BMC Public Health

RESEARCH

Open Access

The factors affecting substance abuse relapse based on theory of planned behavior in male addicts covered by addiction treatment centers in Southern Iran

Mojtaba Sohrabpour[1], Amirhossein Kamyab[2], Asiyeh Yari[3], Pooyan Afzali Harsini[4] and Ali Khani Jeihooni[5*]

Abstract

Background Given the destructive nature of addiction and its relapse after quitting, the present study aimed to investigate the factors affecting substance abuse relapse based on the Theory of Planned Behavior (TPB) in male addicts covered by addiction treatment centers in Shiraz, Iran.

Methods This cross-sectional study was conducted on 400 male addicts covered by addiction treatment centers in Shiraz, Iran, in 2021–2022. The data collection tool was a researcher-made questionnaire. Data were analyzed using SPSS-22 software through descriptive statistical methods, linear regression, and binary logistic regression.

Results 190 people (47.50%) were aged 31–40 years, 265 people (66.25%) were married, 224 people (56%) lived with their spouses, and 192 people (48 percent) had their first use at the age of 16–20. The substance respondents used were methamphetamine (59.5%), heroin (53%), opium (48%), and alcohol (40%). 138 people (34.5%) had their first place of consumption at friends' houses (Tables 1 and 2).

342 people (85.5%) had a history of relapse, and 172 people (50.29%) had 1–5 relapses. Marital status, occupation, and income were among the demographic risk factors, and addicted friends and close relatives were among the behavioral risk factors for drug relapse among people with a history of relapse. Personal desire and the insistence of friends were also among the individual and interpersonal factors of drug use among participants. The regression results showed that the constructs of awareness, attitude, subjective norms, perceived behavioral control, and behavioral intention were predictors of drug relapse among addicts ($P < 0.05$).

Conclusion The current study's findings indicate that among the behavioral risk factors for drug relapse in individuals with a history of relapse are addicted friends and close relatives, while marital status, occupation, and income are among the demographic risk variables. Among the individual and interpersonal factors influencing drug usage among participants were personal desire and friends' insistence. Furthermore, the findings indicated that the TPB's structures might be used to predict drug relapse in addicts.

Keywords Relapse, Substance abuse, Theory of planned behavior, Addicts, Addiction treatment centers

*Correspondence:
Ali Khani Jeihooni
Khani_1512@yahoo.com
Full list of author information is available at the end of the article

Background

Substance dependence is known as a chronic and recurrent brain disorder that is followed by compulsive seeking and consumption despite harmful consequences [1]. These harmful consequences, with physical, psychological, social, acute, and chronic aspects, lead to serious social problems such as crime, unemployment, family destruction, and inappropriate use of medical care [2]. The United Nations Office on Drugs and Crime (UNODC) in 2020 has raised new and serious warnings about the increased number of drug users. The 2020 UNODC report is far more alarming than the 2019 report, which compiled global data for 2017. According to the latest information from UNODC and based on regional reports, the total number of people aged 15–64 who have used drugs or stimulants at least once by the end of 2018 has increased by 30% compared to 9 years ago, reaching 269 million [3].

Addiction in Iran has also been growing in recent years. Due to its proximity to Afghanistan, as the world's largest poppy and opium producer, Iran is the largest consumer of opium and other opium derivatives in the world [4, 5]. The total number of drug addicts announced in Iran in the second half of 2018 and the beginning of 2019 was 2,800,000, and the mean age of users is 24 years, of which 94% are male and 6% are female users [6]. In Shiraz City, which is one of the southern cities of Iran, addiction to substance and alcohol has been recognized as a major problem [7, 8]. To combat the pervasive drug usage issue in the nation, Iran has launched a number of initiatives and programs aimed at helping people kick their addiction [9, 10]. These programs include of support groups for addicts, rehabilitation facilities, and education and awareness campaigns [11]. Still, there are a lot of obstacles in the way of properly combatting drug misuse in Iran [12].

Addiction relapse is the biggest problem for recovered addicts [13]. A relapse is a state when an individual resumes their prior levels of alcohol or drug usage after losing motivation to cut back or refrain from using these substances [14]. Relapse, contrary to slip, is a planned condition in which the person does not have any intention to continue the recovery plan [15]. There are many factors affecting the relapse, including education, social or peer pressures, work-related stress, interpersonal issues, family problems, negative or false emotions or beliefs, place of residence, socioeconomic status, and some personality characteristics such as self-control [16, 17]. Therefore, the transition from the drug-using world to the drug-free world requires more and may be a period of serious and challenging struggles [18].

Many studies show the high prevalence of addiction relapse. In a study by Witkowitz's, more than 80% of addicts return to drug use in less than 6 months after quitting [19]. A prospective study by Xie et al., which lasted for ten years, showed that 25% of completely recovered subjects relapsed during the first year of the study and the remaining 75% during the follow-up period [20]. The high prevalence of relapse indicates the insufficient effect of current addiction treatment methods. Studies show that countless factors, including individual, interpersonal, social, and public policy factors, are effective in starting, continuing, and returning to addiction after quitting. In a study by Deepti et al., friends played the main role in the relapse [21]. Afkar et al. believed that individual, family, occupational, and economic factors were the most important predictors of the relapse [22].

Considering the high prevalence of addiction and the high rate of its relapse on the one hand and ineffective intervention programs on the other hand, the need to address affecting factors at the ecological level and to use a planning framework based on evidence and theories to conduct relapse prevention interventions is seriously felt. In this regard, various models and approaches for the development, implementation, and evaluation of health education and promotion programs have been prepared by the scientists, one of which is the Theory of Planned Behavior (TPB). TPB is a suitable educational design framework and model for identifying needs in health education and designing behavior-change interventions. This theory is a social-cognitive model of value expectation, stating that intention is the main determinant of behavior. In this model, the intention itself is under the influence of three independent constructs: attitude, subjective norms, and perceived behavioral control. Attitude reflects a person's positive or negative evaluation of performing a behavior. Subjective norms refer to the fact that perceived social pressures may cause a person to perform a certain behavior or not. And finally, perceived behavioral control is the perceived difficulty or ease of performing a specific behavior, which directly or indirectly affects the behavior.

The TPB shows that when people positively evaluate performing a behavior, believe that important ones think that the person should perform that behavior, and imagine that performing the behavior is under their control, they intend to do the behavior. In addition, in this theory, it is assumed that attitude, subjective norms, and perceived behavioral control are determined by their underlying beliefs [23]. Utilizing this theory, could effectively assess the factors affecting relapse. According to the nature of relapse and the factors affecting it. Given the importance of substance abuse relapse and its prevalence, factors influencing it, and the structures discussed in the TPB, the present study aimed to investigate the factors affecting substance abuse relapse based using

the TPB in a group of male addicts covered by addiction treatment centers in Shiraz, Iran.

Methods

This cross-sectional study was conducted on 400 male addicts covered by addiction treatment centers, which are designed to quit different kinds of substance addictions, in Shiraz, Iran, in 2021–2022. To collect data, after obtaining the necessary permits, the researcher referred to the addiction treatment centers, coordinated with the officials, and obtained informed written consent from the participants. The questionnaires were then provided to the participants.

Data collection tool

The data collection tool was a researcher-made questionnaire designed by reviewing different studies [24–29], including three parts of demographic characteristics (age, education, marital status, occupation, income, place of residence, residence status, and monthly income), behavioral risk factors (questions like which drug did you use?; at what age did you use drugs for the first time?; have you ever slipped?; how many relapses did you do?; which of the following are the main reasons for relapse?), and TPB constructs (awareness, attitude, subjective norms, perceived behavioral control, and intention).

TPB questionnaire

In this questionnaire, awareness was assessed by 15 questions on a 5-point Likert scale, ranging from 15 to 75. Attitude structure was measured by 10 questions on a 5-point Likert scale, ranging from 10 to 50. Each of the subjective norms and perceived behavioral variables were quantified using eight questions on a 5-point Likert scale, ranging from 8 to 40.

Validity of the questionnaire

An item effect size more than 0.15 and a content validity ratio greater than 0.79 were used to evaluate the validity of the questionnaire. To determine the face validity of the tool, a list of compiled items was targeted by 40 patients (who were under methadone treatment) with demographic, economic, and social characteristics similar to those of the population. The content validity was determined based on the opinions of 10 experts on health education and health promotion, 1 psychiatrist, and 1 psychologist.

Using the Lawshe index, items higher than 0.56 were considered essential and kept for further analysis. Most of the items were above 0.70. Based on Cronbach's alpha, the overall reliability was calculated to be 0.89. Also, the reliability of awareness, attitude, subjective norms, perceived behavioral control, and behavioral intention was calculated to be 0.82, 0.89, 0.89, 0.88, and 0.87, respectively.

Sampling method

The present study aimed to investigate the effect of educational intervention based on TPB on substance abuse relapse in male addicts covered by addiction treatment centers in Shiraz. The sampling method in the analytical-descriptive stage was cluster sampling. In this way, after obtaining the necessary permits from the ethics committee of the University of Medical Sciences, the list of active addiction treatment centers in Shiraz was first received. Then, 8 centers were randomly selected. It should be noted that if someone did not want to participate in the study, substitute subjects were included in the study. According to previous studies, the relapse rate was 80% [27], which required 264 subjects to conduct the study with 95% confidence and 5% accuracy. In addition, by applying the cluster factor of 1.5, the sample size increases to 400.

$$N = \frac{Z^2 1 - aP(1-P)}{d^2}$$

Inclusion and exclusion criteria

Inclusion criteria were addicts covered by addiction treatment centers, having no chronic physical or mental diseases according to the medical records, and obtaining informed written consent to participate in the study. The exclusion criterion was the inability to answer the questions.

Data analysis

Data were analyzed using SPSS 22 software through descriptive statistical methods, linear regression, and binary logistic regression.

Results

In this research, 400 addicts were examined under the coverage of addiction treatment centers in Shiraz. 190 people (47.50%) were aged 31–40 years, and 142 people (35.50%) had a high school education. 265 people (66.25%) were married, and 224 people (56%) lived with their spouses. 272 people (68 percent) live in the city, 268 people (67 percent) have an income of less than 20 million riyals, and 192 people (48 percent) had their first use at the age of 16–20. methamphetamine (59.5%), heroin (53%), opium (48%), and alcohol (40%). 138 people (34.5%) had their first place of consumption at friends' houses (Tables 1 and 2).

The findings of the study showed that 92 people (23 percent), their fathers, 82 people (20.5 percent), and 68 people (17 percent) best friends had the most history

Table 1 Demographic characteristic of the participants and their association with relapse

Variables	No relapse	Relapsed	*P*-value
Age			
≤ 20	0 (0)	12 (3)	0.99
21–30	15 (3.75)	80 (20)	0.56
31–40	32 (8)	158 (39.50)	0.82
41–50	7 (1.75)	70 (17.50)	0.57
≥ 50	4 (1)	22 (5.50)	0.44
Education			
Illiterate	4 (1)	18 (4.5)	0.32
Primary school	10 (2.5)	70 (17.5)	0.35
Secondary school	12 (3)	106 (26.5)	0.28
High school	20 (5)	122 (30.5)	0.17
College	12 (3)	26 (6.5)	0.54
Marital status			
Married	50 (12.50)	215 (53.75)	0.14
Single	2 (0.50)	93 (23.25)	0.001
Widowed	1 (0.25)	1(0.25)	1
Divorced	5 (1.25)	33 (8.25)	0.32
Employment			
Worker	12 (3)	56 (14)	0.76
Employed	10 (2.5)	12 (3)	0.001
Self-employed	26 (6.5)	224 (56)	0.65
Unemployed	10(2.5)	50 (12.5)	0.72
Place of residence			
City	40 (10)	232 (58)	0.38
Village	18 (4.5)	110 (27.5)	0.25
Income			
≤ 20 million Rials	30 (7.5)	238 (59.5)	0.001
20–50 million Rials	18 (4.5)	70 (17.5)	0.27
≥ 50 million Rials	10 (2.5)	34 (8.5)	0.18

Table 2 Frequency distribution of individual and environmental risk factors for the relapse

Variables	Number	Percentage
The age of onset of use		
≤ 15	52	13
16–20	192	48
21–25	92	23
26–30	64	16
Type of substance used		
Cigarette	318	79.5
Hashish	124	31
Alcohol	160	40
Grass	82	20.5
Opium	192	48
EX	12	3
Norgesic	10	2.5
Cocaine	18	4.5
Heroine	212	53
Crack	84	21
Methamphetamine	238	59.5
Methadone	196	49
Tramadol	132	33
Other	22	5.5
Place of the first relapse		
One's home	128	32
Friends' home	138	34.5
Party	52	10.5
Street or park	42	10.5
Other	40	10

Table 3 Frequency distribution of history of drug use in family and friends

	Number	Percentage
Father	92	23
Mother	4	1
Brother	82	20.5
Sister	3	0.75
Close relatives	66	16.5
Other relatives	41	10.25
The best friend	68	17
Other friends	44	11
Total	400	100

of drug use (Table 3). 342 people (85.5%) had a history of relapse, and 172 people (50.29%) had 1–5 relapses (Table 4). Marital status, occupation, and income were among the demographic risk factors, and addicted friends and close relatives were among the behavioral risk factors for drug relapse among people with a history of relapse. Personal desire and the insistence of friends were also among the individual and interpersonal factors of drug use among study participants (Table 5).

The results showed that among the constructs of the TPB, the constructs of attitude and behavioral intention had the highest mean (Table 6). The regression results showed that the constructs of awareness, attitude, subjective norms, perceived behavioral control, and behavioral intention were predictors of drug relapse among addicts ($P < 0.05$) (Table 7).

Discussion

The aim of this study was to examine the impact of educational interventions based on the TPB on substance abuse relapse among male addicts receiving treatment

Table 4 Frequency distribution of relapse status

History of relapse		**Number**	**Percentage**
No		**58**	**14.5**
Yes		**342**	**85.5**
History of relapse	**Number of relapse**	**Number**	**Percentage**
Yes	1–5	172	50.29
	6–10	96	28.07
	≥ 10	74	21.64

in Shiraz, Iran. Our findings shed light on several critical aspects related to substance abuse and relapse.

Firstly, the study highlighted the early onset of substance use, with nearly half of the participants initiating drug consumption before the age of 20. In a study by Mirzaei et al. [30], the age of onset of use for 63% of participants was under 20 years of age. This underscores the necessity of implementing effective addiction prevention programs targeting young individuals, as interventions during this critical period could potentially mitigate the risk of future substance abuse.

Regarding the types of substances consumed, our results indicated cigarettes, opium, heroin, and crack as the most addictive substances consumed. Notably, individuals who engage in polydrug use were found to be at a higher risk of developing substance abuse disorders. Consistently, local surveys have shown that opium was the most common type of substance consumed in Iran [31]. Our findings align with previous research by Guindalini et al. highlighting the correlation between concurrent use of multiple substances and increased susceptibility to addiction [32].

Furthermore, familial and social factors emerged as significant contributors to relapse. The influence of family dynamics and relationships on addiction propensity has been well-documented, with familial drug use history serving as a particularly influential factor [33]. Consistent with existing literature, our findings underscored the role of family support and the detrimental impact of familial drug use patterns on individuals' susceptibility to relapse [34]. Our findings are consistent with those of Coviello et al. [35], Habibi et al. [36], and Habibi, Basharat, and Wreder-Ferrer [37].

In terms of relapse patterns, participants reported experiencing relapse multiple times, with various factors contributing to this recurrence. These factors included association with addicted peers, psychological stressors, environmental triggers, familial rejection, and exposure to drug-related stimuli. In line with our finding, Hoseyni and Falahzade [38] stated the

Table 5 Behavioral, personal, interpersonal, and environmental risk factors for the relapse

	No relapse	**Relapsed**	***P*-value**
Behavioral risk factors			
Addicted father			
No	52 (13)	256 (64)	0.28
Yes	6 (1.5)	86 (21.50)	0.34
Addicted mother			
No	57 (14.25)	339 (84.75)	0.42
Yes	1 (0.25)	3 (0.75)	0.25
Addicted brother			
No	42 (10.50)	276 (69)	0.48
Yes	16 (4)	66 (16.50)	0.18
Addicted sister			
No	58 (14.50)	339 (92.25)	0.15
Yes	0 (0)	3 (0.75)	0.31
Addicted friends			
No	46 (11.50)	286 (71.50)	0.24
Yes	12 (3)	56 (14)	0.02
Other friends			
No	54 (13.50)	302 (75.50)	0.18
Yes	4 (1)	40 (10)	0.07
Close relatives			
No	47 (11.75)	287 (71.75)	0.12
Yes	11 (2.75)	55 (13.75)	0.02
Other relatives			
No	56 (14)	303 (75.75)	0.36
Yes	2 (0.50)	39 (9.75)	0.47
Personal, interpersonal and environmental risk factors			
Curiosity			
No	50 (12.5)	300 (75)	0.27
Yes	8 (2)	42 (10.50)	0.35
Inclination			
No	57 (14.25)	264 (66)	0.18
Yes	1 (0.25)	78 (19.50)	0.001
Friends' pressure			
No	50 (12.50)	284 (71)	0.14
Yes	8 (2)	58 (14.50)	0.001
Pleasure			
No	53 (13.25)	244 (61)	0.16
Yes	5 (1.25)	98 (24.50)	0.02
Accessibility			
No	56 (14)	240 (60)	0.21
Yes	2 (0.5)	102 (25.50)	0.03
Place of residence			
No	56 (14)	310 (77.50)	0.12
Yes	2 (0.5)	32 (8)	0.22
Family issues			
No	56 (14)	254 (63.50)	0.16
Yes	2 (0.5)	88 (22)	0.02
Job failure			
No	52 (13)	302 (75.50)	0.24

Table 5 (continued)

	No relapse	Relapsed	*P*-value
Yes	6 (1.50)	40 (10)	0.82
Mental issues			
No	47 (11.75)	230 (57.50)	0.16
Yes	11 (2.75)	112 (28)	0.10
Escapism			
No	48 (12)	260 (65)	0.28
Yes	10 (2.50)	82 (20.50)	0.24

Table 6 Mean score of awareness, attitude, subjective norms, and perceived behavioral control of participants

Constructs	Mean	SD	Score range
Awareness	7.22	1.18	0–15
Attitude	20.77	3.09	10–50
Subjective norms	14.23	2.65	8–40
Behavioural control	13.14	2.94	8–40
Behavioural intention	14.40	2.55	8–40

Table 7 Analysis of linear regression in predicting relapse prevention

Constructs	B	SE	β	95% CI of B	*P*-value
Awareness	0.061	0.027	0.152	0–014.118	0.032
Attitude	0.052	0.038	0.096	0–024.122	0.041
Subjective norms	0.041	0.042	0.085	0–018.104	0.038
Behavioural control	0.064	0.025	0.228	0–012.112	0.024
Behavioural intention	0.085	0.034	0.234	0–021.230	0.020

factors influencing the relapse are drug addict friends, mental-psychological pressures, returning to former places, unfortunate situations, being rejected by family and society, and being in touch with objects of drug use. Moreover, previous studies showed that a majority of the surveyed addicts had a history of relapse in the first year of quitting [39–41]. Considering that background factors such as friends, family's financial condition, personality, etc. play a decisive role in addiction relapse, and on the other hand, most quitted addicts do not correct their previous underlying factors, the possibility of relapse is highly expected.

Furthermore, socio-economic factors such as unemployment and low income emerged as significant risk factors for relapse. Economic instability and social marginalization can exacerbate vulnerabilities to substance abuse, emphasizing the importance of holistic support systems and socio-economic empowerment initiatives in addiction recovery efforts [42]. From the addict's point of view, socializing with addicted and deviant friends has been described as the most important interpersonal factor in addiction relapse. However, unemployment, poverty, and inappropriate treatment by family members are among the other factors [43].

Individual-level factors, including personal pleasure and desire, were identified as influential determinants of relapse. This highlights the subjective nature of addiction and the pivotal role of individual motivations and cravings in driving substance use behaviors. Our results are consistent with the results of previous studies [44, 45]. Allahverdipour et al. [46] found the sense of curiosity and gaining pleasure as the most important causes of the tendency towards drugs. Conclusively, prevention programs must address these intrinsic factors by promoting healthier coping mechanisms and enhancing individuals' resilience against cravings and temptations.

The findings also underscored the predictive power of TPB constructs in understanding and mitigating substance abuse behaviors. Constructs such as awareness, attitude, subjective norms, perceived behavioral control, and behavioral intention were identified as significant predictors of substance abuse and relapse. Additionally, educational interventions targeting these constructs have shown promise in promoting negative attitudes towards drug use and enhancing individuals' ability to resist social influences and impulsive behaviors. Consistent with the present study, the results of studies by Moeini [47], Orbell [48], Olds [49], and Moan [50] have shown that models such as TPB are good predictors of unhealthy behaviors. Other studies have shown that training subjective norms could increase the subjects' participation in changing their behavior [51].

In conclusion, our study contributes to the growing body of literature on substance abuse and relapse by elucidating the multifaceted determinants and predictive factors underlying addiction behaviors. By addressing socio-economic, familial, social, and individual-level factors, targeted interventions based on the TPB framework hold potential in mitigating substance abuse relapse and promoting long-term recovery among individuals battling addiction.

Conclusion

The current study's findings indicate that among the behavioral risk factors for drug relapse in individuals with a history of relapse are addicted friends and close relatives, while marital status, occupation, and income are among the demographic risk variables. Among the individual and interpersonal factors influencing drug usage among participants were personal desire and friends' insistence.

Furthermore, the findings indicated that the TPB's structures can be used to predict drug relapse in addicts.

In other words, the disorders can be predicted based on the mentioned components. Therefore, conducting theory-based educational interventions in the future such as implementing the TPB in interventions conducted on addicts with a history of relapse could have a significant effect on reducing the intention of substance abuse in them.

Abbreviations

TPB Theory of Planned Behavior
BSSI Beck Scale for Suicidal Ideation

Acknowledgements

We express appreciation to the participants in this study and the staff of the private and public clinics for their valuable help.

Authors' contributions

MS, AK, AY, PAH and AKHJ conceived and designed the study. AY and AKHJ analyzed and interpreted the data, and drafted the manuscript. MS, AK, AY, PAH and AKHJ were involved in the composition of the study tool, supervision of the research process and critical revision and review of the manuscript. All the authors read and approved the final manuscript.

Funding

None.

Availability of data and materials

The datasets used and/or analyzed during the current study can be made available by the corresponding author on reasonable request.

Declarations

Ethics approval and consent to participate

The study procedures were carried out following the Declaration of Helsinki. This study was approved by the Ethics Committee of Shiraz University of Medical Sciences. Informed consent was taken from all the participants. For illiterate people, the text of the consent form was read to them and their fingerprints were recorded. There was an emphasis on maintaining privacy in keeping and delivering the information accurately without mentioning the names of the participants. The participants were given the right to leave the interview at any time if they wished to leave the interview process, and they were promised to have the study results if they want.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

Author details

[1]Noncommunicable Diseases Research Center, Fasa University of Medical Sciences, Fasa, Iran. [2]Faculty of Medicine, Fasa University of Medical Sciences, Fasa, Iran. [3]Department of Health Education and Health Promotion, School of Health, Hormozgan University of Medical Sciences, Bandar Abbas, Iran. [4]Department of Public Health, School of Health, Kermanshah University of Medical Sciences, Kermanshah, Iran. [5]Nutrition Research Center, Department of Public Health, School of Health, Shiraz University of Medical Sciences, Shiraz, Iran.

Received: 26 November 2023 Accepted: 29 April 2024
Published online: 08 May 2024

References

1. Koob GF, Kandel DB, Baler RD, Volkow ND. Neurobiology of Addiction. In: Tasman, A., et al. Tasman's Psychiatry. New York City: Springer, Cham; 2023. https://doi.org/10.1007/978-3-030-42825-9_29-1.
2. Sau M, Mukherjee A, Manna N, Sanyal S. Sociodemographic and substance use correlates of repeated relapse among patients presenting for relapse treatment at an addiction treatment center in Kolkata, India. Afr Health Sci. 2013;13(3):791–9.
3. U. Nations. World drug report. Vienna: United Nations publication; 2020.
4. E. M. C. f. Drugs, D. Addiction, and Europol. EU drug markets report 2019. Lisbon: EMCDDA and Europol, Publications Office of the European Union; 2019.
5. Akbari H, Roshanpajouh M, Nourijelyani K, Mansournia MA, Rahimi-Movaghar A, Yazdani K. Profile of drug users in the residential treatment centers of Tehran, Iran. Health Promot Perspect. 2019;9(3):248.
6. Jahormi LR, Alamdarloo SMM, Asmanjerdi MJE, Khoshroo M, Mazidi SS. The impact of drop in center services on homeless drug users' quality of life, reduction of dangerous behaviours, and improvement of emotional regulation. NeuroQuantology. 2022;20(7):3127.
7. Khatami MG, Javidi H. Examining the factors effective in addiction potential among the adolescents in Shiraz. J Adv Pharm Educ Res. 2020;10(S4):141.
8. Ahmadi J, Sharifi M. Prevalence of alcohol use disorders in Shiraz, Iran. J Subst Use. 2002;7(4):251–4.
9. White WL, Daneshmand R, Funk R, Dezhakam H. A Pilot study of smoking cessation within an Iranian addiction recovery community. Alcohol Treat Q. 2016;34(1):15–29.
10. Alam-Mehrjerdi Z, Abdollahi M, Higgs P, Dolan K. Drug use treatment and harm reduction programs in Iran: a unique model of health in the most populated Persian Gulf country. Asian J Psychiatr. 2015;16:78–83.
11. Zafarghandi MBS, Jadidi M, Khalili N. Iran's activities on prevention, treatment and harm reduction of drug abuse. Int J High Risk Behav Addict. 2015;4(4):e22863.
12. Khorasani-Zavareh D, Mohammadi R, Khankeh HR, Laflamme L, Bikmoradi A, Haglund BJ. The requirements and challenges in preventing of road traffic injury in Iran. A qualitative study. BMC Public Health. 2009;9(1):1–9.
13. Brower KJ, Perron BE. Sleep disturbance as a universal risk factor for relapse in addictions to psychoactive substances. Med Hypotheses. 2010;74(5):928–33.
14. Melemis SM. Focus: addiction: relapse prevention and the five rules of recovery. Yale J Biol Med. 2015;88(3):325.
15. A. R. Toronto. The difference between a relapse and a slip. https://addictionrehabtoronto.ca/the-difference-between-a-relapse-and-a-slip/. Accessed.
16. Sinha R. New findings on biological factors predicting addiction relapse vulnerability. Curr Psychiatry Rep. 2011;13:398–405.
17. Mohammadpoorasl A, et al. Addiction relapse and its predictors: a prospective study. J Addict Res Ther. 2012;3(01):122.
18. Bhandari S, Dahal M, Neupane G. Factors associated with drug abuse relapse: a study on the clients of rehabilitation centers. Hindu. 2015;99(1):84–6.
19. Ahmadi K, Maleki M, Alipour M. Addiction relapse in iranian veterans: determination of etiologies and solutions. Iran J War Public Health. 2010;2(4):40–4.
20. Sadeghieh Ahari S, Azami A, Barak M, Amani F. Factors affecting the relapse among the patients referring voluntarily to addiction-abandoning centers, 2000. J Ardabil Univ Med Sci. 2004;4(2):36–41.
21. Deepti SS, Kaur S, Kaur J. A study of drug relapse and its associated factors among cases admitted in Swami Vivekananda Drug De-addiction Centre, GMC, Amritsar. J Interdiscip Multidiscip Res. 2014;2(2):100–5.
22. Afkar A, Rezvani SM, Sigaroudi AE. Measurement of factors influencing the relapse of addiction: a factor analysis. Int J High Risk Behav Addict. 2017;6(3):e32141.
23. Ajzen I. Perceived behavioral control, self-efficacy, locus of control, and the theory of planned behavior 1. J Appl Soc Psychol. 2002;32(4):665–83.
24. Zemore SE, Ajzen I. Predicting substance abuse treatment completion using a new scale based on the theory of planned behavior. J Subst Abuse Treat. 2014;46(2):174–82.
25. Kelly PJ, Deane FP, McCarthy Z, Crowe TP. Using the theory of planned behaviour and barriers to treatment to predict intention to enter further

treatment following residential drug and alcohol detoxification: a pilot study. Addict Res Theory. 2011;19(3):276–82.
26. Abdollahi Z, Taghizadeh F, Hamzehgardeshi Z, Bahramzad O. Relationship between addiction relapse and self-efficacy rates in injection drug users referred to Maintenance Therapy Center of Sari, 1391. Global J Health Sci. 2014;6(3):138.
27. Mousali AA, et al. Factors affecting substance use relapse among Iranian addicts. J Educ Health Promot. 2021;10:129.
28. Ataee M, Jouybari A, Alavijeh MM, Aghaei A, Mahboubi M, Motlagh FZ. Factors related with intention to methadone maintenance treatment among Iranian men addicts. Life Sci J. 2014;11(4s):228–31.
29. Pissamorn C, Kaeodumkoeng K, Therawiwat M. An application of theory of planned behavior on methamphetamine relapse prevention among persons with drug addict rehabilitation at drug addicts rehabilitation center. J Health Educ. 2019;42(1):68–79.
30. Mirzaei T, Ravary A, Hanifi N, Miri S, Oskouie F, Mirzaei Khalil Abadi S. Addicts' perspectives about factors associated with substance abuse relapse. Iran J Nurs. 2010;23(67):49–58.
31. Amin-Esmaeili M, et al. Epidemiology of illicit drug use disorders in Iran: prevalence, correlates, comorbidity and service utilization results from the Iranian Mental Health Survey. Addiction. 2016;111(10):1836–47.
32. Guindalini C, Vallada H, Breen G, Laranjeira R. Concurrent crack and powder cocaine users from Sao Paulo: do they represent a different group? BMC Public Health. 2006;6:1–7.
33. Sharifinia A, Nejati M, Bayazi MH, Motamedi H. Investigating the relationship between addiction to mobile social networking with marital commitment and extramarital affairs in married students at Quchan Azad University. Contemp Fam Ther. 2019;41(4):401–7.
34. Makarem S, Zanjani Z. The relationship between individual and family religiosity with substance abuse. Sci Quart Res Addict. 2014;7(28):75–88.
35. Coviello DM, Alterman AI, Cacciola JS, Rutherford MJ, Zanis DA. The role of family history in addiction severity and treatment response. J Subst Abuse Treat. 2004;26(1):1–11.
36. Habibi M, Alahdadi S, Mohammadi L, Ghanbari N. Psychometric properties of Leeds Dependence Questionnaire (LDQ) in dependent people with drug and alcohol. Pajoohandeh J. 2016;21(3):153–60.
37. Habibi M, Besharat MA, Bahrami-Ehsan H, Rostami R, Ferrer-Wreder L. Predicting substance use in adolescents based on risk indices and individual protective preventing, family, peers and location. J Clin Psychol. 2012;4(1):43–54.
38. Falahzade H, Hoseyni N. Reviewing the causes of recurred addiction from the perspective of addicts who referred to welfare center of Yazd city. Tolooe Behdasht J. 2005;15(1):2.
39. Friedmann PD, Saitz R, Samet JH. Management of adults recovering from alcohol or other drug problems: relapse prevention in primary care. JAMA. 1998;279(15):1227–31.
40. Amani F, Sadeghieh S, Salamati P. Characteristics of self introduced addicts in Ardebil. Payesh (Health Monitor). 2005;4(1):55–9.
41. Taghva A, Kazemi H, Abbas R, Ebrahim M, Mostafazade B. The relapse rate, one and six months after detoxification in opioid dependent patients. Ann Mil Health Sci Res. 2009;7:35–8.
42. Henkel D. Unemployment and substance use: a review of the literature (1990–2010). Curr Drug Abuse Rev. 2011;4(1):4–27.
43. Tarrahi M, Ansari H, Heydari K, Sharhani A, Akrami R, Holakouie Naeini K. Viewpoint of care providers and self-reported substance drug addicts referring to withdrawal centers about etiology of re-addiction in Khoramabad, 2010. J Rafsanjan Univ Med Sci. 2013;12(4):299–308.
44. Ahmadpanah M, Haghighi M, Behfar M, Moradi A, Nazaribadie M. Investigation of factors affecting on relapse of addiction in substance abuse patients referred to narcotics anonymous population. Avicenna J Nurs Midwifery Care. 2018;26(4):247–56.
45. Mansouri A. Prevalence and attitude about using drugs and tobaccos in male students. Zahedan J Res Med Sci. 2012;13(suppl 1):e95292.
46. Allahverdipour H, Farhadinasab A, Bashirian S, Mahjub H. Pattern of drug abuse among younger adults. J Yazd Univ Med Sci. 2007;15(4):35–42.
47. Moeini B, Bashirian S, Moghimbeigi A, Kafami V, Mousali A. Effect of educational program to decrease substance abuse among suburban bus drivers based on theory of planned behavior. Avicenna J Clin Med. 2015;21(4):330–40.
48. Orbell S, Blair C, Sherlock K, Conner M. The theory of planned behavior and ecstasy use: roles for habit and perceived control over taking versus obtaining substances. J Appl Soc Psychol. 2001;31(1):31–47.
49. Olds RS, Thombs DL, Tomasek JR. Relations between normative beliefs and initiation intentions toward cigarette, alcohol and marijuana. J Adolesc Health. 2005;37(1):75.
50. Moan IS, Rise J. Predicting intentions not to "drink and drive" using an extended version of the theory of planned behaviour. Accid Anal Prev. 2011;43(4):1378–84.
51. Hazavehei SMM, Sharifirad GR, Kargar M. The comparison of educational intervention effect using BASNEF and classic models on improving assertion skill level. 2008.

Publisher's Note