

Using Social Cognitive Theory to Investigate the Risk Factors of Waterpipe Smoking among Southeastern Iranian Adolescents

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Abstract

Background: Explaining the risk factors of waterpipe smoking (WS) is very necessary in prevention programs. The aim of this study was determining the risk factors and the prevalence of WS in adolescents based on the social cognitive theory (SCT).

Materials and Methods: This cross-sectional study was conducted among urban adolescents in two provinces located in the South East of Iran. We recruited 1,218 adolescents (girls=595 and boys=623) through multistage sampling during the period October 2017 to February 2018. The data collection tool was a self-administered standardized questionnaire that included basic baseline characteristics, SCT constructs items and questions about WS behavior in the participants. The data were analysed using SPSS software version 22.0.

Results

The ever use prevalence of WS in boys was 43.8% (n= 264), and in girls 27% (n=160). WS in family member (OR=1.87, CI: 1.32-2.63; p<0.001) and intimate friends (OR=2.34, CI: 1.70- 2.26; p<0.001) were the most important risk factors for adolescents. In the relation of WS with constructs of SCT: outcome expectations (OR=0.64, 95% CI: 0.50-0.84; p<0.001), outcome expectancy, (OR=0.65, 95% CI: 0.55-0.85; p=0.002) self-efficacy, (OR=0.30, 95% CI: 0.23- 0.41; p<0.001), and situational perception (OR=0.63, 95% CI: 0.47- 0.84; p=0.002) were the most important and related factors of WS. Boys were 1.92 times (OR: 1.06 – 2.43; p<0.001) more exposed to water-pipe smoking than girls.

Conclusion

The prevalence of WS was notable in students especially in boys. Peer group and family are important risk factors for tendency toward WS in adolescence. Also, lower score in SCT constructs such as knowledge, self-efficacy and situational perception in adolescents are important risk factors for WS in participants.

Key Words: Adolescence, Risk factors, Social Cognitive Theory, Students, Waterpipe smoking.

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1- INTRODUCTION

The pattern of tobacco use in recent years has been accompanied with many evolutions and this pattern has changed from middle-aged to lower ages. Many studies have shown that the age of tobacco use in many countries is less than 15 years old in the world (1-4). In some countries such as Iran, instead of smoking, waterpipe smoking (WS) with less social stigma has become popular among adolescents as a recreational and leisure facility (5). According to the statistics in Iran, 40-60% of teenage boys and 15-25% of teenage girls have experienced WS during their lifetime (6, 7). Also, the minimum age of WS from 18 to 20 years in the past decade has dropped to 13 to 15 years at present (6-8). These statistics are increasing and, of course, worrying, compared to the statistics of similar countries, and with those of the last few years (9).

Many factors cause WS at the individual and community level that can lead to tendency to or hate of WS (8, 10). Excitement and curiosity, that is a characteristic of adolescence, the inadequate knowledge about harmful effects of WS, several psychological and social pressures, insufficient skills in problem solving, low self-confidence and self-efficacy, despair and depression, low communication skills and adolescent status in peer groups, parental supervision, attachment and bonding with the family, school and social groups, being inexpensive and easy access to hookah, and the lack of leisure facilities for adolescents are the factors influencing adolescents toward tobacco use, especially WS (10-12). Many studies have shown that adolescents start substance abuse with less harmful substances such as WS (3, 11, 13). Also, the chance of giving up the WS in a person who started hookah from adolescence is much less than people who started it in older ages (1, 2).

Therefore, in order to control and reduce WS, multidimensional programs and interventions should be conducted in various individual and social domains (3, 14). Using behavioral change theories and models helps to determine the factors influencing WS (7, 15, 16). Theoretical framework of the present study was to determine the risk and protective factors of WS based on Social Cognitive Theory (SCT). SCT is one of the most effective theories for explaining and predicting individual and social health behaviors (17,18). The emphasis of this theory is on the two-way relationship between the person and the environment (community). From the perspective of Bandura, three factors, the environment, people and behavior are constantly influencing each other. The interaction of these factors forms the individual behaviors. The major constructs of this theory are knowledge, outcome expectations, outcome expectancies, situational perceptions, self-efficacy, and environment (16).

In Iran, few studies have been conducted based on health promotion theories to identify risk factors against antisocial behaviors, such as tobacco use in adolescents; also, the focus of preventive studies has been on smoking, and less attention has been paid to WS. In our study, the risk factors, and the prevalence of WS were studied based on the SCT in adolescents in the southeast of Iran (Kerman and Sistan and Baluchistan provinces). These two provinces are located in the main routs of opioid transportation from Afghanistan to Iran and other western countries.

2- MATERIALS AND METHODS

2-1. Study design and population

In this descriptive-analytical cross-sectional study 1218 urban adolescents including 595 girls and 623 boys of secondary high school students in the Southeast of Iran (Kerman and Sistan and

Baluchistan provinces) from October 2017 to February 2018 were recruited by multi-stage sampling method. At first, the cities of each province were classified into three categories: large, medium and small according to the population. Then a large city (centers of two provinces), an average city, and a small city from each province were included in the study. In order to increase the generalizability of the results, the cities were selected based on various ethnic and cultural characteristics of the two provinces by expert panel. In the big cities of each province, three girls' schools and three boys' schools were selected. In medium cities, two girls' schools and two boys' schools, and in small cities, one girls' school and one boys' school of various socio-economic levels were selected. From centers of two provinces 300 students, and from medium cities 200 students and from small cities at least 100 students were studied. In total, 710 students of the tenth grade of high school

(360 boys and 350 girls), 390 students of the eleventh grade (200 boys and 190 girls), and 118 students of the twelfth grade (63 boys and 55 girls) were studied. The valid collected data were 662 (54.4%) questionnaires from Kerman and 556 (45.6%) from Sistan and Baluchistan provinces. The data collection instrument was a valid self-administered questionnaire with 57 items based on SCT with three general components whose validation was done in Iran (15). The content validity was done in expert panels (include two substance use researcher, three specialists in health education and promotion and two epidemiologist). The internal consistency of the instrument was determined by Cronbach's alpha coefficient in 27 students and all the constructs values were above 0.70 (range: 0.70 to 0.87). Test-retest reliability was determined using the intra-class correlation coefficient (ICC) considering 95% confidence intervals (CI) (**Table.1**).

Table-1: Intra-class correlation and Cronbach's coefficient alpha of SCT questionnaire constructs.

Constructs	Number of items	Mean ICC (range)	Cronbach's Alpha
Knowledge	9	0.83(0.76 - 0.87)	-
Outcome expectations	7	0.87(0.59 - 0.93)	0.87
Outcome expectancy	7	0.93(0.64 - 0.87)	0.74
Self-efficacy	7	0.68(0.55 - 0.83)	0.73
Situational perception	7	0.77(0.56 - 0.81)	0.70
Environment	9	0.75(0.51 - 0.77)	0.81

ICC: Intraclass Correlation Coefficient.

The questionnaire consisted of three parts: The first part was related to the baseline characteristics of the participants and included 5 items (age, grade, gender, number of family members and parental educational level). The second part had 46 items based on the constructs of SCT including: knowledge (9 items), outcome expectations (7 items), outcome expectancies (7 items), self-efficacy (7 items), situational perception (7 items),

and environment (9 items). These were all scored using a 5-point Likert scale (strongly agree to strongly disagree or very much to none) except knowledge which was scored with yes and no questions. Also, the final score for each construct was according to the result of the average items related to that construct. The third part included questions about the lifetime use and current use (30 days ago) of participants, and their intimate friends and

family members. The response time was about 25 minutes (range: 20 to 30 minutes). Aims of the study were explained and only those who consented verbally were recruited. We trained six graduated students in public health field to recruit the respondents. To increase the confidentiality, the respondents were approached outside the classrooms and in public places such as school hall. The questionnaires were completed by the participants themselves and put in the ballot box.

2-2. Ethical Considerations

The verbal informed consent was obtained from the participants after explaining the goals of the study and assuring their privacy. Also, questionnaires were designed anonymously. This study obtained the ethics code (IR.KMU.REC: 1397.399) from Kerman University of Medical Sciences, Kerman, Iran.

2-3. Statistical analysis

Dependent variable in this study was the lifetime experience of WS. This variable was treated as a binary variable (Yes, No) for descriptive analysis and as a continuous variable to explore the associated factors. We explored the effect of some independent variables including age, gender, education of parents (illiterate, elementary and secondary education, high school or college/university education), number of family members (family size) on the dependent variable. Data were analysed using SPSS software version 22.0, with descriptive and analytical tests including mean (standard deviation), multivariate

logistic regression and decision tree. The significance level of all tests in this study was 0.05. To construct the decision tree, all participants were put in a single node. It is followed by searching for a variable/cut off that best separates participants into two nodes. The process continues in each node and the results are presented as a tree structure. The aim is to classify the subjects into terminal nodes with maximum homogeneity within and maximum heterogeneity between nodes.

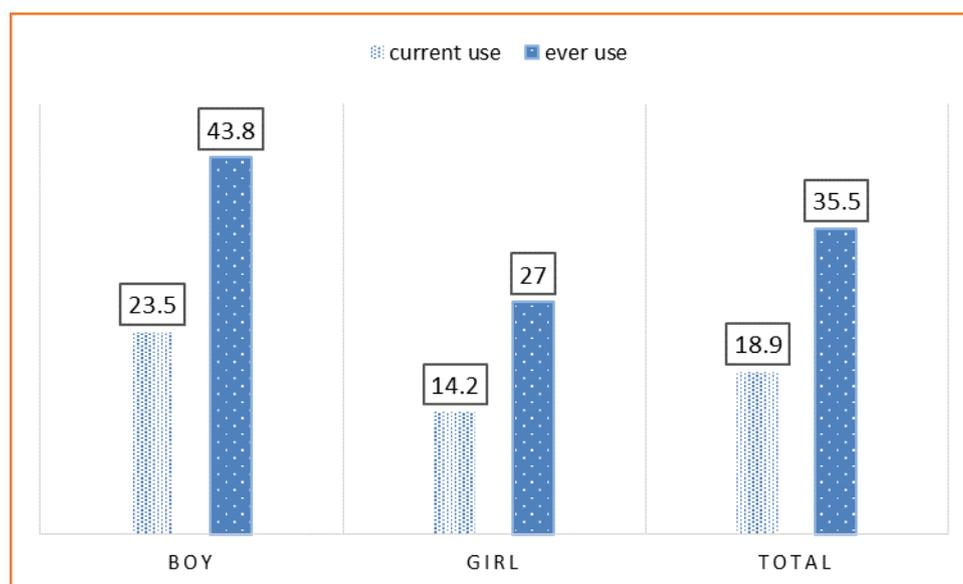
3- RESULTS

The aim of this study was to determine the risk factors based on SCT and the prevalence of WS in the adolescents. The response rate was 94.19% (1196/1218). The mean age of students was 15.93 ± 0.85 and ranged from 14 to 18 years old. The highest level of fathers and mothers' education was high school degree (37.6% and 36.8%, respectively) (**Table.2**). The ever use of WS among boys and girls was 43.8% (n= 264) and 27% (n= 160), respectively ($p < 0.001$, 95% CI: 0.64 – 0.75). The current use of WS among boys and girls was 23.5% (n= 141) and 14.2% (n= 84), respectively ($p < 0.001$, 95% CI: 0.34 -0.42). Also, 27.3% (n= 329) of them stated that they had WS abuser in their families and 53.2% (n= 640) of them stated that they had intimate friends that are WS abusers. Among those who experienced WS, 60.8% of them had the first WS experience with their family and friends and 29.2% of them in coffee shops and about 10% had their first experience of WS in parks and other recreational centers (**Figures 1 and 2**).

Table-2: Baseline characteristics of the subjects at enrollment in the study.

Baseline Characteristics		Boys Number(%)	Girls Number (%)	P-value
Age, Mean \pm SD		15.95 \pm 0.90	15.90 \pm 0.82	0.32
Number of family members	Less than 3	14 (2.4%)	9 (1.5%)	0.22
	3	36 (6.1%)	34 (5.7%)	
	4	203 (34.2%)	196 (33.1%)	
	5 or More	340 (57.8%)	354 (59.7%)	
Paternal education level	Illiterate	39(6.6%)	36 (6.1%)	0.5
	Elementary and secondary	106(17.8%)	144 (24.3%)	
	High school and diploma	228 (38.3%)	218 (36.8%)	
	Collegiate	222 (37.3%)	194 (32.8%)	
Maternal education level	Illiterate	52 (8.7%)	50(8.4)	0.26
	Elementary and Middle School	132 (22.1%)	145 (24.5%)	
	High school	204 (34.2%)	234 (39.5%)	
	College/University education	208 (34.9%)	164 (27.7%)	

SD: standard deviation.

**Fig.1:** The prevalence of WS during lifetime and in the last month compared to the total number of students participating in the study (percentage).

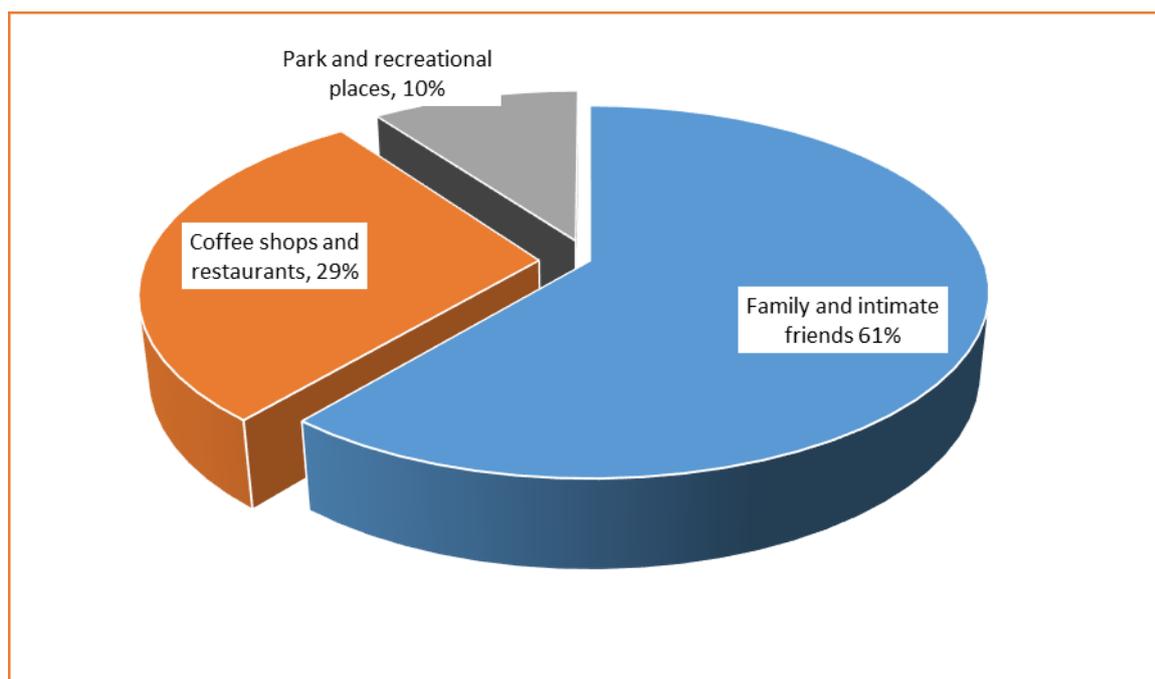


Fig.2: The first experience of WS among adolescents with WS abuser.

Risk factors

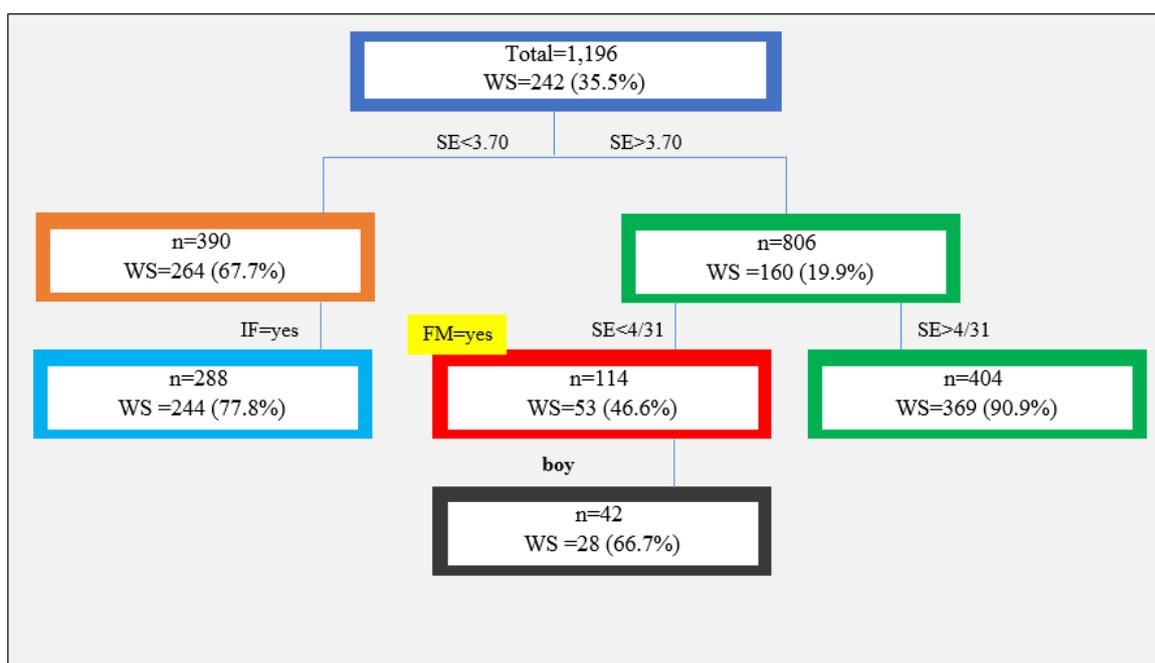
Adjusted logistic regression showed that WS among intimate friends and family members was very strong risk factor. The chance of WS in students whose intimate friends and family members were WS abusers was 2.34 and 1.87 times more than the students whose friends do not abuse WS, respectively. In the relation of WS with constructs of SCT, using adjusted logistic regression showed that by increasing one unit score in the constructs of knowledge, outcome expectations, outcome expectancy, self-efficacy, situational perception and environment, the chance of WS reduces 94%, 36%, 35%, 70%, 37% and 26%, respectively.

Boys were 1.92 times more exposed to WS comparing to girls. Also, adjusted regression showed that the highest OR and predictive power were related to the WS patterns among family members, intimate friends and self-efficacy of participants. Thus these three variables were analyzed using decision tree model (**Table.3**). The results of decision tree showed 77.85% of students who had lower self-efficacy than cut-off point 3.70, and who had friends who were WS became WS abusers and students with self-efficacy score higher than 3.70 and less than 4.31 were also influenced with WS by the family, so that if there was WS in their family, 46.5% of them became WS abusers (**Figure.3**).

Table-3: The relationship between WS and constructs of SCT and demographic variables using crude and multivariate regression.

Variables and Constructs		Crude			Multivariate regression		
		Odds ratio	95% CI	P-value	Odds ratio	95% CI	P-value
WS use in family members		3.03	2.33-3.94	0.001	1.87	1.32-2.63	<001
WS use in intimate friends		5.29	4.04-6.93	0.001	2.34	1.70-2.26	<001
Age		1.13	0.9-1.31	0.52	1.034	0.86-1.23	0.80
Father's Education level							
Illiterate		1.63	0.96 – 2.65	0.06	2.19	1.17 – 4.09	0.07
Elementary and Secondary		1.42	0.92 – 1.80	0.04	1.61	1.05 – 2.47	0.09
High school		1.42	1.04 – 1.84	0.02	1.42	0.98 – 2.03	0.08
College/University		ref	-	-	-	-	-
Mother's Education level							
Illiterate		1.21	0.59 – 2.46	0.59	-	-	-
Elementary and Secondary		1.06	0.63 – 1.77	0.81	-	-	-
High school		1.06	0.70 – 1.62	0.76	-	-	-
Knowledge		0.09	0.05-0.14	<0.001	0.06	(0.24-1.04)	0.03
Outcome expectations		0.32	0.27-0.38	<0.001	0/64	(0.50-0.84)	0.001
Outcome expectancy		0.41	0.34-0.49	<0.001	0/65	(0.55-0.85)	0.002
Self-efficacy		0.26	0.20-0.33	<0.001	0/30	(0.23-0.41)	0.001
Situational perception		0.2	0.16-0.25	<0.001	0.63	(0.47-0.84)	0.002
Environment		0.40	0.32-0.48	<0.001	0.76	(0.57-1.00)	0.05
Gender	Girl	ref	-	-	-	-	-
	Boy	2.71	2.07-3.56	<0.001	1.92	(1.06-2.43)	0.001

95% CI: 95% confidence interval.

**Fig.3:** Important risk and protective factors of water-pipe smoking based on decision tree model in adolescents of study.(SE: Self Efficacy; WS: Waterpipe Smoking; IF: Waterpipe Smoking by Intimate Friends; FM: Waterpipe Smoking by Family Members).

4- DISCUSSION

The purpose of the present study was the application of SCT for determining the risk factors of WS in Southeast Iranian Adolescents. The results of the present study showed that WS in boys is greater than girls. According to analysis of decision tree, the boys were more likely to be waterpipe smokers than the girls, and this is in line with the similar studies (19, 20). It seems that the different prevalence in WS based on gender is due to various individual and social differences in both genders (21-23). Boys are more present in the society than girls in Iran and they spend more hours out of the home and are more exposed to environmental risk factors of WS (18, 23). Also, the boys due to having more freedom in our society have a wider network of friends and spend more time than girls with their friends (23). In addition, the stigma about WS in girls is more than boys and the cultural and psychosocial pressures of WS on girls are more than boys (24). Another reason which can be mentioned is the existing social problems. Boys are more involved in the stress of work and life concerns and are more likely to smoke cigarettes and engage in WS (21, 24).

Though, WS in boys is always higher than girls, the growth rate of WS in girls has increased considerably and in recent years the prevalence of WS has increased in women and girls (21, 22, 24). Due to physiological and psychological characteristics of women, the injuries caused by antisocial behavior in women are more than of men (24, 25). Recent studies show that along with increasing economic and social pressures and community constraints, the prevalence of substance abuse such as WS among women and girls is also increasing (6, 26, 27). This study showed that the family members and intimate friends had great impacts on WS behavior (encouraging or preventing WS). Also, the first experience

of WS was with family members or intimate friends which is consistent with the results of similar studies (5, 10, 26). In fact, WS in family members and intimate friends creates a positive attitude to drugs and is an important factor in substance abuse. In various studies, the role of intimate friends on WS behavior was identified as an important risk factor that encourages adolescents and youth to tobacco and drug abuse (28). Social Cognitive Theory consists of the interdependence of three factors including behavioral, environmental and personal factors. In terms of behavioral factors we could point to the WS, in terms of environmental factors we could point to using WS in family and peer groups and in terms of personal factors we could point to the knowledge and beliefs about WS, situational perception and self-efficacy.

The essential elements of this theory include knowledge, perceived self-efficacy, outcome expectations and environment. Knowledge is a necessary cause but it is not enough cause for behavioral changes (3, 29). Self-efficacy could affect the behavioral change in two directions: direct effects and by its influence on the other factors. Efficacy beliefs could affect on the goals and aspirations. Those with a better self-efficacy generally have higher goals for making a better life. So these people could reduce involvement in antisocial behavior such as WS (29). In this study, lower score of the entire individual constructs of the SCT included the knowledge, outcome expectations and outcome expectancies, self-efficacy and situational perception had risk factor roles in the prevention of WS. In societies where hookah is very easy to access, all people, if they choose, can access the WS. Therefore, we need to reinforce individual factors such as knowledge, attitude, self-efficacy, and improve the understanding of the situational perception by providing good

documentation for adolescents. In our study, the impact of self-efficacy in control and prevention of WS is more than other constructs of SCT. This result is in line with similar studies (15-17, 30). To our knowledge, the students had adequate awareness about WS and intervention programs should change the predisposing environmental factors and increase self-efficacy of adolescents. In similar studies based on SCT, self-efficacy is the most important and effective construct in control and prevention of antisocial behaviors (15), and the high self-efficacy increase the chance of changing unhealthy behavior to healthy behaviors. Also, self-efficacy has a great impact on other constructs such as situational perceptions, outcome expectations and outcome expectancies and causes reinforcement of these constructs in people (15, 17).

The environment is also one of the important constructs in tobacco abuse, especially WS (28, 30-32). Low price and easy access to hookah, turning WS to a recreational means, low social stigma of WS and flavored tobacco are facilitators of WS. Also, high profitability of sales and providing hookah in coffee shops are important environmental factors that cause the tendency of youth and adolescents to WS (30, 31). Moreover, lack of recreational and sports facilities and expensive sports facilities compared to WS are among other environmental effective factors in WS in youth (31, 33-34). Also, in this study, easy access to hookah is known as an effective factor in WS, which is consistent with the results of similar studies (34, 35). In SCT, one very important and effective construct in individual behaviors is the environment.

4-1. Study Limitations

This is a cross-sectional study and cannot identify the causative factors of drug abuse. Longitudinal studies have more valid results in studying the effective

factors on drug abuse. This study was conducted in adolescents of urban population and it is also necessary to conduct such studies in rural communities.

5- CONCLUSIONS

The results of this study showed the prevalence of WS among adolescents in these two provinces that are close to the eastern borders of Iran and located in the transit route of opioid from Afghanistan to the western countries is considerable. Also, this study showed WS among family and close friends are two important risk factors for WS. Further, personal factors such as the lack of enough knowledge of WS side effects, low self-efficacy and incorrect situational perception are important risk determinants. Therefore, using community-based theories like SCT in prevention interventions at the personal level to promote life skills among people and also to improve the knowledge and, at the family level such as the healthy family environment for adolescents and at the community level such as reduced access to WS could affect on WS risk factors in the society.

6- CONFLICT OF INTEREST

All the authors declare that they have no conflict of interest.

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