

# Mobile Application for Teleguidance and Telemonitoring in the care of COVID 19: User Evaluation

## Aplicativo Móvel de Teleorientação e Telemonitoramento no cuidado da COVID 19: Avaliação dos Usuários

**Joao Batista Cavalcante Filho<sup>1</sup>**

Orcid: <https://orcid.org/0000-0001-8642-9868>

**Patrick Joaner Lobo Triarca<sup>2</sup>**

Orcid: <https://orcid.org/0000-0002-6599-9404>

**Luciana Guimaraes Nunes De Paula<sup>3</sup>**

Orcid: <https://orcid.org/0000-0003-4739-6842>

**Flavia Giovannone de Godoy<sup>4</sup>**

Orcid: <https://orcid.org/0000-0002-1699-667X>

**Maria Heliziane dos Santos<sup>5</sup>**

Orcid: <https://orcid.org/0000-0001-9831-892X>

### Abstract

**Introduction:** This study is the result of the Extension Project Monitora COVID 19 - developed by the Federal University of Sergipe - which aims to include, under the guidance of professors at the institution, graduate students in teleguidance and telemonitoring carried out through an application created for this purpose – Application Monitora COVID 19. **Objective:** To assess the satisfaction of users of Application Monitora COVID 19 residing in the state of Sergipe - Brazil. **Materials and Methods:** This is a descriptive, cross-sectional study, through closed questions in a questionnaire produced by the researchers and sent to users of the application electronically. **Results:** it was observed that 57.32% of users said they were very satisfied with the use of the application, while 9 users (5.73%) said they were very dissatisfied with its use. When analyzing the question that used the Net Promoter Score (NPS) methodology, a total of 75.80% of users were classified as promoters and 9.55% as detractors, resulting in an NPS of 66.25, considered very good. **Conclusion:** The COVID 19 pandemic increased the possibilities of using Information and Communication Technologies to expand access to health care. In this experience, the use of an application for teleguidance and telemonitoring was well evaluated by users and may be a legacy of the strategies for coping with the pandemic

**Keywords:** covid-19 pandemic; telemedicine; telemonitoring; teleorientation; information technology; consumer behavior.

### Resumo

**Introdução:** O presente estudo é fruto do Projeto de Extensão Universitária Monitora COVID-19 - desenvolvido pela Universidade Federal de Sergipe - que tem por objetivo inserir, sob a orientação de professores da instituição, estudantes de graduação na teleorientação e telemonitoramento realizados através de um aplicativo criado para este fim – Aplicativo Monitora COVID 19. **Objetivo:** avaliar a satisfação dos usuários do Aplicativo Monitora COVID 19 residentes no estado de Sergipe - Brasil. **Materiais e Métodos:** Trata-se de estudo descritivo, de corte transversal, através de questões fechadas em questionário produzido pelos pesquisadores e enviado aos usuários do aplicativo por via eletrônica. **Resultados:** observou-se

<sup>1</sup> Universidade Federal de Sergipe. Programa de Pós-graduação em Ciências da Saúde, Brasil. E-mail: joaofesfsus@gmail.com

<sup>2</sup> Departamento de Medicina - Universidade Federal de Sergipe, Brasil. E-mail: patricktriarca@hotmail.com

<sup>3</sup> Universidade Federal de Sergipe. Programa de Pós-graduação em Ciências da Saúde, Brasil. E-mail: lucymed59@gmail.com

<sup>4</sup> Departamento de Medicina - Universidade Federal de Sergipe, Brasil. E-mail: flaviabim@gmail.com

<sup>5</sup> Departamento de Medicina - Universidade Federal de Sergipe, Brasil. E-mail: mariaheliziane@hotmail.com

que 57,32% dos usuários afirmaram estar muito satisfeitos com o uso do aplicativo, enquanto 9 usuários (5,73%) declararam-se muito insatisfeitos com seu uso. Quando analisada questão que utilizou a metodologia Net Promoter Score (NPS) encontrou-se um total de 75,80% de usuários classificados como promotores e 9,55% de detratores, resultando em um NPS de 66,25, considerado muito bom. Conclusão: A pandemia de COVID 19 aumentou as possibilidades de utilização das Tecnologias de Informação e Comunicação para ampliação do acesso ao cuidado em saúde. Nesta experiência, a utilização de um aplicativo para teleorientação e telemonitoramento foi bem avaliada pelos usuários e pode ser um legado das estratégias de enfrentamento da pandemia.

**Palavras-chave:** pandemia covid-19; telessaúde; telemonitoramento; teleorientação; tecnologia da informação e comunicação; satisfação do usuário.

## Introduction

COVID-19 was characterized by the World Health Organization as a pandemic on March 11, 2020. In Sergipe, a state located in northeastern Brazil, the first case was diagnosed on March 14, 2020, in its capital Aracaju.<sup>1</sup>

According to the Epidemiological Bulletin<sup>2</sup> issued by Sergipe's State Department of Health on July 07, 2021, 184,692,748 cases of COVID-19 had already been diagnosed in the world, of which 18,855,015 in Brazil and 267,107 in Sergipe.

The breakout of the COVID-19 pandemic has reinforced the role of Information and Communication Technologies (ICT) and Digital Communication and Information Technology (DCIT) in the health sector as a non-face-to-face means of establishing relationships in health systems due to the need for social distancing to control disease transmission.<sup>3,4,5</sup> The Monitora Covid-19 Extension project was developed by the Federal University of Sergipe in order to include undergraduate students in the Teleguidance and telemonitoring carried out through an application created to this end, under the guidance of professors of the institution.

The Monitora Covid 19 app was made available to the population of Sergipe. On July 09, 2021, the app had approximately 16 thousand downloads in the state and about 70 thousand consultations had already been carried out (<https://todoscontraocorona.net.br/>).

The advancement of ICT has the potential of expanding access to information and health care.<sup>6</sup> However, studies indicate that there is a lack of scientific work indicating the relationship between the adoption of ICT and the quality of health care.<sup>7</sup>

Along with efficiency and effectiveness, user satisfaction is one of the determining factors for a good evaluation of an app geared to care.<sup>8</sup> After users had voluntarily entered the data in the application, including their e-mail address, it was possible to send them online questionnaires and analyze their results after approval by the Research Ethics Committee.

This study is the result of the Monitora COVID-19 extension project, which seeks to evaluate the satisfaction of the users of a Teleguidance and telemonitoring app residing in Sergipe.

## Materials and Methods

### Sample and Type of Study

A descriptive, cross-sectional study using closed questions based on a questionnaire produced by the researchers and sent to the users of the application via Googleforms, linked to the digital signature of a free and informed consent term, between January and March 2021.

### Location of the Study

The state of Sergipe is located in the Northeast region of Brazil. With 21,918.443 km<sup>2</sup>, it is the smallest Brazilian state in

terms of size, with the exception of the Federal District.

Sergipe's population in 2020 was estimated to be 2.318.822 inhabitants. Its capital Aracaju had an estimated population in 2020 of 664,908 inhabitants, concentrating approximately 30% of the state's population (<https://cidades.ibge.gov.br/brasil/se/aracaju/panorama>).

### Monitora COVID 19 App

The Monitora COVID-19 app is one of the fruits of a technological order carried out by the Bahia's State Family Health Foundation (*Fundação Estatal de Saúde da Família*, FESF-SUS), which sought to contract solutions to implement an information management and technological healthcare development model.<sup>9</sup> The app was made available free of charge by the State Government of Sergipe, through its association in the Interstate Consortium for Sustainable Development of the Northeast, the Northeast Consortium (*Consórcio Nordeste*).

The app is available for download on the largest platforms for this purpose (Apple Store® and Play Store®). Its objectives include offering Teleguidance and telemonitoring services, avoiding the unnecessary displacement of users to health services – an important action because social isolation is one of the strategies to cope with the pandemic; guiding the immediate search for face-to-face care according to the remotely-evaluated clinical condition by a healthcare professional; performing the georeferencing of the people registered in the app according to the severity classification based on self-reported symptoms; and providing information to support the analyses, strategies and evaluations for health management.<sup>10</sup>

### Research Design

To assess the app's user satisfaction, questions were included employing the

Likert scale,<sup>11</sup> with alternatives ranked in 5 levels of evaluation, the first being the worst and the fifth the best evaluation, as described below:

- How difficult is it to use the app?
  - Very Difficult
  - Difficult
  - Neither Easy nor Difficult
  - Easy
  - Very Easy
- Was the Monitora COVID 19 app helpful to you in the pandemic?
  - Not Useful at All
  - A Little Useful
  - More or Less Useful
  - Very Useful
  - Extremely Useful
- In general, how do you rate your satisfaction when using the app?
  - Very Dissatisfied
  - More or less Dissatisfied
  - Neither Satisfied Nor Dissatisfied
  - More or less Satisfied
  - Very Satisfied

At the end of the questionnaire, a question was included using the Net Promoter Score – NPS methodology:<sup>12</sup> *What is the possibility of you recommending the Monitora Covid 19 app to a family member or friend who needs guidance on Covid 19 during the pandemic?* The answer was recorded in scores ranging from 0 to 10, where 0 means they would never recommend and 10 means they would certainly recommend the app.

On the NPS scale, scores 9 and 10 indicate user satisfaction with the product, and these users are classified as promoters. Scores 7 and 8 indicate neutrality towards the product; and scores below 7 indicate dissatisfaction with the product, classifying the users as detractors. NPS is calculated through the difference between the percentage of promoters and detractors.

Global classifications like NPS are used to summarize user experience and are predominantly associated with their experiences in care processes.<sup>13</sup>

### Inclusion and Exclusion Criteria

The study population is composed of people of any sex or race who registered to the Monitora COVID-19 app in the state of Sergipe. People over 18 years registered to the app and who reported at least one symptom related to the disease were included in the sample. Those who refused to participate or sign the informed consent form were excluded.

### Ethical Aspects

The study followed the current legislation on research ethics and was approved by the Research Ethics Committee of the Federal University of Sergipe under case number 4,385,035.

### Procedures

An exploratory analysis was performed where the continuous variables were described through the mean  $\pm$  standard deviation. The categorical variables were described through simple frequency and percentage, calculated with the help of the Microsoft Excel 2019 software.

### Results

The questionnaire was sent to users registered in the Monitora COVID 19 app in the state and Sergipe. Of the responses received, 157 met the inclusion criteria. Of these, 104 were women (66.2%) and 53 were men (33.8%). The characterization of the users is described in Table 1.

**Table 1** - Characterization of the target audience included in the study

Variable	N	%
Sex		
Female	104	66.24
Male	53	33.76
Age (37.97 $\pm$ 11.09)		
20 -< 40 years	97	61.78
40-< 60 years	54	34.39
> 60 years	6	3.82
Level of Education		
Elementary Scholl	3	1.91
High-Scholl graduate	36	22.93
Graduation	52	33.12
Graduate School	66	42.04
Health Insurance		
Yes	102	64.97
No	55	35.03

Table 2 describes the situation of app users according to the diagnosis and

search for health services in relation to COVID 19:

**Table 2** – Situation of users according to the diagnosis and search for Health Services - COVID 19

Variable	N	%
Did a diagnostic exam	157	
Yes	125	79.62
No	32	20.38
Exam performed*	125	
RT PCR	108	86.40
Antibody Test	29	23.20
Rapid COVID 19 Test	20	16.00
Exam Result	125	
Positive	90	72.00
Negative	35	28.00
Face-to-face health care	157	
Yes	98	62.42
No	59	35.58
Type of face-to-face health care	98	
Public	55	56.12
Private	43	43.88

\* More than one alternative could be marked.

Regarding the app satisfaction assessment, the first question involved asking how users became aware of it. The majority (40.76%) knew of the application through disclosure on the internet (websites

and social media), followed by disclosure on TV shows (22.29%) and the indication by another person (21.66%). The results for the questions using the Likert and NPS scale are shown in Table 3:

**Table 3** – Distribution of participants responses to instrument items related to the satisfaction with the Monitora COVID 19 app

Question	N	%
What is your degree of difficulty in using the application?		
Very difficult	1	0.64
Difficult	2	1.27
Neither hard nor easy	16	10.19
Easy	59	37.58
Very easy	79	50.32
Was the Monitora Covid-19 app helpful to you in the pandemic?		
Not useful at all	5	3.18
More or less useful	23	14.65
A little useful	17	10.83
Very useful	70	44.58
Extremely useful	42	26.75
Overall, how do you rate your satisfaction when using the app?		
Very dissatisfied	9	5.73
More or less dissatisfied	7	4.46
Neither satisfied nor dissatisfied	12	7.64
More or less satisfied	39	28.84
Very satisfied	90	57.32
What is the possibility of you recommending the Monitora Covid19 application to a family member or friend who needs guidance about Covid19 during the pandemic?		
Promoters	119	75.80
Neutrals	23	14.65
Detractors	15	9.55

## Discussion

The fast spread of the pandemic and high incidence of COVID 19 in the world has brought with it the threat of overloading health systems, despite most of those affected progressing with asymptomatic or mild forms of the disease.<sup>14</sup>

The recommendation of social distancing measures as a way to prevent the spread of the disease has been accepted by governments in different parts of the world, at different levels. For the health services, this entailed strengthening the use of

personal protective equipment, a review of care flows, and the postponement of non-essential face-to-face meetings. This also led to the search for alternatives to care in this context of restrictions.<sup>4</sup>

In this search for alternatives, information and communication technologies (ICT) have acquired a strategic role because they enable the most varied information, training, direct assistance, monitoring or guidance activities to be carried out without the need for face-to-face meetings in health care.<sup>15</sup>

The Monitora COVID 19 app arises in this context.

The Brazilian federal government's response to the pandemic has been widely criticized for its inaction and irregularities, and it is one of the factors that puts the country among the global leaders in numbers of cases and deaths.<sup>16</sup> The lack of national coordination has generated different local and regional responses, such as the creation of the Northeast Consortium (*Consórcio Nordeste*) on July 29, 2020, a mutual cooperation mechanism established by the state governments of the nine states of the Northeast region of Brazil.<sup>17</sup>

The Northeast Consortium established a Scientific Committee to Fight the Coronavirus (C4), which used a volunteer program to produce technical notes and prospected solutions to mitigate the pandemic, sharing them with the nine states of the Northeast region.<sup>16</sup> One of these solutions was the Monitora COVID 19 app. Built in partnership with the Family Health Foundation of the state of Bahia, the solution was presented by Bahia's Department of Science and Technology and shared with the States in the Northeast.<sup>18</sup>

The Monitora COVID 19 app has been made available for download with clinical back-up by the state government in Sergipe since May 2020 (<https://www.saude.se.gov.br/governo-de-sergipe-ja-realizou-mais-de-45-mil-atendimentos-atraves-do-monitora-covid-19/>). The app is managed by the State Health Foundation of Sergipe (*Fundação Estadual de Saúde de Sergipe*, FUNESA).

After downloading, the users fill out a questionnaire with their data, symptoms and signs related to COVID 19, being georeferenced and classified according to their clinical condition. The users will then receive telephone calls from health professionals for Teleguidance and telemonitoring, in which they can clarify their doubts regarding the disease and be guided to seek the most appropriate health service for their care, when so required.

The Monitora COVID-19 Teleguidance and Telemonitoring extension project is one of the more than 70 registered projects related, directly or indirectly, to the fight against COVID-19 carried out by the Federal University of Sergipe (UFS).

The project included undergraduate medical students of the UFS, under the guidance of the course professors, in the Teleguidance and telemonitoring carried out through the Monitora COVID 19 app. Through this process, the students received refreshers in the treatment, pathophysiology and epidemiology of the disease and in the organization of the Brazilian Public Health System (SUS). In addition, the project involved a literature review on the topic and the user satisfaction assessment research that originated this study.

In the results of the satisfaction survey, we could observe that the population that responded to the study was predominantly female (66.24%), with an average age of 37.97 years, most with a college or graduate degree (75.16%), and with a private health insurance plan (64.97%).

The initiative to download the application is personal in nature and an attitude of self-care. The female majority of respondents may indicate an association with male socialization, where care is not considered a masculine practice.<sup>19</sup>

Brazil is a country with high socioeconomic inequality and this is reflected in the access to ICTs. The National Household Sample Survey (PNAD) carried out by IBGE focusing on the access to ICT<sup>20</sup> revealed a high degree of internet access: in the population over 10 years of age, 78.3% had used the internet in the last 3 months.

However, while there are citizens who can access the internet for complex activities - such as the production of texts - others, concentrated in the underprivileged classes, have limited access to the internet through mobile phones, basically limiting their access to social media.<sup>21</sup>

In the current study, we found greater access among young adults with college education and with access to private health insurance, which reveals an elitist economic profile and access to education among the users who answered the survey.

Most of the users of the survey performed a test to diagnose COVID 19 (79.62%), most of which through the completion of the RT PCR (86.40%), the gold standard test for this purpose. Extensive testing was one of the recommendations of the World Health Organization (<https://apps.who.int/iris/handle/10665/331509>) to get a better view of the pandemic and break the disease's chain of transmission through the isolation of those with a positive diagnosis.

The respondents sought predominantly face-to-face care (62.42%) in the public sector (56.12%). The Brazilian public health system has been expanding access to diagnostic COVID-19 tests since January 2020, in addition to regulating the provision of tests by the private sector/health insurance providers.<sup>22</sup>

Most users did not encounter difficulties when using the app and considered its use to be easy (37.58%) or very easy (50.32%), totaling 87.9% of users. 71.33% of users considered the application useful or very useful, while only 3.18% considered it not useful at all.

As for user satisfaction with the application, 57.32% of users said they were very satisfied, while 9 users (5.73%) declared themselves very dissatisfied with its use. However, when the other responses of these 9 users were analyzed, 8 pointed out that they would recommend the app to friends and family with the maximum score, 4 classified the application as extremely useful, 3 as very useful and 1 as more or less useful, which may indicate that there were problems in understanding the alternatives.

When analyzing the question that used the NPS methodology, we found a total of 75.80% of users classified as promoters and 9.55% as detractors,

resulting in an NPS of 66.25, which is considered very good.

The positive results may be influenced by the difficulty of users in criticizing the service they used and benefited from (gratitude bias). The fact that the methodology uses an electronic questionnaire has several limitations, such as low response rates and fear that the submission may be considered an invasion of privacy or even include a malicious link (malware) for fraud or data theft.<sup>23</sup>

## Conclusion

The app is well rated by its users. It was considered easy to use, useful for obtaining information and guidance regarding COVID-19, and most users would recommend it to friends and family.

The Monitora COVID 19 Teleguidance and Telemonitoring extension project involved students and professors in the care of the many users of the app. The project involved pedagogical meetings to understand the treatment of the disease and contributed to the permanent education in practice of its participants, while at the same time contributing to the care services provided by the Brazilian Public Health System (SUS) at a time of so much need.

The COVID 19 pandemic has increased the possibilities of using ICTs to expand access to health care. Ordinance 467 of March 20, 2020, of the Ministry of Health, regulated telemedicine actions in the context of the COVID 19 pandemic, contemplating preclinical care, care support, consultations, monitoring and diagnosis, both within the scope of the SUS and in private healthcare.<sup>24</sup>

It is expected that the lessons learned by the SUS while facing its greatest challenge will result in increasing its efficiency and advancing the effectiveness of healthcare as a right of all and a duty of the State.

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