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Original Article

Design and Validation of an Addiction Potential Questionnaire for Iranian Children Aged 12 to 18 Using Exploratory Factor Analysis

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Abstract

Background: Drug addiction is one of the social and health problems worldwide. Children are the most vulnerable social stratum in the problem of addiction. The study aimed to design a questionnaire for children's addiction tendencies and study the psychometric characteristics of Iranian children.

Methods: It was a cross-sectional study that was conducted in 2023 among 400 students of Shiraz city (Iran), selected using multi-stage sampling (stratified cluster simple random). Inclusion criteria were students, residents of Shiraz city, studying in the first or second year of high school, and exclusion criteria were non-cooperation and unwillingness to participate in the study. Validity was determined through face, content, and construct validity, with exploratory factor analysis (EFA), and reliability was assessed using Cronbach's alpha and the intraclass correlation coefficient (ICC). Moreover, SPSS 26 was applied for further analysis.

Findings: The average age of the participants was 15.39±1.94. The face and content validity of the scale was quantitatively and qualitatively assessed and confirmed, and the construct validity was demonstrated through EFA. The scale consists of 30 items with four factors that explain 40% of the total extracted variance. Cronbach's alpha and the ICC of the factors indicated strong to excellent reliability of the scale.

Conclusion: The results showed that the current questionnaire has good validity and reliability; thus, it can be applied with confidence to study the addiction tendency and screening of Iranian children aged 12 to 18 years.

Keywords: Addiction potential questionnaire, Validation studies, Child, Factor analysis, Iran

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Introduction

Today, the drug crisis is one of the major global crises, leading to the most significant contemporary social problem, which is addiction.[1] Addiction, however, is a behavioral-psychological syndrome characterized by a strong desire for drugs, constant use, and a strong urge to use again after stopping drug use.[2-5] Accordingly, the United Nations (UN) has defined addiction as acute or chronic poisoning that is harmful to a person or society and is caused by using natural or industrial drugs.[2,6-8] Iran's unique position in the Golden Crescent region has significantly contributed to the increased consumption of these substances.[9,10] According to United Nations statistics, about 90% of drug addicts are detected in the Golden Crescent region.[10] Furthermore, addiction leads to the disintegration of individual personality and family structures and is an effective factor in the destruction of social life and society as a whole. Therefore, the most vulnerable social stratum in the occurrence of the problem of addiction is children who are either addicted themselves or live in a family where one of the adult members is an addict.[11,12] The lowering of the age of addiction in the country is a warning sign that highlights the vulnerability of the young Iranian society to drugs.[13-16] According to the report (2022) of the United Nations Office on Drugs and Crime (UNODC), approximately 284 million individuals aged 15 to 64 around the world used drugs in 2020, which represents a 26% increase over the last decade.[17]

According to experts, the instrumentalization of the content related to each instrument should be directly from the individuals who are the reference for the instrument.[18] To examine the available instruments in the field of addiction tendency among children aged 12-18 years, an extensive review of texts was conducted in databases such as PubMed, Magiran, Google Scholar, and SID. Additionally, researchers[19] conducted systematic research. However, it was found that despite the high priority of children's addiction, none of the studies have used a single and specific instrument for the target group.[20-61]

Among the major limitations of the existing instruments, the following is likely to be mentioned: failure to examine the sample size according to scientific principles,[24,32,35,40,42,44,49,52,62] not belonging to a specific group (children, imprisoned women, addicted men, students, etc)[22,27,33,34,41,46,55,60,63,64] failure to report validation indicators in several studies[23,26,29,32,33,41,43-45,47,48,51,54,58,61,62]; the uncertainty of the number of questions in some studies[32,33,48,58,61,62]; failure to updating some instruments[1,23,27,29,31,33-36,38,41-47,49,51,52,54,56,58,61,62]; and the lack of a standard questionnaire that has examined children's tendency toward addiction.[32,37,43,51,58,61] However, some instruments are not valid and merely consist of lists used to test addiction tendency.[26,51]

Considering the significance of reducing the unwanted consequences of children's addiction, the need to design and psychometrically assess a standard questionnaire for children's addiction tendencies in Iran has emerged. Accordingly, several shortcomings were observed in previous research, highlighting the need to improve research methods and use more up-to-date and appropriate instruments. Furthermore, the need for designing a psychometric instrument for children's addiction tendency is discussed in light of the needs and priorities of society, as indicated by the notification from the "Anti-Narcotics Headquarters"[65] regarding children's addiction and the special cultural and social context of the country. Therefore, the outcome of the research is a standard questionnaire that may be applied to measure the degree of tendency toward addiction in children, to screen and identify children at risk of addiction, and to refer them to the authorities if necessary.

Materials and Methods

This cross-sectional study was conducted in 2023 and consisted of two phases. In the first phase, the preliminary stages of questionnaire questions were compiled. Initially, by reviewing texts in Persian and Latin databases and scientific sites such as PubMed, Magiran, Google Scholar, SID, and Qolbank,[66] highlighted keywords—namely, "Addiction Tendency Questionnaire," "Tendency Questionnaire on Iranian Population," and "Validation of Addiction Questionnaire"—were searched using Medical Subject Headings (MeSH) and by combining synonyms of words with the condition operators "AND," "OR," and "NOT.". Following the collection of articles and questionnaires, conducting systematic research,[19] and addressing the mentioned limitations, the initial collection of questions was developed according to the opinion of experts, the review of texts, the supervisor's input, and the review of the questionnaire concerning these concepts, resulting in the formation of a pool of items. Subsequently, the relevant questions were designed and written. After finalizing the questions, face validity was measured quantitatively by 32 participants and qualitatively by 32 participants and 15 experts. Next, content validity was assessed qualitatively and quantitatively by 15 experts from across the country, of whom 10 individuals had the rank of professor and 9 had expertise in instrument development from different fields: epidemiology, clinical psychology, psychiatry, sociology, social work, health education, nursing education. Following the design of the questionnaire and the measurement of face validity, reliability was evaluated through a pilot study using Cronbach's alpha test among the participants.

In the second phase, after the corrections were made by the participants and experts, the secondary formulation of the questionnaire was done, and then the validity of the structure was evaluated using the maximum likelihood of the exploratory analysis factor and varimax rotation. At this point, the final questionnaire (containing 30 questions) was given to the participants, and the secondary collection of questions was performed accordingly. According to scientific principles, the sample size must consist of at least 5 and a maximum of 10 participants for each item[66]; therefore, after determining the number of questions (final 30 questions), considering the possible loss of participants, the sample size was 400 individuals. Moreover, the study population consisted of children aged 12 to 18 years in Shiraz city, and the research sample included students aged 12 to 18 years in schools in Shiraz city, who were selected using a multi-stage sampling method (stratified-cluster-simple random). Accordingly, Shiraz was first divided into 4 classes based on the 4 education districts. Based on the total required volume, the sample size in each class was calculated, and then the required number of schools was selected randomly within each floor as part of the cluster sampling from the list of schools in the last class. Subsequently, in each school, the required number of students was selected using simple random sampling. Upon establishing the validity, reliability was evaluated using Cronbach's alpha and the intraclass correlation coefficient (ICC).

The variables of the research included age, gender, education, tendency to addiction, course of study, level of education, and educational district. The inclusion criteria were students, residents of Shiraz, studying in the first or second year of high school, and students who were willing to cooperate in the study. The exclusion criteria

were non-cooperation and unwillingness to participate in the study. To keep the information confidential, no names or addresses were recorded on the questionnaires, and each questionnaire was assigned a unique code to avoid mistakes in data collection and analysis.

Statistical methods for analysis included descriptive and analytical indices, the Pearson correlation coefficient, exploratory factor analysis (EFA), Cronbach's alpha, and ICC. Moreover, SPSS 26 was utilized for data analysis.

Results

Descriptive findings

In this study, 400 students participated, with an average age of 15.39 ± 1.94 years. Moreover, the minimum age of the students was 12 years and the maximum age was 18 years. Fifty percent (n = 200) of the participants were boys. Besides, the number of students in each district was 100 cases (25%), and 50% (n = 200) of the students were studying in the first year of high school (Table 1).

Items generation

First, the texts were tested in Persian and Latin databases as well as scientific sites. After collecting the articles and questionnaires, we created a pool of addiction tendency questions (628 items). Next, semantic items were discarded through theory and hypotheses, review of texts, review of existing questionnaires, and input from a panel of experts; this included removing repeated, unrelated, similar, ambiguous, unclear, and negative sentences. Upon compiling and designing, 30 final items were approved.

Face validity

Quantitative face validity results, which were performed by calculating the item impact index among 32 participants (students), showed that all items had an acceptable score (above 1.5) in terms of "significance".[67-77] Furthermore, to qualitatively measure face validity, the items were given to 15 experts and 32 participants, and the level of the questions was tested in terms of "difficulty of expressions", "appropriateness", "ambiguity", and "insufficiency". Consequently, 6 items required clarification, and examples were provided based on the responses of the participants and experts. Following the measurement of face validity, the reliability of Solat was assessed as a pilot study through Cronbach's alpha in 32 participants, which was found to be acceptable (0.87).

Table 1. Individual characteristics of the participants

Quantitative variable	Mean ± SD	Min	Max
Age, year	15.39 ± 1.94	12	18
Qualitative variables	**Category**	**Frequency (n = 400)**	**Percent**
Gender	Female	200	50
	Male	200	50
Education district	1	100	25
	2	100	25
	3	100	25
	4	100	25
Study course	1st	200	50
	2nd	200	50
Father's education	High school	116	29
	Diploma	132	33
	A university's degree	152	38
Mother's education	High school	104	26
	Diploma	158	39.5
	A university's degree	138	34.5

Content validity

For qualitative content validity, the items were given to 15 experts to test their opinions on the questionnaire terms in terms of *grammar*, *wording*, *item allocation,* and *scaling*. However, the results showed that 27 items needed to be modified, 10 items were revised, 4 items were merged, 6 items were replaced with more appropriate words, and 7 items were changed from a yes/no format to a 5-option Likert scale. Additionally, the comparative content validity ratio (CVR) and the content validity index (CVI) were employed to quantitatively measure the validity of the content. In calculating the CVR, experts were asked to test each item based on a three-point scale of "necessary", "useful but not necessary", and "not necessary".

Ultimately, the judgment about the CVR was based on the Lawshe Table. As the table shows, the acceptable CVR value for 15 evaluators was 0.49. The results indicated that all items met the acceptable threshold (above 0.49). Furthermore, to assess the CVI, the Waltz and Basel content validity index was applied. The experts evaluated the questions based on the following criteria: "Relevance," "Clarity," and "Simplicity." According to a 4-point Likert scale, each item was rated as "relevant", "relevant to some extent", "relevant", and "completely relevant". The acceptable CVI, however, is 0.79.[67-69,71-75,77-80] The results showed that all items had acceptable CVI values (higher than 0.79).

Construct validity

Construct validity was evaluated using maximum likelihood factor analysis and varimax rotation. To perform EFA, the following assumptions were first examined: sample size (5 to 10 subjects per item), data

Table 2. The result of the KMO statistic and Bartlett's sphericity test

Indicators	Value
KMO statistic and Bartlett's sphericity test	0.88
Chi-square test	2846.484
Degrees of freedom	435
P value	< 0.001

normality, outliers, missing data, correlation between items (min. 0.3, and max. 0.9), collinearity, factorability, and sampling adequacy.[31,67-73,75,76,79,81-83], all of which were satisfied. Table 2 displays the factorability and sampling adequacy. Moreover, the Keyser-Meyer-Olkin (KMO) statistic was 0.88. Furthermore, as Cereny and Kaiser stated, the value of KMO should be more than 0.6 to perform EFA.[31,67-76,79,83] The results showed that the questions were actionable. Additionally, Bartlett's sphericity test was significant ($P<0.001$),[31,67-73,75-79,81-83] which indicates that the participants' responses for factor analysis were sufficient to extract and explore the factors.

Table 3. CVI, CVR, and total variance explained of the Children's addiction tendency scale

Factor	Item	Item Description	CVI	CVR	Extracted Factors			
					Factor loading	Communality	% of Variance	Eigenvalues
1st Factor: Physical & mental problems	12	Do you feel bored, sad, or upset for no reason?	0.86	0.88	0.67	0.54	22.25	6.68
	19	How many negative thoughts come to your mind that cannot be recounted?	1	1	0.64	0.47		
	6	Have you ever had sleep problems? (Irregularity in waking up and sleeping)	0.73	0.93	0.62	0.44		
	18	How often have you experienced chronic (long-term) fatigue, digestive problems, or bone and muscle pains in your life?	0.86	0.86	0.61	0.44		
	23	Have you ever felt like hurting yourself or hurting others?	1	1	0.52	0.42		
	24	Have you ever thought of going to a doctor or a psychologist to relieve physical pain or mental-psychological problems?	0.86	0.86	0.42	0.25		
	11	Do you become irrational or aggressive when angry?	0.73	1	0.47	0.40		
	25	Have you ever decided to live independently from your family? (Living independently from parents and family)	0.86	1	0.49	0.43		
2nd Factor: Family-personality	9	Have you ever argued/disputed with your family members?	0.73	0.93	0.60	0.52	6.02	1.81
	10	Have you ever been disliked or rejected by people around you?	0.86	0.86	0.62	0.51		
	20	How much do parents trust you?	0.86	0.93	0.50	0.43		
	21	Are your parents strict or scolding you?	0.86	0.86	0.50	0.41		
	27	How often has divorce occurred in your family or close relatives?	1	1	0.49	0.35		
	28	Is anyone in your family (father, mother, brother, sister) an addict?	1	1	0.60	0.38		
3rd Factor: Social	16	To what extent can you resist your inappropriate desires and desires (e.g., the desire to party or have fun during exams, etc.)?	1	1	0.54	0.33	5.64	1.70
	17	To what extent are you influenced by the suggestions of your friends and family?	1	1	0.35	0.25		
	7	How much "power to say no" do you have in front of suggestions from friends and people around you?	1	0.93	0.34	0.25		
	15	How interested are you in doing things that require long-term persistence and concentration, such as studying for a long time or doing difficult homework?	0.86	0.93	0.61	0.45		
	22	Have you ever had to take money from your parents without their permission?	0.86	0.93	0.47	0.32		
	1	How much do you enjoy your life?	0.86	0.86	0.54	0.49		
	2	How many sports activities do you do daily?	0.86	0.86	0.63	0.41		
	3	In your free time, how often do you engage in social activities (e.g. reading books, scientific olympiads, sports activities, singing group, theater, etc.)?	0.86	0.93	0.62	0.40		
	4	How much do you ask God for help with the problems in your life?	0.73	0.86	0.39	0.20		
	29	Are there any addicts among your relatives?	0.86	0.93	0.52	0.36		
	30	Is anyone among your friends addicted?	1	1	0.49	0.43		
4th Factor: Other items	13	How much do you believe in this sentence: "Anything enjoyable should be experienced, even if it involves risks"?	1	1	0.36	0.25	5.12	1.45
	14	Do you enjoy doing exciting things with danger or taking risks (such as violent martial arts, dangerous motorcycle riding, driving at high speed, jumping from a great height, etc.)?	0.86	0.93	0.43	0.27		
	26	Have you ever failed or collapsed in your studies?	0.86	1	0.47	0.45		
	5	Have you ever experienced poverty (impoverished) in your life?	0.73	0.93	0.39	0.37		
	8	To what extent do you adhere to the norms and values of the society (e.g., respect for others, respecting the rights of others, the way you dress, cleanliness of the environment, etc.)?	0.73	0.93	0.41	0.20		

Table 3 shows the CVI and CVR indices, factor loadings, communality, the percentage of variance, the eigenvalues, and the total variance explained of the instrument with the maximum likelihood method and varimax rotation among 30 items. Consequently, four factors—namely, "physical-mental problems," "family-personality," "social factors," and "other items"—were extracted, with eigenvalues of 6.68, 1.81, 1.70, and 1.45, respectively. Moreover, the first factor accounted for 22.25% of the variance, the second for 6.02%, the third for 5.64%, and the fourth for 5.12%. The percentage of the total variance explained was 40% (Table 3). Furthermore, according to the scree plot, four factors have eigenvalues higher than one (Figure 1).

Reliability

Table 4 shows that the internal consistency of the entire questionnaire was 0.87, which indicates a strong correlation of the entire instrument. Furthermore, the internal consistency of each factor ranged from 0.46 to 0.80, which indicates a moderate to strong correlation between each factor and the corresponding items. To calculate the ICC, the questionnaire was given to 150 participants, and two weeks later, the same questionnaire was completed again by the same participants. The intraclass correlation for the whole instrument was 0.88, indicating good to excellent agreement between domains and items. Additionally, the ICC between each factor and the corresponding items ranged from 0.69 to 0.84, indicating a moderate to strong ICC between each factor and its items.

Discussion

The purpose of this study was to compile and validate the Addiction Tendency Questionnaire for Iranian children aged 12 to 18. According to the results, all items had an acceptable impact factor index (above 1.5) in terms of quantitative face validity. Furthermore, the qualitative formal validity index was modified based on the proposed suggestions. Subsequently, qualitative content validity was evaluated by a group of experts. The quantitative content validity reported in CVR and CVI was above 0.49 and 0.79, respectively. Additionally, the results showed that the sampling adequacy index was 0.88 and that Bartlett's test was significant ($P<0.001$). Moreover, four factors were identified through the Children's Addiction Tendency Scale, and the percentage of the total explained variance was 40%. In terms of reliability, Cronbach's alpha value and ICC for the entire designed instrument were 0.87 and 0.88, respectively, which indicated moderate to strong reliability of the measuring instrument.

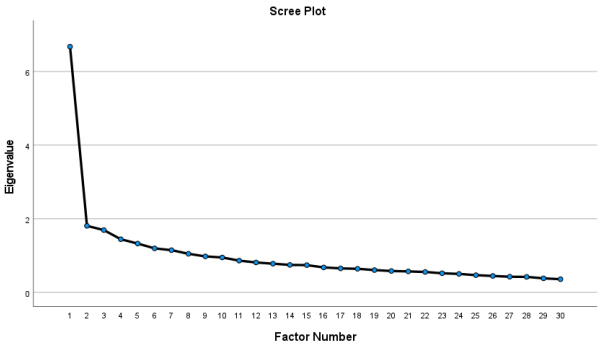

Figure 1. Scree plot

In a study titled "Life Skills Training Impact on Self-Mastery and Attitude Towards Drug Use in High School Students" by Habibi-Kaleybar et al, a sample size of 30 girls in Tabriz was examined, using the questionnaire developed by Wade and Butcher in 1990 for validation. However, while Cronbach's alpha was utilized to measure reliability, they did not mention any validity measurements. The results showed that the Addiction Tendency Questionnaire does not possess construct validity. The open-ended test criterion was 0.60, which is likely to separate non-addicted and addicted teenagers from each other. It also demonstrates a high Cronbach's alpha.[62] The report of Cronbach's alpha may not be optimal or satisfactory, and its value must be highlighted accordingly. In the present study, however, the reliability index of the measurement was reported as 0.87. Furthermore, the open-ended test criterion reported (0.6) does not have an optimal influence to confirm the reliability, although our results showed that the ICC holds a value of 0.88. Correspondingly, both quantitative and qualitative measurements of formal and content validity were performed. Regarding construct validity, four factors were extracted through EFA; all items exhibited high factor loadings, and the extracted factors accounted for 40% of the items' variance. In the present study, unlike the previous study, the instrument was validated for both genders.

Accordingly, Azarmehr and Ahmadi conducted a study on the tendency of youngsters to become addicted, involving male and female students in East Azerbaijan (2017). They surveyed 150 individuals using a questionnaire derived

Table 4. Internal consistency (Cronbach's alpha coefficient) and intraclass correlation of test-retest scores of subscales and the questionnaire

Factor	Sub-scale	Items (number of items)	Cronbach's alpha	ICC	CI (ICC)	*P* value
1	Physical & mental problems	8 (12,19,6,18,23,24,11,25)	0.80	0.84	0.78 - 0.88	<0.001
2	Family	6 (9,10,20,21,27,28)	0.70	0.72	0.61 - 0.79	<0.001
3	Environmental-social-spiritual	11(16,17,7,15,22,1,3,2,4,29,30)	0.61	0.69	0.58 - 0.78	<0.001
4	Other items	5 (26,5,8,13,14)	0.46	0.74	0.64 - 0.81	<0.001
Total		30	0.87	0.88	0.83 - 0.91	<0.001

from the work of Narimani et al,[45] which contained 41 questions. Moreover, the results showed that 49% of the total variance in addiction tendency could be explained by the factors identified.[24] The total amount of explained variance in our research was calculated as 40%, indicating that the studies are aligned with each other. The sample size in the aforementioned study was considered to be n = 150; however, in our research, we evaluated 400 cases. According to experts, however, it is beneficial to include 5 to 10 subjects in the study for each item,[31,67-76,79,80] which implies that the minimum sample size for the mentioned study should be n = 200. In the present study, due to the appropriate sample size (n = 400), suitable factor loadings were achieved.

In their study, Naderiasar et al studied the effectiveness of group training in spiritual intelligence on the degree of addiction tendency among Qazvin high school students. Accordingly, 53 students were included in the study selected by the multi-stage sampling. In this study, Cronbach's alpha was reported as 0.82. However, they did not mention the validity of the questionnaire. Another point is the age group of the studied students, which was unclear in the study. Moreover, it is expected that a sample size of at least n = 80 should be included in the study. According to experts, a sample size of fewer than 100 individuals yields weak and unreliable results.[31,67-76,79,80] In the present study, despite the similarity in Cronbach's alpha (0.87), the intraclass correlation index (0.88) was utilized to report reliability, contributing to the robustness of the work. Additionally, the age group was 12 to 18 years, and the sample size was 400 cases. Another point is the reliability of the questionnaire items, which were not mentioned in the study. While the authors of the present study, in contrast to the study by Naderiasar et al, reported the Cronbach's alpha and the overall ICC of the questionnaire as well as those of its subcategories, separately for each factor and their corresponding items.[44]

The tendency to use drugs among high school students in Marivan city was assessed by Valadbaigi et al. In their study, the addiction tendency of 367 male and female students was measured using a questionnaire containing 32 questions. The results showed that the explanatory power of the four studied variables (commitment, involvement, attachment, and belief) was 53%.[59] Our findings reported the explanatory power of the items at 40%, which is consistent with this study; this may refer to the appropriate sample size, which is evident in both studies. Furthermore, the number of items in the current questionnaire was 30 questions, and four factors were extracted. In this study, the number of items was 32. The studied factors also comprised four factors, which may explain the correlation coefficients and variance explanation.

Among other studies, the following studies may be mentioned: Ghaedamini Harouni et al[29], Hajihasani et al[32], Zia Aldini et al,[61] Parsian et al,[43] Mousavi et al,[55] Sheikh and Kashi,[58] Pourmovahed et al,[48] Narimani et al,[45] Jalililan and Yazdanbakhsh,[38] Heidari Sarban and Saeb,[53] Mohammadi et al,[41] Yekkehfallah et al,[60] Baghiani Moghadam et al,[25] Mikaeili et al,[47] and Hajli et al.[33] In all these studies, however, the instrument was either created by the researcher or another questionnaire was used, which was revalidated. Additionally, there were limitations in different validation steps that required clarification and reporting of the mentioned cases.

The present study was the first national comprehensive study on designing an instrument for addiction tendency in Iranian children. Up to now, a specific, standardized, and updated questionnaire regarding the degree of addiction tendency of Iranian children has not been compiled, designed, and validated, which represents an innovation and the creation of a new instrument according to the needs of the Iranian society. Another strong point of the study was the application of a combined quantitative-qualitative method in determining the formal and content validity of the instrument. Furthermore, in most studies, only one method was employed to determine the reliability of the instrument, whereas in the present study, two methods—Cronbach's alpha coefficient and the ICC—were utilized for this purpose.

Moreover, unlike most studies, in this research, we examined the construct validity through EFA and identified the latent factors of the items, which was unprecedented in all the studies conducted in this field. Utilizing 15 experts with a well-known background in instrument development across the country, who have numerous publications on research validation, greatly contributed to the study. However, despite all the strengths, like other studies, the present study had limitations, including the subject of the research and the target group under study, which are still considered a social stigma; this led to difficulties in obtaining the necessary permissions.

Conclusion

The Addiction Tendency Questionnaire for Iranian children aged 12 to 18 years demonstrated adequate validity and reliability and may be applied by interested organizations, such as education, welfare, anti-narcotics headquarters, awareness police, and those combating drug trafficking. Moreover, researchers in the country are focused on children's addiction and their screening. The validity of the questionnaire was confirmed both quantitatively and qualitatively through research conducted using face and content validity methods. Additionally, construct validity was assessed through the validity of the current instrument was confirmed using the aforementioned methods. Correspondingly, the examination of the reliability of the instrument, from the perspective of internal homogeneity and the ICC, showed that all questions play the same role in the total

score. If any question were deleted, the reliability would not increase significantly; therefore, the questions in the questionnaire exhibited acceptable reliability. Therefore, to study the addiction tendency of Iranian children, as well as for screening by relevant organizations, this valid and reliable instrument may be applied with confidence.

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Conceptualization: Jafar Hassanzadeh, Aboubakr Jafarnezhad.
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Investigation: Aboubakr Jafarnezhad.
Methodology: Jafar Hassanzadeh, Haleh Ghaem Maralani, Ali Sahraian, Aboubakr Jafarnezhad.
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Competing Interests
The authors reported no conflicts of interest.

Data Availability Statement
The datasets generated and/or analyzed during the current study are not publicly available. However, they can be obtained from the corresponding author upon reasonable request, with permission from the Ethical Committee of Shiraz University of Medical Sciences.

Ethical Approval
The study was part of the thesis in the doctoral program of epidemiology, approved by the Ethics Committee of Shiraz University of Medical Sciences and Health Services in 2023 with the code of ethics IR.SUMS.SCHEANUT.REC.1402.112. Additionally, approvals were obtained from Iran's Anti-Narcotics Headquarters, the Scientific Research Committee of Education of Fars province, the officials and protection of education of Fars Province, and the four education districts of Shiraz, as well as from the officials of the schools involved in the study. Verbal consent was obtained from each participant. Furthermore, the participants were assured that cooperation in the research is voluntary and that findings will be reported and published anonymously.

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