

A scale development study: The readiness to smoking cessation scale

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Abstract

Aim: Today, smoking has become an epidemic that causes many health problems. One of the starting steps for individuals who want to quit smoking is the determination of the readiness level of the individual to quit. The aim of this study was to develop a measurement tool to determine the readiness levels of individuals who want to quit tobacco use.

Material and Methods: This is a methodological study. For the context validity of the Readiness to Smoking Cessation Scale, the 120 item draft scale was sent to 4 expert physicians for their views. The construct validity of the draft scale was tested using the SPSS (Statistical Package for the Social Sciences) program running factor analysis tests (KMO, Bartlett test, Anti Image Correlation, Principal Components Analysis, Varimax Rotation)

Results: A draft scale consisting of 28 items was formed from the pool of 120 items. Before explanatory factor analysis, principal components analysis on the non rotated components and principal components rotated on the principal axis were performed. The KMO of 0.853 at this point showed the high validity of our scale. Since the value attained was over 0.70, the scale was considered reliable. The Cronbach Alpha value of the scale was found to be 0.874. 10 items with total test correlation values under 0.45 were excluded from the scale.

Conclusion: The RSC-Scale is a valid and reliable measurement tool with 18 items and 4 sub dimensions measuring the readiness of individuals to quit smoking. Through the RSC-S, the readiness levels of individuals who want to quit smoking can be determined, preventing loss of time and motivation as well as increasing costs.

Keywords: Readiness; scale; reliability; smoking cessation; validity; Turkey

INTRODUCTION

Today, smoking has become an epidemic that causes many health problems and increasing costs for health systems (1). Despite the prevalence of smoking, important opportunities to protect public health have been formed in our country through the enactment of policies and legal regulations towards the prevention and control of tobacco use (2).

Each year, 70% of tobacco smokers think about quitting while a third actually try to quit. Despite the blow annual quit rate, in 2015, 59% of adults who had ever smoked had quit, and the rate of tobacco use in the US has been steadily declining (3). Relapse back to tobacco smoking is part and parcel of nicotine dependence. Every smoker who quits remains prone to relapse (4,5). Otherwise, smokers who seek support in quitting are much more likely to quit than those who try to quit alone, and the most effective aid for achieving smoking cessation is coupled with tailored behavioral support from specialist stop smoking services (6,7).

According to data from the World Health Organization (WHO), while approximately 500 million people from 11 countries benefited from smoking cessation suggestions in 2007, this number became 2.4 billion people from 26 countries in 2016 (8). For an individual to effectively benefit from smoking cessation programs, he/she should feel willing, resolute, and ready (9). Dalton and Gottlieb (2003) have defined readiness as exhibiting a certain behavior as a result of maturing and learning. Planning and applying smoking cessation programs without considering the readiness of individuals has been reported to be one of the most important reasons for smoking cessation failure (9,10). For this reason, the determination of readiness before intervention would increase the success of smoking cessation programs (11).

The measurement tools required to determine these readiness levels for smoking cessation efforts to be performed in patients who present at polyclinics to quit smoking are insufficient throughout the world. Researchers have begun to examine smoking behavior

Received: 28.02.2020 **Accepted:** 21.08.2020 **Available online:** 21.09.2020

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using theories from the behavioral sciences. One of the more promising of these theories is the Transtheoretical Model (TTM) of behavior change. (12). TTM is used to understand how when people are ready to change, they weigh their beliefs about the decision balance of behavior change and their behavior change (13).

It is important to know that the persons who are at the preparation stage of TTM are actually ready to quit smoking will be helpful to the professionals who support them in quitting smoking. The aim of this study was thus to develop the Readiness to Smoking Cessation-Scale (RSC-S).

MATERIAL and METHODS

Setting, Design, and Sampling

This is a methodological study performed to measure how ready people who want to quit smoking actually are. The population of the study consists of 2900 students studying at 4 faculties at Zonguldak Bulent Ecevit University Health Sciences Campus. Inclusion criteria were smoking tobacco, aiming to quit smoking, having made an attempt to quit smoking within the last 6 months, volunteering to participate in the study, and being of 18 years of age and above. Exclusion criteria were not completing the questionnaire fully, receiving treatments for smoking cessation, and being under 18 years of age. The sample of the study consisted of 277 smokers who met the inclusion criteria and aimed to quit smoking. Among the students, 33.2% studied in Medical School, 17.3% in Dentistry, 15.1% in the Health Sciences Faculty, and 2.9% in the Pharmaceutics Faculty.

Study Measures

The Development of the Scale

First, a 120 item draft scale was formed through scanning the literature. For the context validity of the Readiness for Smoking Cessation Scale, the draft was sent to 4 expert physicians for their views. According to the suggestions, the draft was reduced to 28 items. A pilot study with the participation of 30 individuals was performed before the study. During pilot application, the necessary corrections to the items with which the participants had trouble understanding were performed. After testing for validity and reliability, the final form of the scale was decided to consist of 18 items.

To test the construct validity of the items, an explanatory factor analysis was performed, where the KMO value was found to be 0.853. In order to test reliability, the Cronbach Alpha coefficient was calculated to be 0.874. The number of rotations was determined to be 25, and the promax rotation was selected thinking that factor structures were not in compliance with each other. For fit, values under 0.45 were disregarded. In data collection, the items of the scale and a questionnaire for socio demographic characteristics were used. The questionnaires were filled out through face to face interviews with the participants.

Statistical Analysis

Data was evaluated using the SPSS 16.0 program in a

digital environment. The high Cronbach Alpha coefficient shows that the items of the RSC-S were consistent with predicted the same characteristic. For the validity and reliability tests of the scale, percentages, mean values, Cronbach Alpha, the Pearson Correlation test and factor analysis tests (KMO, Bartlett test, Anti Image Correlation, Principal Components Analysis, Varimax Rotation) were used. The relationship between the scale and its sub dimensions was evaluated using the Spearman-Brown correlation analysis technique. $p < 0.05$ was considered statistically significant.

RESULTS

The mean age of the students who participated in this study was 21.8 ± 3.5 , where 46.2% were female and 53.8% were male. Among the students, 33.2% studied in Medical School, 17.3% in Dentistry, 15.1% in the Health Sciences Faculty, and 2.9% in the Pharmaceutics Faculty.

Results Regarding Validity and Reliability

Validity Analysis

In order to test the construct validity of the RSC-S, an explanatory factor analysis was performed. In factor analysis, Principal Components Analysis and the Varimax Rotation Method were used. However, before this process, the Kaiser-Meyer-Olkin (KMO) coefficient was found to be 0.853, and the result of the Bartlett test was found to be $\chi^2 = 2154.625$; $p = 0.0001$ which have very advanced statistical significance.

Table 1. The Factor Matrix Results of the RSC-S

Items	Intention stability	Subdimensions		
		Self-Control	Compliance	Awareness
9	0.638			
10	0.563			
11	0.853			
12	0.656			
13	0.849			
14	0.712			
15	0.696			
16	0.681			
17	0.807			
18	0.740			
1		0.716		
2		0.821		
3		0.782		
4		0.795		
5			0.868	
6			0.839	
7				0.826
8				0.843

When the cluster graph regarding the items in the RSC-S given in Figure 1 is examined, it can be seen that the 28 items analyzed gathered under 4 factors with eigenvalues over 1 and that these 4 factors explained 62.358% of the total variance.

The respective percentages of variance explained by the factors were 34.552% for factor 1, 11.764% for factor 2, 9.323% for factor 3, and 6.719% for factor 4. The variance explained by the factors increased alongside eigenvalue. The number of factors strong in analysis was determined to be 4 according to eigenvalues. This can be clearly seen in the cluster graph regarding the items of the RSC-S.

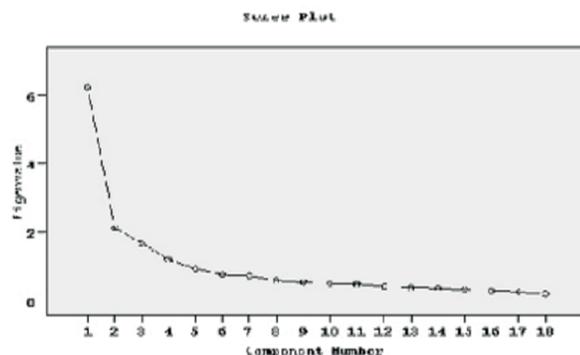


Figure 1. Cluster graph regarding the items in the RSC-S

Factor 1 included items regarding perception of Intention stability (9-18), factor 2 included perception of control (1-4), factor 3 included perception of compliance (5,6), and factor 4 included awareness (7,8). As seen in Table 1, the factor load values of the 10 variables within the first factor were between 0.563 and 0.853, the factor load values of the 4 variables within the second factor were between 0.716 - 0.821, the factor load values of the 2 variables within the third factor were between 0.839- 0.868, and, the factor load values of the 2 variables within the fourth factor were between 0.826-0.843 (Table 1).

Table 2. The Correlation Results Between The Sub dimension Scores of The Scale

Sub-dimensions	Self-Control r	Compliance r	Awareness r	Total r
Intention Stability	0.307	0.364	0.301	0.911
Self-Control	-	0.168	0.059	0.577
Compliance	-	-	0.297	0.545
Awareness	-	-	-	0.466

Reliability Analysis

In order to test internal consistency, tests for item-total score correlations, item correlations, and the Cronbach Alpha coefficient were performed. The Cronbach Alpha coefficients for the sub dimensions of the 18 item scale were found to be respectively 0.902 for the perception of Intention Stability sub dimension, 0.781 for the perception of control sub dimension, 0.772 for the perception of compliance sub dimension, and 0.707 for the awareness sub dimension, while the Cronbach Alpha coefficient for the whole scale was found to be 0.874. Item-Total Score Correlation Analysis was used to explain the relationship of the sub dimensions to each other. A positive and

“sufficiently high” correlation between sub dimensions would show which sub dimensions were related. The relationships between the sub dimensions were given in Table 2.

The relationship between the whole scale and its sub dimensions was evaluated using the Spearman-Brown correlation analysis method, and a positive, high level, statistically significant relationship between the total scores of the scale and all sub dimension scores was found ($p < 0.001$) (Table 2).

DISCUSSION

Tobacco use is identified by the World Health Organization (WHO) as the leading cause of preventable death worldwide. For this reason, the struggle against smoking carries vital importance throughout the world. However, it has been reported that approximately 70% of smokers want to quit and that 80% of all smokers try to quit smoking at some point in their life (4). Even if those who want to quit smoking receive efficient treatment, the yearly rates of abstinence vary between 17 and 43% (14-24). The motivations of individuals who fail at quitting smoking decrease, and these individuals do not want to quit again. For this reason, it has become important to determine the readiness levels of those who want to quit smoking. The RSC-S was developed to measure the readiness levels of individuals who want to quit smoking. First, construct validity analyses were conducted on the 28 items remaining in the scale pool. The KMO value of 0.853 before this analysis showed that the sample was sufficient. Additionally, the $p < 0.001$ level of significance exhibited sufficient correlation between variables. This, in turn showed that the power of the relationship between variables was sufficient and that we could proceed. Since Buyukozturk (2016) stressed that a KMO above 0.60 was sufficient for factorization (25). We considered this study appropriate for factorization as well. In this study, Explanatory Factor Analysis was used to determine the sufficiency of the number of factors (26-31). Factors with a load below 0.45 were decided to be removed from the scale. As a result of factor analysis, the items of the scale were found to gather under 4 sub-dimensions with eigenvalues over 1, and the items were found to have acceptable load values in the factor they entered (lowest item load value of 0.563 and highest of 0.868). The total variance explained by the scale with 4 sub factors was 62.3%. The total variance value over 0.45 shows a strong factor structure (32-34).

In this study, the Cronbach Alpha value, which is one of the most widely used methods to measure internal consistency for reliability, was found to be 0.874. According to Ozdamar (1999), this is a value that indicates high reliability(32). Accordingly, the answers given to the scale items were consistent and measured the desired quality correctly (16,19-21).

The RSC-Scale took its last form with 18 items and 4 sub dimensions. The Intention Stability to quit sub dimension

consisted of 10 items and measured the Intention Stability of the individual to quit smoking. The self control sub dimension consisted of 4 items and measured the ability of the individual to control oneself. The Compliance sub dimension consisted of 2 items and measured how much the individual would comply with treatments if he/she received such treatment. The Awareness sub dimension consisted of 2 items, and measured how aware the individual was of the seriousness of the harms of smoking.

The scoring and use of the RSC-Scale: The scale is a 5 way likert type scale where items are evaluated between "1-I certainly disagree" and "5-I completely agree". The maximum score that can be attained from the RSC-S is 90 while the minimum is 18. Higher scores indicate higher levels of readiness to quit smoking.

CONCLUSION

The RSC-Scale is a valid and reliable measurement tool with 18 items and 4 sub dimensions. The readiness of individuals to quit smoking can be determined using the RSC-S and individuals who are ready can then be referred to the appropriate support units. Individuals who are not yet ready to quit smoking can be readied through motivational interviews and cognitive behavioral approaches. Additionally, this scale can be used for scanning with patients presenting at polyclinics to quit smoking and efforts, over 18 years old, in the general public to help people quit smoking.

Competing interests: The authors declare that they have no competing interest.

Financial Disclosure: There are no financial supports.

Ethical approval: A permission dated 3/10/2018 with the protocol number 419 was taken from the Bulent Ecevit University Human Research Board of Ethics.

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