


Outcomes of telemedicine care during the COVID-19 pandemic: Experience from an intervention program designed for vulnerable population in Brazil

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Abstract

Purpose: Telehealth plays an important role on the combat of COVID-19. In this context, the SAS Brasil telemedicine program became a viable option in Brazil, where the population faced challenging access to healthcare services during the pandemics. In this study, we describe the sociodemographic profile, reasons for enrollment, outcomes of consultation, and satisfaction of participants who received telemedicine consultations through the SAS program.

Methods: A retrospective cross-sectional study was conducted with data from the SAS Telemedicine program including consultations performed from July 15, 2020, to April 15, 2021. The study describes the SAS Brasil experience and data collected in the period. Patients' satisfaction perception was evaluated through the Net Promoter Score (NPS).

Results: A total of 6490 participants were evaluated, 69.5% of them were female and 40.8% with age from 21 to 40 years. In the period, 22,664 teleconsultations were performed, mainly due to Mental health (40.4%), Respiratory (35.8%), and Nutritional (4.5%) disorders. Out of the 6312 patients with a defined outcome along the period, 96.0% were discharged and 4.0% were referred to presential care. The calculated NPS was + 95.77 and most patients answered that they would use the service again if needed (99.21%) and had their issue resolved (89.76%).

Conclusion: During the period of the COVID-19 pandemic, telehealth has been consolidated as a tool that offers access to specialized healthcare with wide acceptance by users and can be implemented in populations in vulnerability situations.

Keywords

telemedicine, satisfaction, NPS, vulnerable populations

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Introduction

In December 2019, the first cases of respiratory failure of unknown cause were reported in Wuhan, Hubei, China. In February 2020, the World Health Organization (WHO) named this new entity COVID-19. Caused by a type of coronavirus, the disease's main clinical features include respiratory symptoms and fever, but fatigue, myalgia, diarrhea, among others, can also be reported.^{1,2} Due to its virulence and capacity of dissemination, measures such as social distancing and the use of individual protection equipment and masks were needed to control its spreading.³ The illness impacted not only public health services but also

resulted in economic and humanitarian loss, which showed the lack of preparation of some countries to deal with this kind of situation.⁴

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Telehealth plays an important role on the combat of COVID-19 throughout the world and brings positive implications to health systems mainly in terms of specialized care services delivery.⁵ In Brazil, the challenging access to such services through the public health system was already a reality before the pandemics and has become more evident since then.⁶ As part of emergency measures against the disease dissemination, the national ministry of health extended the exercise of telemedicine through new resolutions allowing the use of teleconsultations with emergency purposes while the pandemic lasts.⁷

The SAS Brasil (Health, Joy and Sustainability Brazil, in direct translation) is a Brazilian nonprofit health institution created in 2013 that, in response to the COVID-19 pandemic, has been offering clinical and psychological care through teleconsultations, targeting low-income populations (household income up to three minimum wages). The SAS Telemedicine project has begun in March 2020 and since then has counted with more than 430 health care volunteers, distributed among 22 different medical and seven nonmedical specialties offered by the program, who perform remote consultation through the SAS telemedicine system.

The purpose of the current study is to describe the socio-demographic profile, reasons for enrollment, outcomes of consultation, and satisfaction of participants who received telemedicine consultations through the SAS program launched during the COVID-19 pandemic in Brazil.

Methods

A retrospective cross-sectional study was conducted with data from the SAS Telemedicine program including consultations performed from July 15, 2020, to April 15, 2021. The study protocol was approved by the HOLhos Research Ethics Committee and was carried out in accordance with the tenets of the Declaration of Helsinki.

SAS telehealth program

The teleconsultations were carried out through SIAS (SAS Smart own telehealth platform developed in partnership with SAS Brasil) in accordance with the laws in effect in the country, considering patient safety and data protection. The locations for the project implementation were selected according to the population socioeconomic status identifying the more vulnerable groups. Before any intervention take place, local leaders and preexisting health networks were contacted in the selected communities from the cities of São Paulo (SP), Rio de Janeiro (RJ), and Natal (RN).

A monthly family income of up to three minimum wages (equivalent to USD 580) was chosen as the inclusion criterion for carrying out the free teleconsultations for patients who spontaneously sought the service. The free teleconsultations were advertised on mapped local communications

lanes (e.g. pamphlets, car stereos, community radios, local public health services, and community centers), and a phone number was made available for patients to contact SAS Brasil (through the WhatsApp application) to schedule an appointment.

At the first contact, registration with personal information was performed by a team of trained volunteers, in addition to an initial assessment of the main complaint, its severity, and its urgency, later validated by the project's nursing team. Patients then had their appointments scheduled and carried out by volunteer health professionals through the SIAS system.

Patients were invited to answer a questionnaire about their perceptions of the experience with the program after being discharged. It included a quantitative question on the Net Promoter Score (NPS) in which the participant was asked about the chance, from 0 to 10, to indicate the

Table 1. Sociodemographic characteristics from the evaluated population.

Characteristic	N (%)
Sex	
Male	1979 (30.49)
Female	4511 (69.51)
Age	
0–20	1432 (22.06)
21–40	2649 (40.82)
41–60	1794 (27.64)
61–80	534 (8.23)
80 +	81 (1.25)
Race	
Mixed	2925 (45.07)
White	2206 (33.99)
Black	1129 (17.39)
Yellow	175 (2.70)
Indigenous	55 (0.84)
Origin (Brazilian States)	
Rio de Janeiro (RJ)	3766 (58.03)
Rio Grande do Norte (RN)	1212 (18.67)
São Paulo (SP)	1142 (17.60)
Other states	370 (5.70)
Monthly household Income (USD)	
\$0–\$100	1613 (24.85)
\$101–\$200	1302 (20.06)
\$201–\$300	1535 (23.65)
\$301–\$400	815 (12.56)
\$401–\$500	467 (7.20)
\$501–\$600	267 (4.11)
\$601 or more	242 (3.73)
Not informed	249 (3.84)
Number of people living in the house	
0–5	5909 (91.05)
6–10	489 (7.53)
11 or more	92 (1.42)
Total	6490 (100.00)

service to a friend or a familiar, and a qualitative question regarding the reasons for those responses. Participants were still questioned if they would use the service once again if needed and if they considered that their issue was resolved.

Audit data

Sociodemographic profile was analyzed considering gender, age, race, educational level, household income, state of residence, and number of people living in the same house. Reasons for enrollment were evaluated according to the participant symptomatology. Consultation outcomes could include discharge when the patient was released from care after completing one or more consultations that were sufficient to attend his/her necessity, or referral for an in-person service

when further actions needed to be taken within a health facility. Along with the period, those patients who were still being monitored were counted as still under care not having received an outcome yet.

Statistical analysis

Statistical analyses were performed using Stata/SE Statistical Software, Release V.14.0, 2015. Frequency tables were used for descriptive analysis. The NPS responses were categorized in promoters (those who responded grades 9 or 10), passives (responses 7 or 8), and detractors (responses 6 or below). The NPS score was calculated disregarding passives and by subtracting the proportion of detractors from the proportion of promoters so that the final score is shown as an integer, not a percentage, from -100 to +100.

Table 2. Reason for consultation.

Symptoms	N (%)
Mental health disorders	9157 (40.40)
Respiratory disorders	8109 (35.78)
Nutritional disorders	1029 (4.54)
Dermatology disorders	923 (4.07)
Orthopedic disorders	438 (1.93)
Gynecology disorders	420 (1.85)
Gastrointestinal disorders	408 (1.80)
Speech Pathology disorders	394 (1.74)
Ophthalmology disorders	385 (1.70)
Cardiovascular disorders	318 (1.40)
Other	1083 (4.78)
Total	22,664 (100.00)

Results

A total of 6490 participants were evaluated through the SAS Telemedicine Program along with the study period. Table 1 shows the sociodemographic characteristics from the evaluated population. Along the period, 22,664 consultations were performed, representing an average of 3.49 ± 3.66 consultations per patient. Table 2 indicates the reason for consultation. Figure 1 shows the frequency of mental health, respiratory, and other specialties along the studied period by each month.

Out of the 6490 participants, 6312 (97.26%) had their final outcome determined during the evaluated period, while 178 (2.74%) are still under care within the system. Table 3 presents the outcomes. Discharged patients were

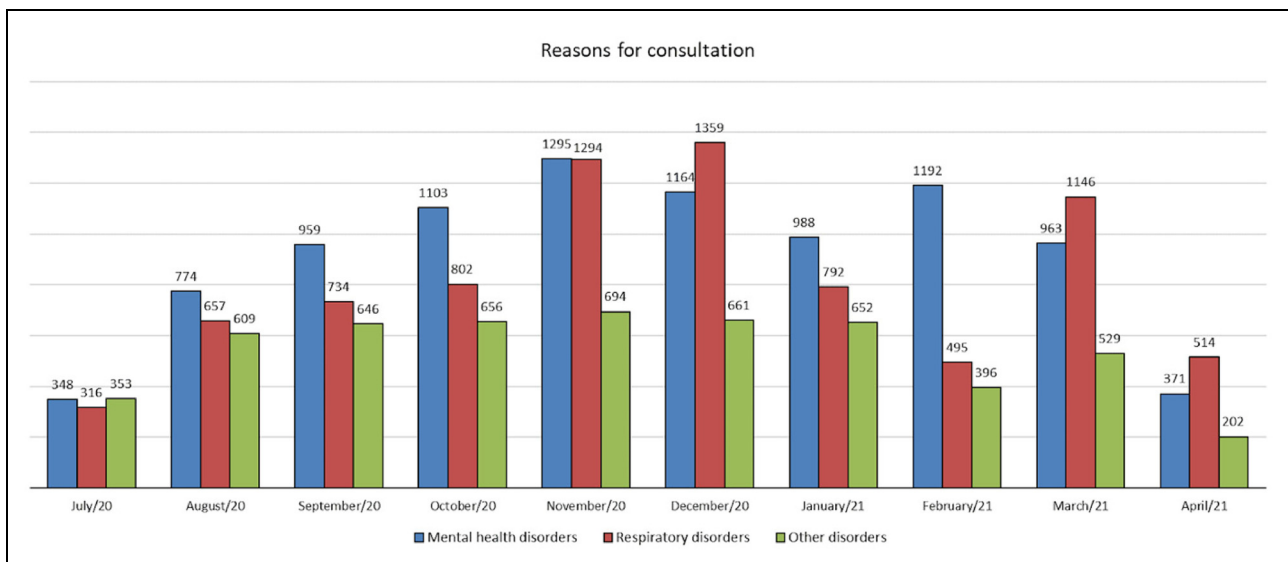


Figure 1. Frequency of mental health, respiratory, and other specialties along with the studied period.

Table 3. Consultation outcomes.

Outcomes	N (%)
Final outcomes N = 6312	
Discharged	6059 (95.99)
Referral presential	253 (4.01)
Overall outcomes N = 6490	
Discharged	6059 (93.36)
Under care	178 (2.74)
Referral presential	253 (3.90)

Table 4. Satisfaction outcomes.

Variable	Results N (%)	Response Rate %
Chance of recommending for family/friends		71.05
9 or 10 (Promoters)	2503 (96.23)	
7 or 8 (Passives)	86 (3.31)	
6 or less (Detractors)	12 (0.46)	
Would use the service once again if needed		69.35
Yes	2519 (99.21)	
No	20 (0.79)	
Consider the issue was resolved		67.77
Yes	2227 (89.76)	
No	254 (10.24)	

asked about their satisfaction with the telemedicine service, and the results are shown in Table 4.

The calculated NPS was +95.77. Most of the respondents informed that they would use the service again if needed (99.21%) and had their issue resolved (89.76%). Reasons for not recommending the service for family and friends mainly included the low number of consultations per patient in case of psychotherapy and lack of communication between patient and doctor.

Discussion

This is the first study evaluating a telemedicine program intervention implemented during the COVID-19 pandemics in a developing country as Brazil. The program was designed and launched in response to the pandemic and for that reason, the data collection and management went through improvements along with the first three months so that our analysis included data since July 2020 despite the program has started in March 2020. Nevertheless, in this paper, we report the program results including consultations of a large sample size of individuals who were impacted by the SAS initiative.

Our demographics analyses indicate a higher proportion of women using the program (69.51% of the total),

a similar finding described by Ramirez et al., in his study evaluating the telemedicine service in vulnerable Hispanic populations, where 86% of the visits were from female patients.⁸ Women are known for being responsible for centralizing care in the family nucleus and this characteristic seems to be even more striking in Latino culture.⁸ From a social point of view, the current study brings data from a low-income population, whose more than 68% of the enrolled participants had a household income of less than 300 dollars a month, and about 25% had an income of less than 100 dollars a month. Populations with social vulnerability tend to have greater morbidity and mortality when compared with less vulnerable populations with less vulnerability which reinforces the importance of interventions such as the SAS telemedicine program.⁹

Telemedicine services often can be challenging depending on the technology literacy from the target population. Despite the fact that study focused on low-income communities and more than 1/3 of the participants were aged 40 years and older, the program had an overall high attendance demonstrating the acceptance of the population when an easily technological resource is offered. Another differentiating point of our intervention was the video call testing with patients before the teleconsultation itself. We believe that this is an essential step to motivate patients and professionals to use the service widely, and to make sure the technology literacy was not a limiting factor for teleconsultation access. This must be a determinant point of attention for the implementation of teleconsultation models in public health.

About 40% of consultations in our program were initiated by a complaint involving some symptom related to mental health. In the current epidemiological context in which we are living, mental health is a prominent issue around the world and the COVID-19 pandemic brought an exacerbation of complaints related to mental health. Hossain et al. show that COVID-19 not only impacted the increase in new cases of mental illness but also exacerbated preexisting complaints and illnesses.¹⁰ In that sense, there was an increase in the demand for mental health care, as shown in the current analysis.

Considering the current period of the COVID-19 pandemic and its symptoms commonly involving the respiratory tract, the proportion of this complaint among the evaluated patients was expressive. Wiersinga et al. also pointed out respiratory symptoms as one of the most frequent reasons for seeking medical attention, including dry cough between 60 and 86% of cases and dyspnea between 53 and 80% during the COVID-19 pandemic.¹¹

Along with the pandemic period, the Brazilian Ministry of Health released daily reports on the surveillance of new cases and deaths related to COVID-19. These reports clearly showed two main peaks of new cases in the country, the first in December 2020 and the second in

March 2021, reaching records of 70,000 and 100,000 new cases/day, respectively. Interestingly, our data show that the high number of patients with respiratory complaints along with the period also peaked in the months of December 2020 and March 2021, following the national temporal trend of new COVID-19 cases.^{12,13}

Continuous efforts for the development of telehealth models in Brazil and worldwide have been in progress since the 1990s.^{6,14} Particularly in Latin America and the Caribbean, these efforts look for the reduction of inequality in access to health services.¹⁴ In Brazil, the Ministry of Health's Telehealth Networks Project (REDES) and the Telemedicine University Network Project (RUTE) were two of the main pioneer national initiatives in this regard, while some state programs such as the Teleassistance of Minas Gerais Program (RTMG) and the Telehealth nucleus of Rio Grande do Sul (TelessaúdeRS).¹⁵⁻¹⁷ Despite continuing efforts, the COVID-19 pandemic was determinant for the evolution of telehealth programs.¹⁸ The expansion of telehealth operations, regulated by new law resolutions during the pandemic, and the circumstantial need for remote care were two important impulses for the emergence of new initiatives in telehealth.¹⁹

Despite previous national projects focused on different actions in telehealth, such as teleconsultations and telediagnosis integrated to the National Health System (SUS), the SAS Brasil's care model emerges as one of the innovator strategies for carrying out teleconsultations for vulnerable populations. With the legal authorization enacted by Law No. 13,989/2020, our organization created a complete and safe physician-patient telemedicine service platform. Different from the models that offered assistance to patients in institutional physical facilities, SAS Brasil offers support to patients in their own localities, from within their homes, using their own cell phones. Efforts to adapt communication to accessible language, simplicity of communication processes (through Whatsapp application), teleservices (within SIAS) not requiring a large amount of internet data for consultations, and a platform for synchronous teleconsultations and medical records, allowed for great and quick acceptance by the population, which might explain the project reaching a broad diversity of locations throughout the country beyond those initially preestablished. The choice of this easy-to-use technological tool should be one of the most important points for a successful telehealth program.⁸

The satisfaction assessment for validating innovative health models is an important tool for monitoring their implementation strategies and special attention should be given when such strategies focus on populations in vulnerable situations.²⁰

Several tools are described to assess satisfaction²¹⁻²⁶ but their performance in vulnerable populations can be challenging due to the less adherence and possible difficulty in understanding complex questionnaires. According to

Mair et al., few studies had a population larger than 100 patients, most of those studies identified that telehealth was an acceptable consultation model due to the increased access to specialized services and the lower need for travel and time involved to realize the consultation. However, communication between health professionals and patients was identified as a point of attention.²¹ The choice of NPS as a satisfaction indicator in this study is due to its applicability and acceptability in noncommercial settings, particularly among low-literacy populations, despite the value of this methodology as a predictor of growth and indicator of customer satisfaction in for-profit industries.²⁷ Still, the NPS indicator has been shown to produce repeatable results and have clarity on what they are intended to measure.

There are few national studies that assess the satisfaction of users in telehealth, probably due to the legal limitation that existed for conducting teleconsultations until the beginning of the COVID-19 pandemic. However, in countries where it was already allowed, studies showed that the perception of satisfaction among service users is usually high.^{23-26,28,29}

When comparing patient satisfaction due to teleconsultation before and during the pandemic, Ramaswamy et al. found out that there were significantly higher scores in the COVID-19 period when compared with the pre-COVID-19 period (93.4% vs 92.5%, $p < 0.001$) and that patient satisfaction with video consultation was significantly higher than in-person visits (94.9% vs. 92.5%, $p < 0.001$).²⁵ Polinski et al. found that, among 1734 patients who had telehealth visits, 95% were very satisfied with the quality of the health care they received and rated telehealth as better than or just as good as a traditional visit.²⁶ Another interesting fact about patient's teleconsultation satisfaction was observed by Bushey et al.; although the virtual services are a useful supplement to the usual in-person consultations, humanized interactions on the patient's virtual journey that recognize their individual needs seem to be a determinant factor not only in the satisfaction perception but also in their clinical outcomes.²³

Our high response rate, added to the high NPS score, reinforces the excellent acceptance of the telehealth model proposed by SAS Brasil for patients in vulnerable situations. It can also be associated with improved health care access as described by Mehrotra et al. to elevated satisfaction scores rate.³⁰ Socioeconomic and geographic conditions have already been reported by Pessoa et al. as factors associated with greater engagement of professionals in telehealth programs in Minas Gerais, Brazil, due to the network infrastructure difficulties these professionals face in these locations. The perception of patients about teleconsultation models, however, should also be taken into account because, despite the possible challenged access to resources, the acceptance to the offered services indicates a great investment opportunity for public health policies.³¹

In conclusion, during the period of the COVID-19 pandemic, telehealth has been consolidated as a tool that offers access to specialized healthcare with wide acceptance by users and can be implemented in populations in vulnerability situations. The success of telehealth programs, however, relies on simple methodologies and easy understanding by patients, which include popular and cheap tools to be used. More studies on methodologies to assess the perception by health professionals and patients are needed for a better understanding of this context even after the pandemic.




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