

Abstract

Objective: The present study was conducted to evaluate the conceptual model of substance abuse among the adolescents at risk of substance abuse and to provide a comprehensive model to predict and explain the behavior of substance abuse. **Method:** A sample of 413 high school students (199 boys and 214 girls) was selected using multi-stage cluster sampling. The sample units were studied in Kerman in the academic year of 2015-2016. They were evaluated through "Risky Behavior Questionnaire" and "Risk and Protective Factors Questionnaire". **Results:** The results of structural equation modeling predicted the direct and indirect role of familial, social, and school factors via self-control skills and social skills (personal and social skills) regarding substance use. In addition, self-esteem and attitude to drugs were influenced by adolescents' emotional bond with family and school. These variables were evaluated within the realm of individual factors and the results indicated that they have no direct relationship with drug use. However, they indirectly influence drug use through self-control skills and social skills. **Conclusion:** The evaluated model enjoys an acceptable fitness and is an important step in learning about different aspects of individual, family, community, and school domains related to substance use in the adolescents at risk of drug use. Furthermore, this model is very useful as an ideal model for the design and development of comprehensive programs towards the prevention of risky behaviors.

Keywords: substance abuse, adolescents at risk, social and individual factors

Structural Model of Substance Abuse in Adolescents: Direct and Indirect Roles of Individual, Psychological, Family, and Social Factors

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Introduction

Nowadays, substance use has become a major social and health problem in many countries. In this regard, adolescents are the most vulnerable group that are at risk for drug use more than other social groups since they experience the transition from childhood to adulthood, identity crisis, and adventure and diversity. Research findings are indicative of the increasing tendency of adolescents to drink alcohol, smoke cigarettes, and use other substances (Ahmadi & Hasani, 2003). Today, substances and drugs are widely available to adolescents and many of them are inclined to use them; therefore, adolescents are a vulnerable group that constitute the main target of preventive programs. However, the design and development of effective prevention programs require a true understanding of the phenomenon of drug use and the factors associated with it. Over the past years, various theories and models in the field of pathology and prevention of drug use among adolescents have been proposed. These theories have assessed a wide range of factors related to substance abuse, including psychological, family, social, and cultural factors. Social learning theory (Sutherland, 1939; Bandura, 1977) mainly emphasizes social and interpersonal factors to explain substance abuse. These theories suggest that adolescents extract their beliefs about delinquent behavior from role models, especially their close friends and parents. According to Kaplan, Martin & Robbins's self-derogation theory (1982), one's overall self-esteem is considered the main factor in substance abuse and its prevention. In a longitudinal research on adolescents, Kaplan et al. (1982) found that self-esteem has an indirect relationship with substance use. Botvin & Griffin research (2004) showed that there is a relationship between certain attitudes and beliefs about drug use and the onset of drug use. In the same way, such social factors as inappropriate socioeconomic status, lack of social cohesion, the norms and laws facilitating substance use, and availability of drugs increase the likelihood of substance abuse (Center for Substance Abuse Prevention, 2001). According to Kumpfer & Turner's social ecology model (1991), mental pressures, especially emotional stress associated with school constitute the main factors of substance abuse. The school students who perceive school as a difficult and stressful entity are fugitive from school activities and choose deviant peers as a remedy to extricate themselves from mental pressure and stress. These theories have attempted to explain substance use in adolescents, but none of them have been able to explain all the aspects of this phenomenon. It is now quite clear that no single factor is a necessary and sufficient condition for substance abuse and, thereby, substance abuse is the result of a combination of various factors. Some of these factors increase the risk of substance use, while others reduce substance use (Mohammadkhani, 2007). The model of risk and protective factors has been one of the models very helpful in the explanation and prevention of substance abuse in recent years. This theoretical model states that it is possible to predict the

behavior of drug use in adolescents based on a variety of risk factors. Risk factors are, in fact, the settings, features, variables, and events that increase the likelihood of substance abuse. In contrast, protective factors are the ones that nullify the influence of risk factors and, thus, reduce the likelihood of the incidence of problems. The risk and protective factors of problematic behaviors are highly variable and occur at different levels, such as family, home, school, peer groups, and individuals (Hawkins, Catalano & Miller, 1992; Botvin, 2000; Center for Substance Abuse Prevention, 2001). Pandian (2002, cited in Shamsizadeh, 2012) categorized the risk and protective factors of risk behaviors into four domains, namely personal domain, peer domain, school area, and social domain. Personal factors include the problematic biological and psychological readiness, attitudes, values, knowledge, information, skills, and behaviors. One of the strongest predictors of high-risk behavior in adolescents is relations with the peers with high-risk behaviors (Biglan, Duncan, Ary & Smolkowski, 1995; Jessor & Jessor, 1997). Membership in peer groups contributes to the adolescents' impulsive behavior. Within the area of family, parents' attitudes toward risky behavior, history of substance use in the family (Bachl et al., 1996, cited in Shamsizadeh, 2012), impaired family functioning, and poor emotional bond between parents and children are among the risk factors that generate high-risk behaviors (Hawkins et al., 1992). In the domain of school, variables such as commitment to school and education and poor academic performance are among the risk factors that may produce high-risk behaviors (Moskovitz et al., 1992; cited in Shamsizadeh, 2012). Hence, it is clear that substance use in adolescents is a multifactorial phenomenon. This has important implications in the conceptualization of potential areas of intervention for the prevention of substance use.

Considering the above points and the need for the design and implementation of preventive programs based on scientific data, the current study has been designed to evaluate the goodness of fit of the conceptual model of substance abuse and to provide a comprehensive etiological model. Therefore, based on the main components of social learning theory, self-derogation theory, ecological social model, Botvin & Griffin's research findings (2004), as well as Pandian's risk and protective factors (2002), a conceptual model (Fig. 1) was developed and assessed using structural equation modeling. In the conceptual model evaluated in the present study, the structural relationships of a set of individual, social, and school factors related to substance use in adolescents in Kerman province were investigated using structural equation model. These factors included family ties, school relationships, social disorganization, self-esteem, attitude to drugs, self-control, and social skills.

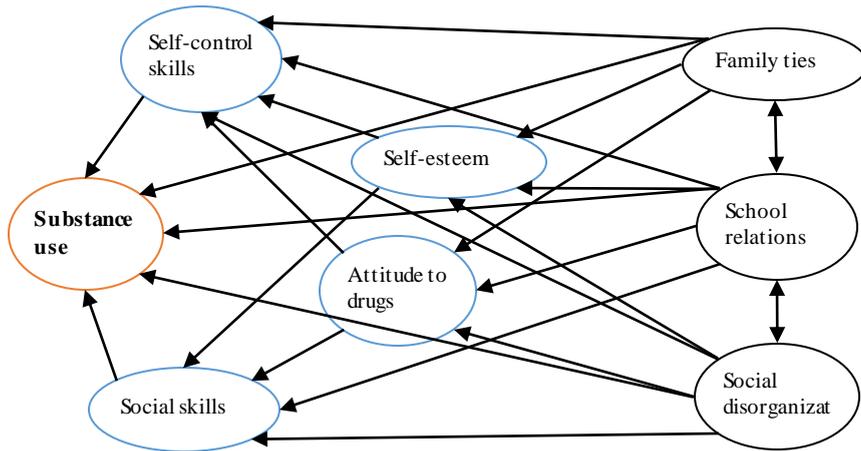


Figure 1: Conceptual model of the factors effective in substance use among the adolescents at risk

Method

Population, sample, and sampling method

Considering the main aim of reducing and solving community problems in the study, an applied research design was used for the conduct of the current study. The high school students of Kerman in the academic year of 2015-2016 constituted the statistical population of this study. At first, 500 students were selected from the population using cluster sampling method. Indeed, the number of school districts in Kerman city was specified and, then, 8 male high schools and 8 female high schools were randomly selected (one male and one female high school from each district). Then, one classroom was selected from each of the selected schools and the questionnaire was administered. It is noteworthy that the number of 87 questionnaires was excluded from the final analysis and, therefore, the analysis was done on 413 high school students (199 boys and 214 girls). The participants in the study were asked to respond to the questionnaire items accurately and honestly considering the importance of research objectives. In addition, the respondents were assured that their information would remain confidential, and would be used only in group format for research purposes.

Instrument

1- The revised version of Risky Behavior Questionnaire: This questionnaire has been adapted from the questionnaire belonging to Youth Risk Behavior Surveillance System (American Center for Disease Control, 2008) by Mohammadkhani (2007). It consists of two parts, i.e. demographic and risky

behaviors. This questionnaire has been prepared by Mohammadkhani (2007) and its reliability has been reported to be 0.87 (Mohammadkhani, 2007). It consists of 42 items that are supposed to determine the baseline of high-risk behaviors that adolescents have committed in the past. The behaviors that are assessed in the questionnaire include physical confrontation at school during the past 12 months, cigarette smoking during the past month, tobacco use (hookah) in the past month, alcohol consumption in the past 12 months, and drug use in three periods, i.e. lifetime, past 12 months, and the past month. Azarmi & Mohammadkhani (2009) have reported the Cronbach's alpha coefficient of 0.82 for the questionnaire. Similarly, Mohammadkhani & Anbari (2010) obtained the Cronbach's alpha coefficient of 0.87 for the scale. This questionnaire is a standard tool for the measurement of the prevalence of high-risk behaviors that has been used in research studies in the country. In this study, the sections pertaining to the prevalence of drug use have been used.

2- Risk and Protective Factors Questionnaire in Adolescents: This questionnaire is a screening tool to assess and identify risk and protective factors for substance use among 12-to-13-year-old adolescents who are at risk of substance use, which has been constructed and standardized by Mohammadkhani (2005-2014). The internal consistency of the questionnaire has been obtained equal to 0.92 based on Cronbach's alpha. The investigation of the discriminant validity of the questionnaire was performed by comparing the drug using students with the non-using students and the results showed that this scale can discriminate the two groups from each other. Therefore, the instrument enjoys acceptable discriminant validity. In addition, the construct validity of the questionnaire was evaluated using confirmatory and exploratory factor analysis and it was revealed that it is consistent with the theoretical models predicting substance use and, thereby, it also merits desirable construct validity (Mohammadkhani, 2005, and 2007).

Results

Based on the obtained results, 16.95% of the students reported that they have smoked cigarette at least once in their lifetime, 19.85% of them had drunk alcohol, 7.3% of had taken codeine, 6.5% of them had used opium, 4.1% of them had used performance-enhancing drugs, 2.9% of them had taken tramadol, 2.4% of them had used opium sap, 2.2%, had used ecstasy, 1.9 of them had taken hashish, 1.5% of them had consumed crystal, 1.5% of them had smoked grass, 1.2% of them had used Ritalin, 1% had used crack, and 0.7% of them had used heroin. Among these substances, alcoholic beverages and cigarettes constituted the most highly used ones and heroin was the least used substance. In this research, goodness of fit index (GFI), adjusted goodness of fit index (AGFI), and standardized root mean squared residual (SRMR) have been considered as absolute fit indexes. In addition, comparative fit index (CFI), normed fit index

(NFI), non-normed fit index (NNFI) have been considered as comparative fit indexes, whereas Chi-square to degrees of freedom, parsimony fit index, and root mean square error of approximation (RMSEA) have been considered as adjusted fit indexes. These indexes have been reported separately in Table 1.

Table 1: Indexes of goodness of fit of the research model

<i>Absolute fit indexes</i>			
Index	GFI	AGFI	SRMR
The obtained value	0.96	0.91	0.03
Acceptable limit	Above 0.90	Above 0.80	Below 0.05
<i>Comparative fit indexes</i>			
Index	CFI	NFI	NNFI
The obtained value	0.97	0.96	0.95
Acceptable limit	Above 0.90	Above 0.90	Above 0.90
<i>Adjusted fit indexes</i>			
Index	X2/df	PNFI	RMSEA
The obtained value	2.12	0.82	0.04
Acceptable limit	Below 3	Above 0.60	Below 0.08

According to Table 1, the GFI equals 0.96 for the research model, which is larger than 0.90. The AGFI is equal to 0.91, which is larger than 0.80. The SRMR value is equal to 0.30, which is smaller than 0.05. The CFI value equals 0.97, which is larger than 0.90. The NFI value equals 0.96, which is larger than 0.90. The NNFI value has been obtained 0.95, which is greater than 0.90. The X2/df value is equal to 2.12, which is lower than 3. The PFI value has been obtained equal to 0.62, which is larger than 0.60, and RMSEA is 0.04, which is less than 0.08. Considering these findings, we can claim that the conceptual model of the research enjoys a good fit. The research model is reported in Figure 2.

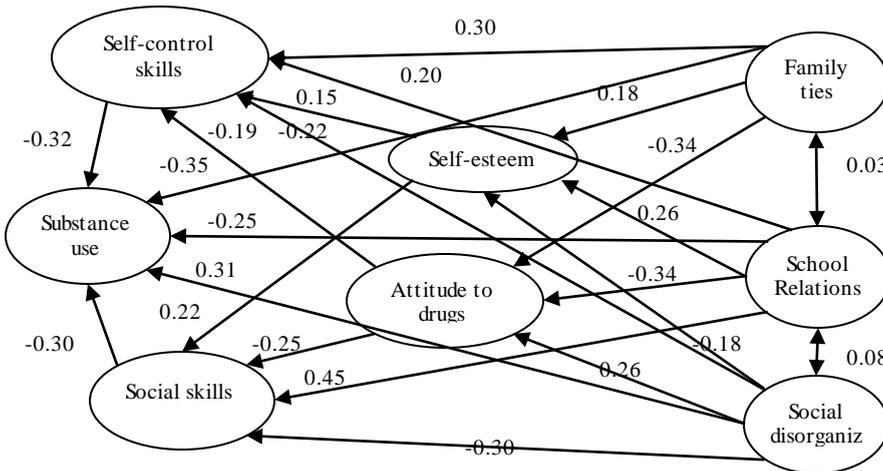


Fig. 2: Conceptual model of substance use in adolescents

In Table 2, the coefficients of direct impacts, t-statistic for each path, and the significance levels of the paths have been reported.

Table 2: Estimated coefficients of the direct effects of the conceptual model

<i>Variable</i>	<i>Path coefficient</i>	<i>Parameter estimates</i>	<i>Standard error</i>	<i>t</i>	<i>Sig.</i>
To drug use from					
Self-control skills	-0.32	-0.16	0.65	-9.18	0.001
Social skills	-0.30	-0.21	0.73	-8.56	0.001
Family ties	-0.35	-0.32	0.56	-10.24	0.001
School Relations	-0.25	-0.51	1.04	-7.28	0.001
Social disorganization	0.22	0.43	0.85	6.66	0.001
To self-esteem from					
Family ties	0.18	0.71	0.35	6.12	0.001
School Relations	0.26	0.67	0.73	7.77	0.001
Social disorganization	-0.18	-0.72	0.34	-5.27	0.001
To drug attitude from					
Family ties	-0.36	-0.79	0.67	-10.51	0.001
School Relations	-0.34	-0.63	0.54	-10.05	0.001
Social disorganization	0.26	0.39	0.46	7.11	0.001
To self-control skills from					
Family ties	0.30	0.04	0.39	9.70	0.001
School Relations	0.20	-0.07	0.24	-6.15	0.001
Social disorganization	-0.23	0.12	0.33	0.37	0.001
Self-esteem	0.15	-0.73	0.40	-4.83	0.01
Attitude to drugs	-0.19	0.07	0.32	-5.23	0.01
To social skills from					
School Relations	0.45	0.47	0.26	12.97	0.001
Social disorganization	-0.30	0.57	0.35	-9.72	0.001
Self-esteem	0.31	0.38	0.16	9.85	0.001
Attitude to drugs	-0.25	0.73	0.47	-7.12	0.001

The statistics in Table 2 show that the direct effect of self-control skills (-0.32), social skills (-0.30), family ties (-0.35), school relations (-0.25), and social disorganization (0.22) on substance use is significant. In addition, family ties, school relations, and social disorganization have had a significantly direct and causal effect on attitudes to drugs and self-esteem. Moreover, self-control skills are influenced by family ties, school relations, social disorganization, self-esteem, and attitude to drugs; and social skills are affected by school relations, social disorganization, self-esteem, and attitude to drugs.

One of the features of the path analysis is the estimation of indirect effects of the variables on each other. This feature allows researchers to examine the mediating role of variables in the model. Table 3 shows the estimated coefficients of indirect effects.

Table 3: Estimated coefficients of indirect effects

<i>Variable</i>	<i>Path coefficient</i>	<i>Parameter estimates</i>	<i>Standard error</i>	<i>t</i>	<i>Sig.</i>
To substance use from					
Family ties and self-control skills	-0.096	-0.14	0.42	-7.12	0.01
Family ties, self-esteem, and self-control skills	-0.009	-0.31	0.51	-5.56	0.01
Family ties, self-esteem, and social skills	-0.02	-0.46	0.63	-5.27	0.01
Family ties, attitude to drugs, and self-control skills	-0.02	-0.76	0.73	-7.30	0.01
Family ties, attitude to drugs, and social skills	-0.03	-0.61	0.32	-5.33	0.01
School relations and self-control skills	-0.06	-1.09	0.68	-6.95	0.01
School relations, self-esteem, and self-control skills	-0.012	-0.98	0.48	-5.55	0.01
School relations, self-esteem, and social skills	-0.008	-0.34	0.58	-4.78	0.01
School relations, attitude to drugs, and self-control skills	-0.021	-0.68	0.44	-5.68	0.01
School relations, attitude to drugs, and social skills	-0.025	-0.73	0.28	-5.79	0.01
Social disorganization, self-esteem, and self-control skills	0.008	0.23	0.03	5.13	0.01
Social disorganization, self-esteem, and social skills	0.017	0.56	0.08	4.97	0.01
Social disorganization, attitude to drugs, and self-control skills	0.016	0.15	0.13	4.91	0.01
Social disorganization, attitude to drugs, and social skills	0.019	0.18	0.07	5.05	0.01

According to Table 3, it can be asserted that all the indirect effects and the mediating role drawn in the conceptual model are supported.

Discussion and Conclusion

The findings of this study indicated that the hypothetical structural model of predictors of substance use in adolescents has a good fit with the experimental data. This designed structural model is a good predictor of substance use among adolescents. The findings on the direct and indirect impact of familial, social, and school-related factors and the mediating role of personal factors are consistent with the research findings obtained by Botvin (2000), Glantz & Hartel

(2002), Wang et al. (2005), Sale et al. (2003), Alaei Khazayem (2010), and Mohammadkhani (2005 and 2006).

The results of this study showed that interpersonal/psychological factors, such as self-esteem and attitude to drugs can play a mediating role in the relationship between social factors and substance use. In other words, personal/psychological factors mediate the effects of social variables and indirectly affect substance use. One of the important findings of this study is the mediating role of self-esteem in the relationship between social factors and personal and social capabilities. According to these findings, the enjoyment of high self-esteem, which is the outcome of the strong affective bond with the family and school, affects alcohol drinking, cigarette smoking, and the use of other substances in the adolescents at risk through the capabilities of self-control and social skills. Hence, as the self-esteem and self-concept increase in adolescents, their problem-solving ability, stress coping, and assertive refusal to substance use will be better and more effective. This finding is consistent with the findings of the studies carried out by Epstein, Griffin & Botvin (2000); Carvajal, Evans, Nash & Getz (2002) who showed that the adolescents' ability in social problem-solving and assertive refusal are the function of their self-efficacy and self-concept. Moreover, the results of the current study showed that self-control skills, which are referred to as the adolescents' ability in problem-solving, decision-making, and stress management and also social skills, such as assertiveness play a mediating role in the relationship between self-esteem and substance use. Therefore, the students who have a higher level of self-esteem and self-concept can better use their individual and social capabilities to deal with the problems and refuse substance use; thus, they turn to the consumption of alcohol, tobacco use, and use of other drugs to a lesser extent. The structural model designed in this study showed that variables such as self-control and social skills can also play a mediating role in substance use.

In line with the results of this research, a number of studies were done in the field of life and social skills training in adolescents and the results represented a reduction in smoking, alcohol use, and drug use, an increase in negative attitudes towards substance abuse, and the increased self-esteem in social skills (Panther et al., 1988, cited in Shamsi, 2012). In addition, based on the results of the current study, positive attitude towards drug use is among the risk factors for substance use in adolescents that indirectly predicts substance use. This finding is consistent with results of the studies that view attitude to drugs as the most important predictor of drug use, and argue that the adolescents who believe in the preponderance of the benefits of substance use over its negative consequences are at risk of drug use and test drug use more (Center for Substance Abuse Prevention, 2001; Kenney, Hansen & McNeal, 2000; Mohamadkhani, 2007).

The results obtained from this study both indicate the direct role of family factors in drug use and the indirect prediction of substance use via the impact on

individual/psychological factors, such as self-esteem, attitude to drugs, self-control skills, and social skills. The results of the study in terms of familial risk factors show that the weakness of family ties causes the tendency of children to the drug use. Hence, the adolescents who live in stressful families and hold weak ties with their families will be at greater risk of alcohol consumption, smoking, and use of other substances. This finding is consistent with those of the studies conducted by (Botvin, 2000, Glantz & Hartel, 2002; Center for Substance Abuse Prevention, 2001; Mohamadkhani, 2008). Given that this weak link with the family and family conflicts have a significant negative relationship with self-esteem, it seems that these adolescents turn to the higher rate of alcohol drinking, cigarette smoking, and the use of other drugs as a way to compensate for their low self-esteem due to their low positive self-concept, which is correlated with assertiveness and depression. Based on Kaplan's self-derogation theory, the adolescents who are frequently exposed to negative evaluation and criticism of the others will lose their self-esteem, find feelings of inadequacy, and feel humiliated. These adolescents try to strengthen their self-worth by showing unusual behaviors and establishing relationships with abnormal peers (Kaplan, Martin & Robbins, 1982).

The results of the structural model of substance use in adolescents in this research indicated that social factors, such as school relations and social disorganization are among the most powerful predictors of substance use in the adolescents exposed to risk, which directly and indirectly influence the drug use behavior through personal and social skills, self-esteem, and attitude toward drug consumption. Based on these findings, family ties, school relations, and social disorganization directly predict smoking, alcohol drinking, and the use of other drugs in adolescents. Therefore, the adolescents who have weak school relations and family ties and live in a socially polluted and chaotic environment and have friends that drink alcohol, use tobacco and other drugs are more likely to turn to drug use. The findings of the study are consistent with the results obtained by Dishion & Owen (2002) who reported that social factors are the strongest factors effective in alcohol consumption, smoking, and the use of other drugs, matches. Among the social factors associated with drug use, school relations were revealed to be the strongest social factor that directly or indirectly influences substance use. Therefore, the students who have weak school relations are more likely to use alcohol, smoke cigarettes, and use other substances. In general, based on the findings of this study, the higher the adolescents' school relations and family ties, the lower the rate of substance use in them. In addition, with increasing social disorganization, which is marked by easy access to drugs, the presence of peers taking drugs, and environmental contamination, the rate of substance use in adolescents will experience an increase. These results are consistent with the findings of other studies in this domain (Kumpfer & Turner, 1991; Botvin, 2000; Sedigh Sarvestani, 2003; Mohamadkhani 2005, and 2007).

Thus, according to the results of the current research, the consumption of alcohol, tobacco, and other substances in adolescents emerges as a result of the dynamic interaction of environmental and personal factors in which peers, parents and other social factors, such as school will get entangled with psychological vulnerabilities, including low self-esteem, lack of self-control and social skills, and positive attitude to drugs. In short, substance use in adolescents is a multifactorial phenomenon. This has important implications in the conceptualization of the potential level of intervention for substance use prevention.

Given that a multitude of factors in various domains of individual, family, social, and school factors are associated with drug use, preventive interventions should be multi-level and must target risk factors in multiple domains. On the other hand, prevention programs that target only one level of the risk factors and neglect other areas lack effectiveness. Therefore, the design and implementation of community, family, and school-based programs, especially life skills training should receive the attention of substance abuse prevention planners and decision-makers in order to make a difference in knowledge, attitudes, and personal and social skills of adolescents. In addition, specific interventions should be planned for parents and teachers. Since the present study has been conducted in Kerman province, the results cannot be generalized to the whole country with certainty. Therefore, it is expected that researchers in other provinces evaluate the structural models of substance use in order to achieve a comprehensive model for intervention programs.

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