CULTURAL ADAPTATION AND VALIDATION OF THE REASON OF USING FACE MASK SCALE FOR BRAZILIANS

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ABSTRACT

Objective: to carry out the translation, cultural adaptation and validation of the Reason of Using Face Mask Scale among Brazilians. Methods: methodological study conducted between April and May 2020 using the following steps: translation; synthesis of translations; back-translation; committee of judges; pre-test and evaluation of psychometric properties. Data collection took place online from messages sent through social media. The questionnaire was made available from a link and the data stored in Google Forms. Exploratory Factor Analysis, Kaiser-Meyer-Olkin and Bartlett’s Sphericity tests were used to check if the sample was adequate and factorable. Results: the scale was translated into Portuguese, evaluated by five experts, pre-tested with 20 adults and applied to 500 people from the Brazilian population. The content validity index for the scale as a whole was 0.92. The Kaiser-Meyer-Olkin (0.639) and Bartlett’s Sphericity test (p=0.000) values indicated that the items were factorable. The explained variance was 62.18%. In the construct validity for different groups, a satisfactory result was obtained (p<0.05). Conclusion: the Brazilian Version of the scale was adapted to the Brazilian culture and is valid to evaluate the reasons for the use of masks among Brazilians.

Keywords: Personal Protective Equipment. Masks.COVID-19. Validation Study. Psychometrics.

INTRODUCTION

The outbreak of coronavirus disease 2019 (COVID-19), initially identified at the end of 2019, was classified by the World Health Organization (WHO) as a pandemic in March 2020. This situation culminated in new health demands at global levels, such as adaptations in social coexistence and the use of obstructive methods to halt the spread of severe acute respiratory syndrome (SARS-CoV-2) (1). Among these methods, face masks quickly gained prominence and began to be adopted by countries in different continents (2).

In Brazil, the population began to use face masks in different environments, such as public spaces and homes, in addition to health services, both healthy people and those with flu-like symptoms (3). Such use is an important preventive action, with the potential to reduce the chain of transmission of the virus, insofar as this individual action is beneficial for collective protection (4).

Nevertheless, the scarcity of this Personal Protective Equipment (PPE) has become the center of recent discussions between managers and specialists (5) and a key issue regarding disease prevention and control measures, so that researchers have been engaged in the search for evidence on measures more accessible to different population groups, such as the use of fabric masks(6,7).

In the Brazilian context, the use of face masks in everyday life is a novelty. Therefore, studies are needed to evaluate adherence to this practice, as well as the reasons that motivate people to adhere to it. However, in Brazil, no valid and reliable instruments have been found...
that evaluate the reasons why people wear face masks, nor with similar purposes. Thus, it should be highlighted that tools such as these can contribute to the development of health education strategies on the theme.

Nevertheless, a scale in this directive, the *Reason of Using Face Mask Scale*, was developed in English by researcher Simon Ching Lam for application in the multinational project entitled: “*Face mask use among general public during the outbreak of COVID-19: a multi-country cross-sectional study*”, from the adaptation of a research instrument, based on the Health Belief Model, used in Hong Kong, to determine the factors associated with the individual practice of preventive behavior (use of face mask) during the outbreak of Severe Acute Respiratory Syndrome (8).

In this context, considering the current pandemic scenario, the importance of evaluating the reasons why people use face masks, the absence of instruments of this nature validated in Brazil and the participation of Brazilian researchers in the aforementioned multicenter study, the following research question was established: Is the Brazilian Version of the *Reason of Using Face Mask Scale* valid to evaluate the reasons for the use of masks among Brazilians? Accordingly, the objective of the study was to carry out the translation, cultural adaptation and validation of the *Reason of Using Face Mask Scale* among Brazilians.

**METHODS**

This is a methodological research, with a quantitative approach, developed between April and May 2020, through the following steps: initial translation; synthesis of translations; back-translation; face and content evaluation by a committee of judges; pre-test and evaluation of psychometric properties (9).

Two Brazilian translators carried out the translation of the instrument from English to Brazilian Portuguese. The translators were certified, independent, from the health area and without prior knowledge of the study objectives. Two versions of the scale were generated, from which a synthesis was performed among the researchers, which culminated in the elaboration of the consensual version (version 1).

Back-translation was carried out by two other translators, different from the initial translation, independent, also from the health area and certified. Version 1 was back-translated into the original language, English, so that the coherence between the original and translated versions could be evaluated, with due transmission to the author of the original instrument, the international coordinator of the multicenter study, who approved this translated version, without indicating changes.

The committee of judges was composed of health experts. As inclusion criteria adopted for the judges, it was considered: nurses and/or health professionals with experience in the theme of scale validation; and, as exclusion criteria, it was chosen to exclude professionals who only perform administrative and managerial activities.

The selection of judges was performed through curricula on the Lattes Platform of the Coordination for the Improvement of Higher Education Personnel (CAPES, as per its Portuguese acronym). The selected judges responded to the parameters of Fehring model, which considers experts only those participants who achieve a minimum score of five points, following the scoring logic (10). In addition, according to the literature, for validation procedures, up to 20 participants are recommended at this step (11). Accordingly, for this study, a total of five experts were considered.

The judges’ evaluation instrument was made available in an online format, through Google Forms. The judges were invited to participate in the research through messages sent by WhatsApp® Messenger or electronic mail, where the link containing the instruments was included.

Version 1 was sent to this committee for face and content validation, which made it possible to check the wording of the items regarding their clarity, i.e., if they were written in a way that was understandable to what was proposed. The judges received, via e-mail, the version of the original scale in English, the first consensus version and the evaluative instrument, so that the semantic, idiomatic, cultural, and conceptual equivalences could be checked (9).

The evaluative instrument contained a Likert-type scale with scores ranging from 1 to 4, with
the objective of evaluating the clarity of the items and the instrument, as follows: 1- not clear; 2- unclear; 3- clear; and, 4-very clear. In addition, the instrument had fields for suggestions regarding the clarity of the items. For the evaluation of the agreement among the judges, the Content Validity Index (CVI) was adopted both for the individual items (I-CVI) and for the average of the items (S-CVI/Ave)\(^{(12)}\).

After this step, the Brazilian Version of the *Reason of Using Face Mask Scale* was assigned for the pre-test, performed via an online form with 20 adult participants to explore the pattern of participants’ responses, seeking to identify their understanding of the translated instrument. A form with general information and the Brazilian Version of the *Reason of Using Face Mask Scale* were applied with a field for suggestions. The sample was selected for convenience among individuals over 18 years of age.

In the evaluation of the psychometric properties, adults with internet access and residents in the five regions of Brazil participated. The minimum number of participants in this step was established following the recommendation that, for a significant factor loading of 0.30, at least 350 individuals from the target audience are needed\(^{(13)}\).

People were invited, through messages, WhatsApp\(^{®}\), Instagram\(^{®}\), Facebook\(^{®}\) and other social media, which contained a link to the data collection form, which included the following instruments prepared in Google Forms: a) form for the socioeconomic characterization of the general population; b) Brazilian Version of the *Reason of Using Face Mask Scale*.

The version adapted by the Chinese author Simon Lam consists of 13 items, three more than the version by Tang and Wong\(^{(10)}\), distributed in five domains: perceived susceptibility (items 1, 2 and 3); perceived severity (items 4 and 5); perceived benefits (item 6); perceived barriers (items 7 and 8); and action tips for (items 9, 10, 11, 12 and 13), which lead to knowledge about the reasons for the use of mask among people.

The scale score is Likert-type, with four response options (not at all, a little, a lot or extremely) for 11 of the items, except for items 2 and 3, whose responses are “yes” or “no”. Each domain has its minimum and maximum score (1 to 4 for the Likert scale; “0” for yes and “1” for no), which together represent a total of 46 points, being that, the closer to this value, the greater the perception of the participants’ reasons attributed to the use of masks.

For the evaluation of face and content by the committee of judges, a Likert-type scale was used, with scores ranging from 1 to 4, with the objective of evaluating the relevance and representativeness of each item, as follows: 1 = not representative, 2 = not very representative; 3 = representative and 4 = very representative\(^{(14)}\). I-CVI was calculated from the sum of responses classified as 3 and 4 (representative or very representative), divided by the total number of responses, while S-CVI/Ave by the general average of the items. The values recommended as satisfactory must be greater than 0.78 for I-CVI and greater than 0.80 for S-CVI/Ave\(^{(15)}\).

For the evaluation of psychometric properties, the IBM® SPSS v.20 software was adopted. Descriptive statistics were used to characterize the participants, through analysis of absolute and relative frequencies, central tendency (mean) and dispersion (standard deviation). For checking the factor structure of the instrument, Confirmatory Factor Analysis (CFA) was used, followed by Exploratory Factor Analysis (EFA). Before starting EFA, the Kaiser-Meyer-Olkin (KMO) and Bartlett’s Sphericity (anti-image correlation matrix, AIC) tests were performed to check if the sample was adequate and factorable.

The KMO values can vary from 0 to 1, and the closer to 1, where the better the AIC is considered statistically significant (p<0.05) when no variable is correlated with the other, thus indicating the existence of sufficient correlations between/among the variables. After the KMO and AIC tests confirm that the matrix is factorable, the factors are extracted. The factor extraction methods adopted were unweighted least squares and varimax rotation with Kaiser Normalization\(^{(16)}\).

The adjustments considered satisfactory for CFA were: root mean square error of approximation (RMSEA)<0.08, Normalized Fit Index (NFI) and Comparative Fit Index (CFI) >0.90\(^{(17)}\).

Construct validity by known groups\(^{(18)}\) was
checked by obtaining the scale score and comparing age and working or not in the health area. The T-test and ANOVA were used to compare the mean scores obtained for the Brazilian Version of the Reason of Using Face Mask Scale, ranging from 13 to 46 points. A value of \( p < 0.05 \) was considered.

The study was approved by the National Research Ethics Committee (CONEP, as per its Portuguese acronym) under Opinion n° 3.971.512 and CAAE: 30572120.0.0000.0008. Ethical aspects were respected and confidentiality was guaranteed to participants. The Free and Informed Consent Term (FICF) was signed online after clarification about the research. The second copy of this FICF was guaranteed to the participants through the "download" option.

### RESULTS

The instrument was translated by two independent translators, generating a consensual version from a synthesis of the two versions, which was back-translated into the source language and approved by the author of the original instrument.

Consequently, in the cultural adaptation of the instrument, the evaluation was held by a committee of five judges (100%), four (80.0%) were female and one (20.0%) was male. Of the total, three (60.0%) had a doctoral degree, one (20.0%) had a master’s degree and one (20%) had a post-doctoral degree. The content validity index obtained for the scale as a whole (S-CVI/Ave) was 0.92, while the validity index for the items (I-CVI) resulted in a variation between 0.8 and 1.0. These results revealed excellent content validity for both the scale in general and its items.

For all items of the instrument there were suggestions for modification. The suggestion in terms of replacing the word “outbreak” with “epidemic/pandemic” was made for all items, as well as the replacement of the expression “what degree” with “how much”. It is worth mentioning that the improvement of the formatting (appearance) of the instrument was suggested by most of the judges, since its availability took place in the online format (Chart 1).

| Items                                                                 | Judges’ suggestions                                                                                     |
|-----------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|
| 1-Do you feel vulnerable to contracting the disease outbreak?         | Replace the word "outbreak" with "epidemic/pandemic"                                                    |
| 2-Did you know or have close contact with individuals infected with the disease outbreak? | Delete the word “If”. Replace the word "outbreak" with "epidemic/pandemic"                             |
| 3-Did you have symptoms similar to the disease outbreak (such as sore throat, cough, fever, muscle pain and shortness of breath)? | Delete the word "If". Replace the word "outbreak" with "epidemic/pandemic"                             |
| 4-To what degree were you afraid of contracting the disease outbreak? | Replace the word "outbreak" with "epidemic/pandemic"                                                    |
| 5-To what degree were you concerned about the place becoming a quarantined city because of the spread of the disease outbreak in the community? | Delete the expression "What degree".                                                                    |
| 6-To what degree did you agree to wearing face masks could prevent the contraction and spread of the disease outbreak? | Delete the expression: “What degree”. Do not use the word "contraction". Keep only "spread".             |
| 7-To what degree did you have difficulty in obtaining face masks?     | Delete the expression: "What degree".                                                                   |
| 8-What is the level of discomfort when using a face mask?              | Replace the response option "not at all" with "none"                                                    |
| 9- To what degree did the local government encourage you to wear a mask? | Replace "government" with "management"                                                                   |
| 10-To what degree did your family members and/or colleagues encourage you to wear face masks? | Delete the expression "What degree".                                                                   |
| 11-Do you perceive that you had adequate knowledge about the disease outbreak? | Delete the expression "Do you perceive"                                                              |
| 12-Do you think the local health authorities provided adequate information about the disease outbreak? | Change response options to "very and extremely"                                                       |
| 13-To what degree did you believe you could adequately use the mask?  | Rewrite the item: Do you believe you used the mask adequately?                                        |

Chart 1. Description of the judges’ suggestions for the scale items, Rio das Ostras, RJ, Brazil. 2021
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After the step of the work of the committee of judges and the back-translation, some adjustments were made and the Brazilian Version of the Reason of Using Face Mask Scale was created.

A total of 20 (100%) adults participated in the pre-test, with 18 female (90.0%) and 2 (10.0%) male. As for education, 12 (60.0%) reported having higher education, 6 (30.0%) had a graduate degree and 2 (10.0%) had secondary education. Changes were suggested only in the presentation layout of the Brazilian Version of the Reason of Using Face Mask Scale, which were accepted. Finally, the instrument was submitted to the evaluation of the psychometric properties.

For checking the factor structure of the instrument, 500 (100.0%) individuals from the general population from different regions of the country participated in the study. The participants, with a mean age of 31 years (SD=11.9), were mostly women, 346 (69.2%), single, 294 (58.8%), with graduation, 364 (72.8), and not working in the health area, 357 (71.4%).

CFA was used to confirm the factor structure of the original version of the Reason of Using Face Mask Scale. Nevertheless, the adjustments were not satisfactory (RMSEA=0.150; CFI=0.000; NFI=0.000) and the model was not confirmed, indicating that the Brazilian Version of the Reason of Using Face Mask Scale does not have the same factor structure as the original instrument. Accordingly, EFA was carried out to identify the new model.

The values obtained for KMO (0.639) and for Bartlett’s Sphericity test (p=0.000) indicated a satisfactory condition for Exploratory Factor Analysis. For 13 items of the instrument, the factor loadings were above 0.30, with an explained variance of 62.18% (Table 1).

### Table 1. Factor matrix of the Brazilian Version of the Reason of Using Face Mask Scale according to varimax rotation (n=500). Rio das Ostras, RJ, Brazil. 2021

| Items | Factors | 1       | 2       | 3       | 4       | 5       |
|-------|---------|---------|---------|---------|---------|---------|
| Item 4 | 0.825   |         |         |         |         |         |
| Item 5 | 0.748   |         |         |         |         |         |
| Item1 | 0.504   |         |         |         |         |         |
| Item 6 | 0.422   |         |         |         |         |         |
| Item3 |         | 0.998   |         |         |         |         |
| Item2 |         | 0.620   |         |         |         |         |
| Item11 |         |         | 0.982   |         |         |         |
| Item12 |         |         |         | 0.573   |         |         |
| Item9 |         |         |         |         | 0.533   |         |
| Item10 |         |         |         |         |         | 0.303   |
| Item13 |         |         |         |         |         | 0.301   |
| Item8 |         |         |         |         |         | 0.624   |
| Item13 |         |         |         |         |         | 0.381   |
| Item7 |         |         |         |         |         | 0.323   |

Extraction Method: Unweighted Least Squares; Rotation Method: Varimax with Kaiser Normalization.

The Brazilian Version of the Reason of Using Face Mask Scale is also composed of 13 items allocated into five domains, according to the Health Belief Model, namely: perceived susceptibility (two items), perceived severity (four items), perceived benefits (one item), action tips (four items) and perceived barriers (two items) (Chart 2).

In the evaluation of construct validity by known groups, there was a statistically significant difference (t=-2.59; p=0.010) in the comparison of the scale scores, with higher individuals working in the health area (32.7; SD=4.0) when compared to those who did not work in the area (31.7; SD=3.8). A significant statistical difference (t=2.20; p=0.028) was also observed in the comparison of the scale scores between the participants’ age. People aged between 18 and 28 years had higher scores (32.4; SD=3.7) than those aged 29 years or older (31.6; SD=4.1). These results show that the Brazilian Version of the Reason of Using Face Mask Scale has sensitivity to detect the difference between/among known groups.
Chart 2. Brazilian Version of the *Reason of Using Face Mask Scale* according to the scale domains. Rio das Ostras, RJ, Brazil. 2021

| Items       | Item description                                                                 |
|-------------|----------------------------------------------------------------------------------|
| Perceived susceptibility                      | 2. Did you know or have close contact with individuals infected with the epidemic/pandemic disease? |
|             | 3. Did you have symptoms similar to the epidemic/pandemic disease (such as sore throat, cough, fever, muscle pain and shortness of breath)? |
| Perceived severity                             | 4. How afraid were you of contracting the epidemic/pandemic disease?               |
|             | 5. How concerned were you that the place where you live becomes a quarantined city because of the spread of epidemic/pandemic disease in the community? |
|             | 1. Do you feel vulnerable to contracting the epidemic/pandemic disease?           |
|             | 6. How much did you agree that wearing face masks could prevent the contraction and spread of epidemic/pandemic disease? |
| Perceived benefits                             | 11. Do you perceive that you had adequate knowledge about the epidemic/pandemic disease? |
| Action tips                                      | 12. Do you think the local health authorities provided adequate information about the epidemic/pandemic disease? |
|             | 9. How much did the local government encourage you to wear a face mask?           |
|             | 10. How much did your family members and/or colleagues encourage you to wear face masks? |
|             | 13. How much do you believe you used the face mask correctly?                    |
| Perceived barriers                              | 8. How much discomfort do you feel when using a face mask?                        |
|             | 7. How much difficulty did you have in obtaining face masks?                    |

**DISCUSSION**

This study carried out the translation, cultural adaptation and validation of the *Reason of Using Face Mask Scale* among Brazilians. The cultural adaptation of a measurement instrument to a culture and language different from the original involves a broad process that requires a rigorous evaluation of idiomatic, conceptual, semantic and measurement equivalences\(^{(19)}\). In turn, the analysis of the adapted version carried out by a committee of experts makes it possible to evaluate the face and content validity of the translated instrument\(^{(14)}\). This step is essential in the process of validating measurement instruments, in order to guarantee that the elements contained in the instrument are clear, representative and appropriate to measure the construct that is proposed to be measured\(^{(22)}\).

Usually, in order to carry out a more rigorous and precise evaluation of the consensus of the modifications suggested by specialists, the use of the CVI is recommended, which consists of an index that evaluates the agreement of the obtained responses. This measure can be performed considering the set of items as a whole and can also be calculated for each item in the instrument. When evaluating the whole, the recommended values should be greater than 0.90\(^{(14)}\), and the closer to 1, the better the obtained agreement indexes. In this study, the results obtained for both the global CVI (S-CVI/Ave) and the CVI for each item (I-CVI) revealed excellent content validity.

When it is intended to carry out the cultural adaptation of a measurement instrument, it must be considered that, after the end of this process, it is essential that the instrument be validated prior to its application. This process involves the measurement of several parameters, being the evaluation of the psychometric properties essential to guarantee its quality\(^{(21)}\).

The analysis of the factor structure of the instrument is configured as an indispensable type of validity in the validation process, since it makes it possible to check the hypothetical dimensionality of the construct to be studied\(^{(18)}\). In this study, factor analysis was used to explore the existing domains in the model. After this analysis, the Brazilian Version of the *Reason of Using Face Mask Scale* was obtained, consisting of 13 items allocated into five domains, namely: perceived susceptibility, perceived severity, perceived benefits, action tips and perceived barriers. The set of items discusses the reasons related to the use of masks in the context of the Health Belief Model, and its use is indicated to identify the determinants of mask use\(^{(8)}\).
Investigating the factors that influence the use of masks was the objective of a literature review conducted by researchers from Singapore using the Health Belief Model, considering the individual and the environment where he/she is inserted in five factors, exactly: perceived susceptibility, perceived severity, perceived benefits, perceived barriers and action tips (22).

The aforementioned investigation shows that individuals are more likely to wear masks due to perceived susceptibility and perceived severity, with perceived benefits being the most significant effects in complying with this practice. As barriers, experiences and discomfort were cited, and actions for use included the promotion of public and organizational health guidelines provided to the population (22).

A survey conducted Chinese adults in Hong Kong using the same instrument identified that 61.2% of respondents claimed to use masks to prevent SARS, where three of the five components of the Health Belief Model were significant predictors for adherence to this measure, being perceived susceptibility, action tips and perceived benefits (8).

In the evaluation of the perceived benefits of using the mask, the Reason of Using Face Mask Scale considers if the individual has knowledge about the epidemic/pandemic disease. Some authors argue that the media play an important role in disseminating this information and that, depending on the considerations made by these communication channels, people will have a perception of high risk or not. The news disseminated about the risks that a particular disease poses to health can influence decision-making, as well as can promote positive behaviors (23), which can affect not only the perception of risk at a personal level but also at a social level (24).

In the construct validity by different groups, a satisfactory result was obtained in this study. In this evaluation, the instrument is expected to be sensitive in order to detect differences (20). In this sense, the Brazilian Version of the scale showed sensitivity in detecting differences in scores among the compared groups.

It is known that the use of masks among Brazilians is current and consists of a measure that has been held, considering the context of the COVID-19 pandemic, not being a routine practice among the population, even in the face of flu symptoms or other respiratory diseases. Nonetheless, it is necessary to consider the reasons that influence its use. Since there is evidence, the perception of susceptibility and severity, in addition to the benefits and barriers, within the pandemic context, can determine the adoption of preventive measures, intensifying positive behaviors (24).

Assuming that the Reason of Using Face Mask Scale was built based on the Health Belief Model and that individual perceptions weigh in on the adoption or not of modifiable risk actions, such as the use of masks (24), the availability of the Brazilian Version will enable the evaluation of the reasons attributed to the use of masks in the pandemic context in Brazil. Moreover, the validation of a measurement instrument is important both for carrying out methodological research and for supporting health actions (25), as it can favor the targeting of strategies that aim to identify possible obstacles and improve adherence to the use of this protective equipment.

As a limitation of the study, the type of online study is pointed out, making it impossible for people who do not have access to digital tools to participate.

**CONCLUSION**

The Reason of Using Face Mask Scale was translated and adapted for the Brazilian culture, having satisfactory evidence of validity to evaluate the reasons for the use of masks among Brazilians. The Brazilian Version of the Reason of Using Face Mask Scale is a valid instrument that provides important contributions to the analysis of reasons for the use of masks.

The findings of this study are innovative, since there is no scale available in Brazil to evaluate this construct. It is important to underline that this instrument was adapted to the Brazilian cultural characteristics, within the pandemic context, as the use of masks is something new for this population. Furthermore, future studies are expected to be developed so that the applicability of the instrument is evaluated in different contexts and regions of the country, with the objective of identifying the reasons for the use of masks.
ADAPTAÇÃO CULTURAL E VALIDAÇÃO DA REASON OF USING FACE MASKS CALE PARA BRASILEIROS

RESUMO

Objetivo: realizar a tradução, adaptação cultural e validação da Reason of Using Face Mask Scale entre brasileiros.

Métodos: estudo metodológico realizado entre abril e maio de 2020 mediante as seguintes etapas: tradução; síntese das traduções; retrotradução; comitê de juízes; pré-teste e avaliação das propriedades psicométricas. A coleta dos dados foi online a partir de mensagens enviadas por meio de mídias sociais. O questionário foi disponibilizado a partir de um link e os dados armazenados no Google Forms. Utilizou-se a Análise Fatorial Exploratória, testes de Kaiser-Meyer-Olkin e de Esfericidade de Bartlett para constatar se a amostra era adequada e passível de factorização.

Resultados: a escala foi traduzida para o português, avaliada por cinco especialistas, pré-testada com 20 adultos e aplicada em 500 pessoas da população brasileira. O índice de validade de conteúdo para a escala como um todo foi de 0,92. Os valores de Kaiser-Meyer-Olkin (0,639) e teste de esfericidade de Bartlett (p=0,000) indicaram que os itens eram fatoráveis. A variância explicada foi de 62,18%. Na validade de construto por grupos distintos, obteve-se resultado satisfatório (p<0,05). Conclusão: a Versão Brasileira da escalafoi adaptada para a cultura brasileira, sendo válida para avaliar os motivos para o uso de máscaras entre brasileiros.

Palavras-chave: Equipamento de Proteção Individual. Máscaras. COVID-19. Estudos de Validação. Psicometria.

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