Application for coping with COVID-19 by health professionals in home care

Aplicativo para enfrentamento da COVID-19 por profissionais de saúde na Atenção Domiciliar

Aplicación para enfrentamiento del COVID-19 por profesionales de la salud en la atención domiciliaria

José Ronaldo Alves[1] https://orcid.org/0000-0002-4255-8884
Geraldo Magela Salomé[1] https://orcid.org/0000-0002-7315-4866
Flávio Dutra Miranda[1] https://orcid.org/0000-0002-1631-0164

How to cite:
Alves JR, Salomé GM, Miranda FD. Application for coping with COVID-19 by health professionals in home care. Acta Paul Enferm. 2022;35:eAPE01436.

DOI
http://dx.doi.org/10.37689/acta-ape/2022AO0143666

Keywords
Personal Protective Equipment; Occupational Health; Occupational Exposure; House Calls; COVID-19; Coronavirus infections; Information technology

Descritores
Equipamento de proteção individual; Saúde do trabalhador; Exposição ocupacional; Visita domiciliar; COVID-19; Infecções por coronavírus; Tecnologia da informação

Descriptores
Equipo de protección personal; Salud laboral; Exposición profesional; Visita domiciliaria; COVID-19; Infecciones por coronavirus; Tecnología de la información

Submitted
June 1, 2021

Accepted
January 19, 2022

Corresponding author
Geraldo Magela Salomé
E-mail: salomereiki@univas.edu.br

Associate Editor (Peer review process):
Paula Hino
(https://orcid.org/0000-0002-1408-196X)
Escola Paulista de Enfermagem, Universidade Federal de São Paulo, SP, Brazil

Abstract

Objective: To present the development and validation of an application to guide health professionals on Personal Protective Equipment donning and doffing in the context of the COVID-19 pandemic, as well as the guidelines in this regard that they are able to pass on to patients in home visit.

Methods: The application validation was performed with 55 health professionals (nurses, physiotherapists and physicians) who were on the front line to combat COVID-19 in home care, using the Delphi technique. For data analysis, Content Validity Index and Cronbach's alpha coefficient were adopted.

Results: Most judges assessed the application from inadequate to fully adequate in the first assessment. After corrections according to suggestions, the application was reassessed as adequate to fully adequate. The mean Cronbach's alpha coefficient was 0.942, characterizing the instrument's internal consistency. Content Validity Index in the first assessment ranged from 0.935 to 0.939, and in the second assessment it was 1.0.

Conclusion: The *Orienta COVID-19* application was validated by professionals who were on the front line in the fight against COVID-19 with consensus among judges in the second assessment.

Resumo

Objetivo: Apresentar o desenvolvimento e a validação de um aplicativo para orientar profissionais da saúde sobre paramentação e desparamentação dos Equipamentos de Proteção Individual no contexto da pandemia da COVID-19, bem como as orientações a esse respeito que eles são capazes de passar ao paciente em visita domiciliar.

Métodos: A validação do aplicativo foi realizada com 55 profissionais de saúde (enfermeiros, fisioterapeutas e médicos) que estavam na linha de frente de combate à COVID-19 na Atenção Domiciliar, utilizando-se técnica Delphi. Para a análise de dados, foram adotados Índice de Validade de Conteúdo e coeficiente alfa de Cronbach.

Resultados: A maioria dos juízes avaliou o aplicativo entre inadequado a totalmente adequado na primeira avaliação. Após correções de acordo com as sugestões, o aplicativo foi reavaliado como adequado a totalmente adequado. A média do coeficiente alfa de Cronbach foi de 0,942, caracterizando consistência interna do instrumento excelente. O Índice de Validade do Conteúdo na primeira avaliação variou entre 0,935 e 0,939, e, na segunda avaliação, foi de 1,0.

Conclusão: O aplicativo orienta COVID-19 foi validado por profissionais que estavam na linha de frente no combate à COVID-19 com consenso entre os juízes na segunda avaliação.

[1]Universidade do Vale do Sapucaí, Pouso Alegre, MG, Brazil.
Conflicts of interest: nothing to declare.

Resumen

Objetivo: Presentar la elaboración y validación de una aplicación para orientar a profesionales de la salud sobre colocación y retiro de los Equipos de Protección Personal en el contexto de la pandemia del COVID-19, así como instrucciones sobre este tema que puedan brindarle al paciente en visita domiciliaria.

Métodos: La validación de la aplicación fue realizada con 55 profesionales de la salud (enfermeros, fisioterapeutas y médicos) que estaban en la línea de frente de combate contra el COVID-19 en la atención domiciliaria y se utilizó el método Delphi. Para el análisis de datos, se adoptó el Índice de Validez de Contenido y coeficiente alfa de Cronbach.

Resultados: La mayoría de los jueces evaluó la aplicación entre inadecuada y totalmente adecuada en la primera evaluación. Luego de las correcciones basadas en las sugerencias, la aplicación fue revaluada de adecuada a totalmente adecuada. El promedio del coeficiente alfa de Cronbach fue de 0,942, que caracterizó una consistencia interna excelente del instrumento. En la primera evaluación, el Índice de Validez de Contenido varió entre 0,935 y 0,939, y en la segunda evaluación fue de 1,0.

Conclusión: La aplicación orienta COVID-19 fue validada por profesionales que estaban en la línea de frente de combate contra el COVID-19, con consenso entre los jueces en la segunda evaluación.

Introduction

The World Health Organization (WHO), seeking to reduce the spread of coronavirus disease 2019 (COVID-19) globally, recommends some measures that should be put into practice by Family Health Strategy (FHS) professionals during home visits, such as use of Personal Protective Equipment. They should also guide patients and family members on the form of COVID-19 transmission, the necessary distancing, the correct use of masks, hand hygiene with 70% gel alcohol, or hand hygiene with water and soap.[1,2]

Some patients who are seen by FHS may present neurological disorders, hypertension, diabetes, sickle cell anemia, skin lesion and others so that many are more susceptible to coronavirus of severe acute respiratory syndrome 2 (SARS-CoV-2), and it is important using Personal Protective Equipment (PPE) by professionals during home visit.[3]

Professionals who provide home care to FHS individuals should have technical and scientific knowledge that goes beyond those obtained in their training. Entering the home and developing care actions requires much more than knowing and acting, because care is performed in a space of mastery of patients and their family.[4]

In FHS, nurses provide care considering both the structural and organizational aspects of public health care, in order to offer higher quality care and resolution. It plays an important role in rescuing the bond of care between nurses and family, in the search to contribute to improving the quality of health and life of individuals in the family environment. It should also perform basic epidemiological and health surveillance care actions for children, adolescents, women, workers and older adults, in addition to acting as instructor/supervisor of Community Health Workers and in the management of nursing staff and the Health Unit, and participating in the Municipal Health Council.[3,4]

During home visits, professionals must perform hand hygiene with 70% gel alcohol or with soap and water before and after the visit, and use Personal Protective Equipment.[5-7] Such equipment is intended to protect workers' physical integrity and include gloves, eye or facial protectors, respiratory protectors and aprons. Proper use of PPE involves not only the efficiency required to control the risk of exposure, but also comfort in its use. Discomfort during the use of equipment causes the professional not to use it and does not incorporate it into routine practice.[5-7]

After the care of patients suspected or confirmed with COVID-19 attended by FHS professionals, all PPE should be removed and disposed of correctly. Immediately after disposal, hand hygiene should be done. Potentially infected waste must be treated before the environmentally appropriate final disposal.

In times such as the COVID-19 pandemic, the use of mobile applications by FHS professionals facilitates access to information on the preventive measures of this disease, the technique of donning and doffing and combating the spread of fake news. With the app installed on the mobile phone,

professionals can access the information quickly, at any time.

Using computational technologies in the educational and health areas has been innovating teaching and learning relationships and theoretical-practical relationships in care, demonstrating that the interactivity provided by virtual learning environments favors the learning process and the provision of safe care without harm to patients.[8,9]

This study aimed to present the development and validation of an application to guide health professionals on PPE donning and doffing in the context of the COVID-19 pandemic, as well as the guidelines in this regard that they are able to pass on to patients on home visits.

Methods

This is a methodological study, applied in the modality of technological production based on software engineering, of multicenter, qualitative and quantitative character, for an instrument validation by a panel of judges.

The study can be divided into two stages: application development and instrument validation.

Application development

Initially, theme identification, research question selection and integrative literature review were carried out. In the application development, the methodology of contextualized instructional design was used, which involves a constructivist proposal based on the intentional action of planning, developing and applying specific didactic situations, incorporating mechanisms that favor contextualization.[10,11]

The choice of the theme arose during several home visits made in 2020 by the authors of this study, who worked at FHS in a city in the countryside of the state of Minas Gerais, when it was observed, during home visits to several patients with COVID-19, that some professionals used PPE inappropriately. Furthermore, it was noticed that some patients, family members and caregivers also had difficulties with social etiquette, social distancing, mask use (surgical or homemade), in the care of mask during and after its removal as well as in washing it. During the development of this research, no publication related to this problem was found.

It was used in the elaboration of questions for the resolution of the clinical question the PICO strategy, in which "P" corresponds to the population (health professionals performed home visits in accordance with FHS); "I" corresponds to intervention (technique of PPE donning and doffing and preventive measures to prevent the spread of COVID-19 among health professionals, patients, family members and caregivers); "C" refers to comparison (does not apply); and "O" refers to outcome (application).[12]

Two fundamental questions were determined: What are the correct techniques for PPE donning and doffing that health professionals should use during home care in FHS, in care for suspected patients or with COVID-19? What are the guidelines on preventive measures that should be provided by FHS health professionals to patients, family members and caregivers, in order to prevent the spread of COVID-19?

To answer these questions, an integrative literature review was carried out with the MEDLINE®, Scientific Electronic Library Online (SciELO) and Latin American and Caribbean Health Sciences Literature (LILACS) databases. The search was conducted on November 22, 2020, using the descriptors "coronavirus infections", "family health strategy" and "PPE". The search strategy occurred from its different combinations, adopting the Boolean operator AND (e.g., coronavirus infections AND family health strategy AND Personal Protective Equipment), in Portuguese, Spanish and English, depending on the base researched. Primary studies related to the theme available in full, original and published in 2020 were included. Theses, dissertations, monographs, technical reports and articles that, after reading the abstract, were not related to the proposed theme were excluded.

From the literature review, didactic content was produced; the topics were defined; the sub-

jects were drafted; the media was selected and the application interface design was designed. The didactic contents were divided into two main topics: COVID-19 infection and use of PPE by health professionals during the COVID-19 pandemic. Information on definition, type, signs and symptoms of COVID-19 and preventive measures described in the articles, which are recommended by the WHO, were included, according to which health professionals should guide patients, family members, caregivers and the community during home care, to avoid contamination and transmission of COVID-19.

In the topic on use of PPE by health professionals, the definition of PPE was provided. The types of PPE that should be used by professionals during the home visit and the donning and doffing techniques of this equipment were informed, which were described in the articles selected during the literature review, which are recommended by WHO. Well-defined instructions on the correct techniques of PPE donning and doffing during home care were included, which should be performed in a systematic way, to prevent the professional from contracting the disease.

The development of the software comprised the selection of tools, the definition of the navigation structure, the structural planning of environments, the tool setting, educational technological resources and the construction of an environment to download the application from the internet and install it on the mobile device. The final validated version of the application, called *Orienta COVID-19*, has 40 screens and 130 images (Figure 1).

Instrument validation

The target audience for the use of *Orienta COVID-19* comprised all health professionals working in FHS. The application content validation was performed by a panel of judges composed of nurses, physicians and physiotherapists, belonging to the target audience and working on the front line for coping with COVID-19.

The judges were selected by means of snowball convenience sampling. Thus, after the identification of a subject who met the study inclusion criteria, it was requested the nomination of other possible participants. Judges with an undergraduate degree in nursing, physical therapy or medicine and working on the front lines of COVID-19 were included. Professionals who agreed to participate in the study but did not answer or submitted the assessment questionnaire within 8 days of receipt were excluded from the study.

Figure 1. Screen examples of *Orienta COVID-19*. (A) Summary of topics covered; (B) recommendations for home care; (C) donning and doffing techniques; (D) care for the homemade mask

The number of panelists was defined based on Brazilian Association of Technical Standards ISO/IEC 25062:2011, which recommends minimum sampling of ten participants for each type of professional participating in the study. In this study, the judges (nurses, physiotherapists and physicians) who met the inclusion criteria totaled 55 participants, according to the current norm.

Data were collected from January to February 2021 using the Delphi technique.[13] This technique uses questionnaires to assess the instrument content by judges, in search of a level of agreement of 50% to 100% among them. Usually, there are two to three rounds or assessment cycles, and there may be more. In this study, 100% agreement among judges was considered necessary for the application validation.[14]

Each study participant received an invitation letter by e-mail consisting of the researcher's initial presentation; elucidations on the research topic; copy of the opinion of the Research Ethics Committee; Informed Consent Form; explanations about the importance of the evaluator for the study, about the assessment cycles and to carry out the assessment and send the answered questionnaire within 8 days, counting from the day of submission.

The questionnaire was divided into two parts: identification of evaluators (five questions), including name, type of undergraduate degree, time since graduation, time working in the area and academic background; and application assessment (19 questions), involving the application content assessment regarding the graphical presentation, sequence of topics, clarity and understanding of information; the scientific basis of the information; material appropriate to the sociocultural level of the proposed target audience; writing style and appropriate illustrations and in sufficient quantities. The following were assessed: definition of COVID-19; descriptions of signs and symptoms of COVID-19; prevention measures; respiratory etiquette; recommendations to caregivers for home care; definition of PPE; description of types of PPE recommended by WHO to be used by health professionals during the COVID-19 pandemic; descriptions of donning and doffing techniques for PPE; recommendations for home care during the COVID-19 pandemic; guidelines to reduce transmission of COVID-19 and description of homemade mask.

The answers to the assessment questions were arranged on a four-point Likert scale, with "adequate", "partially adequate", "totally adequate" and "inadequate" response options, with instructions for optional descriptive answers. The answers marked "adequate" or "totally adequate" by judges were counted. Items classified as "inadequate" or "partially adequate" were reviewed based on suggestions made and presented in a new assessment round, according to the Delphi technique.[14]

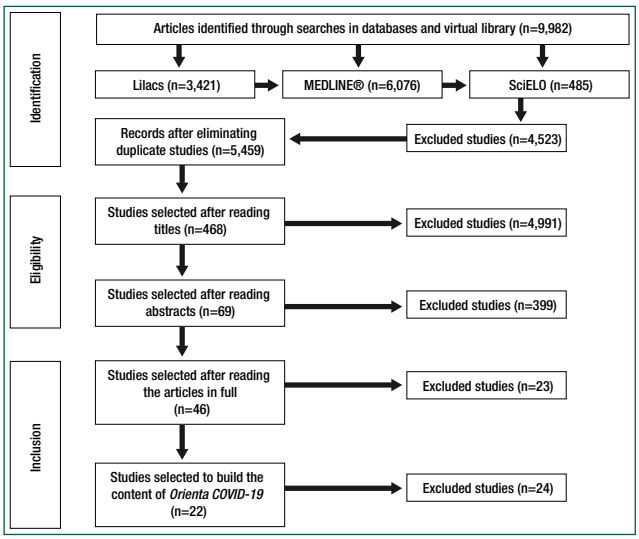
Cronbach's alpha coefficient was used to assess the questionnaire's internal consistency to estimate the reliability of the instrument applied to the research. Cronbach's alpha is calculated from variance of individual items and from variance of the sum of the items for each evaluator, for all items in a questionnaire that use the same measurement scale.

Content Validity Index (CVI) aims to measure the proportion or percentage of judges who agree on certain aspects of an instrument content. In this context, CVI was calculated from the mean of the number of "adequate" and "fully adequate" answers provided by judges. To verify the instrument validity regarding content, the agreement value of >0.8 among judges was adopted.

The study was approved by the institutional Ethics Committee (opinion 4,472,241) (CAAE (*Certificado de Apresentação para Apreciação Ética* - Certificate of Presentation for Ethical Consideration) 40578720.9.0000.5102) and developed in accordance with Resolution 466/12 of the Brazilian National Health Council (*Conselho Nacional de Saúde*) that establishes guidelines and regulatory standards for research involving human beings. All participants signed the Informed Consent Form before being included in the study.

Results

During the integrative literature review, 9,982 articles were identified in the LILACS and MEDLINE® databases and in the SciELO virtual library. After excluding articles identified during the interactive literature review, 22 were selected to develop the application *Orienta COVID-19* (Figure 2).



LILACS - Latin American and Caribbean Literature in Health Sciences; SciELO - Scientific Electronic Library Online

Figure 2. Flowchart of the identification, selection and inclusion of studies, based on the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) recommendation

A total of 87 questionnaires were sent, 55 of which were returned within the stipulated period of 8 days. It was observed that 29 (52.70%) were nurses, 15 (27.30%) were physicians and 11 (20.00%) were physiotherapists. Survey participants had more than 10 years of training. Most completed graduate studies and had experience in the care area and as a professor. Table 1 presents the values of Cronbach's alpha coefficient for the questionnaire used and CVI for the first and second assessment of the application by judges. Cronbach's alpha coefficient showed a mean value of 0.93 (range 0.93 to 0.94), indicating excellent internal consistency. In the first round of assessment, all judges assessed the app content as "inadequate" to "fully adequate", resulting in a mean CVI of 0.97 (range 0.94 to 1.0). The judges presented suggestions related to: PPE donning and doffing; care that patients, family members and caregivers should have during and after the use of mask and appropriate material for making homemade masks and washing the mask. The revised application was resubmitted for the second round of assessment, in which all items were assessed as "adequate" or "totally adequate", validating the instrument with a CVI of 1.0, i.e., 100% of agreement among judges.

Table 1. Cronbach's alpha coefficient and Content Validity Index values of the questions used for the application assessment and validation

Items assessed by judges	Cronbach's alpha	CVI	
		First assessment	Second assessment
Graphics introduction	0.93	0.98	1.00
Content sequence	0.93	0.98	1.00
Clarity and easy understanding	0.94	0.94	1.00
Scientifically correct information	0.93	0.98	1.00
Material adequate for the target audience	0.94	1.00	1.00
Writing style	0.94	0.98	1.00
Appropriate illustrations and in sufficient numbers	0.93	0.98	1.00
Definition of COVID-19	0.94	0.98	1.00
Signs and symptoms of COVID-19	0.94	0.96	1.00
Preventive measures	0.93	0.98	1.00
Social respiratory etiquette	0.93	0.98	1.00
Recommendations to caregivers	0.94	0.96	1.00
Definition of PPE	0.94	0.98	1.00
Types of PPE for health care professional	0.93	0.98	1.00
EPI - donning techniques	0.93	0.96	1.00
PPE - doffing techniques	0.93	0.94	1.00
Recommendations for home care	0.93	0.96	1.00
Guidelines for reducing COVID-19	0.93	0.98	1.00
Use of homemade mask	0.93	0.98	1.00
Mean values	0.937	0.97	1.00

Cronbach's alpha coefficient ($\alpha > 0.90$ = excellent internal consistency); CVI > 0.90 = excellent agreement among judges; CVI: Content Validity Index; PPE: Personal Protective Equipment

Discussion

The limitation of this study was related to the low number of responses of experts. However, it is noteworthy that the sample of judges was constituted by a number considered adequate, according to the criteria proposed by the Brazilian Association of Technical Standards ISO/IEC 25062:2011.

Orienta COVID-19 development and validation followed methodological rigor in order to provide information based on scientific evidence that was accessible and easy to understand to health professionals who provided home care and were on the front line of COVID-19. The choice of the *Orienta COVID-19*'s theme came from the observation made by the authors of this study of the inappropriate use of PPE by some health professionals who attended FHS and the difficulty that some patients, family members and caregivers presented with social etiquette, mask use and in social distancing, which could lead to the spread of COVID-19. The application constructed in this study was developed after an integrative literature review and should be used by health professionals who attend at home.

The applications developed after literature review provide support for professionals to provide quality and safe care and identify the needs of each individual and family member who are in their care, outracing preventive measures and assistance with the least possible risk.[15,16]

Applications are important educational materials for coping with various problems in the care and management of services in public health, and it is necessary to be developed with scientific basis. Studies validated by scientific evidence have technical, organizational and political guidelines as a basis and focus on the standardization of clinical, surgical and preventive approaches.[10]

In the area of health, mobile applications are key instruments for the management of quality care and must include all stages of the procedure, providing guidelines for decision-making, especially when these are complex, providing safety for professionals and patients.[9,11] The application was elaborated and structured after literature review to support evidence-based practice; provide a broad view of the entire process; facilitate the management of home care; assist in technical, clinical, administrative and financial procedures, with the aim of improving patient care; minimize risk and damage and reduce the cost of treatment.[7,11,17]

Applications should be assessed for their effectiveness and functionality by the target audience, and the incorporation of relevant suggestions from evaluators is essential in the instrument's validation process.[18,19] The instrument validation by a multidisciplinary panel of judges composed of professionals belonging to the target audience allowed the strengthening of critical-reflexive practice.[20] The excellent level of internal consistency of the questionnaire used for data collection and application validation with 100% agreement among judges are good indications that the application can be used to guide professionals who are on the front line of COVID-19 in decision-making to prevent the infection transmission, at home and in the community.

The use of applications by professionals on the front line of COVID-19, during home care to FHS individuals, provides agility in the search for information, supports decision-making and diagnosis and enables remote monitoring.[19-23]

Specific actions to combat the transmission of COVID-19 should provide the dissemination and implementation of control measures, dissemination of quality health information, reorganization of internal flows of Family Health units and external flows related to other points in the network, in addition to monitoring the isolation of users affected by the disease and their close contacts, including the inclusion of technological health surveillance strategies, such as the use of applications and telephone monitoring.[22-26]

The development of new tools requires the incorporation of other technologies that meet the needs of treatment, which are important for both health professionals and organizations that provide health care. [8,9,27-29]

Orienta COVID-19 can assist health professionals who provide home care to individuals according to FHS, to better organize care in coping with the spread of the COVID-19 pandemic, in PPE donning and doffing, contributing to reducing the risk of transmission of the virus to professionals and from professionals to patients, families and communities.

Conclusion

Orienta COVID-19 was developed and validated by professionals who were on the front line in the fight against COVID-19, through consensus among judges in the second assessment. The application is a practical tool to qualify, direct and guide health professionals who provide home visits to FHS individuals, offering the correct donning and doffing technique and the guidelines that should be offered to individuals and their families, related to COVID-19 prevention.

Collaborations

Alves JR, Salomé GM and Miranda FD state that they contributed to study design, data analysis and interpretation, article writing or relevant critical review of intellectual content and final approval of the version to be published.

References

1. Brasil. Ministério da Saúde. Protocolo de Manejo Clínico para o Novo Coronavírus (2019-nCov). Brasília (DF): Ministério da Saúde; 2020 [citado 2021 Dez 6]. Disponível em: https://www.saude.gov.br/images/pdf/2020/fevereiro/11/protocolomanejo-coronavirus.pdf
2. Tonin L, Lacerda MR, Caceres NT, Hermann AP. Recommendations in COVID-19 times: a view for home care. Rev Bras Enferm. 2020;73(2 Suppl):e20200310.
3. Arruda DE, Martins DD, Silva IF, Sousa MN. Prognóstico de pacientes com COVID-19 e doenças crônicas: uma revisão sistemática. Comunicação Cien Saude. 2020;31(3):79-88.
4. Almeida IL, Garces TS, Sousa GJ, Cestari VR, Florêncio RS, Moreira TM, et al. Rigid social isolation during COVID-19 pandemics in a state of Brazilian Northeast. Acta Paul Enferm. 2021;34:eAPE02531.
5. Struyf T, Deeks JJ, Dinnes J, Takwoingi Y, Davenport C, Leeflang MM, Spijker R, Hooft L, Emperador D, Dittrich S, Domen J, Horn SR, Van den Bruel A; Cochrane COVID-19 Diagnostic Test Accuracy Group. Signs and symptoms to determine if a patient presenting in primary care or hospital outpatient settings has COVID-19 disease. Cochrane Database Syst Rev. 2020;7(7):CD013665.
6. Cordeiro JF, Alves AP, Gir E, Miranda DO, Canini SR. Use of personal protective equipment in a home care service. Cogitare Enferm. 2016;21(3):1-8.
7. Greenhalgh T, Koh GC, Car J, Bonsfield MV, Gusso G, Geise A. Covid-19: avaliação remota em Atenção Primária à Saúde. Rev Bras Med Fam Comunidade. 2020;15(42):2461.
8. Salomé GM, Pontes BC. Pressure ulcers during the covid-19 pandemic. J Nurs UFPE On Line. 2021;15:e246189.
9. Silva MG, Sakata-So KN, Pereira EG, Egry EY. Mobile of the terminology subset for coping with domestic violence against children. Rev Bras Enferm. 2021;74(Suppl 5):e20200287.
10. Melo EB, Primo CC, Romero WG, Sant'Anna HC, Sequeira CA, Lima EF, et al. Construction and validation of a mobile application for development of nursing history and diagnosis. Rev Bras Enferm. 2020;73(Suppl 6):e20190674.
11. Cruz NS, Soares DK, Bernardes A, Gabriel CS, Pereira MC, Evora YD. Nursing undergraduates' technical competence in informatics. Rev Esc Enferm USP. 2011;45 Spec No:1595-9.
12. Medeiros RK, Ferreira Júnior MA, Pinto DP, Vitor AF, Santos VE, Barichello E. Modelo de avaliação de conteúdo de Pasquali nas pesquisas em Enfermagem. Rev Enferm Referencia. 2015;4(4):127-35. Review.
13. Cassiani SH, Rodrigues LP. The Delphi technique and the nominal group as strategies to collect data in nursing research. Acta Paul Enferm. 1996;9(3):76-83.
14. Polit DF, Beck CT. Fundamentos da pesquisa em enfermagem: avaliação de evidências para a prática de enfermagem. Porto Alegre: Artmed; 2011. 456 p.
15. Colodetti R, Prado TM, Bringuente ME, Bicudo SD. Mobile application for the management of diabetic foot ulcers. Acta Paul Enferm. 2021;34:eAPE00702.
16. Salomé GM, Dutra RA. Prevention of facial injuries caused by personal protective equipment during the COVID-19 pandemic. Rev Bras Enferm. 2021;74(Suppl 1):e20201219.
17. Gomes ML, Rodrigues IR, Moura NS, Bezerra KC, Lopes BB, Teixeira JJ, et al. Evaluation of mobile Apps for health promotion of pregnant women with preeclampsia. Acta Paul Enferm. 2019;32(3):275-81.
18. Ferreira DS, Ramos FR, Teixeira E. Mobile application for the educational praxis of nurses in the Family Health Strategy: ideation and prototyping. Esc Anna Nery. 2021;25(1):e20190329.
19. Marques AD, Moreira TM, Carvalho RE, Chaves EM, Oliveira SK, Felipe GF, et al. PEDCARE: validation of a mobile application on diabetic foot self-care. Rev Bras Enferm. 2021;74(Suppl 5):e20200856.
20. Bittencourt MN, Flexa RS, Santos IS, Ferreira LD, Nemer CR, Pena JL. Validação de conteúdo e aparências de manual educativo para promoção da saúde mental infantil. Rev Rene. 2020;21:e43694.
21. Oliveira HC, Souza LC, Leite TC, Campos JF. Personal protective equipment in the coronavirus pandemic: training with Rapid Cycle Deliberate Practice. Rev Bras Enferm. 2020;73(Suppl 2):e20200303.
22. Paula DG, Francisco MR, Freitas JD, Levachof RC, Fonseca BO, Simões BF, et al. Hand hygiene in high complexity sectors as an integrating element in the combat of Sars-CoV-2. Rev Bras Enferm. 2020;73(Suppl 2):e20200316.
23. Figueiredo AM, Figueiredo DC, Gomes LB, Massuda A, Gil-García E, Vianna RP, et al. Social determinants of health and COVID-19 infection in Brazil: an analysis of the pandemic. Rev Bras Enferm. 2020;73(Suppl 2):e20200673.
24. Tibes CM, Dias JD, Zem-Mascarenhas SH. Mobile applications developed for the health sector in brazil: an integrative literature review. Rev Min Enferm. 2014;18(2):479-86.
25. Salome GM, Miranda FD. Validation of a brochure to guide health professionals in the dressing and undressing of personal protective equipment during the SARS-CoV-2 pandemic. J Coloproctol. 2021;41(4):1-7.
26. Miranda FD, Almeida MV, Salome GM. Validation of Algorithms for Donning and Doffing Personal Protective Equipment during the COVID-19 Pandemic. J Coloproctol 2021;41(4):1-8.

27. Salomé GM. Algorithm for paramentation, deparamentation and prevention of facial injuries: COVID-19. Rev Enferm Contemp. 2021;10(2):1-14. Review.

28. Nussbaumer-Streit B, Mayr V, Dobrescu AI, Chapman A, Persad E, Klerings I, et al. Quarantine alone or in combination with other public health measures to control COVID-19: a rapid review. Cochrane Database Syst Rev. 2020;4(4):CD013574. Update in: Cochrane Database Syst Rev. 2020;9:CD013574. Review.

29. Pontes BC, Salomé GM. Booklet on the use of personal protective equipment during the COVID-19 pandemic: preventing facial skin injuries. Fisioter Mov. 2021;34:e34111.