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# Strategic planning of a Telepharmaceutical Care service for patients with asthma: An implementation study

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## Abstract

**Objective:** To describe the implementation process of the Telepharmaceutical Care pilot program, as a tool to promote adherence to the treatment for asthma. **Methods:** In planning, the Situational Strategic Planning theory and adapted Design Thinking were used to develop the intervention instrument. A questionnaire was designed to guide Telepharmaceutical care, which included the asthma control score and the Brief Medication Questionnaire. Planning began in February 2020 and the treatment took place from March to May 2020. The sample was non-probabilistic and included older adults with asthma registered at the Drug Pharmacy of Rio Grande do Sul, located in Porto Alegre. The McNemar statistical test was used to compare asthma control results at time 0 (pre-intervention) and after the Telepharmaceutical Care intervention. **Results:** The description of the implementation process provided a mechanism that may be useful for the applicability of this type of service in other scenarios, highlighting the professional pharmacist acting as a teleconsultant, working in remote care for people with chronic respiratory diseases. In the pilot test, 20 patients were seen, who received a second consultation within a period of 3 months. Of the total sample, 70% were women and the general mean age was 71 years old ( $\pm 8$  years old). The mean telephone call time in minutes in the first consultation was 22.4 ( $\pm 11.4$ ) and, in the second consultation, it was 17.9 ( $\pm 6.7$ ). The McNemar statistical analysis indicates an increase in the proportion of individuals in the "good control" category between time zero and after the Telepharmaceutical Care intervention ( $p = 0.016$ ). **Conclusion:** Through this action on a pilot scale, it was possible to initiate the implementation of Telepharmaceutical Care in RS in a planned and coordinated manner, standardizing the work process and suggesting potential to improve the patients' quality of life.

**Keywords:** pharmaceutical services; telemedicine; implementation science; asthma; lung diseases.

## Planejamento estratégico de um serviço de telecuidado farmacêutico para pacientes com asma: Um estudo de implementação

## Resumo

**Objetivo:** Descrever o processo de implementação do programa piloto de Telecuidado farmacêutico, enquanto ferramenta de promoção da adesão ao tratamento da asma. **Métodos:** No planejamento, foi utilizado a teoria do planejamento estratégico situacional e o *design thinking* adaptado para o desenvolvimento do instrumento de intervenção. Foi elaborado questionário para guiar a consulta farmacêutica, que inclui escore de controle da asma e o *Brief Medication Questionnaire*. O planejamento iniciou em fevereiro de 2020 e as intervenções ocorreram de março a maio de 2020. A amostra foi não probabilística e incluiu idosos com asma cadastrados na Farmácia de Medicamentos do Rio Grande do Sul (FME/RS), localizada na cidade de Porto Alegre. Foi utilizado o teste estatístico McNemar para comparar os resultados de controle da asma no tempo 0 (pré intervenção) e após a intervenção do telecuidado farmacêutico. **Resultados:** A descrição do processo de implementação forneceu estratégias que poderão ser benéficas para a aplicabilidade desse tipo de serviço em outros cenários, destacando a atuação do profissional farmacêutico como teleconsultor, atuando no cuidado remoto às pessoas com doenças respiratórias crônicas. No teste piloto, foram atendidos 20 pacientes, que receberam a segunda consulta num período de 3 meses. Do total da amostra, 70% eram mulheres e a média de idade geral foi de 71 anos ( $\pm 8$  anos). O tempo médio da ligação telefônica em minutos na primeira consulta foi de 22,4 ( $\pm 11,4$ ) e na segunda consulta foi de 17,9 ( $\pm 6,7$ ). A análise estatística de McNemar indica aumento na proporção de indivíduos na categoria "bom controle" entre o tempo zero e após a intervenção do telecuidado farmacêutico ( $p=0,016$ ). **Conclusão:** Através dessa ação em escala piloto, foi possível iniciar a implementação do telecuidado farmacêutico no RS de forma planejada e coordenada, padronizando o processo de trabalho e sugerindo potencial para a melhoria da qualidade de vida dos pacientes.

**Palavras-chave:** assistência farmacêutica; telemedicina; ciência da implementação; asma; doenças pulmonares.



## Introduction

Hundreds of millions of people of all ages suffer from chronic respiratory diseases (CRDs) around the world, with an increase in prevalence that is particularly worrying among children and older adults.<sup>1,2</sup> These problems affect quality of life, causing disability in the individuals and major economic and social impacts.<sup>2</sup> In 2019, CRDs were responsible for nearly 1,190,891 hospitalizations and 2,500 deaths in Brazil.<sup>3</sup> In the world, asthma is the CRD with the highest rise in prevalence, morbidity, mortality and economic burden, with Brazil ranking 8<sup>th</sup> in the world in terms of prevalence, varying from 10% to 20%, depending on the region and age group considered.<sup>1</sup>

An important complicating factor in asthma control is non-adherence to the treatment, which can reach rates of 14%, a fact reinforced by studies that indicate a total treatment adherence rate of only 32.4% in Brazil.<sup>4,5</sup> It is estimated that 24% of the cases of exacerbation of the disease and 60% of the asthma-related hospitalizations could be attributed to poor adherence to the treatment.<sup>6</sup> Thus, as this is a clinical condition that requires the use of inhalation devices for maintenance and control of the symptoms, it is essential that adherence is addressed through the teaching and review of the inhalation technique, which presents increasing evidence of a positive impact on disease control.<sup>7,8</sup>

The clinical guidelines for the management of asthma indicate that health care strategies should be directly applied to control the symptoms in order to achieve satisfactory clinical results.<sup>9-12</sup> Diverse evidence suggests that symptom control guarantees normalization of the health-related quality of life levels, but there are relevant limitations that must be considered in this intervention process, such as those of a genetic, environmental and cultural nature.<sup>8,13</sup> In addition to that, the perception of symptom control is associated with the individual understanding of each patient and also of the health professionals who are responsible for their care, which may be discordant, exerting a direct impact on the patients' treatment options and clinical results.<sup>13</sup>

The information and communication technologies can be allies in improving adherence. Jeminiwa et al. (2019) observed that the use of Telehealth tools is effective in improving adherence to the use of inhaled corticosteroids, mainly in clinical interventions through the use of mobile devices.<sup>14</sup> Thus, it is highly relevant that remote interventions that can contribute to improving therapeutic adherence are explored.

This study aims at describing the implementation process of the Telepharmaceutical care pilot program, as a tool for education in health and promotion of adherence to the treatment for asthma, using Situational Strategic Planning (SSP) and Design Thinking, in order to guide the large-scale implementation of the service in the State Drug Pharmacies (*Farmácias de Medicamentos do Estado*, FMEs) of Rio Grande do Sul.

## Methods

This is a study about the implementation of the Telepharmaceutical Care service in the state of Rio Grande do Sul. For its conduction, the 4 stages of Situational Strategic Planning (SSP), a management tool commonly used to face challenges in public administration, were used.<sup>15</sup> Design Thinking adapted to the reality of the pharmaceutical services was also used, as described by Souza

(2017), a tool that encourages creativity in solving the barriers encountered in the implementation process, culminating in the development of the intervention instrument.<sup>16</sup> The complete planning process is represented in detail in Figure 1, and in accordance with the guidelines set forth in the Standards for Reporting Implementation Studies Statement (STaRI) for service/intervention implementation studies.<sup>17</sup>

The implementation of the Telepharmaceutical Care pilot project was planned and carried out by a work team from the Pharmaceutical Care Department (*Departamento de Assistência Farmacêutica*, DEAF) of the Rio Grande do Sul State Health Secretariat (*Secretaria de Estado da Saúde do Rio Grande do Sul*, SES/RS). The sector is responsible for managing Pharmaceutical Care in RS. Planning was initiated in February 2020 and the interventions took place from March to May 2020.

The Telecare intervention developed during this implementation study consists of a pharmaceutical consultation performed remotely, via telephone call, directed to users diagnosed with asthma (ICD-10 J45) who receive medications from the Unified Health System (*Sistema Único de Saúde*, SUS). The consultation addresses the patient's health status, medications used, non-pharmacological treatment, smoking habit, existence of possible pharmacotherapy-related problems, such as lack of adherence to the treatment, problems of effectiveness, safety and need, in addition to issues related to COVID-19. In order to facilitate the intervention and train pharmacists for this type of care, a guiding questionnaire was developed, structured with questions and checklists, such as the Brief Medication Questionnaire (BMQ)<sup>18</sup>, used to assess adherence. To assess asthma control, questions from the Global Initiative for Asthma (GINA, 2020 version)<sup>11</sup> were used, and a detailed checklist was included with the technique for using the inhalers, in order to check the description of the step-by-step description of how to use the inhaling device. The guiding questionnaire is fully contained in Supplementary Material 1 and was applied both in the first and in the second appointment, except for Section 1 and part of Section 2, related to the sociodemographic data, which were applied only in the first consultation. In addition to that, a space was included at the end of the appointment to record the patient's information through the Subjective, Objective, Assessment and Plan (acronym for SOAP) method, so that the information could be retrieved in the next consultation.<sup>19</sup>

To carry out the pilot test, 20 elderly adults were included, with ICD-10 for asthma, who had an updated registration at the Special Drug Pharmacy (FME/RS) of Porto Alegre, in the Medication Administration (*Administração de Medicamentos*, AME) information system, used for the logistics and control of medication dispensing within the scope of the SES/RS. A non-probabilistic sample was used, excluding the patients who did not answer the phone after the third contact attempt and those who were not interested in participating in the consultation, reaching a total of 20 patients. Asthma control was assessed as the primary outcome. Adherence to the treatment and the technique for using the inhalation device were assessed as secondary outcomes.

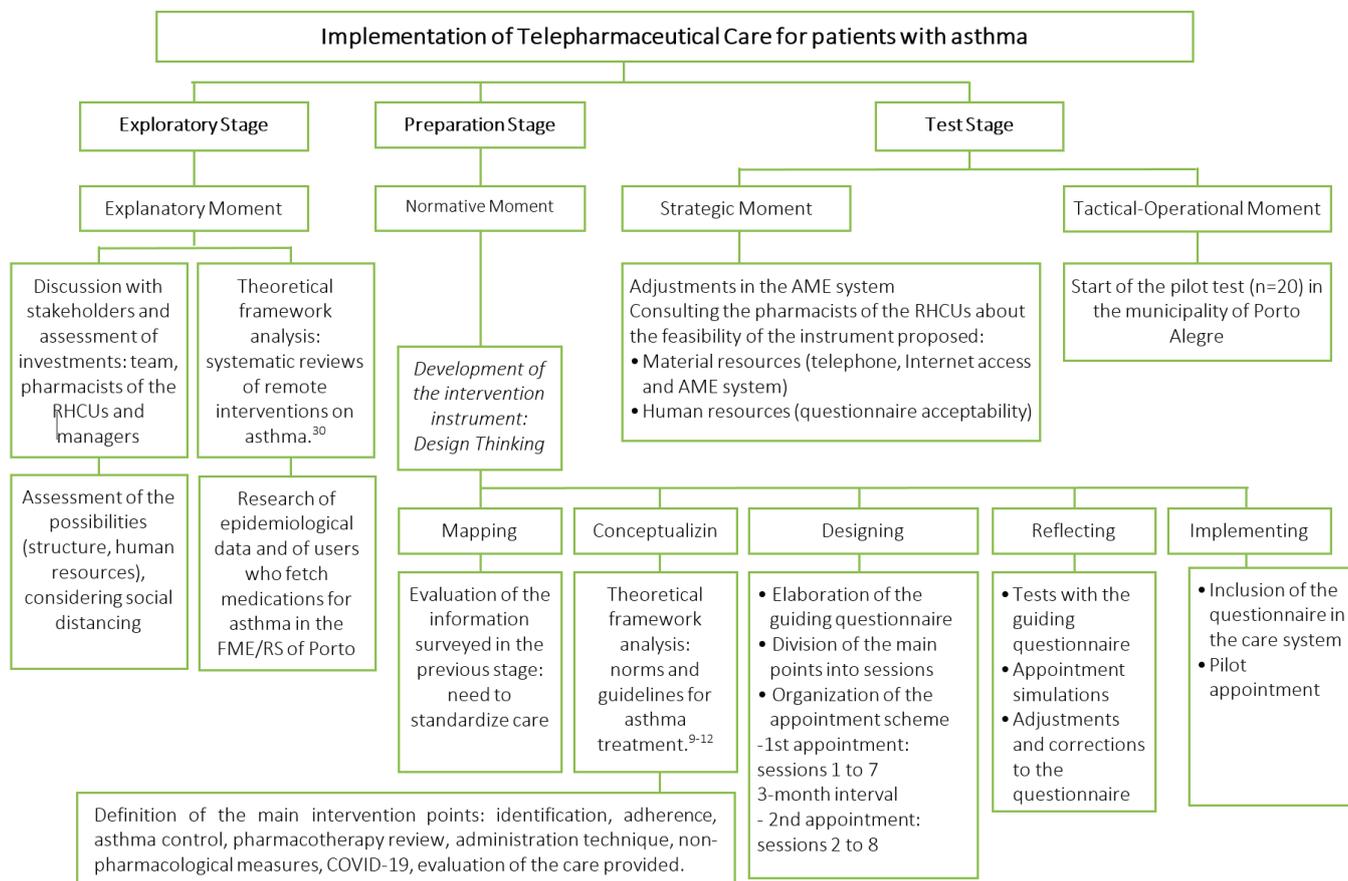
The information collected was tabulated and analyzed using descriptive statistics, with presentation of frequencies of categorical variables and mean and standard deviation of continuous variables. McNemar's non-parametric statistical test was used to compare asthma control in the first and second appointments. For this, a score was used, calculated from the questions about asthma control (Section 2, Supplementary Material 1), which divides



the results into categories: well-controlled, partially controlled and not controlled. In the statistical analysis, the scores of each asthma control category were condensed in only two categories: well-controlled and not controlled. p-values below 0.05 were considered significant.

This paper was approved by the Research in Health Ethics Committee of the Public Health School (*Comitê de Ética na Pesquisa em Saúde da Escola de Saúde Pública, CEPS-ESP/RS*), under CAAE: 40194820.1.0000.5312.

**Figure 1.** Flowchart corresponding to the implementation of Telepharmaceutical Care for patients with asthma.



## Results

Situational Strategic Planning took place at four moments: 1) Explanatory moment: investigation of the problem; 2) Normative moment: elaboration of the intervention; 3) Strategic moment: implementation feasibility; and 4) Tactical-operational moment: the pilot test.

The first moment of the SSP consisted of meetings of the team responsible for the project with the pharmacists of the RHCUs and managers from the municipalities, when the process of implementing pharmaceutical care in the FME/RS was discussed. The meetings were planned in 2019 to take place in person during 2020; however, due to the COVID-19 pandemic, all the meetings took place online.<sup>20</sup> A meeting was held with each RHCU, as well as an expanded meeting with all the coordinating units, totaling 19 meetings with a mean duration of 3 hours each.

The team chose to develop the axis of the *Cuidar + RS* program referring to the implementation of Telepharmaceutical Care in the state, since the format of the action allows for remote consultation

and contributes to care continuity for users with chronic diseases, respecting social distancing.<sup>21-23</sup> Thinking about the most prevalent chronic diseases in RS, it was decided to initiate the pilot aimed at the population with asthma, as it represents one of the risk groups for COVID-19 and needs long-term monitoring to verify adherence to the therapy, considering that it positively affects disease control and, therefore, represents an important financial impact on the public coffers.<sup>24,25</sup> However, the RHCU pharmacists raised the concern about professional qualification for the care of users with asthma through telephone calls, both because the consultations are not part of these professionals' work routine and because of difficulties conducting consultations through this communication means. Thus, standardization of this Teleappointment will facilitate expanding the service to users with other prevalent chronic diseases.

At the second moment, the design of the new service was carried out using the Design Thinking method, developing a guiding questionnaire that meets the needs of the target audience of the intervention (Supplementary Material 1).

At the third moment, the pharmacists of the 18 RHCUs were consulted to find out if there was the necessary physical structure in the municipal FMEs (telephone and computer with Internet access and the AME system), and pharmaceutical professionals with the possibility of booking appointments in the schedule for the appointments, in addition to willingness to follow the guide proposed, since pharmaceutical consultation by phone or even in person is still not a reality in many places in RS<sup>22</sup>. In relation to the resources of the AME system, the platform's functionalities allowed linking the questionnaire in the electronic medical record specifically of the users registered in the AME system with ICD J45, enabling proper registration of the pharmaceutical service provided, as well as the possibility of sending an SMS with a satisfaction questionnaire and a declaration of pharmaceutical services at the end of the teleconsultation.

At the last moment, the teleappointments were initiated. Calls were made to 51 patients; of these, 23 answered the calls and only 3 were unwilling to participate, reaching a total of 20 individuals, 16 patients and 04 caregivers, totaling 40 consultations performed (first and second) by 4 different teleconsultants. In the first consultation, the questions referring to sections 1 to 7 of the intervention were followed; in the second consultation, it was asked about the items referring to sections 2 to 8 (Supplementary Material 1). All the appointments obtained the maximum score in Section 8, showing receptivity and a positive perception about the appointment on the part of these patients.

The female gender was predominant in the sample, corresponding to 70% of the total of people assisted (n=14), whereas the male gender corresponded to 30% (n=6). The mean age was 71 years old ( $\pm 8$  years old).

In relation to schooling, 45% of the people assisted had incomplete elementary school (n=9), 15% had complete elementary school (n=3), 15% had completed high school (n=3), 10% had incomplete high school (n=2), 10% had complete higher education (n=2) and only 01 person had a post-graduate degree. All the individuals assisted earned incomes from 1 to 5 minimum wages (Brazilian currency corresponding to 2020).

In minutes, the phone calls lasted a mean of 22.4 ( $\pm 11.4$ ) in the first consultation and of 17.9 ( $\pm 6.7$ ) in the second.

The main results obtained from the intervention are shown in Table 1. As for the primary outcome, an increase in the proportion of individuals in the "well-controlled" category of asthma was observed between time zero and after the Telepharmaceutical care intervention (p=0.016), according to the McNemar test.

In addition to that, between the first and second consultation, there was a reduction in the frequency of problems related to adherence barriers, according to the application of the BMQ, as well as a decrease in the reporting of adverse reactions (six patients reported adverse reactions in the first consultations and no patients in the second). Regarding the technique for using the inhalation device, an increase was verified in the frequency of errors when performing it, although with differences in relation to the type of error (Table 1).

Also at the tactical-operational moment, from the performance of the pilot test, we verified the possibility of improving the intervention instrument, including the Asthma Control Test (ACT)<sup>26</sup> and the Test of the Adherence to Inhalers (TAI)<sup>27</sup> questionnaires, so that they are also used as parameters for measuring the clinical impact of the intervention on patients in future studies.

**Table 1.** Asthma control results, adherence to the medications (BMQ) and problems related to the technique for using the inhaling devices in the first and second consultations of the pilot test, Porto Alegre- RS, March to May 2020.

Information	First appointment	Second appointment	p-value <sup>1</sup>
<b>Asthma control n (%)</b>	<b>N=20</b>	<b>N=20</b>	
Well-controlled	8 (38.1)	13 (61.9)	0.016
Fairly controlled	5 (27.8)	4 (20.0)	-
Not controlled	7 (35.0)	3 (15.0)	0.125
<b>Brief Medication Questionnaire n (%)</b>	<b>N=14</b>	<b>N=9</b>	
Non-adherence potential	6 (42.9)	6 (66.7)	
Beliefs barrier	4 (28.6)	-	
Forgetfulness barrier	4 (28.6)	3 (33.3)	
<b>Problems related to the technique for using the inhalation device detected in the checklist n (%)</b>	<b>N=16</b>	<b>N=19</b>	
Placing the capsule in the base	1 (6.2)	-	
Piercing the capsule	1 (6.2)	1 (5.3)	
Placing the inhalator on the mouth	1 (6.2)	-	
Tilting the head 45 degrees	4 (25.0)	1 (5.3)	
Releasing the air in the lungs before inhalation	4 (25.0)	1 (5.3)	
Holding the breath, mentally counting up to 10 seconds, approximately	2 (12.5)	2 (10.5)	
Rinsing the mouth with water and/or brushing the teeth immediately after using the medication	1 (6.2)	5 (26.3)	
Discarding the capsule	1 (6.2)	1 (5.3)	
Removing residues from the device with the aid of a brush or soft brush	1 (6.2)	8 (42.1)	

<sup>1</sup>The asthma control scores were divided into two categories: well-controlled and not controlled, and p-values below 0.05 by the McNemar test were considered significant.

## Discussion

Telepharmaceutical care is an innovative and underexplored service in Brazil, mainly for the general population, and its main application context is services aimed at populations living in remote communities and with difficult access to the health services.<sup>25</sup> The satisfactory implementation of an intervention in the care practice depends on a process that is carefully planned and elaborated, ensuring a scenario where the minimum conditions exist for the intervention to take place. In this case, using a strategy is fundamental to guide the process in a conscious and controlled manner.<sup>28</sup>

In this study, we conducted the implementation of a Telepharmaceutical Care service for people with asthma in an unprecedented manner in RS, using the SSP and Design Thinking approaches to develop the care tool.<sup>15,16</sup> The description of the implementation process provides strategies that may be beneficial for the applicability of this type of service in other scenarios and clinical contexts, highlighting the role of the pharmacist as a teleconsultant, working in remote care for people with asthma.

The profile of the users assisted was that of elderly adults with low schooling levels, and is in line with the population profile of other research studies.<sup>29,30</sup> In addition to that, this predominance was already expected, since most of the users registered in the AME system who receive their medications in the FME are part of this population segment. Another important point to be highlighted is the need to identify the users and their profiles right at the start of the service, in order to adapt the questionnaire's questions and language to the reality of the person served, as it is already a standard in face-to-face pharmaceutical consultations,<sup>31</sup> as it was verified that it is not always the user who receives the guidelines, but the person responsible for the care of that patient.

Pharmaceutical interventions carried out in the scope of Telehealth contributed to the improvement of clinical outcomes in the patients treated, highlighting the applicability of the BMQ assessment instrument and the evaluation of the technique for using the inhalation devices, which can be used both through telephone interventions and in interventions by means of video conference. The questions about asthma control provided important considerations for the analysis of the patients' current health status, suggesting that there is a percentage of patients with poorly controlled or regular asthma who can benefit from the teleconsultations. After conducting the test pilot, we noticed the need to adopt ACT, for being validated in Brazil. This test is particularly useful in evaluating the effectiveness of health promotion interventions for people with asthma, and its simplicity allows using it by means of phone calls.<sup>26</sup>

The use of inhaling devices is the main form of treatment for patients with asthma; however, if the technique for using the devices is performed inappropriately, there may be impairments in symptom control, negatively affecting adherence to the treatment.<sup>32</sup> Education in health is responsible for 90% of the success in the treatment of CRDs and, in the case of asthma, it is essential to verify how the patient uses the device, being a challenge in the context of telephone care, where there is no visual contact between the pharmacist and the user.<sup>33</sup> In this regard, the checklist was a very useful and suitable instrument to remotely verify the use of the inhaling device, and it can be used when there is no possibility or difficulty in making a video call, which would allow for a more reliable observation of the drug administration technique.

We identified that the most frequent failures were related to correct cleaning of the device, oral hygiene after the use of inhaled corticosteroids, expiration and proper posture for aspiration of the medication. All of these items negatively affect the treatment, and may lead to adverse effects or underdosing related to an inadequate administration technique.<sup>34</sup> In a research study carried out by Wang et al. (2020), pharmacists produced videos explaining the proper technique for using the inhalation devices as a strategy for education in health and verified that demonstrating the technique ensured the patient's mastery and yielded important results in the outcome of controlling these diseases, in addition to highlighting the importance of evaluating patients individually.<sup>35</sup> In our study, when identifying the failures, the pharmacist provided guidance according to each patient's needs.

In addition, it is noted that more failures were reported in the second appointment, when compared to the first, which is possibly related to the difference between the teleconsultants or to the change in the users' perception of details which, after the first consultation, come to judge as more relevant, and should be noted as a possible research bias in larger trials. The possibility of the patients performing the technique correctly at a given moment and incorrectly at a second moment cannot also be discarded, since operational techniques can decrease over time, if education in health is not constant.<sup>35</sup>

We verified that asthma control tends to improve after the intervention with the pharmacist in the guidance in relation to the correct use of the medication, with an increase in asthma control from 40% to 65%, which will be investigated in a randomized clinical trial that is being conducted in the population. In a systematic review, Jia et al. evidenced the pharmacists' role in the care of people with asthma and COPD, showing a positive effect on adherence to the treatment (Relative Risk - RR: 1.34 [95% CI: 1.18-1.53],  $p < 0.0001$ ) and in the inhalation technique (RR: 1.85 [95% CI: 1.57-2.17],  $p < 0.00001$ ). In the subgroup meta-analysis, a significant improvement in adherence to the treatment was only identified in patients with COPD (RR: 1.41 [1.24-1.61],  $p < 0.0001$ ).<sup>36</sup>

The professional's assessment shows that the main concern of the teleconsulting pharmacists is related to the potential of non-adherence to the treatment for asthma. The reflection after the appointment to assess and record the user's greatest need is useful because it assists the pharmacist in the second appointment to focus on this issue in order to develop a plan that helps the user to overcome this difficulty.<sup>34</sup> In addition to that, evaluations of the implementation process as a whole, associated with the teleconsultants' and users' experiences, are fundamental for a later implementation, exploring experiences, barriers and facilitators of pharmacists and patients for the use of Telecare.

Through the action on a pilot scale, it was possible to promote the necessary adjustments and adaptations, enabling the implementation of the service in the state, previously identifying some weaknesses and potentialities of Telepharmaceutical Care in RS. Among the weaknesses during the process, the need for continuing education of the pharmaceutical workers who will carry out Telecare for guidance and proper registration of the appointments using the service method proposed was evident, a barrier that is being overcome with a virtual learning environment guided by the SES/RS. In relation to the potentialities, standardization of care also stands out, which facilitates the implementation of this work process and of the care records in electronic medical charts, which contributes to ensuring care integrality and longitudinality, demarcating pharmaceutical care in



the SUS as a promoter of users' health and assists management in the production of indicators, as well as it suggests an improvement in the users' quality of life and allows future studies on the impact of these interventions on public health.

Finally, we understand that there are limitations that need to be noted. In the first place, the sociodemographic data (income and schooling) collection modality did not allow performing a robust statistical analysis of the data obtained. In addition to that, the sample size obtained was not large enough to allow more in-depth analyses. However, we emphasize that the main contribution of this study lies in the description of the implementation modality, which can be used as a theoretical foundation for future research studies and also as technical-scientific grounds for future implementations of services like this.

## Conclusion

The implementation of Telepharmaceutical Care in the state of RS, in a planned and organized manner, proves to be feasible and represents a major advance for pharmaceutical care in the SUS, in addition to strengthening the category of pharmacists as active professionals in clinical care directly aimed at the user. In addition to that, the interventions conducted by means of Telehealth showed to be promising in the terms of improving the clinical results of the patients assisted. The details reported in this study contribute to the implementation of pharmaceutical services in other points of care and strengthen the use of technologies in pharmaceutical care, especially during the COVID-19 pandemic period.

## Collaborators

A.N.G. was responsible for the conception of the study, data analysis and interpretation, writing of the article, and in the critical review relevant to the intellectual content. A.P.R. collaborated in the conception of the study, data analysis and interpretation, writing of the article, and in the critical review relevant to the intellectual content. V.K.A. collaborated in data analysis and interpretation and in writing of the article. C.S.R. collaborated in writing of the article. F.F.A. collaborated in data analysis and interpretation, writing of the article, and in the critical review relevant to the intellectual content. R.E.S. collaborated in the conception of the study and in the critical review relevant to the intellectual content. All authors approved the final version to be published.

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## Conflict of interest statement

The authors declare that there are no conflicts of interest regarding this article.

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