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Original Article

Validity, Reliability and Psychometric Properties of the Exercise Dependence Questionnaire among Physically Active Young Adults

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Abstract

Background: Exercise Dependence (ED) is characterized by excessive and uncontrollable exercise behaviors leading to physiological and psychological symptoms. Valid assessment tools are crucial for identifying ED in understudied populations. The present study aimed to evaluate the validity and reliability of the Exercise Dependence Questionnaire (EDQ) among physically active young adults in Iran.

Methods: This psychometric validation study used a cross-sectional design with 200 participants aged 18-35 years (49% male, 51% female) recruited through clustered random sampling from sports clubs in Tabriz, Iran. The EDQ was administered between May-July, 2021. Validity was assessed through forward backward translation, content validity analysis, Exploratory Factor Analysis (EFA), and Confirmatory Factor Analysis (CFA). Reliability was evaluated using internal consistency (Cronbach's alpha) and testretest (intraclass correlation, ICC) methods. Ceiling and floor effects, Standard Error of Measurement (SEM), and smallest detectable change (SDC) were also determined.

Results: The EDQ demonstrated good content validity (CVI=0.88, CVR=0.73). EFA yielded a 7-factor model explaining 59.45% of variance. Key factors were withdrawal symptoms, exercise for health/social reasons, positive reward, interference with life, insight into problems, and stereotyped behavior. CFA showed moderate fit. Internal consistency was adequate overall (α=0.8) but lower for some subscales. The ICC confirmed good test-retest reliability (0.80, 95% CI 0.76-0.84). No ceiling and floor effects were detected. SEM and SDC were 0.52 and 1.03, respectively.

Conclusion: The results indicated that the Persian version of the EDQ is a valid and reliable scale for assessing ED.

Keywords: Cross-sectional studies, Iran, Physical activity, Reproducibility of results, Young adult

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Introduction

Numerous studies have shown that exercise improves physical and psychological well-being, including improvements in muscular strength and endurance, mental health conditions, cardiovascular disease, and weight management (1-3). Current guidelines for physical activity in adults are as follows: at least 75–150 *min* per week of vigorous-intensity aerobic, 150–300 *minlper* week of moderate-intensity physical activity, or an equivalent combination of moderate and vigorous-intensity aerobic activity (4). While physical activity has many positive benefits, there is some informal consensus that it may also have negative ones, such as skeletal and muscular damage and mood disorders (5). Studies examining the adverse outcomes of physical activity have primarily focused on exercise dependence. Exercise Dependence (ED), is characterized by an uncontrollable and excessive desire for leisure-time physical activity, often manifesting as physiological (such as withdrawal/tolerance) or mental symptoms (such as depression and anxiety) (6). Although the prevalence of ED has been reported between 0.3% and 52%, it varies based on the population and assessment methods (7-10). Given rising rates of excessive exercise and ED in fitness communities, valid assessment tools are critically required (11,12). Recently, several measures have been developed to evaluate ED, including the Obligatory Exercise Questionnaire (OEQ), the Exercise Dependence Scale (EDS) (13), the Exercise Addiction Inventory (EAI), and the Exercise Dependence Questionnaire (EDQ) (13-17). The EAI, EDS, OEQ, and EDQ are all self-report questionnaires assessing problematic exercise patterns, but the EDQ stands out as the most comprehensive option grounded in theory and diagnostic criteria. While the EAI, EDS, and OEQ provide useful measurements of exercise addiction symptoms, they have notable limitations like a narrow focus or lack of validity testing. In contrast, the 29-item EDQ maps onto substance dependence criteria and evaluates multiple facets of exercise addiction including psychological, behavioral, and social factors (16,18-20). Considering the lack of ED measurement tools in Iran, the present study was aimed at evaluating the psychometric properties of the Persian version of the EDQ among physically active young adults in Iran. Specifically, the purpose was to establish the validity (face, content, construct) and reliability (internal consistency, test-retest) of the Persian EDQ to support its potential use for identifying ED symptoms in future research and clinical practice in Iran.

Materials and Methods

This work was extracted from the MS project and it was approved by the ethics committee of Tabriz University of Medical Sciences (Code: IR.TBZMED.REC.1403.369).

Study design and participants

This cross-sectional psychometric validation study was conducted in Tabriz, Iran, from May 27 to July 5, 2021. Using a three-stage clustered random sampling method, a sample of 200 physically active young adults aged 18-35 years was enrolled. Initially, a directory of appropriate sports clubs was compiled across the five municipal districts of Tabriz. Next, three clubs per district were randomly selected, identifying 15 total clubs. Finally, individual participants were randomly chosen from the membership rosters of these 15 clubs. Exclusion criteria were chronic diseases affecting food intake, anorexia, and psychological problems identified by a psychologist. All the participants reported being physically active for at least 4 *hr/per* week.

Sample size

To conduct exploratory factor analysis (EFA) reliably, a sample of at least 5-10 times the number of scale items is recommended (21). Given 29 items on the EDQ, a minimum of 145 participants was required. A sample of 200 was the aim to allow for more stable estimates (22). For the test-retest reliability subset, 18-20 participants were deemed sufficient based on guidelines for achieving an intraclass correlation (ICC) of 0.5-0.9 (23).

Exercise dependence questionnaire (EDQ)

The original EDQ was developed by Ogden *et al* in England in 1997, and its validity and reliability were confirmed (16). This scale consisted of 29 items and 8 factors as follows: withdrawal symptoms, interference with social/work life/family, positive

reward, insight into problem, exercise for weight control, exercise for social reasons, stereotyped behavior and exercise for health reasons. Each item was scored on a 7-point Likert scale, ranging from 1 (strongly disagree) to 7 (strongly agree). Total scores range from 29 to 203, with higher scores indicating greater exercise dependence severity. Ogden *et al* proposed the following interpretation guidelines for total EDQ scores:

- 29-77: asymptomatic
- 78-113: symptomatic
- 114-152: dependent
- 153-203: addicted

Translation procedure

Due to the possible influence of the questionnaire from the cultural context in which it is carried out, the forward-backward translation method was used (24). Two bilingual health experts independently translated the EDQ into Persian. A consensus version was developed *via* an expert panel that included the translators. Then, two independent translators back-translated this version into English. The discrepancies were resolved by expert panel consensus with all the translators present.

Face and content validity

To evaluate the qualitative face validity of the questionnaire, 10 participants were invited and their opinions regarding the questionnaire were collected. This process caused some changes in the tool. The provisional Persian model of the EDQ was reviewed by a panel of experts. The panel consisted of 12 experts, including 3 with doctoral degrees in health education and promotion, 5 with doctoral degrees in nutrition, and 4 holding master's degrees in exercise physiology or nutrition. All had extensive research experience in exercise, nutrition, or questionnaire validation studies. Experts reviewed the appropriateness and relevance of the items with the cultural context of Iranian youth. According to previous studies (25), the Content Validity Index (CVI) was assessed by the expert panel based on three indicators, including clarity, simplicity, an relevance using a four-point Likert scale. Moreover, based on the "necessity" indicator, the Content Validity Ratio (CVR) was calculated'. The expert panel suggested some modifications to enhance the wording of each question. To assess face validity and improve clarity, 10 eligible young adults evaluated the pre-final version of the questionnaire. Finally, no questions were removed, and the length of the Persian version of the EDQ was the same as the original one. Ceiling and floor effects were also assessed to determine the content validity. Ceiling/floor effects were considered to be present if more than 15% of the participants achieved the highest or lowest possible scores (26).

Statistical analysis

The construct validity was evaluated using the EFA. Kaiser Meyer-Olkin (KMO) and Bartlett's sphericity test were used to evaluate sampling adequacy for factor analysis. For factor extraction, eigenvalues of one or higher for each factor were considered significant. A Principal Component Analysis (PCA) was used by varimax rotation if the loading criterion was 0.4 or higher. Stata Statistical Software (Version 17; StataCorp LLC, College Station, Texas, USA) was utilized to assess the fit of the EFA model to the observed data through Confirmatory Factor Analysis (CFA). To calculate fit indices, Tucker-Lewis Index (TLI), the Comparative Fit Index (CFI), and Standardized Root Mean Square Residual (SRMSR), Root Mean Square Error of Approximation (RMSEA) were used with the following cut-off points of adequacy: TLI >0.80, CFI >0.80, and values ranging from 0 to 1 for SRMSR and RMSEA, respectively (27-29).

The internal consistency was assessed using Cronbach's alpha. This evaluates the correlation between different items on the same test. Cronbach's alpha values above 0.7 generally indicate good internal consistency. Test-retest reliability was evaluated by having a subset of the participants completing the EDQ for the second time 2 weeks after the initial administration. To determine the sample size for test-retest analysis, we aimed for a minimum ICC of 0.5 with an expected ICC of 0.9. The Standard Error of Measurement (SEM) was measured as $SD\times \sqrt{1-r}$. 22. The Smallest Detectable Change (SDC) was calculated as $1.96\times \sqrt{2}\times SEM$ (26). The Statistical Package for the Social Sciences [SPSS 25 (IBM Corp., Armonk, New York, USA)] was utilized for data analysis.

Results

Content validity

In the current study, CVI was equal to 0.88 and CVR was equal to 0.73; this confirms the content validity of the scale according to the World Health Organization (WHO) recommendations (30). An assessment of floor and ceiling effects showed that 5% of the participants obtained the minimum possible score of 29 on the EDQ, while none achieved the highest potential score of 203. The percentages were below the cutoff point of 15%, suggesting no floor and ceiling effect.

Construct validity

As all the items had a missing rate of less than 5% and the mechanism for missing data was random, in the final analysis, we removed the missing data. The results indicated that the sample for the factor analysis was sufficient, as evidenced by the KMO of 0.764 (31,32). According to this statistic, weak EFA is equal to values <0.5, moderate EFA is 0.5-0.7, good EFA is 0.7-0.8, great EFA is 0.8-0.9, and excellent EFA is >0.9 (33). Also, Bartlett's test demonstrated significant results (p=0.001) and explorable associations between the variables. Therefore, each factor extracted by EFA was linked with the others (34). According to an eigenvalue more significant than one, the PCA identified seven factors for the 29 items. It was found that a seven-factor solution could explain 59.453% of the variance. A 7-factor solution was represented by the scree plot (Figure 1). As table 1 indicates, the loads were based on rotated factors. The factor load measured the strength of the correlation coefficient between the question and the factor (the question's priority for the factor). The factors were categorized into seven factors as follows: factor 1 (withdrawal symptoms), factor 2 (exercise for health reasons), factor 3 (positive reward), factor 4 (interference with work and social life), factor 5 (insight into problem), factor 6 (exercise for social reason), and factor 7 (stereotyped behavior). It should also be mentioned that the questions associated with the factor "exercise for weight control" in the original questionnaire were mentioned in factors 2 and 5 of the Persian version. To evaluate the fitness of the model derived from the EFA, the CFA was performed on 29 questions of the last questionnaire. In figure 2, the fit of the model is shown. Covariance matrices were used to calculate fit indices. According to all the fit indices, the tests were moderately good. The

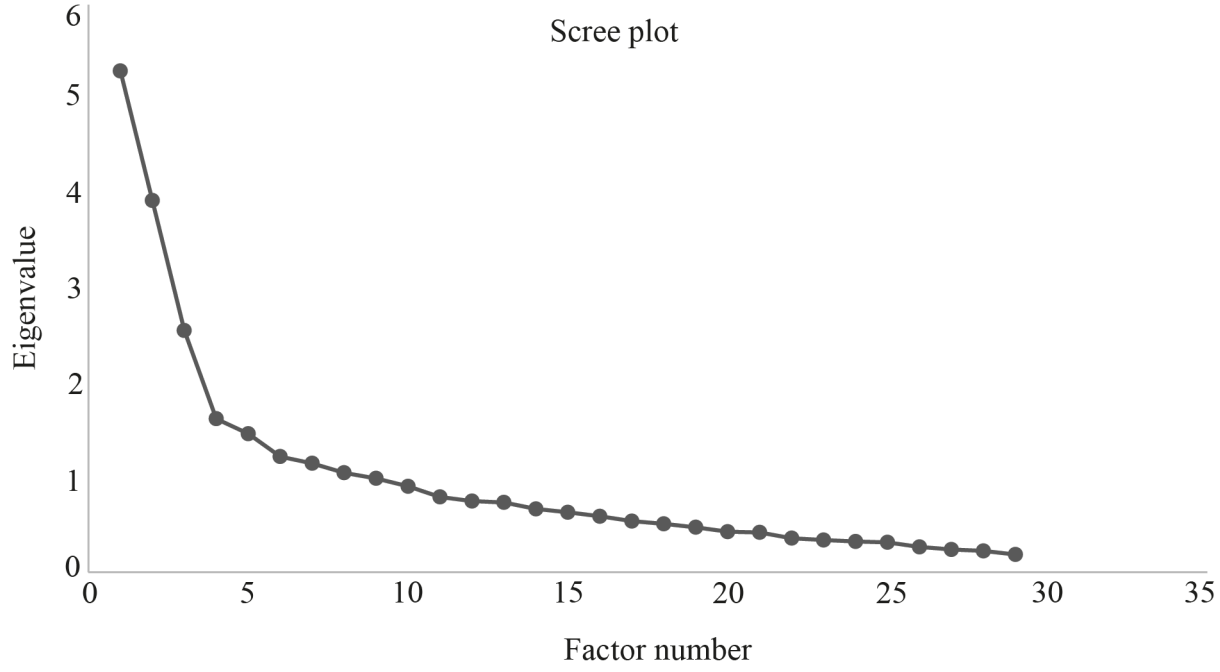

Figure 1. Scree plot for determining the factors of the EDQ.

Table 1. Results of Factor Loads for the EDQ

Items	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6	Factor 7
9/If I cannot exercise, I feel agitated	0.826	-	-	-	-	-	-
3/If I cannot exercise, I feel irritable	0.800	-	-	-	-	-	-
11/I hate not being able to exercise	0.751	-	-	-	-	-	-
4/The rest of my life has to fit in around my exercise	0.677	-	-	-	-	-	-
13/If I cannot exercise, I feel I cannot cope with life	0.664	-	-	-	-	-	-
29/If I cannot exercise, I miss the social life	0.519	-	-	-	-	-	-
14/I exercise to control my weight	-	0.822	-	-	-	-	-
26/I exercise to feel fit	-	0.763	-	-	-	-	-
28/I exercise to prevent heart disease and other illnesses	-	0.719	-	-	-	-	-
18/I exercise to be healthy	-	0.537	-	-	-	-	-
6/I exercise to look attractive	-	0.400	-	-	-	-	-
5/After an exercise session, I feel less anxious	-	-	0.753	-	-	-	-
23/After an exercise session, I feel more positive about myself	-	-	0.740	-	-	-	-
8/After an exercise session, I feel I am a better person	-	-	0.736	-	-	-	-
2/After an exercise session, I feel happier about life	-	-	0.683	-	-	-	-
27/My exercising is ruining my life	-	-	-	0.840	-	-	-
25/My pattern of exercise interference with my social life	-	-	-	0.722	-	-	-
1/My level of exercising makes me tired at work	-	-	-	0.730	-	-	-
21/I make a decision to exercise less but cannot stick to it	-	-	-	-	0.778	-	-
17/I feel guilty about the amount I exercise	-	-	-	-	0.758	-	-
16/Being thin is the most important thing in my life	-	-	-	-	0.657	-	-
20/My level of exercise has become a problem	-	-	-	-	0.589	-	-
19/After an exercise session, I feel thinner	-	-	-	-	0.458	-	-
10/I exercise to meet other people	-	-	-	-	-	0.756	-
12/I exercise to keep me occupied	-	-	-	-	-	0.664	-
15/I have little energy for my partner, family, and friends	-	-	-	-	-	0.400	-
24/My weekly pattern of exercise is repetitive	-	-	-	-	-	-	0.828
7/I sometimes miss time at work to exercise	-	-	-	-	-	-	0.591
22/I exercise for the same amount of time each week	-	-	-	-	-	-	0.496

EDQ Exercise Dependence Questionnaire. * Factor loading higher than 0.4 is acceptable.

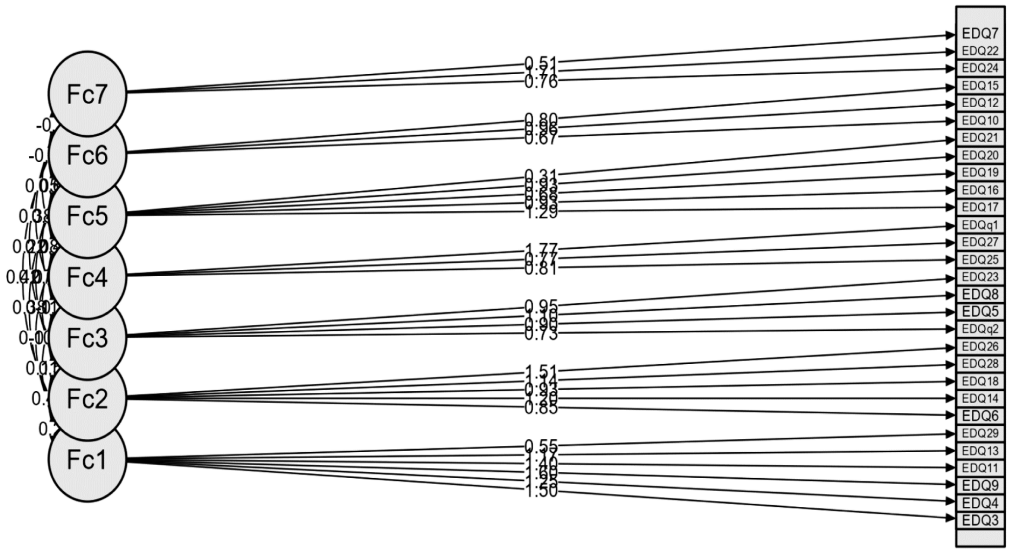

Figure 2. The results of structural equation modelling for the confirmatory factor analysis of Exercise Dependence Questionnaire (EDQ). Fc1: withdrawal symptoms, Fc2: exercise for health reasons, Fc3: positive reward, Fc4: interference with social and work life, Fc5: insight into problem, Fc6: exercise for social reasons, Fc7: stereotyped behavior.

values of relative chi-square ($\chi 2/df$) and RMSEA were 27.69 ($p<0.001$) and 0.078 [90% confidence interval (CI)=0.070-0.085], respectively. TLI was equal to 0.730 and CFI was equal to 0.763, which are the comparative indicators of the model.

Reliability

To examine the temporal stability, 20 individuals answered the questionnaire within two weeks. The sample size was calculated to be 18 participants, based on a minimum acceptable Internal Consistency Coefficient (ICC) of 0.50 and an expected level of 0.90. The reliability of the study was assessed by selecting 20 individuals based on the 10% drop-out rate (23,35,36). As part of the reliability assessment, to determine the internal consistency of the questionnaire, Cronbach's alpha was used, and the ICC coefficient was utilized to determine the temporal stability. A Cronbach's alpha value of 0.8 confirmed the validity of the questionnaire.

The values for subscales 'withdrawal symptoms', 'exercise for health reason', 'positive reward', 'interference with work and social life', 'insight into problem', 'exercise for social reason', and 'stereotyped behavior' are provided in table 2. In addition, the test-retest method confirmed the

Table 2. Cronbach's alpha and ICC for each of the domains of the EDQ

EDQ domains	Cronbach's alpha	ICC
Withdrawal symptoms	0.847	0.838, 95%CI=0.800–0.870
Exercise for health reasons	0.735	0.732, 95%CI=0.669–0.787
Positive reward	0.800	0.799, 95%CI=0.749–0.841
Interference with work and social life	0.762	0.583, 95%CI=0.472–0.674
Insight into problem	0.563	0.572, 95%CI=0.460–0.659
Exercise for social reasons	0.500	0.501, 95%CI=0.367–0.610
Stereotyped behavior	0.542	0.541, 95%CI=0.419–0.641
Total score	0.8	0. 798, 95%CI: 0.755–0.836

EDQ: Exercise Dependence Questionnaire; ICC: Internal Consistency Coefficient; CI: Confidence Interval.

temporal stability of this tool, and the ICC value was 0. 798 (95% CI: 0.755–0.836). Table 2 shows the ICCs for each subscale. The SEM and SDC for EDQ were computed to be 0.52 and 1.03, respectively. Table 3 presents the distribution of EDQ scores across various demographic characteristics of the study participants. The mean age of the sample was 23.1±3.81 years. Regarding education, 14% had a diploma, 1.5% had

Table 3. Descriptive report of participants' means score and total score of exercise dependence questionnaire domains (n=200)

Variables		N (%)	Withdrawal symptoms	Exercise for health reasons	Positive reward	Interference with social and work life	Insight into problem	Exercise for social reason	Stereotyped behavior	Total score
Age	18-20	46 (23)	23.63(9.00)	22.72 (6.73)	22.91 (4.32)	6.30 (2.48)	14.76 (5.61)	7.50 (3.18)	12.17 (4.25)	110.00 (22.11)
	20-30	142 (71)	21.73(8.07)	24.85 (6.41)	23.94 (4.10)	6.32 (4.71)	14.25 (5.31)	7.61 (3.48)	11.41 (3.98)	110.10 (19.00)
	30-35	12 (6)	20.00(5.44)	23.67 (5.66)	23.17 (3.49)	5.50 (2.54)	12.50 (5.47)	6.08 (3.18)	11.83 (2.81)	102.75 (18.21)
Gender	Male	92 (49)	23.01(8.67)	24.02 (6.93)	23.64 (4.18)	6.49 (3.00)	13.14 (5.36)	7.52 (3.46)	12.21 (4.14)	110.04 (20.64)
	Female	102 (51)	21.14(7.62)	24.54 (6.04)	23.67 (4.09)	6.05 (5.07)	15.34 (5.21)	7.47 (3.38)	11.03 (3.91)	109.25 (18.83)
Marital status	Single	183 (91.5)	21.87(8.31)	24.49 (6.52)	23.74 (4.08)	6.30 (4.30)	14.28 (5.39)	7.30 (3.31)	11.61 (4.12)	109.60 (19.92)
	Married	17 (8.5)	24.06(6.53)	22.06 (5.72)	22.71 (4.58)	5.88 (2.67)	14.12 (5.50)	9.59 (3.78)	11.65 (3.39)	110.06 (19.92)
Education	Diploma	28 (14)	23.47(6.68)	25.64 (5.63)	23.68 (3.97)	6.25 (3.91)	15.36 (4.82)	7.54 (3.08)	12.25 (3.83)	114.18 (21.08)
	Associate degree	3 (1.5)	26.33(12.42)	28.33 (7.02)	28.00 (0.00)	3.67 (1.15)	10.00 (6.24)	7.00 (6.93)	12.67 (7.23)	116 (8.89)
	Bachelor's degree	124 (62)	22.55(8.12)	24 (6.47)	23.83 (3.88)	6.27 (2.66)	14.26 (5.56)	7.69 (3.42)	11.30 (4.11)	109.89 (18.86)
	Master's degree	38 (19)	19.24(7.83)	23.24 (6.70)	22.37 (5.06)	6.84 (7.90)	13.39 (5.18)	7.13 (3.33)	11.50 (3.83)	103.71 (22.48)
	Ph.D.	7 (3.5)	21.29(4.67)	28.00 (7.55)	25.57 (1.27)	4.14 (1.34)	16.57 (4.31)	6.14 (3.58)	14.71 (3.09)	116.42 (5.91)
BMI	Low	9 (4.5)	23.78(8.93)	20.22 (9.47)	22.22 (5.24)	6.22 (2.86)	17.22 (4.79)	7.89 (4.11)	12.67 (4.47)	110.22 (26.57)
	Normal	132 (66)	22.91(8.05)	24.46 (6.07)	24.14 (3.66)	6.52 (4.85)	14.34 (5.36)	7.99 (3.53)	11.69(4.19)	112.05 (18.80)
	High	49 (24.5)	20.04(8.23)	24.55 (6.99)	23.29 (4.65)	5.55 (2.24)	13.25 (5.60)	6.20 (2.62)	11.53 (3.80)	104.41 (20.16)
	Obese	10 (5)	19.20(7.83)	24.30 (5.83)	20.30 (4.72)	6.50 (3.68)	15.60 (4.22)	6.90 (3.11)	10.00 (3.02)	102.80 (18.61)
Physical activity	Low	54 (27)	17.96(6.94)	24.46 (7.12)	22.18 (5.03)	5.65 (2.17)	15.78 (5.32)	6.61 (3.33)	9.81 (4.33)	102.46 (21.01)
	Moderate	38 (19)	21.76(6.82)	24.66 (5.23)	23.37 (3.77)	7.71 (7.68)	15.45 (4.91)	7.89 (3.01)	11.74 (3.34)	112.58 (17.89)
	High	108 (54)	24.21(8.46)	24.07 (6.59)	24.49 (3.51)	6.06 (2.97)	13.09 (5.34)	7.80 (3.52)	12.46 (3.88)	112.19 (18.87)

BMI, Body Mass Index.

an associate's degree, 62% had a Bachelor's degree, 19% had a master's degree, and 3.5% had a Ph.D. The majority of participants (91.5%) were single.

Notable variations in EDQ scores were observed across different subgroups. Participants aged 30-35 years showed lower total EDQ scores compared to those aged 18-30 years. Individuals with low and normal BMI had higher EDQ scores than those who were overweight or obese. Additionally, participants reporting moderate to high-intensity exercise demonstrated higher EDQ scores compared to those exercising at low intensity.

Discussion

This study aimed to validate the Exercise Dependence Questionnaire (EDQ) for use in Iranian populations. Overall, the results provide preliminary psychometric support for the Persian version, indicating its potential as a multidimensional assessment of exercise dependence symptoms. The EDQ demonstrated good content validity based on feedback from subject matter experts, and no issues with ceiling or floor effects were detected.

Construct validity findings were mixed. While exploratory factor analysis yielded a 7-factor structure that aligns conceptually with previous literature highlighting multiple components of exercise addiction (19,20), the specific factors identified differed somewhat from the original 8-factor English EDQ model (16). This could be attributable to nuances in how exercise motivations and social influences are perceived across cultures, translation issues, and demographic differences between our sample and initial validation studies. The present 7-factor model showed moderate fit in confirmatory factor analysis, but additional testing across diverse Iranian samples is needed.

The SDC value of 1.03 for the Persian EDQ indicates that a change score greater than 1.03 would be required to represent a true change in exercise dependence, beyond measurement error alone. This SDC estimate provides clinicians and researchers with a meaningful threshold for evaluating whether an individual's EDQ scores have changed significantly over time or in response to an intervention.

In the present study, the first factor load was 'withdrawal symptoms' (with six questions), the second factor load was 'exercise for health reasons' (with five questions), the third factor load was 'positive reward' (with four questions), the fourth factor load was 'interference with work and social life' (with three questions), the fifth factor load was 'insight into problems' (with five questions), the sixth factor load was 'exercise for social reasons' (with three questions), and the seventh factor load was 'stereotyped behavior' (with three questions).

The OEQ (37) is used to determine the subjective necessity to engage in repetitive exercise behaviors. This questionnaire is matched with the seventh factor of the present study.

The EAI (17) measures six common factors for behavioral addiction (conflict, salience, tolerance, mood modification, relapse, and withdrawal symptoms); four factors of this questionnaire are adapted to the factors of the present study.

The EDS-21 (14), which assesses ED based on seven criteria (tolerance, reduction in other activities, lack of control, continuance, time, withdrawal effects, and intention effects) from the Diagnostic and Statistical Manual for Mental Disorders (38), adapted to the exercise domain. Almost all factors of this questionnaire are conceptually consistent with those of the EDQ.

In terms of reliability, adequate overall internal consistency (Cronbach's alpha=0.80) was found, comparable to the original English EDQ psychometrics (16). However, some subscales exhibited lower internal reliability estimates, possibly due to the small number of items. Test-retest findings confirmed good temporal stability, further supporting the EDQ's reliability.

This study had several key limitations that should be considered. First, the sample was limited to physically active young adults from sports clubs, which may restrict generalizability to the broader Iranian population. The self-reported nature of the EDQ responses could also introduce social desirability bias. Additionally, the concurrent validity was not assessed by comparing the Persian EDQ to other exercise dependence measures. The cross-sectional study design precluded evaluation of the EDQ's responsiveness to change over time, as longitudinal studies are required to assess this property. Furthermore, potential differences were not

explored in the EDQ's psychometric performance across key demographic subgroups like gender, age ranges, or exercise types/levels. Future research should investigate measurement invariance to ensure the scale operates equivalently across diverse populations. Lastly, future studies should incorporate more diverse samples beyond physically active young adults, evaluate concurrent validity against other exercise dependence measures, and conduct further psychometric testing to replicate and expand on these initial findings.

Conclusion

Based on the results of the current study, the Persian version of the EDQ demonstrates good construct and content validity. It also showed adequate internal consistency reliability overall, although values were marginal for some subscales. Test-retest findings further support the temporal stability of the translated questionnaire. This suggests the Persian EDQ can serve as a valid and reliable tool for assessing multiple dimensions of exercise dependence symptoms and behaviors in Iranian populations.

Ethics approval and consent to participate

This study protocol has been approved by the ethics committee of the Tabriz University of Medical Sciences (code: IR.TBZMED.REC.1403.369). Written informed consent was obtained from all the participants before participation in the study. All the methods in the current research were performed in accordance with the declaration of Helsinki's guidelines and regulations.

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Conflict of Interest

Authors declare no conflict of interest.

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