







THEMATIC CONTENT FOR THE DEVELOPMENT OF A MOBILE APPLICATION ABOUT COVID-19

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ABSTRACT

Objective: to analyze thematic content about covid-19 for the development of a mobile application for the population, from the perspective of health professionals.

Method: qualitative research, developed in the state of Rio de Janeiro, between August and October 2020, through an electronic form with health professionals, whose data were processed in IRAMUTEQ software by the methods: Descending Hierarchical Classification, Correspondence Factor Analysis and Similarity Analysis.

Results: the thematic contents identified for the development of the mobile application were protective and behavioral measures, accurate and reliable information on the facts surrounding covid-19, contagion, transmission, as well as information on care locations for the population.

Conclusion: it is concluded that the availability of these contents in a mobile app is more than a facilitator for nurses; it presents itself as a critical component to transform nursing practice and education.

DESCRIPTORS: Mobile Devices; Health Personnel; Coronavirus Infections; Pandemics; Health Education.

CONTENIDO TEMÁTICO PARA EL DESARROLLO DE UNA APLICACIÓN MÓVIL SOBRE COVID-19

RESUMEN:

Objetivo: analizar los contenidos temáticos sobre el covid-19 para el desarrollo de una aplicación móvil para la población, desde la perspectiva de los profesionales de la salud. **Método:** investigación cualitativa, desarrollada en el estado de Río de Janeiro, entre agosto y octubre de 2020, a través de un formulario electrónico con profesionales de la salud, cuyos datos fueron procesados en el software IRAMUTEQ por los métodos: Clasificación Jerárquica Descendente, Análisis Factorial de Correspondencia y Análisis de Similitud. **Resultados:** los contenidos temáticos identificados para el desarrollo de la aplicación móvil fueron: medidas de protección y comportamiento, información precisa y fiable de los hechos que rodean al covid-19, el contagio, la transmisión, además de información sobre los lugares de atención a la población. **Conclusión:** se concluye que la disponibilidad de estos contenidos en una aplicación móvil es más que un facilitador para las enfermeras; se presenta como un componente crítico para transformar la práctica y la educación de la enfermería.

DESCRIPTORES: Dispositivos Móviles; Personal de Salud; Infecciones por Coronavirus; Pandemias; Educación en Salud.

INTRODUCTION

In December 2019, a new type of coronavirus was discovered in Wuhan, China, the SARS-CoV-2, causing severe acute respiratory syndrome and characterized by high transmissibility from person to person⁽¹⁾. On January 23, 2020, the World Health Organization (WHO) declared a "Public Health Emergency of International Concern" and on March 11, 2020, a pandemic was declared⁽²⁾.

The problems resulting from the pandemic are not only restricted to the health field, but also extend to the informational field, where the dissemination of untrue information leads to infodemic, according to the WHO. This phenomenon needs to be controlled, since it imposes severe risks to the population regarding access to reliable sources, considering that social networks can disseminate a multitude of intentionally false news quickly, to the detriment of sharing scientific data⁽³⁾.

This phenomenon has been growing in the pandemic context in Brazil, when added to the lack of scientific technical knowledge and critical thinking, made explicit by the fact that more than 11.5 million Brazilians over the age of 15 are illiterate and 38 million are functionally illiterate⁽³⁾.

From this perspective, communication is essential and accurate information of the facts not only helps the responsible bodies to take more effective measures, but also prevents the adoption of inappropriate conduct by the population. Thus, Brazil and the world are seeking ways to educate the population about the seriousness of covid-19, to reassure them about the actions that must be taken individually and collectively to combat the new coronavirus. Thus, several investments have been undertaken by both health agencies and the world press to refute the high number of false information that has been created and shared through social media⁽⁴⁾.

It is understood, therefore, that information is a fundamental strategy for confronting the pandemic. Therefore, access to the internet through mobile devices, such as smartphones, has played a predominant role in terms of searching and obtaining information in Brazil. In recent decades, it was possible to observe that the quality of health information has become a constant concern, with an exponential increase in the consumption of computer systems aimed at improving the quality of care, where nursing has been increasingly improving through the development and validation of digital tools for care management⁽⁵⁾.

Along these lines, there is an urgent need to analyze the current context and develop educational technologies that assist the teaching-learning of individuals, such as a mobile application for smartphone about covid-19. Thus, emerging mobile applications can become instruments for monitoring clear, objective, reliable, and up-to-date information, aiming to minimize injuries.

It is understood that, given the potential risks caused to the population by the new coronavirus and high infectivity, in addition to a limited number of applications about covid-19 from the perspective of health professionals⁽⁶⁾, it was necessary to identify what information these professionals consider important to include in the mobile application under development about covid-19, to enable qualified and safe information through health education. Thus, the study aims to analyze, from the perspective of health professionals, thematic content about covid-19 for the development of a mobile application for the population.

METHOD

Descriptive research with a qualitative approach. The study included 42 health professionals aged 18 years or more, from different regions of Brazil, which were the inclusion criteria of the study. Health academics were excluded. The Consolidated Criteria for Reporting Qualitative Research (COREQ)⁽⁷⁾ were adopted for the construction and description of the research.

Data collection occurred between August and October 2020, in the state of Rio de Janeiro, through an online semi-structured form in the virtual platform Google Forms. The capture of the intended participants occurred by sending the research link via social media (WhatsApp and email), adopting the snowball technique, a non-probabilistic sample implemented through reference chains aiming to locate possible participants⁽⁸⁾. Thus, the first professionals were invited by the research team itself and, later, from the indications of the participants. It is noteworthy that the collection occurred until the theoretical saturation of data⁽⁹⁾, respecting the minimum necessary for analysis by the IRAMUTEQ software, which recommends between 20 and 30 texts⁽¹⁰⁾.

The data collection form was built by two of the authors and qualitatively evaluated by other authors, members of the research team who are experts on the subject regarding face and content validity. It was composed of two parts, the first consisting of objective questions regarding the sociodemographic profile of the participants, including age, gender, marital status, level of education, profession, pre-existing disease, and whether they had covid-19, including the form of diagnosis and contact with a person diagnosed or suspected of having covid-19.

The second part of the form contained open questions about the object of the study: how can an app help in the understanding and prevention of covid-19? When you have questions about covid-19, where do you find information? Why would you use a mobile application to receive information about covid-19? What information do you think is important to have on the mobile app about covid-19?

The answers coming from the filling out of the forms constituted the primary corpus, which was duly prepared and processed through the software *Interface de R pour Analyses Multidimensionnelles de Textes Et de Questionnaires* (IRAMUTEQ), by the methods of Similarity Analysis, Descending Hierarchical Classification (DHC) and Factorial Correspondence Analysis (FCA).

The active forms of the classes of text segments (nouns, adjectives, adverbs, and unrecognized forms) were rescued, which obtained in the chi-square test a value ≥ 3.84 , therefore, $p < 0.05$, highlighting those with a $p < 0.0001$, since they indicated a strong association between the words in their respective class. Data interpretation was based on the methodological assumptions of the Thematic Content Analysis, aiming to identify the nuclei of meaning of each class, allowing the understanding of the analyzed object⁽¹¹⁾.

The ethical aspects were met in accordance with Resolution No. 466 of 2012 of the National Health Council, and all participants were assured of the secrecy, anonymity, and confidentiality of their information by accepting the Informed Consent Form. The study was submitted to the Ethics and Research Committee of the Universidade Federal Fluminense and had its opinion approved under No. 4,132,385.

RESULTS

Of the 42 health professionals included in the study, 30 (71.4%) were nurses, aged between 20 and 63 years, mean 35.9 years, most were female, 37 (88.09%), and married, 26 (61.9%). Regarding the professional profile, 35 (83.3%) had a complete college education, and seven (16.7%) had an incomplete college education. When asked whether they had

any type of comorbidity, 32 (73.8%) said they did not. Among those who had pre-existing diseases, systemic arterial hypertension, seven (16.6%), was the most cited, followed by respiratory disease, four (9.5%).

In data processing, the corpus was formed by 42 texts, 1198 words, with 343 active forms and 334 hápax (single occurrence), obtaining 51 textual segments, of which 95.8% were used by the IRAMUTEQ software, aiming to analyze the thematic contents about covid-19 for the population from the perspective of health professionals.

Initially, the Similitude Analysis method was adopted, as shown in Figure 1, being possible to observe the interconnection between words, as well as the relationship between them, considering that the co-occurrence index between words can be stronger or weaker, depending on the thickness of the lines (Chi-square test). Thus, it was possible to identify thematic content from the central lexical element "information" and its distinct connections, highlighting the strongest relationships with the terms: prevention, form, disease, covid-19, treatment, doubt, clarify, symptom, and transmission.

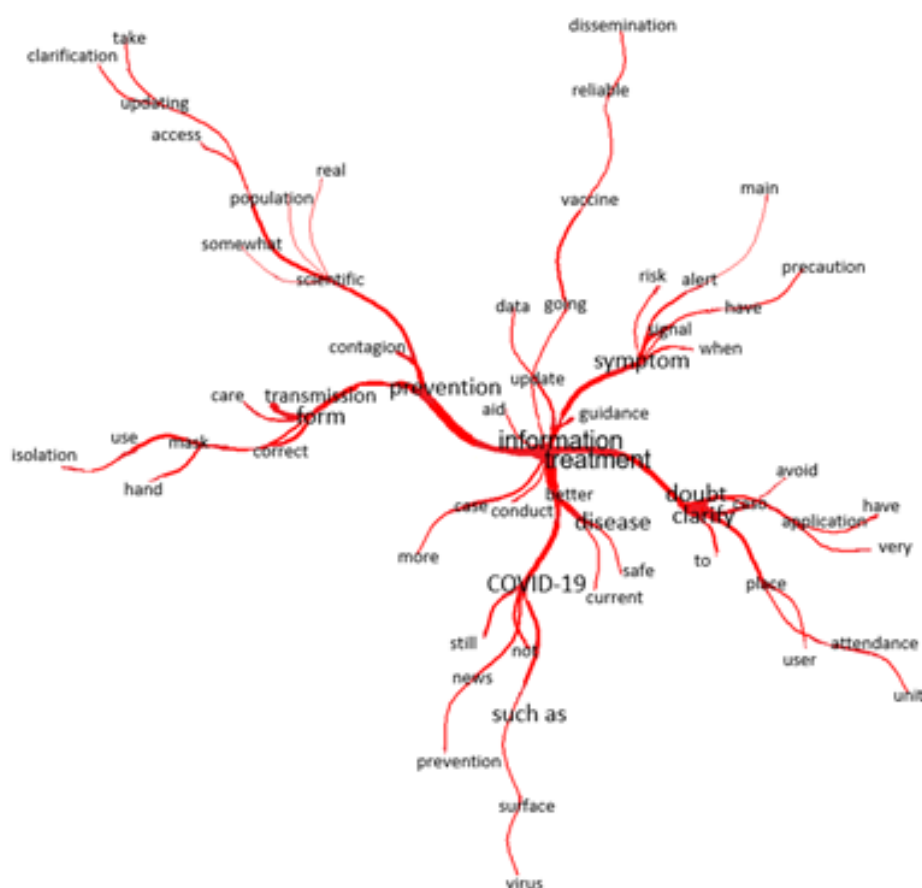


Figure 1 - Similarity Analysis. Rio de Janeiro, RJ, Brazil, 2020
Source: Authors (2020)

Thus, through the analysis of the connectedness of the words and the meanings of the answers, it was possible to see that health professionals believe that the content to be made available through the mobile application needs to deal with the forms of transmission and prevention of the grievance, besides containing information about the symptoms and appropriate treatment.

Another method used in the study was the Descending Hierarchical Classification (DHC) which made it possible to obtain a stable classification where the textual segments were distributed into homogeneous lexical classes, allowing a deeper understanding of the object of study. The DHC generated three definitive classes. The dendrogram presents words with associative strength confirmed by the results of the chi-square test ($Qui^2 \geq 3.84$) and the relationship between the classes (Figure 2).

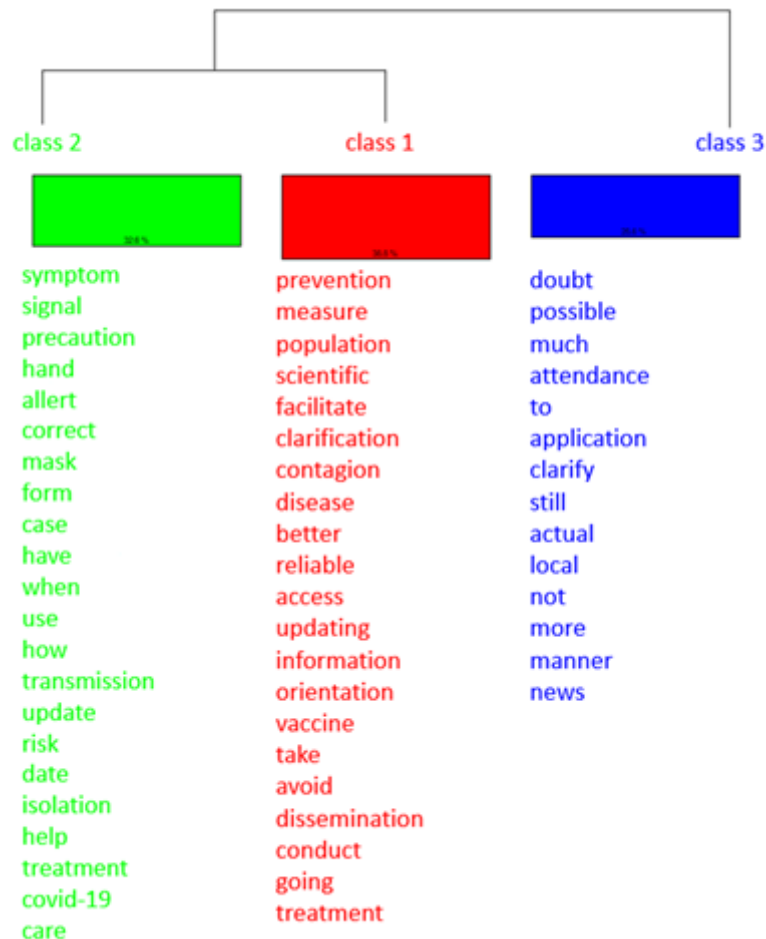


Figure 2 - Dendrogram of the Descending Hierarchical Classification with the significant words. Rio de Janeiro, RJ, Brazil, 2020
Source: Authors (2020)

Initially, the software divided the corpus into two sub-corpus: the first formed by class 3 (blue) (28.6%), which, in lexical terms, opposes the other classes (1 and 2); and the second composed of classes 1 (red) (38.7%) and 2 (green) (32.6%), which present an association among them. That is, while they present vocabulary like each other (classes 1 and 2), they present vocabulary different from the text segments of the other classes, in this case, class 3. From that, the text segments were rescued and interpreted in a detailed way, and each class, facing its nuclei of meaning, received a denomination, as described below.

Class 1 - Preventive measures against covid-19

Class 1 was responsible for 38.8% of the text segments, whose active form that

showed high significant association ($Qui^2 \geq 3.84$ and $p < 0.0001$) was: "prevention", being the central term in this class. However, other words also presented a connection between these terms ($Qui^2 \geq 3.84$), among them, in descending order: measure, population, scientific, facilitate, enlightenment, and contagion.

The term prevention is the main one in this class. From the grouping of textual fragments, it was possible to observe that health professionals consider that prevention is an essential thematic content in the application about covid-19, facing the risks and aggravations imposed by the infection caused by the new coronavirus.

Referring to the disease, but mainly in relation to prevention measures. (Prof 06)

Correct orientation of the population about prevention. (Prof 32)

[...] all relevant information about the theme, mainly about prevention [...]. (Prof 13)

In this directive, it is observed that health professionals consider important, in addition to information on the means of infection, that the application includes content about the appropriate care to be put into practice before, during and after illness, including with contacts, to prevent and control this grievance.

[...] means of infection and care that should be taken with contacts. (Prof 37)

[...] contamination and contagion, as well as care during and after illness [...]. (Prof 17)

All and any information that contributes to effective measures and decision making by the population in the prevention and control of covid-19. (Prof 41)

Still in the perspective of how an application can help in the control of covid-19, health professionals reported the importance of sharing accurate and reliable information of the facts, aiming to assist the adoption of protective measures by the population.

It would be of great help in obtaining correct information about the disease [...]. (Prof 11)

[...] Nothing better than a platform with correct information and based on technical and scientific knowledge for the correct orientation of the population. (Prof 32)

It is considered that information from serious institutions and research are the best ways to know and prevent the disease [...]. (Prof 17)

Another aspect pointed out by the professionals about the application was its configuration, which should be easily accessible, attractive, with clear language, besides being playful, enabling interaction with the user to obtain information about covid-19.

Through images of drawings because few people have patience to read because it becomes tiresome [...]. (Prof 07)

[...] with clear and accessible language to the information [...]. (Prof 41)

... it is especially important that it is an application of easy access, dynamic and with appropriate language to the target audience. (Prof 06)

Class 2 - Symptomatology and protective measures against covid-19

Class 2 accounted for 32.6% of the text segments, whose active form that showed strong significant association ($Qui^2 \geq 3.84$ and $p < 0.0001$) was "symptom", being the central term in this class. The vocabulary words that also showed connectedness between these terms ($Qui^2 \geq 3.84$), in descending order, were signal, caution, hand, alert, mask, correct, and form.

The word symptom is the main one in this class. Thus, health professionals emphasize that the application should disseminate information about the symptomatology of this grievance, including in the pediatric population, as shown in the textual fragments.

What to do when someone in the family presents symptoms but is not hospitalized? Besides warning signs in children. (Prof 02)

Explaining all the symptoms and how to proceed [...]. (Prof 15)

Qualifying the information containing signs and symptoms [...]. (Prof 22)

In addition, the text segments and words that characterized this class express the thematic contents about the specific protective measures to be included in the application, namely, hand hygiene, use of masks, cleaning of the environment, and home isolation.

Dissemination of information about hand washing, mask use and disposal, housekeeping, standard precautions when there is a house dweller with suspected or confirmed covid-19. (Prof 26)

Protocols for entering and leaving the house, correct ways to use the mask, proper material to make the mask, and how to wash the masks. (Prof 38)

How to prevent yourself, correct mask use, hand hygiene and social isolation in case of exposure. (Prof 13)

Class 3 - Mobile application as a means of searching and obtaining information about covid-19

Class 3 accounted for 32.6% of the text segments, whose terms that showed a significant association ($Qui^2 \geq 3.84$), with greater connectedness to each other, in descending order, were: doubt, attendance, very, possible, application, and clarify.

The term "doubt" is the main one in this class. In this sense, health professionals consider it important that users have the possibility to expose their doubts in the application, so that the information provided by this technological tool can meet the real needs of the population.

It would still be good to have a channel where users could register their doubts and then have them clarified, thus becoming an application that meets the real demands of users. (Prof 06)

...] maybe a topic in the application that is fed only by current news, an Inbox for doubts. (Prof 16)

A chat that helps to solve doubts of the population, as well as information. (Prof 04)

In addition to information related to prevention, symptomatology and treatment, the participants also considered it important that the app contains information on care locations, to avoid crowding in collapsed health units.

[...] Put some reference units in the app to avoid crowding in places that have no support [...]. (Prof 16)

[...] Using the user's location to direct them to the nearest care locations. (Prof 20)

...] To seek medical help in which location, health center, hospital, or emergency room? [...]. (Prof 02)

The FCA, made from the DHC, was another method chosen in this study, since, besides resuming the frequencies and correlation values ($Qui^2 \geq 3.84$) of each word in the

corpus, it favors the visualization of the typical vocabulary of each class in distinct lexical worlds. Through this factor plan, it is possible to observe the associations and oppositions between words, as presented in Figure 3.

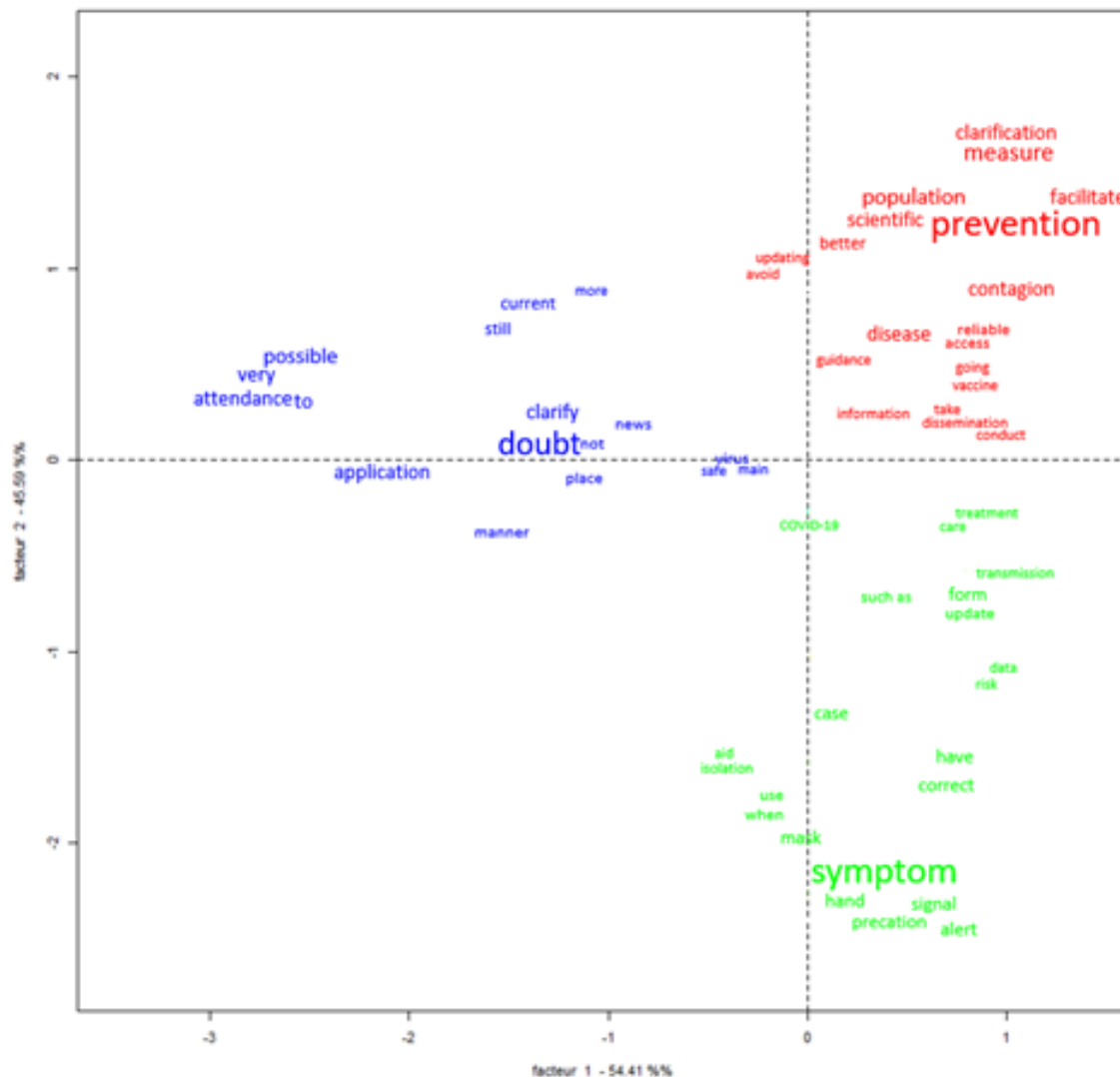


Figure 3 - Correspondence Factor Analysis. Rio de Janeiro, RJ, Brazil, 2020
Source: Authors (2020)

In the horizontal factorial axis, it is observed that classes 1 (red) and 2 (green) are presented in opposite quadrants to class 3 (blue), confirming what was presented in the DHC. In class 1, the central word is prevention, considering its prominent position. Moreover, its proximity to the term's population, scientific, measure, facilitate and clarification reinforces the findings pointed out in class 1 about the relevance of this content to be incorporated into the application, from the perspective of health professionals.

Class 2 (green) is distributed in another quadrant, whose main lexical element is symptom, as presented in the DHC. The connection of this term to the words hand, precaution, sign, and alert, confirm the coherence of the findings in this class, since they deal with the provision of information about protective measures, considered fundamental in the application, such as hand hygiene.

In class 3 (blue), the centrality of the term doubt is confirmed, close, for example, to the words clarify and app, which reinforces that the lexical world of this class points essentially to the recognition of the mobile app on covid-19 as a tool for clarifying doubts for the population.

DISCUSSION

From the results found here, information considered important by health professionals to be made available in the mobile application under construction was highlighted, as health education practices to fight covid-19.

The information that the application should have, from the perspective of the participants, were about: protective and behavioral measures, accurate and reliable information about the facts surrounding covid-19, especially of a scientific nature, contagion, transmission, and information about care centers. In addition, they highlighted the use of the internet as a means of searching for information to clarify doubts, and that the application should have an attractive configuration, easy access, and the use of a colloquial language.

Through the text fragments, it was possible to observe that accurate and reliable information about the facts about covid-19 is a fundamental point, to assist in the adoption of protective measures, and consequent decision making. This fact can be explained by the study that reports that the fake news about the new coronavirus has taken over the social networks with a spread perhaps as large as the virus itself⁽¹²⁾. Thus, monitoring untrue information presents itself as a major challenge at the present time, since the distrust in information passed by the media is growing in large scale, which may represent a serious risk to public health⁽¹³⁾.

Globalization and the growth of the internet have impacted the creation of mobile applications in the health field. The integration of these technologies emerges as an educational proposal capable of expanding the reach of information, besides the establishment of new modes of social and communicational relations. Through this, it becomes possible the independent and autonomous knowledge that assists in decision making, also collaborating to changes in positive attitudes in health practice, significantly favoring the quality of self-care and safer monitoring of health-disease processes⁽¹⁴⁻¹⁵⁾.

The applications show themselves as a promising tool, which aims to synergistically integrate real-time access to reliable and updated information about covid-19 in a safe and qualified way. Thus, they become an inseparable part of the user's daily life in view of the need for information about the infection caused by the new coronavirus, emerging as a differentiated proposal for access to knowledge in a digital and autonomous way⁽¹⁶⁾.

Still on this aspect, a study reports that the use of digital technologies at the present time has great relevance when it comes to guiding the population about covid-19, such as the forms of prevention, recognition of early symptoms and appropriate conduct before diagnosis, thus minimizing the aggravations, with consequent reduction in demand for health services⁽¹⁷⁾. In addition, the WHO ratifies all initiatives aimed at health education to protect the population against this disease⁽¹⁶⁾.

The identification of the real information needs to be included in the development of a mobile application is essential to meet the concrete reality of the population, with contextualized guidelines, not only based on scientific knowledge. Also, corroborating the notes of the participants of this research, a study⁽¹⁹⁾ that developed an application for follow-up of patients with peripheral arterial disease pointed out that the interface of the technology was built to be simple and understandable, to be visibly pleasant and easy to use.

As a limitation of the study, the number of participants may not cover the reality about thematic content about covid-19, so it is possible that there are questions that were not contemplated in this research. Therefore, it is necessary to conduct further studies on this theme for the development of mobile applications about covid-19, based on the gaps that still exist and the demands presented by the audience for whom it will be intended.

CONCLUSION

The development of mobile applications directed to the health field, especially in the current context of the covid-19 pandemic, are of paramount importance, as they become allies for health education.

Based on the findings of this research, in view of the development of the mobile application for the population about covid-19, from the perspective of health professionals, it is noted the urgency of information directed mainly to prevention, early identification of symptoms, and appropriate conduct before, during, and after the diagnosis of the disease. It is understood, therefore, that the availability of these contents in a mobile application is more than a facilitator for nurses, it presents itself as a critical component to transform nursing practice and education.

Thus, through the mobile application, it becomes possible to deliver clear, objective, reliable, and up-to-date educational topics about covid-19 in a practical, dynamic, and reliable way, stimulating its use and at the same time facilitating learning in real time because it is a mobile platform to support health education for civil society in the fight against the pandemic.

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