Psychometric Characteristics of The Persian Version of The Self-Efficacy to Regulate Exercise Questionnaire Among Female Adolescents

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ABSTRACT

Background and Objective: The positive effects of regular physical activity are already approved in all age groups. However, sedentary life style among teenagers is common all around the world. The understanding of self-efficacy can help to maintain and improve health promoting behaviors. This study aimed at psychometric evaluation of the Persian version of the Self-Efficacy to Regulate Exercise Questionnaire (SEREQ) among 15 to 18-year-old girls.

Materials and Methods: In order to evaluate psychometric characteristics of the Persian version of the SEREQ, 439 students were randomly selected by the cluster sampling method from different educational districts. After translating the questionnaire using the Joan's approach, its validity and reliability were evaluated by the Cronbach's alpha, content validity indicators, content validity index and Confirmatory factor analysis.

Results: The students' mean age was 16.51±1.04 years and their mean BMI was 21.40±3.64. The content validity indicators (0.98) and content validity index (0.97) were at an acceptable level for all the questionnaire's items. The level of Cronbach's alpha among the SEREQ questions was 0.898. Confirmatory factor analysis findings showed acceptable fit indices (CFI = 0.946, TLI = 0.934, RMSEA = 0.049, 2.067 = 125/258 =d¦/c2).

Conclusion: The findings of the current study showed that the SEREQ has acceptable validity and reliability in Persian version and can be used to evaluate the efficacy of regular physical activity among Iranian female adolescents.

Paper Type: Research Article
Keywords: Self- efficacy, Physical activity, Validity, Reliability, Iran

Introduction

Self- efficacy or personal performance is a psycho-social concept which was initially introduced by Albert Bandura in 1977(1). It is one of the underlying concepts in the social cognitive theory and is defined as the belief of an individual in his/her capability for successful performance of required behaviors to create reliable resultants(2).

In other words, Self- efficacy is the sense of assurance one experiences following a special act. This concept reflects the level of effort and performance in an individual(1, 3). A man's success requires commitment, training and perseverance which are achieved through self-sufficiency. Self-efficacy specifies how people look at barriers and those with low self-efficiency are easily convinced when encountering problems and quit trying in no time. However, individuals with high self-efficiency overcome the barriers by improving their self-management skills and perseverance and have more control over their work. Therefore the understanding of Self- efficacy can help maintain and improve health-promoting behaviors(4).

In different subgroups of healthy and even unhealthy individuals, researchers have shown that those with higher self-efficiency perform more physical activity; moreover, those interventions focused on promoting Self- efficacy, have experienced greater success in increasing physical activity(5).

The development of beneficial health habits, particularly Self- efficacy for regular physical activity, in childhood and early adolescence is of great importance, as the establishment of healthy habits is much easier in this growth age in comparison to later in life(6, 7). The positive health habits obtained by adolescents can have a prolonged effect on their health, as behaviors which start in adolescence tend to continue into adulthood(7). Adolescence is a unique period in life and one of the most challenging stages of human growth. In addition to the psychological problems associated with physiological changes in sexual growth, adolescents are also at risk of nutritional deficiencies, physical inactivity and improper health behaviors(8).Therefore, one of the main indicators in the domain of health which requires further consideration is physical activity(9). Although in order to correct the life style some factors such as sex, age and genetics cannot be changed, yet certain cognitive-behavioral factors such as self-efficacy can be considered in the promotion of healthy behaviors(10). In addition, strategies for increasing self-efficiency should be strongly recommended to the community(11). Walker et al. and Van et al. studies showed that healthy behaviors in an individual are associated with his/her self-efficiency(12, 13). Moreover, Safavi et al. study stated that education has a positive effect on the Self- efficacy of physical activity among students(14).

The Self-Efficacy to Regulate Exersice Questionnaire (SEREQ) was introduced to the world in 2006(15). According to the various studies performed by using this questionnaire on general populations, the accuracy, validity and reliability of the English version is well-approved. Everett et al. in 2009 evaluated the psychometric characteristics of the SEREQ(16). This questionnaire is consisted of 18 questions in English and has been used in Australia. The Cronbach's alpha coefficient of this indicator is reported as 0.95(16). As the Self- efficacy of health promoting behaviors, specially regular physical activity, is of special importance due to the specific characteristics of adolescence, and while the mentioned questionnaire is specifically designed for this sensitive age group, and due to the lack of appropriate means for measurement;

the present study was performed with the aim of evaluating the psychometric characteristics of the SEREQ among Iranian adolescents.

Methods

Sample size and sampling method

This cross-sectional study was conducted between July 2016 to JULY 2017 on the adolescent students of Chenaran city by the random cluster sampling method.The sampling method was as follows: from among the three education districts of Chenaran city (Golbahar, Golmakan and Chenaran districts), the education district of Chenaran city was randomly selected   and all female students in high school were enrolled. In Chenaran city, five public secondary schools were selected for research and four classes from each school and twenty students from each class entered the study.

To assess the sample size, according to the study by Rastegar et al[17], Using the formula for comparing the mean of the variables and considering 95% confidence and an acceptable error of 0.05, approximately 364 people were estimated and for more confidence, the sample size was increased to 400 students and finally 439 students participated in the research.

$$n_1 = \frac{1.96^2 \times s_1^2}{d^2} = \frac{(3.8 \times 4.90^2)}{0.5^2} = 9 \times \frac{23}{0} . 25 = 364.92 \approx 400$$

In total 439 questionnaires were completed.

Instruments

The demographic data questionnaire included age, weight, parents' occupation and educational level, regular physical activity and the number of hours spent in front of the TV, computer and cell phone. The main study tool was the SEREQ which its English version is consisted of 18 items. We measured exercise self-efficacy using an 18-item exercise self-efficacy (ESE) scale developed by Bandura[15], which has been shown to be a useful measure of exercise beliefs in Korean adults with chronic diseases[18, 19]. Bandura's original statement asked participants to rate how certain they were that they could get themselves to perform their exercise routine regularly[15] and was used for the first time in Iran.

Each item's score is given based on the 5-score Likert scale as 1 to 5 for very high assurance, high assurance, moderate assurance, low and very low assurance, respectively. The total score ranges from 18 to 90 and is classified as follows: poor Self- efficacy (18-35), low Self- efficacy (36-53), moderate Self- efficacy (54-71) and high Self- efficacy (72-90).

Translation of the questionnaire

In order to standardize the SEREQ, the questions were initially translated into Persian and any errors were corrected by a native English speaker. It was once again translated into English and compared with the original version. Eventually it was translated into Persian and the final evaluation showed that the main concepts are useful to Farsi-speaking adolescents. The questionnaire was then given to 15 experts in public health, health education, biostatistics, nutrition, physical education and educational management to check its content validity. It was then delivered as a pilot to several female students in the 15-18 years age group and the ambiguities in the questions were identified.

Validation: Face and content validities

Cronbach's alpha coefficient was used to determine the reliability of the questionnaire. Cronbach's alpha calculated for self-efficacy to regulate   physical activity questionnaire was calculated to be 0.89 . Also, face reliability was determined by completing a questionnaire by 10 female students aged 15-18 in Chenaran within 10 days from the start of the study.

Prior to the study, necessary changes were made in the type of questions and matching options; Then, to determine the validity of the

content, the self-efficacy to to regulate physical activity questionnaire was sent to 15 professors. 5 professors were nutritionists, 4 were health education specialists, and 6 were educational management specialists.

To evaluate content validity quantitatively, two relative content validity coefficients (CVR) and content validity index (CVI) were used. In order to determine the content validity index in this study, the opinion of experts was determined according to the objectives of the research, regarding the relevance of the questions. Also, the criteria of simplicity and the appropriateness of the clarity of the questions were determined. To determine the validity of the content, experts' opinions on the tool questions were measured based on the three criteria of simplicity and fluency, relevance or specificity, clarity or clarity in a 4-point Likert score of 1-4 for each question, and the content validity index was calculated.. According to the Lawshe table, if CVI is above 79% and CVR is above 49%, it is considered appropriate(20, 21). In the present study, the CVR of the regular physical activity self-efficacy questionnaire was 0.97 and the CVI of this questionnaire was 0.98.

Construct validity assessment (Confirmatory factor analysis)

Confirmatory factor analysis was used to determine the validity of the structure and all goodness-of-fit indices were calculated, which indicated the validity of the questionnaire. Each question in the Physical Activity Self-Efficacy Questionnaire had five options: a) (very low confident), b (slightly confident), c (moderately confident), d (very confident), and e (very much confident). Options from 1 to 5 were scored. The ranking was based on the number of questions in the regular physical activity self-efficacy questionnaire between 18 and 90.

Internal validity

In order to approve the structure's validity,

confirmatory factor analyses was used. A factor load>0.4 is significant and approved(22) .The significance level for results' interpretation was considered as P<0.05.

Ethical Considerations

The inclusion criteria were as follows: 15 to 18-year-old girls in high school who were a resident of Chenaran city, had given an informed consent, had no physiological or other underlying disease. All students who did not fill the questionnaire correctly or experienced an illness interfering with the study protocol were excluded from the study. Participation in this study was entirely voluntary and the questionnaires were anonymous. All collected data were confidential. A participation gift was also given to the participants.

Data analyses

After entering the data into SPSS software version 24, absolute and relative frequency, mean and standard deviation were used to describe the data. Internal consistency assessment between questionnaire questions was calculated using Cronbach's alpha. To analyze the data of the descriptive study, after collecting the information related to each of the research units in coded form, it was entered into SPSS software version 24 and after carefully examining and ensuring the accuracy of the data using descriptive statistics, indices of tendency to center and dispersion and values related to quantitative variables and determining the frequency distribution and percentage related to qualitative variables were determined. Then, to determine the distribution of variables, Kolmogorov-Smirnov test was used and based on the results, appropriate parametric tests for normal variables and non-parametric tests for abnormal variables were used. Confirmatory factor analysis method was used to determine the validity of the structure using Amos software.

Results

The students' mean(SD) age was 16.51±1.04 years and the mean (SD) BMI was 21.40±3.64. The demographic characteristics of the studied population are summarized in Table 1. The mean(SD) Self- efficacy for physical activity score was 45.79±13.42; it was poor in 21.2% (n=93), low in 51.3% (n=233), moderate in 21.1% (n=93) and high in 4.6% (n=20). The response rate of the questionnaire was 2.5. The results showed that the self-efficacy to regular physical activity questionnaire is a valid and reliable tool. Cronbach's alpha coefficient calculated to be 0.89. CVR of the self-efficacy to regular physical activity questionnaire was 0.97 and the CVI of this questionnaire was 0.98

Table 1. Demographic characteristics of the studied population

Variable		No. (%)
Father's occupation	Self-employed	395 (90.0)
	Government- employee	44 (10.0)
Father's education	Illiterate to elementary school	145 (33.0)
	Guidance school to diploma	247 (56.3)
	Over diploma	47 (10.7)
Mother's occupation	Housewife	389 (88.6)
	Employed	50 (11.4)
Mother's education	Illiterate to elementary school	199 (45.3)
	Guidance school to diploma	210 (47.8)
	Over diploma	30 (6.8)
Regular physical activity	Yes	104 (23.7)
	No	335 (76.3)
TV watching and work on a computer	≥ 2 hrs	391 (89.1)
	<2 hrs	48 (10.9)
Body mass index	Underweight	28 (6.6)
	Normal	263 (59.9)
	Overweight	125 (28.3)
	Obese	23 (5.2)

Table 2. Goodness of fit indices before adjustment

RMSEA	AGFI	CFI	TLI	χ2/df
0.074	0.859	0.869	0.852	3.411-460.135

Table 3. Goodness of fit indices after adjustment

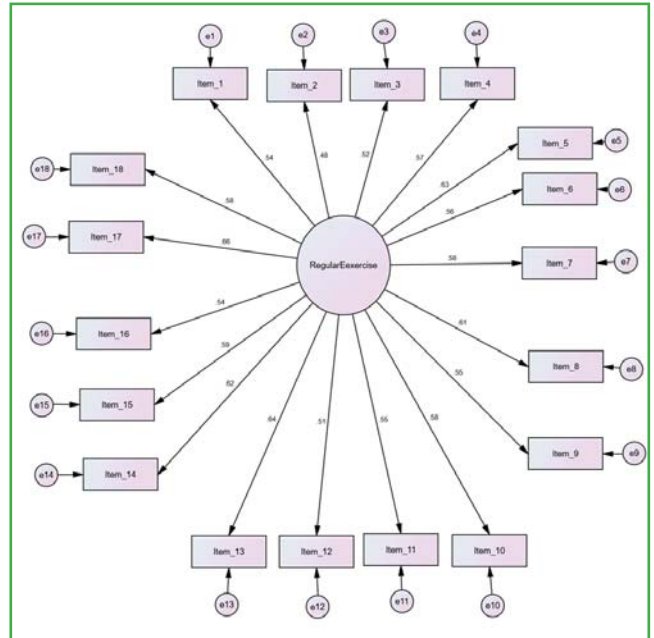| RMSEA	AGFI	CFI	TLI	χ2/df
0.049	0.916	0.946	0.934	2.067-258.125

Fig 1. Confirmatory factor analysis results are displayed before inserting the corrections.
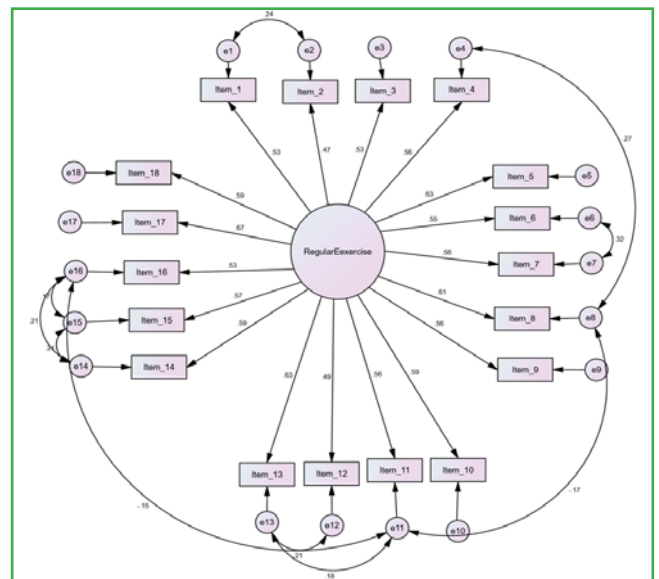

Fig 2. Confirmatory factor analysis results after adjustment

The model goodness of fit index (GFI) indicated lack of model's fit before the adjustment. After adjustment (Fig 2) the validity of the SEREQ was approved.

From the total of fit statistics, 5 fit indices, respectively, root mean square error of approximation (Adjusted goodness of fit index, Goodness of Fit Index), Tucker index Lewis (Tucker-Lewis index) and χ2 were measured in this model. The non-significance of chi-square is an indication of the value, because the confirmation of the null hypothesis was considered. The closer the two AGFI and GFI indices are to each other, the more they show the full fit of the model, and the low of the RMSEA = 0.04 index indicates the suitability of the model (Table 3). The closer it is to zero, the more desirable it is and the values less than 0.1 are good indicators of fit. From the sum of the fit indicators, it can be seen that the data are in complete agreement with the assumed model and the conceptual model (Figure 2) is verifiable. In other words, the data were strong enough to validate the regular physical activity self-efficacy questionnaire using confirmatory factor analysis

Discussion

The aim of the present study was to assess the validity and reliability of the questionnaire for evaluating SEREQ among adolescents in Iran. It was the first attempt on the localization (indigenization) of this tool, and regarding the number of questions on the different aspects of physical activity self-efficiency, it did not differ from the original version. The questionnaire can be simply used and completed by 15 to 18-year-old adolescents in schools or healthcare centers. As the results showed that for all the questionnaire's items the values of Content Validity Indicators and Content Ratio Index are at acceptable levels. The level of Chronbach's

alpha was 0.898 among the questions of the SEREQ and all goodness of fit indicators in the confirmatory factor analyses was at an acceptable level. similar to the present study,YunHee Shin (18) showed that Korean adults with chronic diseases had relatively low exercise self-efficacy and Exercise self-efficacy was significantly correlated with gender, education, regular exercise, and frequency of exercise. The exercise self-efficacy scale was shown to be a useful measure of exercise beliefs of Korean adults with chronic diseases. Also Bronwyn Everett(16) calculated the internal consistency of the total 18-item scale 0.95, and number of factors of the items was subjected to exploratory factor analysis. Based on Everett's study the Kaiser-Meyer-Olkin Measure of Sampling Adequacy was 0.90 , indicating a "marvellous" level of inter-correlation among the items. This result was consistent with Bartlett's test of sphericity, which showed that the correlations between the items were sufficient to perform factor analysis.

As the results show, most students (76.3%) were not used to regular physical activity and spent over 2 hours a day in front of the television, on the computer or with a cell phone (89.1%). In accordance to these findings Piraste et al. study(23) showed that physical activity has decreased significantly among Iranian teenagers, more significantly among girls. Moreover, Taymooria and Lubans(24) study conducted in Iran showed that only 36% of teenage girls perform physical activity. The studied cases lived in a small district and mostly had a sedentary life style due to cultural restrictions.

Moreover, the findings of the current study showed that SEREQ is low among 15 to 18-year-old girls in Chenaran. One main reason is the unfamiliarity of the students, their parents and teachers with the concept and strategies of self-efficiency. Moreover, lack of time, lack of social

support, laziness, indifference, not believing in physical activity and low self-efficiency, lack of suitable sports facilities and sites and being busy with education and work were the most common obstacles in such cases. In general, the results of the current study showed that physical activity self-efficiency is low among the adolescents in Chenaran while a sedentary life style is alarmingly common. In addition, students with an abnormal BMI (slim, overweight and obese) account for a high percentage . With understanding of the strategies of self-efficiency we can take effective steps towards the establishment of healthy behaviors in adolescents. Health habits and patterns are mostly formed in adolescence and thus correct health behaviors in such ages affect health and wellbeing in the coming years; and as schools have a major role in transmitting healthy or unhealthy habits, therefore the necessity of providing educational programs based on self-efficiency patterns aimed at changing health habits and patterns is highly essential.

This study similar to many others had certain limitations. Completing the questionnaire by students was done during their final school exams which might have affected their responses. On the other hand, only 15 to 18-year-old female students from governmental urban schools completed the questionnaire. It is recommended that a similar study is conducted on nongovernmental and rural schools, those in the 10-14-year age group, on male students and high-risk groups. Unfortunately one of the main limitations was the unavailability of a similar study in adolescents which restricted possible comparisons. It highlights the necessity for further studies in this respect. Furthermore, students with overweight or obesity and those with a lower socio-economic status were not willing to fill the questionnaire due to their inappropriate physical condition whom were eventually encouraged and convinced by the researcher, yet highly time-consuming. Finally, other aspects of validity, such as convergent and divergent validity, need to be explored for the Iranian version.

In order to use this questionnaire in future studies, assessment of its validity and reliability is recommended to be done according to the population characteristics. Among the strong points of this study Observation of the main recommended steps based on valid references for the indigenization process and assurance of the cultural alignment of the scale.

The exercise self-efficacy scale used in this study is a reliable and valid measure, and appropriate for use in an Iranian female student population of 15-18 years old. Further testing of this scale with other populations will be needed in assessing not only external validity for different populations, but also the predictive utility of the scale to assess the capacity to initiate and sustain regular physical activity forever. Use of this scale in future research may provide important insights into the dynamics of self-management of regular physical activity, resulting in improved outcomes for individuals.

Acknowledgments

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