

# Barriers to participation in cardiac rehabilitation programs: before and during the Covid-19 pandemic

Pedro Paulo Fernandes de Aguiar Tonetto<sup>1</sup>, Arthur Marco Peres Ribeiro<sup>2</sup>, Carina Aparecida Marosti Dessotte<sup>3</sup>, Rosana Aparecida Spadoti Dantas<sup>4</sup>

## ABSTRACT

**Objective:** Comparing perceived barriers to participation in cardiac rehabilitation programs before and during the coronavirus disease 2019 pandemic. **Method:** Observational, analytical, and longitudinal study conducted with 23 participants enrolled in a cardiac rehabilitation program, phases 2 and 3. Before the pandemic, participants responded to the 21 items of the Cardiac Rehabilitation Barriers Scale, scored from 21 to 105, with higher values indicating greater perception of barriers. During the pandemic period, 18 (78%) participants responded again to the instrument. The paired t-test was used to compare the mean total score and the items of the instrument at the two time points. **Results:** The results show a decrease in the perception of barriers to participation in the Cardiac Rehabilitation Program from the first to the second interview. When comparing the mean values, statistically significant differences were found for the total score of the Barrier Scale ( $p < 0.001$ ), for the total mean of the items ( $p < 0.001$ ), and for the means of 17 of the 21 items. **Conclusion:** The significantly lower scores in the second interview indicate that participants perceived fewer barriers to attending cardiac rehabilitation during the pandemic period than before when the service was operating regularly.

**Descriptors:** Barriers to Access of Health Services; Cardiac Rehabilitation; COVID-19; Health Services Accessibility; Longitudinal Studies; Telephone Interview.

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<sup>1</sup> Ribeirão Preto School of Nursing at the University of São Paulo. Ribeirão Preto, São Paulo, Brasil. ORCID: 0000-0002-1244-320X

<sup>2</sup> Ribeirão Preto School of Nursing at the University of São Paulo. Ribeirão Preto, São Paulo, Brasil. ORCID: 0000-0002-0364-4026

<sup>3</sup> Ribeirão Preto School of Nursing at the University of São Paulo. Ribeirão Preto, São Paulo, Brasil. ORCID: 0000-0002-5521-8416

<sup>4</sup> Ribeirão Preto School of Nursing at the University of São Paulo. Ribeirão Preto, São Paulo, Brasil. ORCID: 0000-0002-3050-7000

## INTRODUCTION

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The right to health is one of the constitutionally guaranteed social rights. It is an unavailable legal prerogative ensured to all Brazilian citizens. As health is a right for all and a duty of the State, it must be guaranteed through social and economic policies aimed at reducing the risks of disease and other health hazards, as well as ensuring universal and equal access to actions and services for its promotion, protection, and recovery<sup>(1)</sup>. Since then, it can be affirmed that access to healthcare has increasingly become subject to judicial intervention. There is also the issue of low health literacy, which is another determinant in mitigating health prevention efforts, posing an intrinsic barrier to accessing this right. Thus, ultimately, the promotion of universal health, as mandated by the Constitution, cannot be achieved through isolated intra-sectoral actions alone, as it falls within the purview of the State and belongs to a larger project, which is the construction of a solidarity-based society <sup>(2)</sup>.

In Brazil, heart diseases are the leading cause of death and hospitalization, accounting for 32.6% of deaths from determined causes. In just the last year, between April 2022 and March 2023. There were 615.599 hospitalizations through the Unified Health System (SUS) due to acute myocardial infarction, other ischemic heart diseases, conduction disorders and cardiac arrhythmias, heart failure, and other heart diseases. Therefore, it is concluded that state spending on the treatment and prevention of heart diseases is substantial<sup>(3)</sup>. In Brazil, the understanding of healthcare professionals regarding the rehabilitation of individuals affected by heart diseases is still heterogeneous and often focused on functional aspects. In most developed countries, this view has expanded, and cardiac rehabilitation (CR) has gained a multidimensional focus, aiming to promote physical activity and a healthy lifestyle, encompassing individuals of both sexes, adults, and the elderly, with different clinical indications, beyond myocardial infarction <sup>(4-7)</sup>.

This unfavorable scenario becomes more complex when considering the existence of barriers to patient adherence to CR programs, which can be intrinsic (personal characteristics such as sex, age, income, presence of comorbidities such as diabetes and obesity, lack of family support, low health literacy, lack of motivation) and extrinsic to patients (lack of medical indication; long waiting lists; language barriers; distance from the rehabilitation center and transportation to the location; conflicts with work and lack of time) <sup>(8)</sup>. A nationwide study conducted with 174 patients, including 74 participants from CR programs in public centers and 100 from private healthcare, concluded that the major barriers are related to comorbidities and/or functional status, perceived needs, and access. Although these barriers are greater among those dependent on the public healthcare system <sup>(9)</sup>, the absence of referral by the cardiologist (either due to lack of awareness by the professional or failure to encourage patients) and difficulties related to distance and transportation were other barriers identified for accessing CR services <sup>(10)</sup>.

The context of the coronavirus disease 2019 (COVID-19) pandemic and its impact on individuals with heart diseases have brought new questions that need to be investigated, including whether there has been a worsening in the perception of these individuals regarding barriers to participation in cardiac rehabilitation programs. The aim of this study was to compare the perceived barriers to participation in cardiac rehabilitation programs before and during the COVID-19 pandemic.

## METHOD

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This is an observational, analytical, and longitudinal study conducted at the Rehabilitation Center of the Hospital das Clínicas of the Ribeirão Preto Medical School of the University of São Paulo (CER-HCFMRP-USP) in Ribeirão Preto, São Paulo (SP), Brazil. The first stage was conducted from January 22 to March 12, 2020, and the second from June 3 to August 9, 2021.

The present article was elaborated following the guidelines for observational studies Strengthening the Reporting of Observational Studies in Epidemiology (STROBE), recommended by The EQUATOR.

In the first stage, which was part of the study "Cardiac Rehabilitation Program: barriers to adherence and access to health", the population of interest consisted of individuals with heart diseases who were enrolled in the Cardiac Rehabilitation Program (CRP), phases 2 or 3, of the CER-HCFMRP-USP. The inclusion criteria for the study were: being adults (18 years or older), of both sexes, regardless of race, enrolled in the CRP of the mentioned rehabilitation center, between January and December 2020. Participants who did not demonstrate orientation to person and autopsychic orientation at the time of the interview were excluded, assessed by the presence of four or more correct responses provided for the following questions: What is your full name? How old are you? What is today's date? What day of the week is it? Where are we right now? What is the name of the city where you were born? <sup>11)</sup>.

Após o estabelecimento, pela Organização Mundial da Saúde (OMS), da pandemia pela COVID-19, em março de 2020, o PRC foi suspenso e os pacientes foram orientados a aguardar o contato da equipe de saúde responsável pelo programa. Com a interrupção do programa, encerramos a coleta de dados com 23 participantes. O desconhecimento do impacto da pandemia na saúde dessas pessoas nos motivou a propor a realização de um novo estudo denominado de "Barreiras para participação em programa de reabilitação cardíaca: avaliação antes e durante a pandemia da COVID-19", objetivando acompanhar os 23 pacientes que participaram do estudo anterior (denominada de Etapa 1). Assim, no segundo estudo (denominado de Etapa 2), a população a ser estudada contemplou os 23 participantes da etapa 1, não havendo a inclusão de novos participantes.

No momento da segunda entrevista, realizada por contato telefônico, a avaliação da orientação alo e auto psíquica do participante, descrita na Etapa 1, foi realizada, com a exclusão da questão "qual o local em que estamos nesse momento?" em razão do contato ter sido realizado por telefone. Um novo critério de exclusão foi inserido: não apresentar condições físicas para realizar a entrevista pelo

telefone, sem qualquer auxílio, por 30 minutos ou mais. Dos 23 participantes da Etapa 1, 18 (72%) concluíram a Etapa 2.

After the establishment of the COVID-19 pandemic by the World Health Organization (WHO) in March 2020, the CRP was suspended, and patients were instructed to await contact from the healthcare team responsible for the program. With the interruption of the program, we concluded data collection with 23 participants. The lack of understanding of the pandemic's impact on the health of these individuals prompted us to propose a new study called "Barriers to participation in cardiac rehabilitation program: assessment before and during the COVID-19 pandemic", aiming to follow up on the 23 patients who participated in the previous study (referred to as Stage 1). Thus, in the second study (referred to as Stage 2), the population to be studied included the 23 participants from Stage 1, with no inclusion of new participants.

At the time of the second interview, conducted by telephone contact, the assessment of the participant's orientation to person and autopsychic orientation, as described in Stage 1, was performed, with the exclusion of the question "where are we right now?", due to the contact being conducted by phone. A new exclusion criterion was added: not having the physical condition to conduct the interview by telephone, without any assistance, for 30 minutes or more. Out of the 23 participants from Stage 1, 18 (72%) completed Stage 2.

The data from the first stage were collected in person, between January and March 2020, before the COVID-19 pandemic. Potential participants were invited during the cardiopulmonary conditioning period, before or after sessions, respecting the service hours, between 8 am and 12 pm, on Mondays and Wednesdays. After the participant's acceptance, with the signing of the Informed Consent Form (ICF), the individual interview was started, conducted in a private and reserved room. In the second stage, interviews were conducted by phone calls, recorded on the researcher's cell phone used for this activity. A telephone contact was made in advance by the researcher so that participants could choose the date and time of the interview. Initially, the researcher contacted the participant and explained the purpose of the study. With their agreement, the participant chose a new date to be interviewed. The fact that these individuals knew the researcher from the interview conducted in the first stage facilitated communication between them, and on the scheduled date, a formal invitation was made with the reading of the new ICF (prepared for the second study - Stage 2) and subsequent data collection.

For sociodemographic data, a questionnaire was developed to be answered by the participant during the interviews, containing the following information: biological sex (male and female), date of birth (for subsequent calculation of age, using the interview date), education level (years of formal education attended), marital status (4 categories and later

grouped into two: married/living in a stable union and single/widowed/separated), current occupation (two categories: active and inactive), and monthly family income. Clinical data, on the other hand, were obtained through consultation of participants' electronic medical records.

To assess perceived barriers to cardiac rehabilitation, we used the instrument called the Cardiac Rehabilitation Barriers Scale (CRBS), which contains 21 items answered on a five-point Likert scale, ranging from one (strongly disagree) to five (strongly agree). The total score of the CRBS ranges from 21 to 105. and the higher the score, where larger values indicated higher perceived barriers to participation or adherence to cardiac rehabilitation programs <sup>(12)</sup>.

The data were initially entered into a simple Microsoft Excel spreadsheet and then transferred to the International Business Machines (IBM) Statistical Package for the Social Sciences (SPSS), version 25.0 for Windows. All variables were analyzed descriptively in terms of frequency (nominal variables) and measures of central tendency and dispersion (numeric variables).

Regarding the use of the CRBS in the second interview to assess the potential barriers reported by participants in the context of a possible resumption of CRP during the COVID-19 pandemic, we chose to exclude items 5 and 16 (domain - perceived needs) and items 9 and 20 (domain - access) from the CRBS, as they were not applicable in the context during the interview. With the exclusion of the four items, participants answered 17 out of the 21 items from the original version, and the sum of responses ranged from 17 to 85. To compare the two total scores of the CRBS obtained in stages 1 and 2, we chose to consider the responses to items 5, 9, 16, and 20 as missing values. The mean response for each participant's items was calculated, and then the mean values were inserted as responses to the four removed items. The substitution of a missing data (known as imputation) of quantitative variables by a central tendency value (mean or median) has been used as a statistical technique in health-related studies (13). After replacing the missing data, the values of the final CRBS scores varied in the same range, i.e., from 21 to 105.

To compare the total CRBS scores as measures of perceived barriers to CRP before and during the pandemic, we used the Student's t-test for paired samples. The significance level adopted was 0.05.

The studies "Cardiac Rehabilitation Program: Barriers to Adherence and Access to Health" (Stage 1) and "Barriers to Participation in Cardiac Rehabilitation Program: Evaluation Before and During the COVID-19 Pandemic" (Stage 2) were developed according to

Resolutions No. 466/2012 and No. 510/2016 of the National Health Council and approved by the Research Ethics Committee of the Ribeirão Preto College of Nursing, University of São Paulo (EERP-USP) (Ethical Appreciation Presentation Certificate Protocols - CAAE 24398619.3.0000.5393 - approval number: 4.512.690 and CAAE 41138920.5.3001.5440 - approval number: 4.569.461. respectively).

In the first stage, all participants signed the informed consent form (ICF) and received a copy of it, informing them about the study's objectives. In the second stage, the full reading of the ICF was conducted over the phone, and only after the participant's acceptance was the research initiated. Those who wished also received an electronic copy of the ICF.

## RESULTS

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During the initial data collection period, which was interrupted due to the COVID-19 pandemic in March 2020. Twenty-three participants were interviewed. After the resumption, now through telephone interviews starting in June 2021. it was found that three patients had died during the hiatus, and two others, in their initial contact to schedule the study, were unable to respond to the questionnaire due to physical conditions, totaling five losses to follow-up. Thus, 18 patients completed the study by participating in the second interview. The sociodemographic and clinical characteristics of the 23 participants, with mean (M) and standard deviation (SD) for numerical variables, according to participation (n=18) or non-participation (n=5) in both interviews, are presented in Tables 1 and 2.

The results regarding the mean responses of each item, as well as the mean item score and total score of the EBRC, both in the First Interview (before the pandemic) and in the Second Interview (during the pandemic) of the 18 participants, are presented in Table 3.

The results show a decrease in the perceived barriers to participation in CR from the First to the Second Interview (Table 3). When comparing the mean values of the two assessments, we found statistically significant differences for the total score of the EBRC ( $p < 0.001$ ), the total mean of the items ( $p < 0.001$ ), and for the means of 17 out of the 21 items. We did not find statistically significant differences only when comparing the means of the items "Because of the cost" ( $p = 0.077$ ), "Because of the bad weather" ( $p = 0.144$ ), and "Because I lack energy" ( $p = 0.120$ ).

**Table 1** - Sociodemographic characterization of the 23 participants, according to the completion or non-completion of the study (subjects who participated in all data collection stages, or who dropped out during the study). Ribeirão Preto, SP, Brazil, 2020 - 2021

Sociodemographic characteristics	First Interview (n=23)	Second Interview (n=18)	Losses/Exits (n=5)
Age in years [M (S.D.)]*	58.91 (11.57)	59.32 (12.54)	61.8 (8.13)
Years of education [M (S.D.)]*	8.52 (5.33)	8.56 (4.70)	8.4 (6.58)
Monthly family income in Brazilian reais [M (SD)]*	2,634.78 (1,777.02)	2,072.78 (1,397.40)	3,660.0 (3,667.95)
Gender, %(n)			
Male	60.9% (14)	66.7% (12)	40% (2)
Female	39.1% (9)	33.3% (6)	60% (3)
Marital status, %(n)			
Married/Common-law marriage	60.9% (14)	50%(9)	80% (4)
Single/Widowed/Separated	39.1% (9)	50%(9)	20% (1)
City of residence, %(n)			
Ribeirão Preto	52.2%-(12)	50% (9)	60%-(3)
Others	47.8% (11)	50% (9)	40% (2)
Employment status, %(n)			
Inactive	91.3 (21)	73.9% (17)	100% (5)
Active	8.7% (2)	4.3% (1)	-

\*M (S.D.) = Mean (Standard Deviation)

**Table 2** - Clinical characterization of the 23 participants, according to the completion or non-completion of the study (subjects who participated in all data collection stages, or who dropped out during the study). Ribeirão Preto, SP, Brazil, 2020 – 2021

Clinical characterization	First Interview (n=23)	Second Interview (n=18)	Losses/Exits (n=5)
CRP phase*, %(n)			
Phase 2	65.2% (15)	61.1% (11)	80% (4)
Phase 3	34.8% (8)	38.9% (7)	20% (1)
Diagnosis for indication to CRP*, %(n)			
Heart failure	56.5% (13)	50.0% (9)	80% (4)
Coronary artery disease	39.1% (9)	44.4% (8)	20% (1)
Others	4.3% (1)	5.6% (1)	0% (0)
Previous procedures before CRP*, %(n)			
No previous procedures	56.5% (13)	55.6% (10)	40% (2)
Other procedures	26.1% (6)	27.8% (5)	40% (2)
Coronary artery bypass graft surgery	17.4% (4)	16.7% (3)	20% (1)

Number of medications in use [M (SD)] <sup>†</sup>	9.4 (2.6)	9.4 (2.4)	9.8 (2.4)
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\*CRP = Cardiac Rehabilitation Program; <sup>†</sup>M (S.D.) = Mean (Standard Deviation)

**Table 3** - Comparison of the means of the total scores, items, and each item of the Barriers to Cardiac Rehabilitation Scale (CRBS), according to the data collection period of the 18 participants. Ribeirão Preto, SP, Brazil, 2020 – 2021

CRBS *	First Interview M (D.P.) <sup>†</sup>	Second Interview M (D.P.) <sup>†</sup>	p Value <sup>‡</sup>
Total Score	43.8 (5.1)	28.0 (8.0)	< 0.001
Mean of Items	2.1 (0.2)	1.3 (0.4)	< 0.001
Items			
1. Because of the distance	2.3 (0.8)	1.7 (1.1)	0.004
2. Because of the cost	2.2 (0.8)	1.5 (1.0)	0.077
3. Because of transportation issues	2.5 (1.0)	1.55 (1.2)	0.027
4. Because of family responsibilities	2.2 (0.7)	1.5 (1.2)	0.030
5. Because I didn't know about cardiac rehabilitation	2.3 (0.8)	1.3 (0.4)	0.001
6. Because I don't need cardiac rehabilitation	1.8 (0.4)	1.2 (0.5)	0.008
7. Because I exercise at home or in the community	1.9 (0.3)	1.2 (0.4)	< 0.001
8. Because of bad weather	2.6 (0.9)	1.9 (1.6)	0.144
9. Because I find exercise tiring or painful	1.9 (0.3)	1.2 (0.7)	0.002
10. Because of travel reasons	2.1 (0.8)	1.0 (0.2)	< 0.001
11. Because I have little time	2.0 (0.8)	1.1 (0.32)	< 0.001
12. Because of work responsibilities	2.0 (0.6)	1.3 (0.7)	< 0.001
13. Because I lack energy	2.0 (0.5)	1.5 (1.1)	0.120
14. Other health problems prevent attendance	2.2 (0.8)	1.5 (1.2)	0.014
15. Because I am too old	1.7 (0.5)	1.1 (0.3)	< 0.001
16. Because my doctor didn't find it necessary	1.9 (0.3)	1.3 (0.4)	< 0.001
17. Because people with heart problems don't attend cardiac rehabilitation, and they are doing fine	1.9 (0.3)	1.0 (0.2)	< 0.001
18. Because I can manage my heart problem	2.0 (0.6)	1.0 (0.2)	< 0.001
19. Because I think I was referred, but the program did not contact me	1.9 (0.3)	1.3 (0.4)	< 0.001



20. Because it took too long for me to be referred and start the program	2.4 (0.8)	1.3 (0.4)	< 0.001
21. Because I prefer to take care of my health on my own, not in a group	1.9 (0.3)	1.0 (0.2)	< 0.001

\* CRBS = Cardiac Rehabilitation Barriers Scale; †M (S.D.) = Mean (Standard Deviation); ‡p = The value from the paired samples t-test

## DISCUSSION

The results of this study indicate that participants in a cardiac rehabilitation program (CRP), assessed before the pandemic, understood the benefits of their involvement in such a program and reported a decrease in barriers to accessing the CRP during the pandemic period. Monitoring individuals with heart disease before and during the pandemic contributes to a deeper understanding of the impact of COVID-19 on this population. We did not find, in the national literature, studies with a longitudinal design that allowed us to analyze this impact.

When comparing the average values of the two assessments obtained by the EBRC, whose total score ranges from 21 to 105 (higher values indicating greater perceived barriers to participation or adherence to cardiac rehabilitation programs), we observed a decrease in the average score from 43.8 to 28. This difference was statistically significant. The result differs from the initial expectations that the COVID-19 pandemic would be the greatest barrier of all.

The significantly lower scores in the Second Interview indicate that participants perceived fewer barriers to attending cardiac rehabilitation during the pandemic period than before when the service was operating regularly. When observing the average scores of responses to the 21 items of the EBRC, we found a decrease from 2.1 to 1.3 on a five-point response scale ranging from one (strongly disagree) to five (strongly agree). This means that during the pandemic, respondents reduced their perception of the items being barriers to participation in the cardiac rehabilitation program they were enrolled in.

Several factors may explain these results, with emphasis on the fact that participants individually felt the social isolation, with direct impacts on mental health <sup>(14)</sup>, including physical inactivity <sup>(15)</sup>. Given this fact, it is necessary to explain that the results were influenced by the participants' desire to return to their old routine. The absence of in-person group commitments three times a week was something that all participants unanimously regarded as the major loss during the pandemic, also reflected in the fact that only seven participants continued, in some way, with regular physical activity, precisely because they did not have a fixed and supervised place to exercise <sup>(16-17)</sup>.

When comparing our results with those obtained in another study conducted in Brazil<sup>(9)</sup>, we observed differences in perceived barriers. In the study involving 174 Brazilians, 74 participants were enrolled in CRP programs offered by SUS-related services. The greatest barriers (item means) in this

study were reported as "due to travel" and "other health problems," although these barriers were greater among those dependent on the public healthcare system <sup>(9)</sup>. In contrast, in our study, the greatest barriers were related to "transportation issues" and "bad weather".

The understanding among healthcare professionals regarding the rehabilitation of individuals affected by cardiac diseases is still heterogeneous and often focused on functional aspects. In Brazil, there is only one vacancy for every 99 patients in need of cardiac rehabilitation <sup>(18)</sup>. In this context, we have the unfavorable situation of individuals with cardiac diseases who lack access to cardiac rehabilitation programs, which are still incipient in Brazilian healthcare services.

That being said, it's possible to state that the COVID-19 pandemic only exacerbated the existing barriers to access to healthcare and rehabilitation services, access that would provide better living conditions for the population. And, at the same time as efforts increased to contain the pandemic, non-pharmacological interventions, social protection mechanisms, and access to healthcare were not equally reinforced by decision-makers <sup>(19)</sup>, largely due to the austerity period during the pandemic and its consequences on the public healthcare system.

Many cardiac rehabilitation programs are solely focused on the cardiopulmonary conditioning of patients, with physiotherapists being the professionals directly involved in this task. However, this approach contrasts with the recommendations of the most recent guidelines, which call for a multidisciplinary team <sup>(20)</sup>. The increased provision of this specialty in response to the pandemic requires strategies to mitigate barriers, as well as inequalities in the distribution of other services across the regions of Brazil <sup>(21)</sup>.

We believe that the results indicating a significant reduction in the perception of barriers to access to cardiac rehabilitation services are contextualized by the fact that patients undergoing rehabilitation are aware of the benefits (clinical, physical, and mental) that a cardiac rehabilitation program can provide, as evidenced in other studies <sup>(22-23)</sup>.

Therefore, based on their experiences so far, they collectively desired the return of activities precisely because of the heightened awareness of "health" during the acute pandemic period <sup>(24)</sup>. More than ever, rehabilitation, in general, should be followed throughout life to demonstrate its effectiveness<sup>(25)</sup>.

## CONCLUSION

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This study and its results have shown that participants in a phase 2 or phase 3 cardiac rehabilitation program understand the program's benefits by perceiving fewer barriers to access during the pandemic period.

Although we followed a small group of individuals enrolled in a CRP, our study provides novel insights into how participants were faring in the second year of the pandemic and how they assessed the barriers to resuming cardiac rehabilitation.

It is worth noting that we had begun evaluating these perceived barriers by participants of a CRP, served at a university hospital located in the interior of the state of São Paulo, in January 2020, when we were surprised, only two months later, by the World Health Organization's declaration about the new global health situation regarding the new virus.

As a consequence, the CRP was canceled, ceasing the enrollment of new participants and without the return of patients to face-to-face activities. It is reinforced, therefore, that the desire to return to regular appointments at the Rehabilitation Center led participants to overcome, even if only by mere aspiration, the barriers that previously probably hindered them from fully participating in a CRP.

New studies are awaited to assess the barriers to accessing various health services, not only with a larger sample size but also diversified in profile. Further investigations in this regard would provide healthcare teams with a better understanding of system users, aiming for greater adherence to the service.

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**Corresponding author::**

Rosana Aparecida Spadoti Dantas. Avenida dos Bandeirantes,  
3900, Campus Universitário - Bairro Monte Alegre. Ribeirão  
Preto, São Paulo, Brasil.

E-mail: [rsdantas@eerp.usp.br](mailto:rsdantas@eerp.usp.br)