23.3)
	Eighth	97 (38.3)	90 (54.9)	187 (44.8)
	Ninth	71 (28.1)	62 (37.8)	133 (31.9)
Parents' Marital Status	Living together	210 (82.7)	149 (89.2)	359 (85.3)
	Other*	44 (17.3)	18 (10.8)	62 (14.7)
Father's education	Illiterate	38 (15.3)	16 (10.3)	54 (13.3)
	Middle and high school	168 (67.5)	107 (68.6)	275 (67.9)
	Diploma and above	43 (17.3)	33 (21.2)	76 (18.8)
Mother's education	Illiterate	46 (18.2)	15 (9.0)	61 (14.5)
	Middle and high school	166 (65.6)	115 (68.9)	281 (66.9)
	Diploma and above	41 (16.2)	37 (22.2)	78 (18.6)
Father's job	Employed	229 (90.5)	140 (87.02)	369 (89.1)
	Unemployed	24 (9.5)	21 (13.0)	45 (10.9)
Mother's job	Employed	21 (8.3)	15 (9.0)	36 (8.6)
	Housewife	231 (91.7)	152 (90.0)	383 (91.4)
Having a personal room	Yes	114 (44.9)	74 (44.3)	188 (44.7)
	No	140 (55.1)	93 (55.7)	233 (55.3)
Use of Information and Communication Technology	Cell phone	188 (74.0)	110 (65.9)	298 (70.8)
	Computer	131 (51.6)	81 (48.5)	212 (50.4)
	Internet	131 (51.6)	69 (41.3)	200 (47.5)
	Satellite	92 (36.2)	64 (38.3)	156 (37.1)
Family history for addiction	Yes	86 (34.1)	57 (34.3)	143 (34.2)
	No	166 (65.9)	109 (65.7)	275 (65.8)
High risk behavior	Tobacco**	94 (37.0)	49 (29.3)	143 (34.0)
	Alcohol	87 (34.4)	28 (16.8)	115 (27.4)
	Substance use	49 (19.3)	24 (14.4)	73 (17.3)
	Sexual relation	47 (20.1)	12 (7.8)	59 (15.2)
Friendship with the opposite sex	Yes	147 (59.0)	83 (50.9)	230 (55.8)
	No	102 (41.0)	80 (49.1)	182 (44.2)
HIV Knowledge level	Unaware	97 (38.2)	35 (21.0)	132 (31.4)
	Low level	142 (55.9)	120 (71.9)	262 (62.2)
	High level	15 (5.9)	12 (7.2)	27 (6.4)

\*Divorced & Dead; \*\*Cigarette& hookah; \*\*\*HIV: Human Immunodeficiency Virus

crisis” emerged as a result of various determinants that explain high-risk behaviors among teenage students living in marginalized areas. Students and trustees identified several contributing factors, some of which were important for both groups. These factors are categorized in Figure 2.

### 3.3. Family-related Challenges

Overall, students mentioned parental neglect as a key determinant of their tendency to engage in high-risk behaviors. In fact, emotional weaknesses in the family can lead to loneliness, and children may seek ways to compensate for it.

“Argument, lack of parents’ understanding, lack of affection, and loneliness can cause someone to

lean toward high-risk behaviors.” (First Girl’s FGD)

The trustees also mentioned a lack of privacy at home as a problem. In fact, not having a personal room and sleeping in a place with parents increases the likelihood of adolescents being aware of their parents’ sexual behavior and experiencing early puberty.

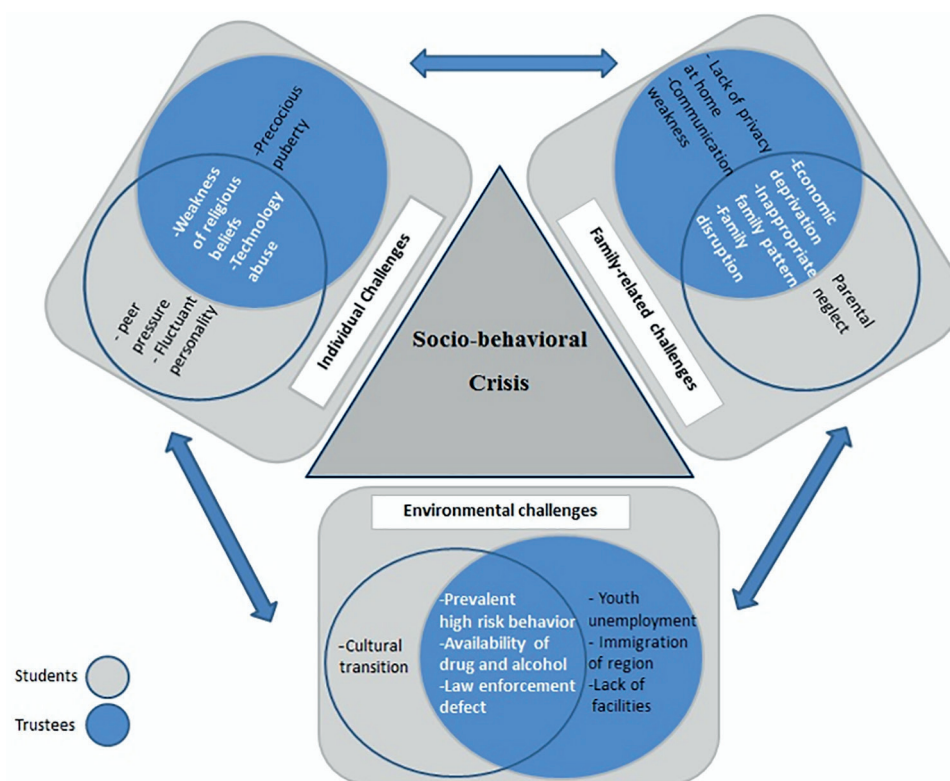
“Some of them live in small houses of approximately 50 square meters with only one bedroom, and some of them do not have this one bedroom either. Well, the parents have sexual intercourse without any privacy.” (Trustees’ FGD)

They also pointed out the parents’ communication weaknesses with their children. They declared:

**Table 2:** Un-adjusted and adjusted association between the study variables and engaging in high-risk behavior

Variables	Categories	Univariate Odds Ratio ( 95% CI)	P value	Adjusted Odds Ratio ( 95% CI)	P value
Age		0.91 (0.75-1.11)	0.397	-	-
Sex	Male	1	-	1	-
	Female	0.41 (0.27-0.63)	< 0.001	0.44 (0.27-0.74)	0.002
Parents' Marital Status	Living together	1	-	1	-
	Other*	5.10 (2.354-11.07)	< 0.001	3.50 (1.26-9.73)	0.016
Father's education	Illiterate	1	-	1	-
	Middle and high school	0.37 (0.179-0.77)	0.008	0.44 (0.18-1.09)	0.078
	Diploma and above	0.20 (0.08-0.48)	< 0.001	0.24 (0.08-0.70)	0.009
Mother's education	Illiterate	1	-	1	-
	Middle and high school	0.36 (0.19-0.71)	0.003	0.85 (0.37-1.91)	0.699
	Diploma and above	0.44 (0.20-0.97)	0.044	1.47 (0.54-3.98)	0.440
Father's job	Employed	1	-	1	-
	Unemployed	7.14 (2.50-20.40)	< 0.001	6.61 (1.85-23.61)	0.004
Mother's job	Employed	1	-	1	-
	Housewife	0.55 (0.24-1.28)	0.172	0.67 (0.23-1.92)	0.461
Having a personal room	No	1	-	1	-
	Yes	1.10 (0.73-1.67)	0.628	-	-
ICT	No	1	-	1	-
	Yes	1.23 (0.61-2.49)	0.556	-	-
Family history addicted	No	1	-	1	-
	Yes	2.96 (1.85-4.72)	< 0.001	2.62 (1.51-4.54)	0.001
Friendship with the opposite sex	No	1	-	1	-
	Yes	2.78 (1.81-4.27)	< 0.001	2.56 (1.56-4.20)	< 0.001
HIV Knowledge level	Unaware	1	-	1	-
	Low level	0.85 (0.54-1.34)	0.495	-	-
	High level	0.68 (0.29-1.59)	0.376	-	-

\*Divorced & Dead; \*\*ICT: Information and Communication Technology



**Figure 2:** The figure shows the socio-environmental model for high-risk behaviors amongst adolescents living in slums of Shiraz, Iran.

“The problem is that the parents don’t become their children’s friend, so they look for it with someone else.” (Trustees’ FGD)

Both students and trustees identified some similar contributing factors such as poverty, inappropriate family patterns, and family disruption. For instance, they stated:

“Poverty is the main problem in the region. When financial problems arise, other problems tend to follow. Some girls become involved with boys because of financial support.” (Trustees’ FGD)

Inappropriate family patterns, such as having addicted parents or a member of the family drinking alcohol, can lead to risky behaviors in children.

*“We have a student whose father drinks alcohol. He tells his child, ‘Let’s drink together.’ In this way, he wants to tell him that they are friends and that if the child wants to drink alcohol, it’s better to drink it with me than with a stranger,” according to the Trustees’ FGD.*

According to the trustees and students’ FGDs, family disruption has many undeniable consequences. As they claimed:

*“Here, there is less official divorce, but emotional divorce is more. Therefore, the parents do not see each other at all; they have their own individual lives. Therefore, children in a home with conflict and disagreement have more problems,” (Trustees’ FGD).*

### 3.4. Individual Challenges

According to the trustees, precocious puberty has increased in the area in recent years, which increases the chance of early engagement in high-risk behaviors.

“Unfortunately, precocious puberty among children nowadays starts from the age of 10” (Trustees’ FGD).

Peer pressure was a determining reason for behavioral deviations, mentioned by the students in their FGD:

*“In our age, children like to drink alcohol and use*

*substances. They are teased if they say no; friends call them ‘little baby.’ By accepting such suggestions, they feel proud” (Second Girls’ FGD).*

Another effective determinant was the unstable personality of adolescents. In other words, they lack decision-making power, do not know how to react in difficult situations, and cannot say no. In addition, a common point of view in all the studied FGDs was the weakness of religious beliefs. Considering the deterrent role of religious beliefs in risky behavior engagement, fragile belief leads to easier acceptance of such behaviors, especially sexual behaviors.

Another shared opinion was the abuse of technology. In fact, the improper use of mobile phones and satellites is a facilitator of such behaviors.

*“More than 80% of families have a satellite, which makes children uncontrollable, and they watch all kinds of movies, even restricted films” (Trustees’ FGD).*

### 3.5. Environmental Challenges

Many environmental determinants provide an appropriate platform for risky behaviors. Generally, the participants believed that cultural transition is a contributing factor in exhibiting risky behaviors among adolescents. Accepting friendship with the opposite sex and even pre-marital relationships are features of the newly created culture.

“Some students think that using tobacco and having a relationship with the opposite sex gives them superiority over others.” (Second Girls’ FGD)

Trustees mentioned youth unemployment as an important cause of engaging in different risky behaviors due to having more free time.

“More than 80 percent of the youth are unemployed. Therefore, they could involve freely in risky behaviors.” (Trustees’ FGD)

The trustees also declared migration to slum areas as a predisposing factor that has many social harms.

“Between 20 to 25 percent of the children are locals, but others are migrants. Most of the

migrants come here due to financial problems, committing a crime, or having an inability to live in other regions. Obviously, these problems could affect lifestyle in slums.” (Trustees’ FGD)

Lack of facilities was another noticeable problem in the region. Trustees declared that adolescents do not spend their leisure time participating in useful activities due to the lack of recreational facilities like gyms, parks, and cultural centers, and this increases their tendency to exhibit risky behavior.

“Here, the amenities are inadequate. If there were recreational facilities near us, the youth would be much healthier. There is nothing to fill their time with.” (Trustees’ FGD)

Both groups mentioned explicit sex work in the area as an environmental determinant of risky behaviors. They also pointed to law enforcement shortcomings as a deducing factor in environmental security. The weakness of the rules and the absence of police surveillance facilitate access to substances as well as to prostitutes.

“The police come here once a year. Here, someone comes with a motorcycle and sells substances (hashish, methamphetamines, cannabis, and heroin) in front of people, and there is no one to arrest them.” (Second Boys’ FGD)

Availability of substances and alcohol was also mentioned as an intensifying determinant of risky behavior. This is not only in the community but also in the family.

*“Among the boys, substances like Naswar and BT are more common, but when we talk to parents, we find a similar background in the families.” (Trustees’ FGD)*

#### 4. Discussion

The present study attempted to investigate the status of high-risk behaviors and their contributing factors among middle school students in a marginalized area of the city of Shiraz, Iran. According to the participants’ views in the qualitative part of the study, the critical socio-economic context of slums has made more vulnerable adolescents engage in risky behaviors, such as cigarette smoking, drug use, alcohol consumption, and unsafe sex. Based on the present

study, factors that increased the likelihood of taking high-risk behaviors were sex, family history of addiction, and having a boyfriend or girlfriend, while the father’s education and employment status were protective factors.

In line with our study, Indian researchers reported a prevalence of substance abuse and unsafe sex in adolescents to be 28% and 16%, respectively, which is much lower than our findings (56.8%) (24). Additionally, 47.1% and 42.5% of American adolescents reported alcohol and drug use (25). The difference in the prevalence of high-risk behaviors in different studies can be attributed to the socio-cultural norms and values of each society. Another reason could be the wide range of definitions of addiction and high-risk behaviors used by researchers (26).

We showed that girls are less likely to engage in risky behaviors than boys. Previous studies in Iran and other countries indicated that boys are more likely to engage in risky behaviors than girls (26, 27). Moreover, previous research suggested that boys tend to have broader social relationships, more freedom, and a tendency to engage in risky behaviors; parents control them less than girls (28). Moreover, our findings indicated that 31.4% of students had poor knowledge about HIV/AIDS, its transmission, and prevention. Previous finding also showed the link between marginalization and less knowledge about STDs, including HIV, which encourages people to engage in more risky relationships (18). In contrast to these findings, some other studies reported a higher level of knowledge among boys (7, 29). This could be due to more public education and teachers’ training on HIV education for girls, which affected their knowledge (30).

According to the qualitative results, three main categories, namely family-related conflicts, personal characteristics, and environmental challenges, were found to be effective in high-risk behaviors among adolescents.

##### 4.1. Family-related Conflicts

The results of the study indicated that 34.2% of girls and boys had an addicted family member, which can increase the likelihood of displaying high-risk behaviors in adolescents. The qualitative results showed that using substances like Naswar



was much more prevalent among the students, which is contrary to the declaration of the quantitative study. One probable reason for the discrepancy in the quantitative section could be the students' fear of reporting the use of substances.

A systematic study has also confirmed the relationship between having addicted parents and children's addiction (31). Drinking alcohol by parents, poverty, and parents' or caretakers' viewpoints on substances are connected with using substances among adolescents. In addition, the positive view of parents on substances and drinking alcohol by older siblings were intensifying factors in the use of substances by children (32). The quantitative results also showed a relationship between parents' or other family members' addiction and having at least one high-risk behavior among teenagers. This is consistent with a study on 2500 students in the high-risk region of Trinidad & Tobago, which revealed that some high-risk behaviors of parents, especially using substances and having antisocial behaviors, are the strongest risk factors for their adolescents (33).

Although land prices are relatively cheap, 49.2% of the region's residents are tenants, which is another indicator of their economic status. Accordingly, the participants in the qualitative section frequently claimed this. Poor economic conditions, especially at lower ages, are known risk factors in behavioral problems due to the involvement of these kinds of families in more stressful and psychological issues (34-36). Noticeably, based on the qualitative part, the weakness of the family's solidarity and parental neglect are also connected to high-risk behaviors.

#### 4.2. *Personal Characteristics*

The findings of the quantitative study showed a non-significant relationship between using ICT and high-risk behaviors. However, qualitative research confirmed the role of technology abuse in high-risk behaviors. Adolescence is an important transition period between childhood and adulthood, during which managing the use of ICT is crucial. Although the Internet provides various opportunities for learning and social networking, it is also an ideal environment for risk tolerance and high-risk behaviors, and some adolescents are tempted to engage in such behaviors (37).

Previous research showed that friendships

with the opposite sex increase risky behaviors, including alcohol use, substance use, and sex in adolescents (38, 39). Mrug and colleagues showed that contact with the opposite sex increases smoking in adolescent girls because they may start smoking to attract the attention and satisfaction of their boyfriends (40). We also found that having relationships with the opposite sex increased the likelihood of high-risk behaviors by 3.81 times in adolescents. In addition, previous study showed that a weak religious belief leads to engaging in immoral behaviors (37).

The students also declared that peer pressure and unstable personality were among other personal factors in high-risk behaviors. An experimental study confirmed the prominent role of peer pressure in risk-taking and engaging in high-risk behaviors among adolescents more than other age groups (6, 41, 42).

#### 4.3. *Environmental Challenge*

Modification of social norms was another factor highlighted in the qualitative study. In other words, changes in viewpoints, such as the use of alcohol and tobacco and their acceptance as ordinary acts among students, were observed. When adolescents see the use of tobacco and alcohol in their families or witness high-risk behaviors at home and school, these behaviors are normalized and may lead them to engage in such behaviors (5). Focus group discussions showed that high-risk behaviors are becoming more frequent in the region as adolescents witness unlawful relationships in their neighborhoods or even in their families. The results also showed that there are no preventive laws in the region, making substances and alcohol easily available. Rules governing the community affect behaviors such as substance and alcohol use throughout the community. Some studies showed that the legal age for using alcohol and cigarettes has a rightful effect on their availability and use. If people know that selling alcohol, cigarettes, or substances to adolescents will lead to serious legal consequences, adolescents' access to these items will be limited as a consequence (43). Another matter that provokes high-risk behaviors in the environment is youth unemployment. In line with other studies, our results also showed that unemployed youth have more spare time, which can lead to addiction or other risky behaviors (44, 45). Evidently, both unemployment and

poor socioeconomic levels of the family during childhood intensify substance abuse in adulthood (46). The increased number of addicted youth in the environment, which is a model for adolescents, is itself another risk factor for engaging in high-risk behaviors.

Migration to the region is another dilemma that increases the risk of engaging in high-risk behaviors. In this study, it was found that only one-fourth of the residents were native, and others were migrants who moved there due to reasons such as their criminal record or bankruptcy. Therefore, people with economic and social problems and sometimes an experience of social abnormalities usually migrate to the region. Previous studies also showed that migrants are often pushed to the outskirts due to economic problems, resulting in social isolation and experiencing social biases (47-49). Migration itself is associated with psychological health issues and high-risk sexual behaviors (50). Following the increase in high-risk behaviors in the environment, the context for engaging in high-risk behaviors would prevail as a result. Therefore, modifying the environment and making adolescents resilient can be two effective strategies in reducing high-risk behaviors among teenagers

#### 4. 4. Limitations

This comprehensive study was implemented for the first time in Iran, and its results provided reliable evidence for policymakers to reduce the burden of risky behaviors in adolescents in similar contexts. However, due to the sensitive nature of the subject, underestimation of some risky behaviors is possible. Additionally, our study was implemented in a specific community with its own socio-cultural context, which could be different from other slum areas in Shiraz, Iran. Therefore, its results may not be generalizable to other areas.

#### 5. Conclusions

Living in slums and adolescence are two predisposing factors for displaying high-risk behaviors. The present study reveals a high prevalence of risky behaviors among adolescents living in slum areas and its socio-environmental determinants. Obviously, the foremost strategy to combat high-risk behavior in these areas would be a long-term focus on reducing social injustice and

inequity. However, in the short-term, policymakers must pay special attention to three main approaches, including family solidarity, a healthy environment, and adolescents' resiliency.

Strengthening counseling and social support services to reinforce family foundations would be a protective program to reduce high-risk behavior among adolescents. In addition, due to adolescents' vulnerability and limited resources and policies to change the slum environment, we recommend that policymakers focus on improving schools' circumstances and students' resiliency.

Finally, considering the interdisciplinary nature of interventions to reduce environmental factors, all stakeholders, including the local community, should engage in a comprehensive advocacy plan. To find and approve the best-customized harm reduction programs, interventional studies in slum areas are recommended.

#### Ethical Approval

Through the principals of the schools, all children's parents were informed about the procedure and aims of the study and based on their verbal agreement/consent we gained access to the schools' children and after explaining the aim of the study and their right to exit the study whenever they want, verbal informed consent was obtained. This study was both reviewed and approved by the Ethical Committee of Research Deputy of Shiraz University of Medical Sciences with the code of IR.SUMS.REC.1394.S45.

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#### Conflict of Interests

The authors of this manuscript declare no relationships with any company whose products or services may be related to the subject matter of the article. Hassan Joulaei, Editor-in-Chief, was not involved in the peer-review and decision-making processes for this manuscript. The non-author,

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