TURKISH VALIDITY AND RELIABILITY STUDY OF FACE MASK PERCEPTIONS SCALE

YÜZ MASKESİ ALGILARI ÖLÇEĞİ TÜRKÇE GEÇERLİK VE GÜVENİRLİK ÇALIŞMASI

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ABSTRACT

Aim: This study was conducted to evaluate the validity and reliability of the Face Mask Perception scale in Turkish society.

Materials and methods: The research was carried out on nurses working in city Training and Research Hospital. The research was carried out between October 2021. "Data from 334 participants were collected. The data in the study were collected using the Introductory Questionnaire and Face Mask Perception Scale prepared by the researchers.

Results: According to the factor analysis, the Kaiser-Meyer-Olkin value of the scale was 0.91, the Barlett's Test result was significant ($p<0.001$) and no item was removed from the scale. The scale consists of 32 items in total. The scale has an eight-factor structure and the total variance explanation rate is 85.49%. The Cronbach Alpha value of the scale is 0.94. Scoring of the scale is a seven-point Likert type, with a score of 1.00, Strongly Agree, and 7.00. The developed scale has thirty-two items and eight sub-dimensions.

Conclusion: As a result of the analyzes and reliability measurements, it shows that the Face Mask Perceptions Scale is a suitable scale for Turkish society.

Keywords: Prevention & control, Reliability and Validity, SARS-CoV-2.

ÖZET

Amaç: Bu çalışma, Yüz Maskesi Algısı ölçeğinin Türk toplumunda geçerlik ve güvenirliğini değerlendirmek amacıyla yapılmıştır.

Gereç ve yöntem: Araştırma, il Eğitim ve Araştırma Hastanesinde görev yapan hemşireler üzerinde gerçekleştirilmiştir. Araştırma, Ekim 2021 tarihleri arasında gerçekleştirildi. "334 katılımcıdan veri toplandı. Araştırmada veriler, araş tırmacılar tarafından hazırlanan Tanıtıcı Anket ve Yüz Maskesi Algı Ölçeği kullanılarak toplanmıştır.

Bulgular: Faktör analizine göre ölçeğin Kaiser-Meyer-Olkin değeri 0,91 olarak bulundu ve Barlett's Test sonucu anlamlıydı ($p<0,001$) ve ölçekten herhangi bir madde çıkarılmadı. Ölçek toplam 32 maddeden oluşmaktadır. Ölçek sekiz faktörlü bir yapıya sahiptir ve toplam varyans açıklama oranı %85,49'dur. Ölçeğin Cronbach Alfa değeri 0.94'tür. Ölçeğin puanlaması 1,00, Kesinlikle Katılıyorum ve 7,00 şeklinde yedili Likert tipindedir. Geliştirilen ölçek otuz iki madde ve sekiz alt boyuttan oluşmaktadır.

Sonuç: Yapılan analizler ve güvenirlik ölçümleri sonucunda Yüz Maskesi Algıları Ölçeğinin Türk toplumu için uygun bir ölçek olduğunu göstermektedir.

Anahtar Kelimeler: Geçerlik ve Güvenilirlik, Önleme ve Kontrol, SARS-CoV-2

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INTRODUCTION

COVID-19 is spread by respiration. WHO recommends the use of masks as an important part of prevention and control measures to stop the spread of COVID-19. Masks can be used both to protect healthy people and for source control. However, even when the mask is used correctly, it is not enough for protection alone. It is very important to prevent human-to-human transmission of COVID-19. Proper handling, storage and cleaning or proper disposal of masks are essential to ensure they are effective and prevent the increased risk of contamination (WHO, 2020).

The potential advantages of wearing masks by healthy people in the general population are that it prevents infecting others or protects those caring for COVID-19 patients in non-clinical settings (Bion et al., 2010); making people feel that they can contribute to stopping the spread of the virus (WHO, 2020); promoting simultaneous contamination prevention behaviors such as hand hygiene and avoiding mouth, nose, and eye touching (Chen et al., 2020; Shiraly et al., 2020; Betsch et al., 2020). It prevents the transmission of other respiratory diseases such as tuberculosis and flu and reduces the burden of these diseases during pandemics (Cowling et al., 2020, Long et al., 2019; Wang et al., 2020). The number of coronavirus cases worldwide is currently 240,260,449 people and 4,890,424 people have died from the coronavirus (WHO, 2021).

In a study conducted after the mandatory use of masks in public places in the USA, there was a decrease of 0.9 percent to 2.0 percentage points in the daily COVID-19 growth rate in 15 states, and the reason for this decrease was associated with the obligation to wear a mask (Lyu & Wehby, 2020). In a study comparing the COVID-19 transmission rate in countries where individuals with and without mask-wearing behavior live, researchers compared the first 30-day cases of COVID-19 in several countries or regions. Groups are divided into mask-wearing (Japan, Hong Kong, Thailand, Taiwan) and non-mask wearing (Spain, Italy, UK, Germany, France). Afterwards, when the data of these countries on the transmission of COVID-19 were examined, the cases of COVID-19 increased significantly in the five countries in the non-mask-wearing group; COVID-19 cases increased less in the mask-wearing group than in the non-mask-wearing group. Thailand, which is very sensitive about wearing masks, is the country with the highest increase among mask-wearing groups (Li et al., 2020).

FMPS provides an initial way to examine facemask perceptions that could lead to the development of interventions to change facemask use. Three work processes were undertaken to develop the FMPS, a 32-item, 8-dimensional measure to measure the reasons for not wearing a face mask. It shows that FMPS produces significant associations with superior psychometric properties, appropriate proof of validity, and face mask wearing (Howard, 2020).

FMPS first examines perceptions of face masks, identifying a way they can help prevent coronavirus. Second, by examining the factors and perceptions associated with facemask use, it prompts the development of recommendations for promoting facemask wearing in future research. Third, it shows the complexity of face mask perceptions. People don't just have positive or negative perceptions about face masks, they probably have conflicting perceptions. Fourth, it evaluates perceptions of face masks as eight-dimensional rather than one-dimensional, emphasizing that people have different reasons for not wearing face masks (Howard, 2020).

The pandemic is a public health problem. Public health nurses have a lot of responsibility in the fight against this epidemic. In this process, the most effective method of struggle is for the public to adopt and believe in the appropriate mask-wearing behavior. Public health nurses are competent people in bringing this behavior to the public. In this study, it is aimed to determine the mask perceptions of healthcare workers who have to wear masks for most of the day due to their job and to contribute to the literature by making the Turkish validity and reliability of the scale. This study was conducted to evaluate the validity and reliability of the Face Mask Perception scale in Turkish society.

MATERIAL AND METHOD

Research Design

This research was carried out as a psychometric in order to adapt Face Mask Perception to Turkish society and to determine its validity and reliability.

Place and Time of Research

The research was carried out on nurses working in city Training and Research Hospital. The research was conducted between October 2021.

Population and Sample of the Research

The universe of the research consisted of nurses working in Malatya Training and Research Hospital. The sample size of the study was determined as 95% with 0.05 error level and 0.25 effect size, and 320 people with 0.95 universe representation power at effect size by power analysis.

Data Collection Tools

The data in the study were collected using the Introductory Questionnaire and Face Mask Perception Scale prepared by the researchers.

Introductory Questionnaire Form: This form, developed by the researchers, consists of 12 questions that determine the socio-demographic characteristics of healthcare workers and their knowledge of mask use.

Face Mask Perceptions Scale (FMPS)

The scale was carried out by Howard in 2020. The scale consists of thirty-two items and eight sub-dimensions. Howard was made with the aim of investigating the reasons why people do not wear face masks and to guide methods to encourage them to wear masks. The FMPS scale consists of eight sub-dimensions: Comfort, Efficiency doubts, Access, Compensation, Discomfort, Appearance, Attention, and Independence.

Language validity

First, Matt C. Howard (responsible author) was contacted via e-mail in order to adapt the scale into Turkish and to conduct validity and reliability studies. Afterwards, necessary permissions were obtained from the author for the adaptation of the scale. First of all, the scale was translated into Turkish by 5 experts, three from Public Health Nursing and two from linguistics. The 5 texts obtained were combined into a common text by 2 different Public Health Nursing specialists. This text has been translated into English by a translator.

Afterwards, the English language of the text was reviewed by the committee composed of linguists, clinicians and academicians, and the language validity of the scale was approved.

Validity

According to the factor analysis, the Kaiser-Meyer-Olkin value of the scale was 0.914, and the Barlett's Test result was significant ($p<0.001$) (Table 2). No item's contribution to the factor was found to be equal to or lower than the 0.40 limit value and was not removed from the scale. In its final form, the scale was collected in eight factors. The total variance explanation rate of these eight factors was found to be 70.01%. The scale consists of 32 items and eight sub-dimensions (Comfort, Efficacy doubts, Access, Compensation, Discomfort, Appearance, Attention, Independence). Each sub-dimension has 4 items.

Reliability

The Cronbach's Alpha coefficient of the scale was calculated as 0.948, and it was determined that it had a summable score feature.

Confirmatory Factor Analysis Results

The compatibility of the model that emerged after the principal component analysis was tested with confirmatory factor analysis.

Data collecting

A short informative message describing the purpose of the study was sent to all health personnel working in city Training and Research Hospital and their consent was obtained. Then, the questionnaire created from the Google forms was sent to the health personnel via the WhatsApp application. The average time for filling out the questionnaire is 10-15 minutes.

Evaluation of Study Data

The data obtained from the study were evaluated using Bartlett's test of sphericity, Cronbach α reliability coefficient, factor analysis and Kaiser–Meyer–Olkin analyzes.

Ethical Principles of Research

Permission was obtained from Matt C. Howard via e-mail to adapt the scale into Turkish. İnönü University Health Sciences Scientific Research and Publication Ethics Committee approval (16-11-2021/2621) was obtained before starting the study. In addition, the participants were informed about the research and their individual consents were obtained.

RESULTS

The mean age of nurse in the study was 34.83±9.67. In the study, 72.2% of the nurse were women, 61.4% were married, 76.6% were university graduates, 54.5% nurses, 75.7% stated that their perceived income level was medium, 57.2% of them stated that their perceived health level was medium. 44% of the employees stated that they wear masks 7-10 hours a day, 36.5% change their masks daily, 42.8% have COVID-19 disease, 23.7% have a chronic disease, 66.5% do not smoke.

Table 1. Descriptive Characteristics

Descriptive Features	S	%
Gender		
Female	241	72.2
Male	93	27.8
Marital status		
Married	205	61.4
Single	129	38.6
Level of education		
Primary education	13	3.9
High school	40	12.0
University	256	76.6
Graduate and above	25	7.5
Perceived income status		
Good	50	15.0
Middle	253	75.7
Bad	31	9.3
Perceived health status		
Good	131	39.2
Middle	191	57.2
Bad	12	3.6
Occupations		
Nurse	182	54.5
Secretary	36	10.8
Patient referral	18	5.4
Technician (laborant, x-ray, anesthetic)	30	9.0
Cleaning Staff	9	2.7
Other	59	17.7
Daily mask wearing time		
1-3 hours	64	19.2
4-6 hours	84	25.1
7-10 hours	147	44.0
11 and above	39	11.7
Mask change frequency		
1-3 hours	69	20.7
4-6 hours	101	30.2
7-10 hours	42	12.6
Daily	122	36.5
COVID-19 catching status		
Yes	143	42.8
No	191	57.2
Presence of chronic disease		
Yes	79	23.7
No	255	76.3

Smoking status		
Yes	112	33.5
No	222	66.5
Average age	34.83±9.67	(mean±sd)

In Table 2, the results of KMO sampling adequacy measurement and Bartlett's sphericity test were found to be 0.91 and 13018.32, respectively. It was observed that both tests were significant at the p=0.000 level.

Table 2. Results of the Kaiser–Meyer–Olkin (KMO) measure of sampling adequacy and Bartlett's test of sphericity

Test		Results	
KMO measure of sampling adequacy		0.914	
Bartlett's test	Approximate x^2	13018.32	**p=0.000**
	df	496	
	Significance	0.000	

Table 3 shows the results of the 8-factor analysis on 32 items in the scale. The factor structure of the scale was determined using principal component method and analyzes were made using varimax rotation. It was determined that the items were well distributed and suitable for their factors. It was determined that the items in the scale loaded on eight factors and explained 85.48% of the variance. The Cronbach α coefficient for FMPS was determined as 0.94.

Table 3. Factor loadings, Cronbach's α, and Mean of the scale (n = 333)

Scale	Factor loadings	Cronbach's α	Mean±SD
Comfort			
1. Face masks disrupt my breathing.	.876	.947	4.80±2.20
2. It is difficult to breathe when wearing a face mask.	.881	.946	4.90±2.14
3. Face masks cause me to overheat.	.878	.946	4.95±2.13
4. Face masks get too hot.	.862	.947	4.72±2.17
Efficacy Doubts			
1. Face masks provide few health benefits.	.741	.946	3.20±1.91
2. Face masks just provide a false sense of security.	.871	.946	2.83±1.81
3. Face masks are ineffective.	.847	.946	2.72±1.81
4. Face masks are unsafe because they force you to touch your face.	.806	.946	2.99±1.94
Access			
1. I do not know where to buy a face mask.	.748	.949	1.67±1.29
2. There is nowhere for me to buy the proper type of face mask.	.880	.949	1.79±1.30
3. It is difficult to get a face mask.	.842	.948	1.65±1.20
4. Face masks are too expensive.	.740	.949	1.98±1.57
Compensation			
1. I stay away from people when I go out.	.840	.947	4.02±2.10
2. I already social distance.	.896	.947	4.21±2.10
3. I can avoid people when I go out anyways.	.886	.947	4.04±2.09
4. I only go out for a short period of time.	.768	.948	3.43±2.06
Inconvenience			
1. I do not like remembering to wear a face mask.	.601	.946	3.57±2.22
2. I forget to wear a face mask when going out.	.778	.946	3.00±2.08
3. Wearing a face mask is too much of a hassle.	.719	.945	3.20±2.14
4. It is hard to develop the habit of wearing a face mask.	.706	.945	3.26±2.07
Appearance			
1. Face masks look dumb.	.779	.947	2.16±1.75
2. Face masks look silly.	.829	.947	2.03±1.59
3. Face masks are ugly.	.816	.947	2.03±1.60
4. Face masks look weird.	.738	.947	2.09±1.62

Attention

1. Face masks make people seem untrustworthy.	.828	.947	1.97±1.50
2. Face masks make people look suspicious.	.863	.947	2.00±1.48
3. Face masks make others uncomfortable.	.846	.947	1.93±1.45
4. Face masks make other people feel uneasy.	.846	.947	1.97±1.49

Independence

1. I do not like feeling forced to do something.	.750	.946	3.07±2.26
2. I do not like blindly following suggestions.	.801	.946	3.33±2.31
3. I value my independence.	.778	.947	4.08±2.38
4. I want to prove a point against authority.	.664	.946	3.04±2.16

Cronbach's α	.948

Varyans = %85.48

Eigenvalue = 2.49

Confirmatory Factor Analysis was performed to support the findings regarding the sub-dimensions of the FMPS Scale. Confirmatory Factor Analysis (CFA) fit index values for the FMPS Scale; $X2=197,388$, $df=27$ ($p<0.05$), $X2/df=4.60$, RMSEA=0.115. After confirmatory factor analysis, it was determined that it did not fit well in terms of RMSEA and X2/df values. According to the modification recommendations 1-5, 4-7; It was determined that error covariances were high between 7-8, 8-9. A second CFA was performed by associating error covariances to these items. The result of the DFA; $X2=27.242$, $df=23$ ($p<0.05$), $X2/df=2.463$, RMSEA=0.066, IFI=0.952 and CFI=0.951. Path diagram for this is shown in figure 1. The X2/df ratio obtained as a result of DFA is ≤5, the RMSEA value is ≤0.08, and the CFI and IFI values are higher than 0.90 are accepted as the lower limits of the data fit index of the model (Erkorkmaz et al., 2013). IFI values greater than 0.90 are considered the lower limits of the model's data fit index.
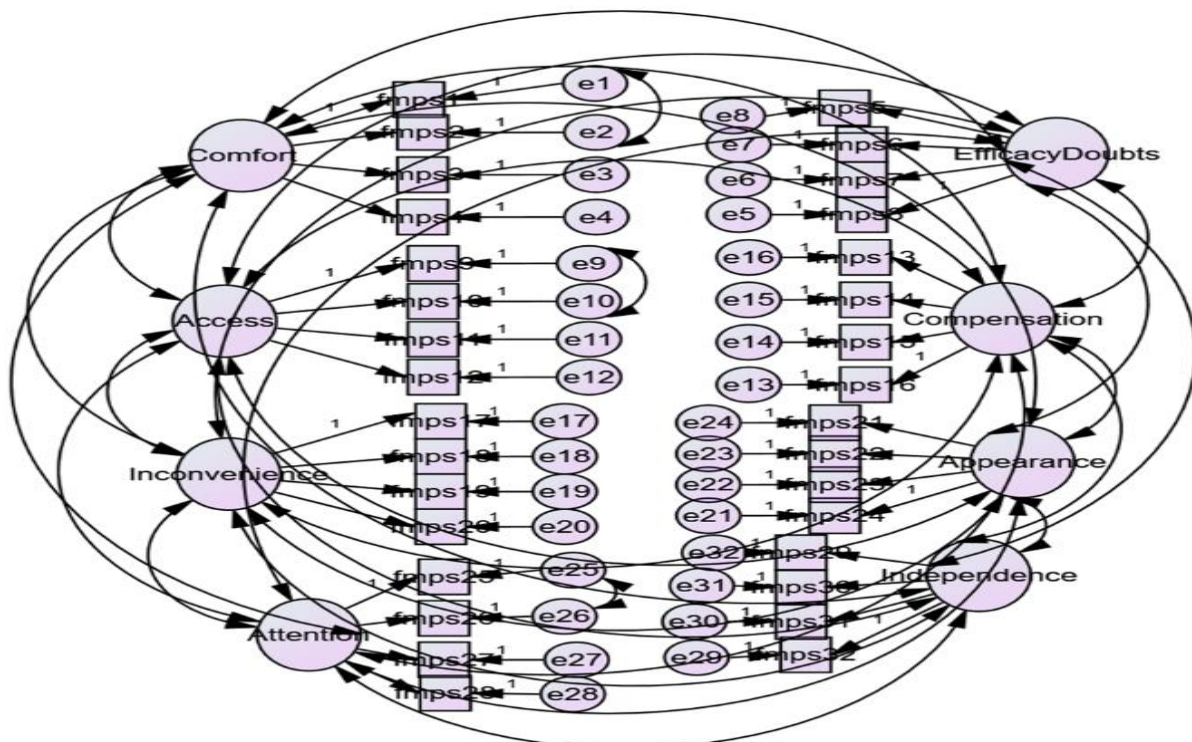

Figure 1: Model of The Factor Structure of FMPS Scale

In Howard's study, CFA fit index values of the scale; CFI = 0.95, IFI = 0.95, RMSEA = 0.05, SRMR = 0.07, v2/df = 1.86 (Howard, 2020).

DISCUSSION

In studies in the literature; It has been found that wearing a mask contributes to the control of COVID-19 by reducing the spread of infected saliva and respiratory droplets from individuals with asymptomatic or mild COVID-19 (Eikenberry et al., 2020; Greenhalgh et al., 2020; Cheng et al., 2020; Lee et al., 2020). For this reason, the correct use of a face mask is very important to reduce the spread of respiratory tract infections in a society (Taş, 2020).

Many health organizations, especially WHO, and health institutions of countries have recommended the use of masks in order to prevent the spread of the said COVID-19 epidemic. In fact, many countries have aimed to spread masks by distributing masks and making masks obligatory, by developing various policies (WHO, 2020; TR Ministry of Health, 2020; Centers for Disease Control and Prevention, 2020; Center for Health Protection, 2020; Ministry of Health, 2020).

Studies on the use of masks in Turkish society are limited. In the study of Kocabaş et al. on nursing students; The rate of wearing a mask when going out of the house was found to be 97.6%. [20] Of those who wore masks when going out of the house, 93.5% wore masks to protect themselves from the COVID-19 virus, 54.8% to protect others, 22% to avoid punishment, and 8.6% to avoid reaction from the society. For those who do not wear masks; 12% did not wear masks because it irritated their skin, 42.8% could not breathe easily, 12.4% did not believe that masks had a protective function, 10.6% had headaches and 21.9% did not wear masks because it bothered them. 3.7% of the participants received a warning/punishment for not wearing a mask. In another study, this rate was 83% (Alıcılar et al., 2020). In a study conducted with 2315 people in Poland, it was determined that 60.4% of the participants used face masks (Matusiak et al., 2020). Carbon in his study; The higher the frequency of wearing masks in the social group, the less the participants felt awkward and wore masks (Carbon, 2021). There is no scale in Turkey that evaluates people's perceptions of wearing face masks. This study will both contribute to the national literature and provide information about the perceptions of wearing face masks in different populations in the international literature.

In the research, 44% of the health personnel stated that they wear masks for 7-10 hours a day, and 36.5% stated that they change their masks daily (Table1). In the study of Kocabaş et al., 28.9% of nursing students stated that they use the same mask throughout the day and 72.2 of them stated that they change their masks daily (Kocabaş et al., 2021). In our study, the KMO value was calculated as 0.91, and this value was found to be appropriate. As a result of Bartlett Sphericity test, the chi-square value was found to be acceptable ($\chi2 =13018.32$; $p<0.001$) (Table 2). On the other hand, the calculated Barlett Sphericity test value was also significant ($\chi2= 13018.32$, $df= 496$; $p<.01$). According to Field (2009), a KMO value greater than 0.50 means that the variables forming the scale can predict each other. The values obtained showed that the data obtained from the sample were suitable for factor analysis (Field, 2009).

In factor analysis, a factor load value of 0.45 and above is considered a good measure. FMPS factor loading values; varies between 0.601 and 0.886 in eight factors (Table 3). This shows that factor loading values in all eight factors are above the accepted minimum value of 0.45, that is, it is a valid scale.

In our study, it was determined that the Cronbach's Alpha values of the scale items were between 0.945 and 0.949, and the total Cronbach's Alpha value of the scale was 0.948.

For Likert-type scales, Cronbach's Alpha analysis is a frequently used method to determine internal consistency. It is defined as an analysis that determines whether the items in the scale are consistent or not and the homogeneity of the scale (Aktürk & Acemoğlu; Çakmur, 2012).

When the Cronbach values of the scale are examined, it is not reliable if it is between 0.00-0.40, 0.40-0.60 is low reliability, 0.60-0.80 is highly reliable, and between 0.80-1.00 it is considered to have high reliability (Çakmur, 2012).

Limitations of the Research

Our study was carried out with only health personnel to ensure homogeneity. For this reason, it is recommended to conduct studies in different occupational groups and different populations in the society by using the scale. Finally, the psychometric relevance of the scale should also be evaluated with larger populations.

CONCLUSION

This scale was developed to identify reasons for not wearing a face mask. There may be many reasons for people not to wear face masks, with various implications for research and practice. Our study shows that the FMPS Scale is a suitable scale for Turkish society as a result of statistical analyzes and reliability measurements.

Conflict of Interest
The authors have no conflicts of interest to declare

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