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Adaptation of COVID-19 risk perception and COVID-19 prevention guidelines compliance scales to Turkish: a validity and reliability study

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ABSTRACT

Aim: The aim of this study is to make Turkish adaptation and psychometric analysis of the COVID-19 Risk Perception and COVID-19 Prevention Guideline Compliance scales.

Material and Method: The COVID-19 Risk Perception and COVID-19 Prevention Guideline Compliance scales administered to a total of 385 healthcare workers (Emergency medical technician, paramedic, ambulance driver etc.) and 50 healthcare workers were retested two weeks later. The opinions of 10 experts were taken for the content validity of the scale, the confirmatory factor analysis was performed for the construct validity, the Cronbach's alpha reliability coefficient was calculated to determine the internal consistency, and the test-retest reliability was performed and the results were evaluated with Pearson correlation analysis.

Results: It can be concluded that an agreement among experts according to the results of the content validity index of the Turkish version of COVID-19 Risk Perception scale was found to be 0.91, the COVID-19 prevention guideline compliance scale was found to be 1. The test-retest reliability correlation of the scales was 0.85.

Conclusion: COVID-19 Risk Perception and the COVID-19 prevention guideline compliance scales were suitable for Turkish culture, and they are valid and reliable.

Keywords: COVID-19, risk perception, prevention guidelines, validity and reliability

INTRODUCTION

According to World Health Organization (WHO) (1) currently the world has been witnessing a global epidemi of 2019 novel coronavirus (SARS-CoV-2) which causes COVID-19 disease. Available data highlighting the actual prevalence of the disease support this view (2,3). It is a well-known fact that the spread of the disease is affected by the willingness of the public to adopt preventive public health behaviors which are often associated with the public's risk perception.

Risk perception is significantly associated with preventive health behaviors reported in all ten countries (4). In order to slow down the spread of the virus some countries have been implementing drastic measures such as severe travel restrictions, border closures, lockdowns, curfews, limiting personal contact with people except family members or permitting only one person who is not a family member. Most people around the world have felt the need to follow the rules of hand sanitation and social distancing in order to prevent coronavirus and its spread. Nevertheless, while some people are strictly obedient to the restrictions, others either ignore or delay restrictions of governments. The fact that individuals act very differently from each other during this period is a sign that risk perception of this disease strongly differs from different places and individuals. Moreover, since this situation can influence the number of new positive cases, it is an indicator that risk perception is a potentially powerful modifier of epidemic evolution (5).

As the number of people dying of the disease increase all around the world, it becomes more significant to understand the risk perception of the public (6). The success of policies that slowed down the rapid spread of the disease during previous pandemic cases is partly attributed to the existence of people who perceived individual and social risk factors in the correct way. In fact, collectively human behavior can fundamentally influence and change the spread of a pandemic (7-9). Threat assessment and

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risk perception can be expressed as fundamental features of protection-motivation theory (10,11). In this context, it is known that collaboration of the community and their willingness to adapt preventive behaviors (frequent hand washing, social distancing, avoiding public places and wearing face masks, etc.) in time to protect their health are significant determinants during pandemics (12). In other words, correct public risk perceptions are critical to effectively managing public health risks (4).

MATERIAL AND METHOD

Even though there is important medical and epidemiological information on severity of the disease and contagiousness of the virus in the corona virus literature, psychosocial responses of the population still is not fully known (13). It is thought that there is limited research particularly on responses of individuals to COVID-19 prevention guidelines. It is considered potentially significant to discover the premises of compliance to these guidelines since it might help us identify the high risk groups and take necessary steps to improve the level of compliance. Permission was obtained from Nejc Plohl via e-mail, in order to use C-RP and C-PGC scales. Plohl sent information on the scale and how to apply the scale via e-mail.

The study protocol was approved by the Ethics Committee of İstanbul Okan University (Date: 23.12.2020, Decision No: 130). All procedures were carried out in accordance with the ethical rules and the principles of the Declaration of Helsinki.

Type of Research

This study has been carried out in a methodological way.

Study Population and Sample

The population of the study is composed of healthcare workers employed within geographical borders of Istanbul province. However, while determining the sample for the objective of the study it was planned to conduct the research on EMTs, paramedics and ambulance drivers, who are considered as special risk groups of priority. Convenience sampling was preferred as sampling method and 385 healthcare workers employed at pre-hospital medical institutions who have approved of the study participated in the scope of the study. In scale adaptation studies, for reliability and validity analysis it is recommended to reach a number of participants that is 10 times the number of items in the scale (14, 15). This rule was taken into account in order to determine the sample size.

Data Collection Tool

Participant Information Form, C-RA and C-PGC scales developed by Plohl and Musil (16) were used. The data which is used for the research had been collected between 1- 20 January 2021 using online questionnaire method. The questionnaires were prepared and uploaded on Google forms database and were sent to the employees' e-mail addresses.

Participant Information Form

This form, created by the researchers, was used in order to collect demographic information about the participants. The form includes questions about participants' gender, age, education level, marital status, occupation, employment state, whether they have a chronic disease, whether they smoke, their responds to health problems and questions about COVID pandemic.

COVID-19 Risk Perception Scale (C-RP)

The scale was developed to evaluate risk perceptions of individuals related to COVID-19 pandemic. The scale was rated with a 7-point likert ranging between strongly agree (1 point) and strongly disagree (7 points). Cronbach's alfa reliability coefficient of the original scale was found to be 0.72 (16). The scale consists of six questions in total and as the score increases a negative situation occurs.

COVID-19 Prevention Guidelines Compliance Scale (C-PGC)

The scale was developed in order to evaluate individuals' compliance levels to measurements taken against COVID-19 pandemic. It consists of 11 actions determined by WHO and CDC that has to be followed to protect against COVID-19. The scale was rated with a 4 Likert chart ranging from Never (1 point) to Always (4 points). The Cronbach's alpha reliability coefficient of the original scale was found to be 0.76 (16). There are a total of 11 questions in the scale and as the score increases, the situation arises.

Data Analysis

The data was analyzed using SPSS 26 and AMOS 20 programs. To determine the adequacy of sample size and evaluate suitability of the items to factor analysis KMO, Barlett sphericity tests were used and to analyze the data about descriptive characteristics frequency tables and central-prevalence criteria were used. In order to analyze validity of the scales, content and construct validity analyses were used and to analyze reliability an internal consistency analysis method Cronbach's alpha coefficient and test r-test analysis were used.

Validity Study of C-RP and C-PGC Scales

Language equivalence-cultural adaptation and content validity: The scales were originally written in English. The original scale was translated into Turkish by two independent linguists competent in their field to create the form in Turkish. The Turkish form created was translated back into English by two different linguists. Finally a third independent linguist revised the items of the scale and determined the most suitable options to create the English

form. The items both on the Turkish form and the original one were examined by group of ten experts consisting of academics for the appropriateness of the translation and content validity. For content validity, the consulted experts were asked to rate suitability and intelligibility of each item of the scale between 1-4 points. The experts were asked to choose one of the options "unsuitable" (1), "the item must be made more suitable" (2), "suitable but small changes are necessary" (3), or "very suitable" (4) for each item. Necessary arranges were made in line with the recommendations of the experts (17). The English form created was submitted for the approval of the author who developed the scale. For content validity, content validity index was calculated.

Construct Validity

Initially CFA assumptions were reviewed and the extent to which the theoretical model explained the relationships in data set was tested. At the last stage analyses were made on alternative models. Chi Square ($\chi 2$), degree of freedom (sd), mean squared error of the predictions (RMSEA), standardized root mean square residual (SRMR) and comparative fit index (CFI), match mismatch coefficients were evaluated. As a result of the exploratory factor analysis performed for the C-RP scale, it was seen that the scale explained two-way factor, 78.97% of the total variance, and the C-PGC scale explains with one-way factor, 64.26% of the total variance.

Reliability

Reliability of the scales was evaluated through internal consistency and test-retest. In order to evaluate internal consistency "Cronbach's alpha reliability coefficient" was used. In the evaluation of the Cronbach's's alpha coefficient, it is stated that 0.50 and below shows low reliability, 0.50-0.70 medium reliability, 0.70-0.90, high reliability, 0.90 and above show excellent reliability (18). In order to assess time invariance, 50 people having the same characteristics of the sample group were retested two weeks following the first data collection time. The relationship between test-retest scores was evaluated using Pearson correlation analysis.

RESULTS

Average age of the participants is 26.39±3.51 and 41.8% are female 58.2% are male 52.5% are single, 67.8% have a university degree. 17.9% of the participants have a chronic disease, 46.8% of them smoke. 90.6% of the participants are employed, 47.0% of them are EMT, and when they have a health condition 53.0% go to a hospital (**Table 1**).

85.5% of the participants access news about COVID-19, on the media, 93.0% of them know methods to protect against COVID-19, 92.7% of them follow "Stay Home Turkey" movement 28.6% have difficulty to supply masks (**Table 2**).

Table 1. Introductory results of students

Variables	Min.-Max.	X ± Sd
Age	18-38	26.39 ± 3.51
	n	%
Gender		
Female	161	41.8
Male	224	58.2
Marital status		
Single	202	52.5
Engaged	56	14.5
Married	127	33.0
Education		
High school	121	31.4
Bachelor	261	67.8
Post graduate	3	0.8
Chronic disease		
Yes	69	17.9
No	316	82.1
Smoking		
Yes	180	46.8
No	205	53.2
Employment		
Yes	349	90.6
No	36	9.4
Profession		
EMT	181	47.0
Paramedic	117	30.4
Ambulance driver	87	22.6
The means they choose for a health problem		
Counseling family or friends	11	2.9
Searching the Internet	19	4.9
Self-treatment	76	19.7
Chemist's	5	1.3
Family doctor	44	11.4
Hospital	204	53.0
Waiting for it to pass	26	6.8
Total	385	100.0

Table 2. Results regarding COVID-19

Variables	n	%
Follow up with media for COVID-19		
Yes	329	85.5
No	56	14.5
Knowing the ways to prevent COVID-19		
Yes	358	93.0
No	27	7.0
Following "Stay home Turkey" movement		
Yes	357	92.7
No	28	7.3
Mask supply		
I have difficulty	110	28.6
I don't have difficulty	275	71.4
Total	385	100.0

Item Analysis and Reliability Results

According to data obtained from 385 participants Cronbach's alpha reliability coefficient of C-RP was found to be 0.79, Cronbach's alpha reliability coefficient of C-PGC was found to be 0,94. Test-retest reliability correlation was found to be 0.85. C-RP score averages of the participants is 28.81±7.84; C-PGC score averages of them is 37.85±7.13 (**Table 3**).

Table 3. COVID-19 reliability analyses and descriptive statistical values of risk perception and compliance with prevention guidelines scales (n=385)

Factor (min- max)	Mean	Sd	Test-Re Test	Cronbach's alfa
COVID-19 Risk Perception Scale (8-42)	28.81	7.84	.85	.79
COVID-19 Compliance with Prevention Guidelines (11-44)	37.85	7.13	.85	.94

Results Regarding Validity

Sample sizes of the scales were evaluated using KMO and Barlett Tests. Sample size of C-RP (KMO=0.725, X^2=1402.478, p=0.00) and C-PGC (KMO=0.958, X^2=3037.842, p=0.00) was found to be medium for C-RP, excellent for C-PGC. Content validity indices of the scales were found to be 0.91 for C-RP and 1 for C-PGC.

Results Regarding Structure Validity

In the Confirmatory Factor Analysis, the factor loads of the 6 two-way factor items of C-RP were found to be between 4.17 and 0.49. As a result of the examination of the fit indices values, it was found that the factor structure showed a high fit (X^2=8.828; χ^2/ df=1.26; GFI=0.99; AGFI=0.97; CFI=0.99; RMSEA=0.026) (**Figure**).

It is found that 11 items of C-PGC scale are one-way factor, and factor loads of items are 0.59 and 0.86. As a result of the examination of the fit indices it was found that the factor structure showed a high fit (X^2=154.971; χ^2/ sd=3.52; GFI=0.92; AGFI=0.88; CFI=1.0; RMSEA=0.081) (**Figure**).

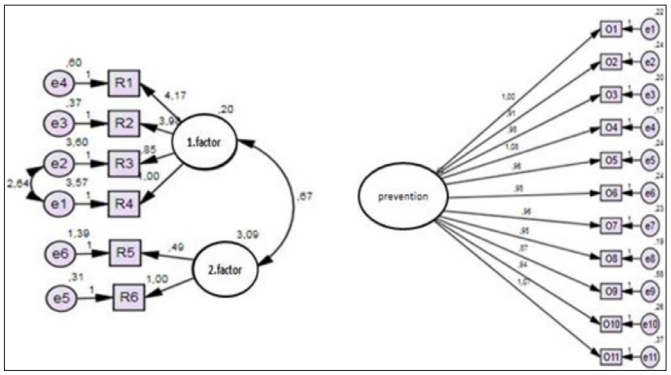

Figure. C-RP and C-CPG item- factor loads

DISCUSSION

In order to define risk perceptions of individuals of COVID-19 and to determine to what extent individuals comply with prevention guidelines, it is necessary to have measurements that are valid and reliable in the field index. In this study, it was determined that the Turkish version of the COVID-19 Risk Perception scale had two factors with 6 items (1st factor; contagion and 2nd factor; fear), and the Turkish version of the Compliance with Prevention Guidelines Scale had 11 items and one factor. It was found that being valid and reliable instruments Risk Perception and COVID-19 Prevention Guideline Compliance scales are valid and reliable scales as well.

In order to evaluate the scope validity it is recommended to consult experts who are acquainted with the subject being researched and the methods of creating scale items. It is stated in the literature that opinions of at least 3 and at most 20 experts should be obtained and percentage of compliance and Content Validity Index (CVI) should be calculated (17). For the CVI, Grant and Davis (19) state that 80 %of the scale items must score 3 points or more. The mean opinion scores given by ten experts consulted for this study is between 3.13-3.43 for C-RP and between 3.83-4 for C-PGC. The CVI was 0.91 for C-RP and 1 for C-PGC showing that scale items are appropriate for our culture and the structure aimed to be measured can be measured.

Confirmatory factor analysis (CFA) which is one of validity methods is used to develop scales or adapting a developed scale to another culture (20). According to the (CFA) results of this study, general coefficient concordance of COVID-19 Risk Perception Scale are found to be X^2=8.828; χ^2/sd=1.26; GFI=0.99; AGFI=0.97; CFI=0.99; RMSEA=0.026) and general coefficient concordance of COVID-19 Prevention Guideline Compliance scales were found to be X^2=154.971; χ^2/sd=3.52; GFI=0.92; AGFI=0.88; CFI=1.0; RMSEA=0.081. Hair et al. (14) state that if the number of items is between 12 and 30 and the number of people is > 250 the value of X^2 is expected to be statistically significant, besides they sate that when CFI is greater than .90 and RMSEA is less than .08 general coefficient concordance of the model can be accepted as adequate. As a result of this, it is possible to claim that theoretical model adequately explains the correlations between the items.

The fact that all items on a measurement instrument measure the desired property and when measured again it gives consistent and stable results (21-24). Internal consistency is the determination of the reliability of the scale that shows concordance of scale items with each other. One of the most frequently used methods to determine internal consistency reliability is Cronbach's alpha coefficient (25). For alpha coefficient of the scales

0.50 or below low, 0.50-0.70 medium, 0.70-90 high and 90 is indicate excellent reliability levels (18). Cronbach's alpha coefficient of the C-RP scale of the original study was found to be 0.72. Cronbach's alpha coefficient of this study was found to be 0.72 which indicates high reliability level. Cronbach's alpha coefficient of the C-PGC scale of the original study was found to be 0.76. Whereas in this study the alpha coefficient of the scale was found to be 0.94 which is a better level than the original scale's. Cronbach's alpha coefficient of sub dimension of internal benefit was found lower than the original study and on a medium level.

Test retest reliability is measurements that are carried out in order to assure that the measurement tool gives consistent results and it is invariable against time. These measurements need to be repeated at least with a 2 week gap or at most a 4 week gap (26) with at least 100 participants (27) and should have a correlation coefficient of ≥ 0.40 (29). On the original study a test-retest correlation was not applied. In this study the test-retest reliability coefficient that was carried out two weeks after following the first data collection work on 50 participants was found to be 0.85 as high level.

Due to the fact that the research was carried out via online questionnaire it is limited to prehospital employees who are able to use the Internet and accepted to participate in the study. Therefore, it will be beneficial to conduct the research on different sample and occupational groups and analyze them.

CONCLUSION

In conclusion, validity and reliability of Turkish form of C-RP and C-PGC scales developed by Plohl and Musil (16) and originally written in English was found to be on a good level. Confirmatory factor analysis carried out to evaluate construct validity verified the original factor structure that is present in the literature. In accordance with these results Turkish form of C-RP and C-PGC can be used.

ETHICAL DECLARATIONS

Ethics Committee Approval: The study protocol was approved by the Ethics Committee of İstanbul Okan University (Date: 23.12.2020, Decision No: 130).

Informed Consent: Written informed consent was obtained from all participants who participated in this study.

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