

## RESEARCH ARTICLE

# Efficacy of the Theory of Planned Behavior in Predicting the Psychological Constructs Influencing the Substance Abuse Treatment Continuity

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## Abstract

**Background & Objective:** The high rate of relapse after addiction quitting indicates inadequacy of detoxification courses and ignoring the role of psychosocial variables as critical components of successful stopping protocols. This study relied on the Theory of Planned Behavior (TPB) to determine the factors affecting the substance abuse treatment continuity (SATC).

**Materials and Methods:** With a simple random sampling method, 195 in-treatment clients referred to Drug-stop clinics of Masal were selected to participate in this cross-sectional study. Data collection tools included demographic information questionnaire, TPB-related scales, substance abuse screening questionnaire (TCU) as well as treatment continuity survey form. Chi-Squared test, independent t-test, one-way ANOVA, Pearson correlation coefficient and path analysis were used to analyze the data.

**Results:** The strongest correlation coefficients were found between intention and constructs such as attitude, perceived behavioral control (PBC), and treatment continuity, as well as between treatment continuity and attitude ( $P < 0.05$ ). Moreover, attitude ( $\beta = 0.51, P < 0.05$ ) and PBC ( $\beta = 0.33, P < 0.05$ ) had the greatest impact on intention towards treatment continuation. Additionally, attitude and subjective norms significantly mediated the relationship between the history of substance abuse and intention to treatment continuation ( $P < 0.05$ ). Overall, TPB constructs described 52% and 31% of the variance of intention and treatment continuity, respectively ( $P < 0.05$ ).

**Conclusion:** The findings confirmed the effectiveness of TPB in determining the factors influencing the SATC. Thus, designing the TPB-based behavioral-cognitive interventions could be recommended to ameliorate substance abuse treatment continuity.

**Keywords:** Substance Abuse; Cognitive-behavioral Therapy; Attitude, Addiction Withdrawal; Intention

## Introduction

Substance abuse is considered as one of the major concerns of public health, which imposes heavy economic and social costs on governments' health care systems. The prevalence of substance abuse has faced a growing trend in Iran in recent years. Studies show that the outbreak of substance abuse in disparate provinces varies from 2.5% in Tehran to 17% in Hormozgan [1].

Substance abuse can lead to serious physical consequences (e.g. damage to the gastrointestinal tract, nervous and cardiovascular system, increased incidence of AIDS and hepatitis B), numerous social harms (e.g. antisocial behavior, deviance, and unemployment), disruption of family relationships (e.g. increasing divorce rates, violence against women, and child abuse), and ultimately reduced quality of life [2].

Substance abuse treatment has always been one of the troubling issues of health policymakers, which accounts for a substantial amount of health care funding. However, the high rate of substance abuse relapse as a major dilemma negatively affects treatment protocols, with remarkable increasing on the related costs. Studies argue that two-thirds of patients participating in treatment programs with the aim of quitting substance abuse would return to drug within 6 weeks. Moreover, 33% of heroin addicts with a three-year withdrawal history take it anew. Furthermore, the relapse rate in the first 6 months is estimated to be roughly 80% [3].

High rates of relapse after exposure to rehabilitation and detoxification courses could be firstly due to ineffectiveness of treatment protocols as neither detoxification nor medication would be sufficient for quitting lonely. Secondly, it is imperative for a successful substance abuse treatment protocol to consider simultaneously the role of inter-intrapersonal, psychosocial, and cultural factors in initiation and quitting of treatment. In fact, realistic and comprehensive understanding of the inter-intrapersonal variables affecting substance abuse will ensure the success of substance abuse treatment programs. Review studies have revealed that a set of individual factors such as lack of sufficient motivation, psychological tensions, insomnia, temptation, lack of awareness of coping strategies as well as environmental-social components comprising convenient access to drug, family conflicts, stressful situations and absence of social support could affect the relapse phenomenon [4]. Hence, the necessity of applying a multifaceted approach consisting of behavioral therapy and cognitive therapy together with drug therapy is fully emphasized in the treatment of addiction [5].

Some studies consider relapse as both an output and a deviation in the behavior change process, which is influenced by psychological variables such as self-efficacy, outcome expectancy, craving, motivation, coping strategies, emotional state, and perceived social support. Therefore, identifying the most important psychological variables affecting the successful substance abuse treatment is an indispensable step in designing comprehensive interventions to reduce relapse rate <sup>6</sup>. Besides, understanding the mechanism by which psychological factors such as subjective norms and control beliefs impact on the intention and behavioral consequences related to substance abuse is critical to designing these interventions [6,7].

Research has shown that the most efficient educational programs are based on theoretical approaches rooted in health education models and behavior change theories [7]. Theory of planned behavior (TPB) is one of the most well-known behavior change models, which its efficacy and effectiveness in predicting the factors affecting health behaviors has been frequently confirmed in previous studies [7, 8]. This theory provides a systematic framework for recognizing factors influencing individuals' decisions to engage in certain behaviors like smoking, substance abuse, or alcohol drinking [8]. As a psycho-social theory, TPB seeks to identify the reasons why a person performs a particular behavior. Intention, the consequence of the influence of attitudes, subjective norms, and perceived behavioral control (PBC) on each other, could directly affect the desired behavior, together with PBC. Attitude can be defined in terms of negative or positive appraisals of behavior and its outcomes. Subjective norms are also the degree to which a person imagines the intimacy or closeness of others to themselves, and in general, how much a society values the targeted behavior (How much one wants to follow such normative beliefs). Furthermore, PBC is described as perceived ease or difficulty of performing a targeted behavior. Attitude, subjective norms, and PBC are able to predict intention. Additionally, intention alone or along with PBC could anticipate behavior, while PBC could predict behavior singly [8]. TPB has been utilized in more than 1,000 independent studies and the findings of these studies strongly support of its effectiveness [8, 9].

TPB has also been applied in predicting behaviors associated with smoking, alcohol consumption, drug injection and substance abuse, with its constructs predicting a significant percentage of intention and behavior variance [10,17]. In this regard, in an investigation conducted on the predicting the SATC using a brief scale (9 items) related to TPB, it was revealed that attitudes, subjective norms, and PBC describe 61% of intention variance and 42% of the variance of treatment completion [11]. Moreover, Kelly et al. (2015) demonstrated that 21% of variance in the continued attendance at advanced therapeutic sessions after alcohol and drug detoxification was predicted by TPB constructs [17].

Given the high prevalence of substance abuse in Iran and its various physical, psychological and social consequences, as well as high percentage of relapses after substance abuse quitting, there is an urgent need to identify the factors affecting the continuation of treatment and prevention of relapse using behavior change models. In fact, recognizing such factors is an undeniable necessity before the designation of cognitive-behavioral preventive interventions aimed at reducing relapse. Hence, the current study aimed to apply TPB framework in order to determine the factors affecting the continuity of substance abuse treatment in the in-treatment clients referring to drug-stop clinics of Masal.

Accordingly, we developed the following hypotheses:

1. The variance in intention to complete substance abuse treatment could be described by clients' attitudes, subjective norms, and/or PBC.
2. More intention to continue treatment and more control could predict a higher percentage of variance for continued treatment.
3. TPB constructs mediate the relationship between the history of substance abuse and intention to treatment continuation.

## Methods

### Study Design

This research was a cross-sectional study conducted between July and January 2019. The study sample included all the addicted men referred to private Drug-stop clinics in Masal.

According to the total number of addicts covered by 3 private Drug-stop clinics ( $N = 400$ ), the error value ( $d = 0.05$ ), the relapse percentage was computed 0.30,  $Z = 1.96$ , and probability of drop out = 10%. Further, with the utility of Cochran's sample size calculation formula, 195 people were considered as the sample size.

Private Drug-stop clinics in Masal were selected as research units. Then, a list of participants was prepared based on the inclusion criteria, with 65 people selecting from each clinic using the convenient sampling method. The date of referral to the clinics had already been determined by a telephone call from the research team to the participants. The inclusion criteria were [1] voluntary and conscious participation; [2] at least 18 years old; [3] reading and writing literacy to understand the items of the questionnaires; [4] lack of substance abuse for at least 6 months (which was approved by a clinic's physician through regular tests); and [5] lack of mental disorders regarding DSM-IV criteria. Moreover, if the participant is at risk of severe medical or psychiatric complications, or a positive urine sample has been obtained from them in the last 6 months, they would be barred from attending the study.

After coordinating and obtaining approval from the management of Drug-stop clinics, the objectives of the research and its process were explained to participants at the beginning of the session. Further, issues such as the voluntary nature of participation in the research, the confidentiality of all responses, the importance and necessity of accurate and honest response to all items were explained to participants. After receiving written consent from the participants, a questionnaire was provided at the training site of the clinics. The questionnaires were completed in approximately 25 minutes. Meanwhile, one of the researchers was present at the time of answering questions in order to resolve possible ambiguities, ensure that all questions were responded, and appreciate the participants. The present study has been approved by the ethics committee of Qazvin University of Medical Sciences (IR.QUMS.REC.1397.266).

## Data gathering instruments

The data collection tool in this study included a self-report questionnaire comprising:

**Demographic items** containing age, level of education, economic level, marital status, individual condition regarding chronic diseases, substance type, duration of addiction, and period of withdrawal.

TPB constructs scales, designed according to Ajzan's questionnaire design guidance [18]. To this end, a semi-structured interview with 15 participants from the main sample, who were then deprived of partaking in the final study, was carried out. The basic items were designed based on the silent beliefs extracted in previous step, and their face validity and reliability were approved by an expert panel. The panel members consisted of a psychiatrist, senior psychiatrist, health education specialist, psychologist, and a general practitioner. With assessing the level of difficulty, amount of appropriateness, ambiguity of phrases and semantic incompatibility of words by the expert panel, and in continue, making minor changes by them, the face validity of the questionnaire was confirmed qualitatively. Subsequently, the impact score of each question was calculated to determine the face validity quantitatively. Hence, at first, a 2-part Likert scale was considered for each of the 21 items in the TPB-related scales such as "Completely disagree (1), disagree (2), no idea (3), agree (4) and completely agree (5)". Second, the scales were given to 10 participants in order to measure the quantitative validity. Finally, quantitative face validity was computed using the formula of the method effects item as follows: "Impact score = frequency (%) × Importance".

Furthermore, in order to evaluate the content validity qualitatively, 4 general practitioners and 2 psychiatrists working in the mentioned clinics were asked to appraise issues such as grammar compliance, use of appropriate words, importance of items, placement of items in their proper place, etc., via carefully surveying the questions related to TPB. After making corrections in TPB related scales, the content validity ratio (CVR) and content validity index (CVI) were applied to characterize the content validity quantitatively. Finally, the validated version of scales was completed in two weeks by 15 participants. The test-retest coefficient and Cronbach's  $\alpha$  coefficient were utilized to assess the reliability and the internal consistency of the scales, respectively. The final TPB-related scales were as follows:

**A)** The attitude scale included 8 items and assessed the individual's evaluation of the positive and negative consequences of SATC. Examples of items on this scale were: "Continuing the substance abuse treatment is very useful and valuable for me". Participants were asked to reply questions using a 5-point Likert scale, ranging from 1 "completely disagree" to 5 "completely agree". The range of answers was between 8 and 40, where a higher score indicated a more favorable attitude, and vice versa. Cronbach's  $\alpha$  coefficient ( $\alpha = 0.83$ ) and the test-retest coefficient ( $r = 0.77$ ) confirmed the internal consistency and reliability of the scale, respectively. Moreover, other indexes listed in Table 1 demonstrated the validity and reliability of this scale.

**B)** the scale of subjective norms was measured with 4 items and answered using a 5-point Likert scale, ranging from 1 "not at all correct" to 5 "completely correct". The scores ranged between 4 and 20 as follows: the higher score, the stronger social support, and vice versa. Subjective norms are associated with the approval or disapproval of a treatment continuation from the perspective of significant others. An example of the items used was as follows: "My family would like me to continue the process of substance

TPB constructs	Number of items	Range of scores	ICC*	Test retest reliability	$\alpha$ **	CVI	CVR
Attitude	8	8-40	0.67	0.77	0.83	0.79	0.85
Subjective norms	4	4-20	0.72	0.84	0.88	0.86	0.83
PBC	6	6-30	0.64	0.82	0.85	0.80	0.82
Intention	3	3-15	0.74	0.87	0.94	0.90	0.91

\*ICC: Intra-class correlation coefficient

\*\* Cronbach's  $\alpha$  coefficient

**Table 1:** Psychometric properties of TPB related constructs

abuse treatment". Internal consistency, reliability, and content validity of this scale were established in the pilot study ( $\alpha = 0.88$ ,  $r = 0.84$ ,  $CVR = 0.83$ ,  $CVI = 0.86$ ).

C) A 6-item perceived behavioral control (PBC) Scale: Participants were asked to answer the questions with a 5-point Likert scale ranging from 1 "I am not sure at all" to 5 "absolutely sure". The PBC refers to the perceived difficulty or ease of continuing substance abuse treatment despite existing mental and environmental barriers. An example of the scale items was: "It is up to me to continue the substance abuse treatment process". The scores ranged from 6 to 30, and higher scores represented stronger perceived control, and vice versa. The indicators listed in Table 1 display the validity and reliability of the scale.

D) Intention scale: this scale consisted of 3 items and was answered using a 5-point Likert scale ranging from 1 "Not at all correct" to 5 "Completely correct". Intention is defined by options such as intending, planning, and wanting. Sample item for this scale was as follows: "I plan to continue the substance abuse treatment process for the next 6 months". The range of answers was between 8 and 40 where higher score indicated stronger intention regarding targeted behavior, and vice versa. Internal consistency, reliability, and content validity of this scale were confirmed in the pilot study ( $\alpha = 0.94$ ,  $r = 0.87$ ,  $CVR = 0.91$ ,  $CVI = 0.90$ ).

### Substance Abuse Screening Questionnaire

The TCU (Texas Christian University scale), one of the international tools for measuring the status of smoking, alcohol and related substances and also factors, was used to assess the frequency and severity status of substance abuse. This 9-item questionnaire was composed of two dimensions of intensity and frequency of substance abuse, in which participants were queried about the following questions: "Have you taken a lot of drugs?" or "Have you used the drug for a longer period of time than you intended or planned?" The substance abuse severity score is the sum of the items that each participant chooses from the 9 possible answers (positive answers). The criterion for measuring the frequency of abuse is the combination of responses associated with the list of 13 drug types. Therefore, participants were questioned to report how many times they had used the drugs in the past 12 months. A 5-point Likert scale including never, only a few times, 1-3 times a month, 1-5 times a week, and almost every day was applied to response the questions. The validity and reliability of the questionnaire have been confirmed in previous studies [19].

### Substance abuse Treatment engagement scale (SATES)

This scale consisted of three dimensions comprising treatment participation, treatment satisfaction, and counselor rapport. Involvement in treatment was measured by 12 questions, which included an overall appraisal of participation (e.g. you always actively engage in treatment sessions) and measurement of accompaniment (e.g. you always attend therapy and counseling sessions that are scheduled for you). Treatment satisfaction also consisted of 6 items ranging from extensive assessments (e.g. you are satisfied with the counseling, treatment, and quitting program) to specific aspects of treatment (e.g. you can get a lot of individual counseling at a Drug-stop clinic). Moreover, counselor rapport dimension was made of 12 items that evaluated the addict's relationship with the counselor (e.g. you trust your counselor) and characteristics of the special counselor (e.g. your counselor has a regular, organized, and prepared schedule for each counseling session). The validity and reliability of the questionnaire have been confirmed in previous studies [10].

Finally, the data were entered into SPSS, Version 24.0, and their distribution normality was assessed by Kolmogorov-Smirnov test. Then, they were subjected to Chi-square test, independent and paired t-tests, one-way ANOVA and Pearson correlation coefficient. Path analysis using LISREL 8.80 was also utilized to appraise the complex relationships between latent variables and determine the most important factors affecting the SATC. In the first step, the default model was evaluated using confirmatory factor analysis. In the second step, direct and indirect relationships between substance abuse, attitudes, subjective norms, and PBC with intention were examined. Besides, the hypothesis whether attitude, subjective norms and PBC are mediated between variables of substance abuse and participation in treatment was examined. The fit of model was assessed using the following indexes: root mean square error of approximation (RMSEA), Goodness of fit index (GFI), Tucker-Lewis index (TLI), and Comparative fit index (CFI). Moreover, analyzes were performed using the maximum likelihood estimation method. Significance level was regarded less than 0.05 in the present study.

## Results

The mean age of the participants in this study was  $38.85 \pm 9.15$  years, and the mean duration of addiction was  $2.97 \pm 1.78$  years. Approximately, 60% of the participants had non-governmental jobs, and 68.7% had primary education. The death of family members or close friends as well as financial problems were experienced by 30.26% and 18.46% of participants in the past year, respectively. Other demographic characteristics are listed in Table 2.

Variables		Frequency	Percentage
Marriage status	Married	79	40.51
	Single	56	28.72
	Divorced	25	12.82
	Widow	35	17.95
Employment status	Unemployment	21	10.77
	Government employee	8	4.10
	Non-governmental job	115	58.97
	Farmer	49	25.13
	Others	2	1.03
Educational level	elementary	55	28.21
	Junior	79	40.51
	High school and diploma	57	29.23
	University degree	4	2.05
Economic situation	Excellent	7	3.59
	Good	28	14.36
	Mediums	103	52.82
	Weak	57	29.23
Stressful events in the past year	Economic bankruptcy	36	18.46
	Family	25	12.82
	Death	59	30.26
	Unemployment	11	5.64
	Migration	2	1.03
	Crime and imprisonment	6	3.07
	Sever illness	13	6.67
	No special event	43	22.05
Type of drug	Opium	133	68.21
	Heroin	47	24.10
	Crack	10	5.12
	Ecstasy	3	1.54
	Others	2	1.03
Number of substance abuse treatment	0	125	64.10
	1	33	16.92
	2	27	13.85
	3 and more	10	5.13

Variables		Frequency	Percentage
cost of daily drug use			
(Tomans)*	5000-10000	67	34.36
	10000-20000	43	22.05
	20000-30000	35	17.95
	30000-40000	28	14.36
	40000-100000	19	9.74
	More than 100000	3	1.54
History of substance abuse by family members	Yes	59	30.26
	No	136	69.74
History of substance abuse by close friends	Yes	73	34.77
	No	122	62.56

\*Tomans: Iranian currency

**Table 2:** Demographic characteristics of clients of Drug-stop clinics participating in the study (n=195)

The mean of TPB related constructs, treatment completion, and the score of substance abuse screening are given in Table 3. Given the expected score range of the attitude scale, it can be mentioned that the attitude of the participants was relatively favorable. Subjective norms and PBC were also partly desirable. Analysis of the substance abuse status indicated severe history of substance abuse and high prevalence amongst participants. Overall, evaluating the dimensions of SATC scale revealed the optimal state of treatment satisfaction, appropriate participation, and good relative rapport.

Variables	Subscale	Mean	Standard deviation
Attitude	-	32.14	7.42
Subjective norms	-	14.65	4.50
PBC	-	20.73	6.38
Intention	-	10.42	3.64
Substance abuse history	Substance abuse severity	18.15	4.36
	Substance abuse frequency	14.33	2.74
	Total score	23.27	6.68
Treatment completion	Treatment satisfaction	38.56	6.11
	Treatment participation	39.22	6.72
	Counselor rapport	38.20	5.33
	Total score	39.15	6.10

**Table 3:** The mean and standard deviation of TPB related constructs, treatment completion and substance abuse history

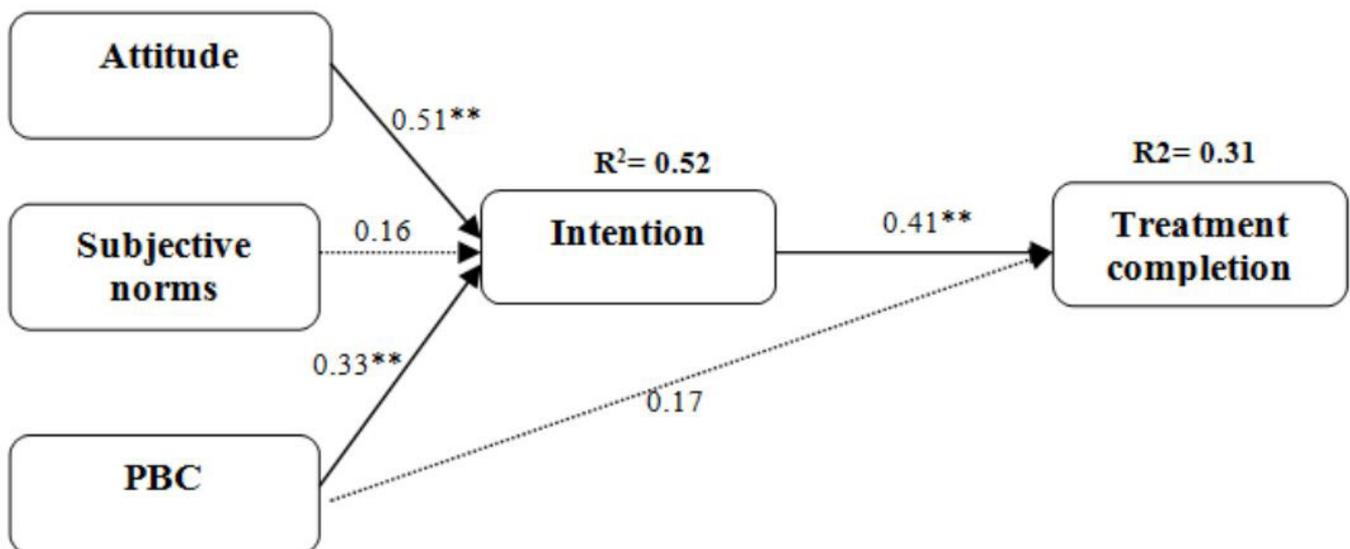
Table 4 shows the correlation coefficients between TPB related constructs, history of substance abuse and the treatment completion. The strongest correlation coefficients were observed between attitude and intention ( $r = 0.55, P < 0.01$ ), PBC and intention ( $r = 0.47, P > 0.05$ ), participation and intention ( $r = 0.45, P < 0.05$ ), and treatment completion and attitude ( $r = 0.42, P < 0.01$ ). No significant correlation was found between history of substance abuse and subjective norms. In addition, direct and moderate correlation coefficients were reported between all variables and treatment completion ( $P < 0.05$ ). However, the correlation coefficient between treatment completion and history of substance abuse was negative ( $r = -0.21, P < 0.01$ ).

Variables	1	2	3	4	5	6
1. attitude	1					
2. subjective norms	0.38*	1				
3. perceived behavior control	0.34**	0.27**	1			
4. intention	0.55*	0.17*	0.47**	1		
5. history of substance abuse	0.27*	0.11	0.18*	0.35**	1	
6. treatment completion	0.42**	0.36*	0.29*	0.45**	- 0.21*	1

\*\*P<0.05, \*P<0.01

**Table 4:** Correlation coefficients between TPB related constructs, history of substance abuse and treatment completion

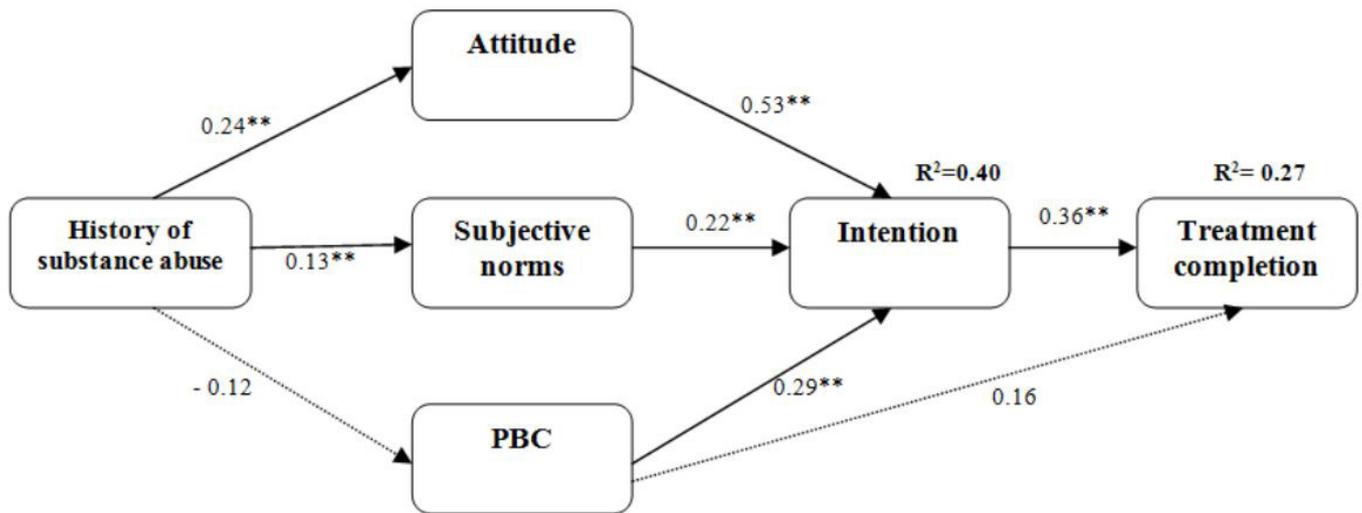
Figure 1 represents the results relevant to the path analysis of application of TPB to determine the factors affecting the SATC. With regard to the TPB assumptions and the determination coefficient ( $R^2 = 0.52$ ), it can be concluded that the results are consistent with the TPB assumptions. Amongst the TPB related constructs, attitude ( $\beta=0.51$ ,  $P<0.05$ ) and PBC ( $\beta=0.33$ ,  $P<0.05$ ) had the major impact on intention to continue treatment process while the path coefficient between subjective norms and intention was not significant. Moreover, higher intention was associated with a greater chance of completing treatment for substance abuse ( $\beta=0.41$ ,  $P<0.05$ ). Path coefficient between PBC and intention was also significant ( $\beta=0.33$ ,  $P<0.05$ ). However, PBC had no direct and significant effect on treatment completion. Intention and PBC altogether predicted 31% of treatment completion variance.



(RMSEA= 0.049, GFI=0.97, TLI=1.01, CFI=0.96,  $P=0.36$ ,  $\chi^2(df=7, n=195)=3.14$ )

**Figure 1:** Path analysis based on the main model and predicting the intention and treatment completion in clients referring to Drug-stop clinics

The findings in Figure 2 show the pathways associated with the mediating role of TPB related constructs between history of substance abuse and intention. Mediating role was assessed based on baron and Kenny's criteria, as well as Sobel statistical test. According to findings, attitude could be a good mediator of relationship between substance abuse and intention (Sobel = 7.43,  $P<0.05$ ). Moreover, subjective norms properly mediate the link between history of substance abuse and intention (Sobel = 3.29,  $P<0.05$ ). History of substance abuse could not significantly predict PBC. Therefore, PBC did not mediate the relationship between history of substance abuse and intention as well as the relationship between history of substance abuse and treatment completion. The most powerful coefficients affecting intention and treatment completion were attitude ( $\beta = 0.53$ ,  $P<0.05$ ) and intention ( $\beta = 0.36$ ,  $P<0.05$ ), respectively. Finally, 40% of the intention variance was described by TPB related constructs and history of substance abuse, with intention and PBC accounting for a total of 27% of treatment completion variance.



(RMSEA=0.051, GFI=0.98, TLI=0.97, CFI=0.95, P=0.21,  $\chi^2(df=7, n=195)=5.36$ )

**Figure 2:** Path analysis of the mediating role of TPB theory structures between substance abuse and the continuation of the withdrawal process

## Discussion

The results of the present study support the utility of TPB in order to understand the factors impressing the SATC. The scale of this study was designed based on Ajzan’s recommendations for evaluating TPB related constructs, which according to the results of previous studies, these structures are significantly associated with the readiness for substance abuse treatment and other clinical criteria related to drug withdrawal [11,18]. The level of predictive variance relevant to treatment completion is also largely consistent with previous studies [10-17]. In addition, the results of current study emphasize the role of attitude and PBC in predicting the continuity of substance abuse treatment as well as the importance of paying attention to the mediating role of TPB related constructs in explaining the relationship between history of substance abuse and intention to continue treatment process.

The first important finding in our study was the correlation between TPB related constructs and intention as well as the correlation between these constructs and the treatment completion, which is consistent with those of previous studies [12,15,17,20]. In Jones et al. (2007) study, significant correlation between intention and PBC ( $r = 0.89$ ), attitude ( $r = 0.80$ ) and subjective norms ( $r = 0.77$ ) was reported [16]. Findings of the study by Jalilian et al. (2020) demonstrated that attitudes toward marijuana abuse, subjective norms, environmental restrictions, and behavioral intentions have a positive correlation with each other and high weekly marijuana abuse. In contrast, high self-efficacy and problem-solving skills are linked to low weekly marijuana abuse [20]. David et al. (2018) also emphasized that there were a significant correlations between the history of smoking, the perceived benefits of nicotine replacement therapy (NRT), and the perceived effectiveness of NRT with intention to use this method in order to quit smoking in clients of smoking cessation clinics [12]. Moreover, in an investigation aimed at assessing the connection between marijuana abuse, parent’s knowledge level, parents’ warmth and constructs of extended TPB, it was revealed that parental knowledge inversely predict a favorable attitude toward marijuana abuse, subjective norms, and PBC, with parents’ warmth predicting a favorable attitude toward Marijuana abuse, subjective norms, behavioral intention, and marijuana abuse over the next year (Lac et al., 2009) [15].

In accordance with the expectations and main assumptions of the TPB, the correlation between TPB related constructs with each other and also with the completion of substance abuse treatment was significant [21,22]. In other words, a client’s intention to continue substance abuse treatment process is the outcome of interaction of psychological variables associated with TPB including attitude (evaluation of the positive and negative consequences of treatment completion), subjective norms (the individual’s

perception of approval and support of significant others in connection with the continuation of the substance abuse treatment process) and PBC (comprehending the perceived difficulty and ease related to SATC and confidence in one's ability to overcome individual and environmental barriers related to continued treatment) [9].

The relationship between attitude and intention to continue substance abuse treatment process ( $\beta = 0.51$ ) and also the mediating role between the history of substance abuse and intention to continue treatment process was another finding of this study. These findings were in line with those of Zomoreh et al. (2014) who demonstrated that attitude affects the intention to complete the substance abuse treatment process, Booth et al. (2014) who indicated that constructive subscales of beliefs and attitudes such as beliefs related to the effectiveness of treatment, negative expectations about cocaine, personal experiences of being excluded from society, the need for secrecy and psychological readiness for treatment are independently linked to need to treat cocaine abuse, and Tavakoli Ghouchani et al. (2015) who displayed that client's attitudes are effective in initiating and continuing the substance abuse treatment process [11,23,13]. In fact, beliefs such as getting tired of substance abuse-related problems, feeling disgusted with substance abuse and a desire to make up for past mistakes associated with return to previous credit with serious changes in mindset and attitude- lead the client to the process of substance abuse treatment [13]. The results of Mohammadnia and Mashhadi (2014) study also emphasized on the negative relationship between the meaning of life and all three cognitive, emotional and behavioral dimensions of attitudes towards substance abuse. Regarding to such study, substance abuse treatment programs should focus on changing attitudes, reducing psychological tensions caused by a sense of meaninglessness, goals setting, and providing opportunities to touch enjoyable daily experiences [24]. Finally, if chain incentives and ongoing feedback were involved as fundamental components in counseling protocols of Drug-stop clinics, less motivated clients could have a positive attitude towards substance treatment and it will probably reduce their withdrawal from the treatment process.

Another significant result of the present study was the relationship between PBC and intention to treatment completion in clients referred to Drug-stop clinics. The findings of Zomoreh et al. (2014), Kelly et al. (2018), Booth et al. (2014) and Bashirian et al. (2011) study are in accordance with ours in this regard [11,17,23,25]. Furthermore, Kadden and Litt (2011) highlighted that self-efficacy is a key predictor of therapeutic outcomes, and in some cases, self-efficacy predicts the amount of alcohol or substance abuse. It was also reported that self-efficacy, as an important predictor of consequences or a mediator of therapeutic effects, is strongly associated with alcohol consumption and quitting, as well as participation in treatment programs. Finally, not only improve effective substance abuse related therapies a person's ability to maintain awareness in the face of high-risk situations but also it help them meliorate their abilities by recognizing their capacities [26]. Low self-efficacy along with an influential personality is a major obstacle to commencing and continuing substance abuse treatment process. Therefore, it is required to emphasize the need for retraining of life skills in order to enhance the capacity of clients to respond decisively to unwanted social influence against basic preventive measures such as assessing the level of self-efficacy of clients and identifying stressful situations relevant to relapse.

The next important outcome of our research was the lack of direct effect of subjective norms on intention to continue substance abuse treatment process in the default model. Nevertheless, path analysis in the second model revealed that subjective norms were the mediating variable between the intention and history of substance abuse. The findings of previous studies differ from results of ours in terms of subjective norms impact on intention [11,17,23,25]. Perhaps, such difference could be attributed to the following reasons: first, many previous studies have used a items to measure subjective norms for the continuity of substance abuse treatment while 4 item scale has been used in the present study. Therefore, the difference in results may be due to different tools for measuring subjective norms.

## Limitation

The present research was a cross-sectional study that, due to its nature, included some limitations as follows:

First, as with all health behaviors, the factors influencing completion of the substance abuse treatment seemed very complicated, influenced by the disease's novelty and diversity of cultural, social, and personality factors. Therefore, it is not possible to measure all the variables affecting the SATC through the TPB. Adding psychological constructs influencing SATC or using a combination of constructs influencing that behavior instead of focusing on a particular theory may lead to better predicting behavior.

Second, Study participants were selected only from Drug-stop clinics of Masal city due to research limitations and, therefore, could not represent the central community. Selecting samples from different geographical areas with various cultural, social, and economic characteristics can significantly increase the results' generalizability. Third, data were collected using a self-administered questionnaire (retrospective self-reports of participants) and without external verifications. Accordingly, the results may be affected by the recall and social desirability bias. Finally, this study was a cross-sectional survey and could not detect cause-and-effect relationships. Therefore, it is impossible to correctly judge preventive behaviors' stability over time based on the research results.

## **Conclusion**

The present study results supported the application of the theory of planned behavior to understand the factors affecting the continuation of substance abuse treatment. Attitude perceived behavioral control, and subjective norms were significant determinants of intention to complete the substance abuse treatment and describing 40% of the variance of intention. Also, 27% of the variance of the SATC was explained by TPB constructs. Due to the high rate of relapse in patients referred to Drug-stop clinics, psychiatrists and health professionals should pay special attention to the psychological variables affecting relapse prevention and design cognitive-behavioral interventions focusing on the TPB framework to increase the probability of successful treatment.

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## **Conflict of interest**

None declared.

## **Availability of data and material**

The data underlying this article will be shared on a reasonable request to the corresponding author.

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