

RESEARCH ARTICLE

Perceived barriers to the implementation of clinical pharmacy services in a metropolis in Northeast Brazil

Genival Araujo dos Santos Júnior^{1☯*}, Sheila Feitosa Ramos^{1☯}, André Mascarenhas Pereira^{1☯}, Aline Santana Dosea^{1☯}, Elton Matos Araújo^{1☯}, Thelma Onozato^{1‡}, Déborah Mônica Machado Pimentel^{2‡}, Divaldo Pereira de Lyra, Jr.^{1‡}

1 Laboratory of Teaching and Research in Social Pharmacy (LEPFS), Department of Pharmacy, Federal University of Sergipe, São Cristóvão, Sergipe, Brazil, **2** Department of Medicine, Federal University of Sergipe, Sergipe, Brazil

☯ These authors contributed equally to this work.

‡ These authors also contributed equally to this work.

* farm.genival@gmail.com



OPEN ACCESS

Citation: Santos Júnior GA, Ramos SF, Pereira AM, Dosea AS, Araújo EM, Onozato T, et al. (2018) Perceived barriers to the implementation of clinical pharmacy services in a metropolis in Northeast Brazil. *PLoS ONE* 13(10): e0206115. <https://doi.org/10.1371/journal.pone.0206115>

Editor: Katie MacLure, Robert Gordon University, UNITED KINGDOM

Received: July 18, 2017

Accepted: October 8, 2018

Published: October 22, 2018

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Data Availability Statement: Data is available upon request to researchers who meet the criteria for access to confidential data. Data requests may be sent to the Laboratory of Teaching and Research in Social Pharmacy (LEPFS) at Federal University of Sergipe (UFS) (lepfs.ufs@gmail.com, +55 79 3194-7598, <http://lepfs.ufs.br/pagina/5266>).

Funding: The author(s) received no specific funding for this work.

Abstract

Background

Clinical pharmacy services (CPS) are professional services provided by pharmacists, who use their skills and knowledge to take an active role in patient health. These services have expanded in health systems around the world. However, it is important to have a comprehensive understanding of factors that may hinder the implementation of CPS in health systems.

Objective

To identify pharmacists' and managers' perceptions of barriers regarding the implementation of CPS in some public health units in a metropolis in Northeast Brazil.

Methods

This is a qualitative study based on focus groups and semi-structured, face-to-face, in-depth interviews. Participants were health-system pharmacists and managers, selected based on their direct participation in the implementation process. Focus groups were carried out with the pharmacists, and interviews were carried out with managers. The audio and videos were transcribed verbatim in full, and were independently analyzed using content analysis. This study was approved by the Brazilian Committee of Ethics in Research and all participants signed informed consent forms.

Findings

There were two focus groups and five interviews. The discussions generated 240 minutes of recordings. The health-system pharmacists and managers expressed barriers were allocated into five categories to facilitate a comprehensive understanding of the implementation

Competing interests: The authors have declared that no competing interests exist.

of CPS; these barriers were related to: the local healthcare networks, the healthcare team, the pharmacists, the implementation process, and the patients.

Conclusions

This study revealed the perceptions of barriers associated with the participants involved in the implementation of CPS in some public health units in a metropolis in Northeast Brazil. The barriers reflect the challenges to be overcome in the CPS implementation process in the health systems.

Introduction

Clinical Pharmacy Services (CPS) can be defined as professional services provided by pharmacists, who use their skills and knowledge to take an active role in patient health, through effective interaction with both patients and other healthcare professionals [1]. In these services, pharmacists have started to develop an important role in patient care process, reducing medication errors [2,3], reducing costs of drug therapy [4,5], and improving patient health conditions [6,7].

In this way, the CPS have expanded in different settings into the health systems [8–10]. In Brazil it would not be different, because CPS have been implemented in the Brazilian Health System (SUS) in the last ten years [11,12]. It is estimated that there are more than 2,500 pharmacists developing CPS [13], many of whom work in health units at SUS [14]. This expansion can be explained by measures taken by the Brazilian Federal Pharmacy Council, which has regulated the clinical activities of the pharmacists [15], and by Federal Government initiatives, such as the National Qualification Program for Pharmaceutical Service, which has implemented CPS in the SUS [16].

However, despite the advancement of these services in health systems around the world, the CPS implementation process is challenging, complex, and influenced by multiple factors [17,18]. Thus, it's important to have a comprehensive understanding of factors that may hinder the implementation of CPS in health systems. Additionally, there is a gap in studies that discuss the barriers to CPS implementation in SUS.

This study aimed to identify the perceptions of barriers of pharmacists and managers who participated in the CPS implementation process developed by the Brazilian Ministry of Health in some public health units in a metropolis in Northeast Brazil.

Methods

Study design

This was a qualitative study involving focus groups and interviews, in order to capture a comprehensive understanding of the implementation of CPS in some public health units in a city in northeast Brazil. The focus groups and interviews were conducted in April and August 2016, respectively. This study used the recommendations proposed by consolidated criteria for reporting qualitative research [19].

Study context

The present study investigated the CPS implementation process was carried out by the Brazilian Ministry of Health, from July 2015 to March 2016. First, a collaborative partnership was agreed between the Brazilian Ministry of Health and the local health authority to ensure the provision of minimum structural resources for the implementation of CPS. Second, an expert

team with substantial previous experience was hired to implement CPS. This expert team was part of the Laboratory of Teaching and Research in Social Pharmacy of the Federal University of Sergipe. In the last step, CPS were implemented through the theoretical and practical training based on patient care process [20] of 42 health-system pharmacists.

The pharmacists should comply with all stages of the implementation process and achieve a performance above 70% in the criteria for accreditation. The accreditation criteria proposed by the Brazilian Ministry of Health were divided into two axes: a) theoretical: directed study, and theoretical evaluation; b) practical: seminars to discuss real clinical cases, attendance of at least 30 first-time patients and 25 return visits, and performance in the patient care process. Therefore, at the end of the implementation process, 23 pharmacists were accredited by the Brazilian Ministry of Health. The whole process of implementation and pharmacists' accreditation are described in detail in previous studies [21].

Setting

This study was performed in Recife city, the ninth-largest metropolitan area in Brazil, with 3,940,456 residents. In the local healthcare network, the CPS were implemented in varied settings in the Brazilian health system, such as primary and secondary health units, mental health centers, emergency rooms, and drug distribution centers (settings that supply pharmacies with drugs and devices). In these workplaces, there were no CPS with systematized and documented pharmacists' work processes before the CPS implementation. The pharmacists focused on logistics activities. Ethics approval was granted by the Brazilian committee of ethics in research (CAAE 35440114.0.0000.0008).

Participants

Participants were health-system pharmacists and managers who were selected based on their direct participation in the implementation process. The health-system pharmacists were: (i) accredited pharmacists, who started the CPS implementation process, fulfilled all stages of the implementation process and implemented CPS at their workplaces; and (ii) non-accredited pharmacists, who started the CPS implementation process, but they gave up the implementation process and did not implement CPS at their workplaces. The managers were the five managers involved in CPS implementation, such as director and coordinators.

Focus groups and interviews structure and moderation

The health-system pharmacists were allocated in two focus groups: accredited and non-accredited pharmacists. We could not make focus group with managers, because they had different hierarchical levels among them and it was impossible to gather them in the same session. Thus, semi-structured, face-to-face, in-depth interviews were conducted with five managers.

Focus groups and interviews were performed according to recommendations in the literature [19] and were moderated by researchers (ASD and GASJ). The questions were formulated from a brainstorming meeting with the authors; these questions asked about each participant's perceptions of barriers, facilitator and strategies to implement CPS. Prior to the focus group and interview sessions, participants signed the informed consent form authorizing the researchers to use the data collected.

Data collection and analysis

The moderators maintained a neutral relationship with study participants and created a stimulating environment for the exchange of views. Additionally, they asked open-ended questions

and only asked a new question or stop collecting information when new data tended to be redundant of the data already collected (data saturation). The focus group and interviews were recorded on video and/or voice.

The data collected were transcribed verbatim in full by three researchers (GASJ, AMP, and SRF). They immersed themselves in the data through multiple readings, and all transcribed data were independently analyzed using the Bardin content analysis technique [22].

This technique is composed of three phases: (1) pre-analysis: the material to be analyzed is organized, the initial ideas are systematized, and text cuttings are made in document analysis. The analysis was done by three researchers (GASJ, AMP, and SRF) independently, with a coding system; (2) the exploitation of the material: the data are aggregated into themes. (3) the interpretation: the material is interpreted, and inferences are made, in an inductive way, through consensus meetings that were held among the research team members.

Rigour and trustworthiness

The focus groups and interviews sessions were moderated by experienced researchers. They used the data saturation like models of saturation. In addition, the data analysis was performed by team members with varied backgrounds, one of them (GASJ) was involved in the data collection, and two of them were external researchers (AMP and SRF). Finally, all analyzed data were carefully reviewed by two senior researchers, one of them (DPLJ) was involved in the CPS implementation process, and the one of them (DMMP) was an external research with expertise in qualitative research. These measures were taken to maintain trustworthiness of the research findings.

Results

The focus groups with accredited pharmacists and non-accredited pharmacists were formed by eight and five pharmacists, respectively. No manager refused to participate in the interviews. The discussions generated a 104-minute recording with accredited pharmacists and a 36-minute recording with non-accredited pharmacists. The interviews had a duration of 100 minutes (average per interviewee: 20 minutes).

The participants expressed several barriers to the implementation of CPS. The barriers were allocated into five categories to facilitate comprehensive understanding of the implementation; these barriers were related to: the local healthcare networks, the healthcare team, the pharmacists, the implementation process, and the patients. [Table 1](#) shows the barriers and the categories that emerged from the focus groups and interviews. The facilitator and strategies to implement CPS are described in a previous study [23].

Barriers related to the local healthcare networks

The participants mentioned problems related to physical and human resources. They were unanimous in pointing the physical structure limitations in some health units (including lack of physical areas and material resources, such as furniture, internet, computer equipment, and devices) and a lack of a private area for pharmacists' clinical activities. Additionally, the accredited pharmacists reported stoppages and strikes among the healthcare professionals (physicians, nurses, pharmacists, pharmacy staff, community health workers, administrative staff), and non-accredited pharmacists reported dismissals and lack of sufficient human resources (pharmacy and administrative staff).

The pharmacists and managers identified that there were problems related to drug logistics management and planning. A shortage of drugs and devices may have directly influenced the pharmacists' activities. The pharmacists reported that the patients were dissatisfied and

Table 1. Perceived barriers to the implementation of clinical pharmacy services in some public health units in a metropolis in Northeast Brazil.

Categories	Accredited pharmacists	Non-accredited pharmacists	Managers
Local healthcare network	<ul style="list-style-type: none"> - Health professionals' stoppages and strikes. - Shortage of drugs and devices. - Lack of adequate physical structure in some health units. - Unawareness of some managers regarding CPS. 	<ul style="list-style-type: none"> - Shortage of drugs and devices. - Lack of adequate physical structure in health units. - Dismissals and lack of sufficient human resources. - Physical distance between some health units and the pharmacists' workplaces. 	<ul style="list-style-type: none"> - Unfavorable political, administrative, and economic environment. - Shortage of drugs and devices. - Lack of adequate physical structure in some health units. - Lack of information about rational drug use in the local healthcare networks. - Managers' resistance to implement the CPS.
Healthcare team	<ul style="list-style-type: none"> - Unawareness of the healthcare team about the pharmacists' work. 	<ul style="list-style-type: none"> - Healthcare team resistance to implement CPS. 	<ul style="list-style-type: none"> - Lack of understanding of the healthcare team about the implementation of CPS. - Unawareness of the healthcare team about the pharmacists' work.
Pharmacists	<ul style="list-style-type: none"> - Insufficient clinical education and training during undergraduate degree in Pharmacy. - Difficulty in recruiting patients. - Difficulty understanding the implementation of CPS. - Lack of adaptation among the healthcare team. 	<ul style="list-style-type: none"> - Difficulty in reconciling the clinical and logistic activities. - Gaps in pharmacist-health unit communication. - Decline of the pharmacist and healthcare team relationship. - Pharmacists' resistance to implement the CPS. - Difficulty in recruiting patients. 	<ul style="list-style-type: none"> - Insufficient clinical education and training during undergraduate degree in Pharmacy. - Difficulty in reconciling the clinical and logistic activities. - Pharmacists who graduated a long time ago. - Lack of initiative and proactivity in the healthcare team. - Pharmacists resistance to implement the CPS.
Implementation process of the CPS	<ul style="list-style-type: none"> - Inappropriate period to implement CPS. - Short period to implement CPS. - CPS not tailored to the health unit and patients. - Poor marketing strategies. - Lack of prior evaluation of pharmacists' clinical competences. 	<ul style="list-style-type: none"> - Inappropriate period to implement the CPS. 	<ul style="list-style-type: none"> - Lack of electronic health records (documentation system). - Need for adequate physical structure in the health units, and a change in the pharmacists' work processes.
Patients	<ul style="list-style-type: none"> - Lack of understanding about CPS. 	<ul style="list-style-type: none"> - Resistance and lack of awareness among the patients regarding CPS. 	Not related.

<https://doi.org/10.1371/journal.pone.0206115.t001>

discredited with their work. In contrast, the managers considered that the structural problems and shortage of drugs and devices were related to the specific and transitory stage of City.

“There was a lack of many drugs and devices [. . .] This really affects the pharmacists' work, because we are working with rational drug use, but there are no drugs” (accredited pharmacist G).

The pharmacists discussed issues related to the health service delivery profile of some health units (mental health centers, emergency rooms, and drug distribution centers). According to them, some workplaces did not have a favorable care profile for straightforward implementation of CPS.

“In the emergency room, we can't easily recruit the patients. They stay for a little time in there. Soon after they are transferred to other services or are discharged” (accredited pharmacist E).

“In the mental health center, not all patients can have access to the CPS. For some patients, I scheduled a meeting and they did not come because of their clinical profile. They simply forget. We cannot contact them because they do not answer the phone. Their relatives are sometimes not involved in the patient's life” (non-accredited pharmacist C).

The managers also declared that the lack of information about rational drug use in the local healthcare networks might have contributed to difficulty in the planning of strategies to facilitate the implementation of CPS.

“We can only have drug management data, we cannot have the data about evidences of the clinical impact of the pharmacists in the patients” (manager A).

Barriers related to the healthcare team

The pharmacists and managers reported barriers related to the interaction between pharmacists and healthcare team.

“What I find it very difficult is the lack of understanding of some healthcare professionals about the pharmacists’ clinical activities” (accredited pharmacist F).

Barriers related to the pharmacists

Accredited pharmacists stated that an important barrier was insufficient clinical education and training during undergraduate degree in Pharmacy. Managers endorsed these concerns.

“In general, the pharmacists do not have a training to take care of patients, at the University. They finish their degree in pharmacy and are not ready to deal with the patients” (manager C).

Other related barriers were the difficulty in reconciling clinical and logistic activities, difficulty in recruiting patients to CPS, and barriers related to poor interaction with healthcare professionals, such as communication failures and lack of initiative and proactivity to work as part of the healthcare team.

“I was very overloaded with tasks. I often had to complete the administrative tasks. Consequently, I had no time to perform clinical activities” (non-accredited pharmacist E).

“I had problems on understanding how the CPS would actually be in practice. Consequently, I had difficulty communicating to the healthcare team how I would take care of the patients” (accredited pharmacist B).

Barriers related to the implementation process

Accredited and non-accredited pharmacists highlighted the poor choice of implementation period, which coincided with long holidays (summer vacation, Christmas and new year period, carnival, etc.) and vacations for most of the healthcare team. Additionally, accredited pharmacists mentioned the short period given to implement CPS (nine months), which may have compromised its implementation. These barriers can also be considered as failures of the CPS implementation process.

“The time was very short [. . .] This construction of knowledge needs a maturity time [. . .] It is like the story of the butterfly's flight. The butterfly can only fly when its wings are ready to fly. There is no use in opening the cocoon before its maturity time” (accredited pharmacist H).

The managers indicated that the lack of electronic health records to store patients’ health information collected by pharmacists was another barrier, because these health records should be shared across different health care settings and healthcare professionals. Additionally,

accredited pharmacists discussed that a lack of prior evaluation of the pharmacists' clinical competencies, and poor marketing strategies, prevented a rapid implementation of CPS.

Barriers related to the patients

Pharmacists were the only participants to report patient-related barriers. The managers did not discuss this issue.

“One of the greatest difficulties was the lack of knowledge of both the population and the healthcare professionals about the pharmacist's clinical activities” (Accredited pharmacist E).

Discussion

Barriers related to the local healthcare networks

The lack of adequate physical structures in the health units was a barrier to the implementation of CPS. Structural problems can impact on the quality of care provided, the privacy required to perform CPS, and the construction of a therapeutic relationship between the pharmacist and their patients [11,24,25]. In Brazil, there is legislation that regulates the provision of adequate physical structures. Nevertheless, we found discrepancies among the official documents, the reports of the participants and other studies [26–28]. Therefore, it is crucial that health decision-makers keep abreast of planning, programming, drafting, evaluation, and monitoring of healthcare facilities.

Other mentioned barrier was the insufficient human resources. Studies have found similar findings regarding the insufficient workforce [25,29–31]. Brazinha and Fernandez-Llimós [32] showed that an insufficient pharmacy workforce impacted on the high pharmacist workload in terms of logistic and administrative tasks, and lead to a reduced focus on clinical activities. Therefore, health systems must ensure sufficient human resources to collaborate with pharmacists on bureaucratic, administrative, and clinical tasks.

In our study, the reported lack of medications and inputs directly influenced all healthcare networks. Heiskanen et al. [33] suggests that drug shortages may cause patient dissatisfaction and increase the workload problems of pharmacy staff. Moreover, in Brazil we have a peculiar situation that the society goes through which is the phenomenon of medicalization of life, an erroneous belief about that the medicine could solve all or the great majority of the health problems [34,35]. In this situation, the drugs assume a fundamental role in the health care process [36,37]. Thus, we infer that the Brazilian situation turned the shortage of drugs into a barrier, because it caused dissatisfaction and discredit on the patients with the pharmacist's clinical role.

The health service delivery profile of some health units was mentioned as a barrier. Although emergency rooms and mental health care centers are challenging workplaces, studies show that pharmacists perform clinically significant interventions, optimize drug use, reduce medication errors, and decrease drug-related problems [38,39]. Thus, the literature endorses the core elements of patient care process, which asserts that any patients using prescription and non-prescription medications, herbal products, and dietary supplements could potentially benefit from CPS [20].

Lastly, a barrier reported by the pharmacists was a lack of information about rational drug use in the local healthcare networks; this has also been reported in other studies [25,40]. This barrier may have led to managers' resistance to implement CPS. In fact, there are few studies investigating drug utilization in this municipality [41–43], and there are few national studies that evaluate drug utilization. The first one was National Survey on Access, Use and Promotion

of Rational Use of drugs in Brazil [44]. However, the results of the survey only began to be published in 2016, after the process of implementation of CPS.

Barriers related to the healthcare team

A collaborative relationship between pharmacists and healthcare professionals, with the aim of improving patient and health system outcomes, has become an important goal to be achieved since pharmacists changed their original focus from drug supply towards a focus on patient care [45–47]. Studies indicate that barriers related to pharmacist-healthcare team interaction may hinder the CPS implementation process [32,48]. Accordingly, inter-professional collaborative relationships should be encouraged to help decrease resistance and increase understanding and awareness among the healthcare team regarding the implementation of CPS.

Barriers related to the pharmacists

The insufficient clinical education and training during undergraduate degree in Pharmacy was a barrier that can be explained by the historical difficulties that colleges and schools of pharmacy have in adapting to the new role of pharmacists in patient care process, particularly in emerging countries such as India [49], Jordan [25], Sudan [50], China [31], and Brazil [26,51]. In contrast, in the United States of America (USA), where CPS first started, some authors describe events in pharmaceutical education, training, practice, and research that have occurred over the years [52,53]. This history in the USA shows that CPS have a promising future, but that it is necessary to promote advances in education and clinical pharmacy research so that pharmacists achieve a high level of knowledge, skills, and attitudes in patient care process.

Pharmacists and managers related to the difficulty in reconciling clinical and logistic activities, which is consistent with the findings of some studies [30,32]. In the present study, this barrier is related to the pharmacists' workload, the lack of sufficient human resources and the poor delegation of pharmacy tasks among members of the pharmacy staff. The lack of time, lack of staff, and large workload are challenges experienced by pharmacists when trying to perform clinical activities [54,55]. Concerning this issue, the literature suggests that pharmacy technicians can assist pharmacists in logistic activities, freeing up pharmacists to devote their attention to other areas of patient care and to dedicate more time to clinical activities [56–58]. In contrast, there is no institution that regulates the professional activities of pharmacy technicians in Brazil.

Other barriers were related to the development of patient care process. Some studies have observed similar findings [32,54,59], which reinforces the need for training of pharmacists focusing on developing clinical knowledge, skills and attitudes as a strategy to promote the CPS implementation.

Barriers related to the implementation process

One of the main barriers cited was the inappropriate period of implementation of CPS in Brazil, it is not yet known the influence of holidays on health services, unlike in the economic sector [60]. Nevertheless, pharmacists' statements and administrative reporting confirm that there is a decrease of the activities in health units, and a decrease in the demand for CPS during times of holidays and vacations.

The short period to implement CPS was also considered a barrier. The literature shows that a variability in the time needed for implementation of CPS may take 2–4 years [18,61]. This variation in the literature is explained by the multifactorial nature of the implementation process [17,18]. In other words, different participants, scenarios and types of CPS may present different barriers, facilitators, and periods required to implement the CPS.

Another barrier mentioned was the lack of an electronic health record (EHR). Several studies report the beneficial impact of EHRs on patient safety and efficiency, such as improvement in quality of care, prescribing safety, disease management, clinical documentation, work practice, preventive care, and in the volume of communication between pharmacists and the healthcare team [62–64]. There is the Brazilian National Electronic Health Record (e-SUS AB), a system that gathers all of the patient's health information and shares it with all members of the healthcare team. However, the system is restricted to primary care, and needs improved documentation by the healthcare team, and the ability to be able to share it at all levels of care.

The accredited pharmacists emphasized that the lack of prior evaluation of pharmacists' clinical competences was a crucial barrier related to the implementation process. Detoni et al. [65] found that evaluation of human resources and pharmacists' characteristics is essential to identify professionals more motivated, more committed to the service, and more willing to deal with the challenges associated with providing the service. As such, prior evaluation of the pharmacists might improve the success of the CPS implementation.

Finally, pharmacists mentioned that poor marketing strategies might have hampered the implementation of CPS. The studies show that marketing strategies contribute to increased visibility and prestige of the service in the community, to sensitize patients and healthcare professionals, to recruit new patients or potential users of the services, and to build a favorable image of a growing reputation and credibility in the minds of patients and healthcare professionals [66–68]. Therefore, marketing strategies may be adopted to communicate the pharmacist's clinical role to managers, the healthcare team, and the patients; this could minimize the effects of lack of understanding and awareness.

Barriers related to the patients. Similar to the current study, several studies showed that a lack of understanding and awareness, and resistance among the patients, were barriers to implementation of CPS [24,30,69]. Two studies reported that the pharmacist should assume a proactive role in the pharmacist-patient relationship [70,71]. In other words, the pharmacist may use marketing strategies to help patients see the value that these services can offer. Therefore, an improved pharmacist-patient relationship may lead to improved patient satisfaction and positive impacts on patients' health outcomes.

Interestingly, barriers related to the patient did not emerge in the interviews with the managers. It is possible that the managers might have considered the patients as passive recipients of healthcare. Studies show that there is a paternalistic approach to healthcare, where health professionals make all of the decisions with little or no input from the patient [72,73]. In contrast, Vahdat et al. [74] showed that the participation of patients is not merely for consultation, but patients must participate in decisions associated with planning, performance, and evaluation of healthcare. Hence, managers should place value on patients' participation in healthcare, and accept their role in quality of care and patient safety [75].

Strengths and limitations

The main strength of the study was the participation of the pharmacists and the managers that worked at varied workplaces of the health system. The professionals had different backgrounds and perspectives about the same CPS implementation process. These characteristics were essential to emerge varied barriers and to have a comprehensive understanding of the implementation process.

We can list some limitations: lack of a previous participants analysis, lack of perceived barriers of other actors involved in the CPS implementation process (patients, healthcare professionals, pharmacy staff, decision makers, policymakers), the conflict of interest of some managers and some failures of the implementation process that were perceived as barriers.

These limitations may have influenced the perceived barriers of pharmacists and managers who participated in the study.

Conclusion

This study revealed the perceptions of barriers associated with the participants involved in the implementation of CPS in some public health units in a metropolis in Northeast Brazil. The accredited pharmacists, non-accredited pharmacists and managers identified barriers related to: the local healthcare networks, the healthcare team, the pharmacists, the implementation process, and the patients. These barriers fill knowledge gaps associated with the CPS implementation. Thus, this work and future studies may contribute with pharmacists, managers, decision makers, and policy makers to plan and implement CPS.

Acknowledgments

We are grateful to the pharmacists who participated in the focus groups and to the five managers who participated in the interviews. Thanks to the team of the Brazilian Ministry of Health: Felipe Tadeu Carvalho Santos, Maria Ondina Paganelli Orlando Mário Soeiro, Karen Sarmiento Costa, Noêmia Urruth Leão Tavares, and José Miguel do Nascimento Júnior. Thanks to the Coordination for the Improvement of Higher Education Personnel (CAPES). And a special thanks to Carla Francisca dos Santos Cruz and Camila Castelo Branco Rangel de Almeida for the valuable collaboration in this study.

Author Contributions

Conceptualization: Genival Araujo dos Santos Júnior, Sheila Feitosa Ramos, André Mascarenhas Pereira, Aline Santana Dosea, Elton Matos Araújo, Thelma Onozato.

Data curation: Genival Araujo dos Santos Júnior, Aline Santana Dosea.

Formal analysis: Genival Araujo dos Santos Júnior, Sheila Feitosa Ramos, André Mascarenhas Pereira, Aline Santana Dosea, Elton Matos Araújo, Thelma Onozato.

Investigation: Genival Araujo dos Santos Júnior, Sheila Feitosa Ramos.

Methodology: Genival Araujo dos Santos Júnior, Thelma Onozato, Déborah Mônica Machado Pimentel, Divaldo Pereira de Lyra, Jr.

Resources: Genival Araujo dos Santos Júnior.

Supervision: Déborah Mônica Machado Pimentel, Divaldo Pereira de Lyra, Jr.

Visualization: Genival Araujo dos Santos Júnior.

Writing – original draft: Genival Araujo dos Santos Júnior, Sheila Feitosa Ramos, André Mascarenhas Pereira, Aline Santana Dosea, Elton Matos Araújo, Thelma Onozato, Déborah Mônica Machado Pimentel, Divaldo Pereira de Lyra, Jr.

Writing – review & editing: Genival Araujo dos Santos Júnior, Aline Santana Dosea, Elton Matos Araújo, Thelma Onozato, Déborah Mônica Machado Pimentel, Divaldo Pereira de Lyra, Jr.

References

1. Roberts AS, Benrimoj SIC, Chen TF, Williams KA. Implementing cognitive services in community pharmacy: a review of facilitators used in practice change. *IJPP*. 2006; 14: 163–170. <https://doi.org/10.1211/ijpp.14.3.0002>

2. Buckley MS, Harinstein LM, Clark KB, Smithburger PL, Eckhardt DJ, Alexander E, et al. Impact of a clinical pharmacy admission medication reconciliation program on medication errors in “high-risk” patients. *Ann Pharmacother*. United States; 2013; 47: 1599–1610. <https://doi.org/10.1177/1060028013507428> PMID: 24259613
3. Preslaski CR, Lat I, MacLaren R, Poston J. Pharmacist Contributions as Members of the Multidisciplinary ICU Team. *Chest*. 2013; 144: 1687–1695. <https://doi.org/10.1378/chest.12-1615> PMID: 24189862
4. Gallagher J, McCarthy S, Byrne S. Economic evaluations of clinical pharmacist interventions on hospital inpatients: a systematic review of recent literature. *Int J Clin Pharm*. 2014; 36: 1101–1114. <https://doi.org/10.1007/s11096-014-0008-9> PMID: 25218003
5. Cheng Y, Raisch DW, Borrego ME, Gupchup G V. Economic, clinical, and humanistic outcomes (ECHO) of pharmaceutical care services for minority patients: A literature review. *Res Soc Adm Pharm*. 2013; 9: 311–329. <https://doi.org/10.1016/j.sapharm.2012.05.004> PMID: 22835704
6. Hatah E, Braund R, Tordoff J, Duffull SB. A systematic review and meta-analysis of pharmacist-led fee-for-services medication review. *Br J Clin Pharmacol*. 2014; 77: 102–115. <https://doi.org/10.1111/bcp.12140> PMID: 23594037
7. Aguiar PM, Brito G de C, Lima T de M, Santos APAL, Lyra DP, Storpirtis S. Investigating Sources of Heterogeneity in Randomized Controlled Trials of the Effects of Pharmacist Interventions on Glycemic Control in Type 2 Diabetic Patients: A Systematic Review and Meta-Analysis. *Schooling CM*, editor. *PLoS One*. 2016; 11: e0150999. <https://doi.org/10.1371/journal.pone.0150999> PMID: 26963251
8. Truong H, Kroehl M, Lewis C, Pettigrew R, Bennett M, Saseen J, et al. Clinical pharmacists in primary care: Provider satisfaction and perceived impact on quality of patient care provided. *Pharmacotherapy*. 2015; 35: e291.
9. Mekonnen AB, McLachlan AJ, Brien J- AE, Mekonnen D, Abay Z. Medication reconciliation as a medication safety initiative in Ethiopia: a study protocol. *BMJ Open*. 2016; 6: e012322. <https://doi.org/10.1136/bmjopen-2016-012322> PMID: 27884844
10. Félix J, Ferreira D, Afonso-Silva M, Gomes MV, Ferreira C, Vandewalle B, et al. Social and economic value of Portuguese community pharmacies in health care. *BMC Health Serv Res*. 2017; 17: 606. <https://doi.org/10.1186/s12913-017-2525-4> PMID: 28851428
11. Santos-Júnior GA, Marques TC, Silva ROS, Silvestre CC, Lyra DP, Silva FA. Quality indicators to medication review services: Evaluation of the structure. *Lat Am J Pharm*. 2015; 34: 1172–1179.
12. Lyra DP Jr, Kheir N, Abriata JP, da Rocha CE, Dos Santos CB, Pelá IR. Impact of Pharmaceutical Care interventions in the identification and resolution of drug-related problems and on quality of life in a group of elderly outpatients in Ribeirão Preto (SP), Brazil. *Ther Clin Risk Manag*. 2007; 3: 989–98. PMID: 18516258
13. Serafin C, Correia Júnior D, Vargas M. Profile of the pharmacist in Brazil: a report [Internet]. 2015. Available: http://www.cff.org.br/userfiles/file/Perfil dofarmacêutico no Brasil_web.pdf
14. Araújo SQ, Costa KS, Luiza VL, Lavras C, Santana EA, Tavares NUL. The organization of pharmaceutical services by “health region” in Brazil’s Unified Health System”. *Cien Saude Colet*. 2017; 22: 1181–1191. <https://doi.org/10.1590/1413-81232017224.27042016> PMID: 28444044
15. Brazilian Federal Council of Pharmacy. Resolution number 585/2013—Resolução n° 585 de 29 de agosto de 2013—It regulates the clinical attributions of the pharmacist and gives other measures. *Brazilian Federal Council of Pharmacy 2013* pp. 1–11. <https://doi.org/10.1017/CBO9781107415324.004>
16. Health BM of. Ministerial Ordinance number 1.214/2012—Establishes the National Qualification Program for Pharmaceutical Service within the Brazilian Health System. 2012. pp. 1–2.
17. Moullin JC, Sabater-Hernández D, Benrimoj SI. Model for the evaluation of implementation programs and professional pharmacy services. *Res Soc Adm Pharm*. 2016; 12: 515–522. <https://doi.org/10.1016/j.sapharm.2015.08.003> PMID: 26341944
18. Blanchard C, Livet M, Ward C, Sorge L, Sorensen TD, McClurg MR. The Active Implementation Frameworks: A roadmap for advancing implementation of Comprehensive Medication Management in Primary care. *Res Soc Adm Pharm*. Elsevier Ltd; 2017; 1–8. <https://doi.org/10.1016/j.sapharm.2017.05.006> PMID: 28549800
19. Tong A, Sainsbury P, Craig J. Consolidated criterio for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus group. *Int J Qual Heal Care*. 2007; 19: 349–357. <https://doi.org/10.1093/intqhc/mzm042> PMID: 17872937
20. Cipolle Robert J., Linda M. Strand PCM. *Pharmaceutical Care Practice: The Patient-Centered Approach to Medication Management*. 2012.
21. Júnior GA dos S. implementation and proposition of strategies for the integration of clinical pharmacy services to healthcare networks. 2018.
22. Bardin L. *Content analysis*. 2011.

23. Ramos SF, Santos Júnior GA, Pereira AM, Dosea AS, Rocha KSS, Pimentel DMM, et al. Facilitators and strategies to implement Clinical Pharmacy Services in a metropolis in northeast Brazil: a qualitative approach. *BMC Health Serv Res*. Forthcoming 2018;
24. Albanese NP, Pignato AM, Monte S V. Provider Perception of Pharmacy Services in the Patient-Centered Medical Home. *J Pharm Pract*. 2016; 0897190016679759-. <https://doi.org/10.1177/0897190016679759> PMID: 27887032
25. Aburuz S, Al-Ghazawi M, Snyder A. Pharmaceutical care in a community-based practice setting in Jordan: Where are we now with our attitudes and perceived barriers? *Int J Pharm Pract*. 2012; 20: 71–79. <https://doi.org/10.1111/j.2042-7174.2011.00164.x> PMID: 22416931
26. Almeida ND. Health in Brazil, dilemmas and challenges faced by the Brazilian public health system. *Rev Psicol e Saúde*. 2013; 5: 1–9.
27. Leite DF, Nascimento DDG do, Oliveira MA de C. Quality of life at work for NASF professionals working in the city of São Paulo. *Physis Rev Saúde Coletiva*. 2014; 24: 507–525. <https://doi.org/10.1590/S0103-73312014000200010>
28. Martins KP, Costa TF da, Medeiros TM de, Fernandes M das GM, França ISX de, Costa KN de FM. Internal structure of family health units: access for people with disabilities. *Cien Saude Colet*. 2016; 21: 3153–3160. <https://doi.org/10.1590/1413-812320152110.20052016> PMID: 27783788
29. Marquis J, Schneider MP, Spencer B, Bugnon O, Du Pasquier S. Exploring the implementation of a medication adherence programme by community pharmacists: a qualitative study. *Int J Clin Pharm*. 2014; 36: 1014–1022. <https://doi.org/10.1007/s11096-014-9989-7> PMID: 25139136
30. Alexander KM, Divine HS, Hanna CR, Gokun Y, Freeman PR. Implementation of personalized medicine services in community pharmacies: Perceptions of independent community pharmacists. *J Am Pharm Assoc*. 2014; 54: 510–517. <https://doi.org/10.1331/JAPhA.2014.13041> PMID: 25148656
31. Penm J, Moles R, Wang H, Li Y, Chaar B. Factors Affecting the Implementation of Clinical Pharmacy Services in China. *Qual Health Res*. 2014; 24: 345–356. <https://doi.org/10.1177/1049732314523680> PMID: 24562375
32. Brazinha I, Fernandez-Llimos F. Barriers to the implementation of advanced clinical pharmacy services at Portuguese hospitals. *Int J Clin Pharm*. 2014; 36: 1031–1038. <https://doi.org/10.1007/s11096-014-9991-0> PMID: 25139137
33. Heiskanen K, Ahonen R, Karttunen P, Kanerva R, Timonen J. Medicine shortages—A study of community pharmacies in Finland. *Health Policy (New York)*. Elsevier Ireland Ltd; 2015; 119: 232–238. <https://doi.org/10.1016/j.healthpol.2014.11.001> PMID: 25467285
34. Hüning AC, Costa JRC. Between health judicialization and medicalization of life: the necessary conscientization and social participation. *Rev Pol Púb e Seg Soc*. 2017; 1: 127–141.
35. Cernadas JMC. The growing medicalization of life: Are physicians aware of the damage it causes? *Arch Argent Pediatr*. 2012; 110: 459–460. <https://doi.org/10.1590/S0325-00752012000600001> PMID: 23224301
36. Lefèvre F. The symbolic function of drugs. *Rev Saude Publica*. 1983; 17: 500–503. <https://doi.org/10.1590/S0034-89101983000600007> PMID: 6201993
37. Lyra D Jr, Marques T. The rational bases of the drug dispensation for pharmacists. 2012.
38. Wright WA, Gorman JM, Odorzynski M, Peterson MJ, Clayton C. Integrated Pharmacies at Community Mental Health Centers: Medication Adherence and Outcomes. *J Manag Care Spec Pharm*. 2016; 22: 1330–1336. <https://doi.org/10.18553/jmcp.2016.16004> PMID: 27783555
39. Proper JS, Wong A, Plath AE, Grant KA, Just DW, Dulhunty JM. Impact of clinical pharmacists in the emergency department of an Australian public hospital: A before and after study. *EMA—Emerg Med Australas*. 2016; 27: 232–238. <https://doi.org/10.1111/1742-6723.12384> PMID: 25818918
40. Ngorsuraches S, Li SC. Thai pharmacists' understanding, attitudes, and perceived barriers related to providing pharmaceutical care. *Am J Heal Pharm*. 2006; 63: 2144–2150. <https://doi.org/10.2146/ajhp060054> PMID: 17057053
41. Neves SJF, Marques AP de O, Leal MCC, Diniz A da S, Medeiros TS, Arruda IKG de. Epidemiology of medication use among the elderly in an urban area of Northeastern Brazil. *Rev Saude Publica*. 2013; 47: 759–768. <https://doi.org/10.1590/S0034-8910.2013047003768> PMID: 24346667
42. Costa EM, Rabelo AR de M, de Lima JG. Evaluation of the role of the pharmacist in actions promoting health and preventing accidents and diseases within primary health care. *Rev Ciencias Farm Basica e Apl*. 2014; 35: 81–88. <https://doi.org/10.1590/S1414-32832005000100013>
43. de Aquino DS, de Barros JAC, da Silva MDP. Self-medication and health academic staff. *Cien Saude Colet*. 2010; 15: 2533–8. PMID: 20802885
44. Bermudez JAZ, Barros MB de A. Profile of access and use of medicines in the Brazilian population—contributions and challenges of PNAUM—Household Survey. *Rev Saude Publica*. 2016; 50. <https://doi.org/10.1590/s1518-8787.201605000supl2ap> PMID: 27982385

45. Hepler CD, Strand LM. Opportunities and responsibilities in pharmaceutical care. *Am J Hosp Pharm.* 1990; 47: 533–43. PMID: [2316538](#)
46. Nkansah N, Mostovetsky O, Yu C, Chheng T, Beney J, Bond CM, et al. Effect of outpatient pharmacists' non-dispensing roles on patient outcomes and prescribing patterns. *Cochrane database Syst Rev.* England; 2010; CD000336. <https://doi.org/10.1002/14651858.CD000336.pub2> PMID: [20614422](#)
47. Jokanovic N, Tan ECK, van den Bosch D, Kirkpatrick CM, Dooley MJ, Bell JS. Clinical medication review in Australia: A systematic review. *Res Social Adm Pharm.* United States; 2016; 12: 384–418. <https://doi.org/10.1016/j.sapharm.2015.06.007> PMID: [26250049](#)
48. Butt F, Ream E. Implementing oral chemotherapy services in community pharmacies: A qualitative study of chemotherapy nurses' and pharmacists' views. *Int J Pharm Pract.* 2016; 24: 149–159. <https://doi.org/10.1111/ijpp.12237> PMID: [26671523](#)
49. Basak SC, Van Mil JWF, Sathyanarayana D. The changing roles of pharmacists in community pharmacies: Perception of reality in India. *Pharm World Sci.* 2009; 31: 612–618. <https://doi.org/10.1007/s11096-009-9307-y> PMID: [19554470](#)
50. Sir S, Mohamed E, Mahmoud AA, Ali AA. Barriers for implementation of pharmaceutical care practice in community pharmacies in Sudan. *Khartoum Med J.* 2014; 7: 921–931.
51. Dosea AS, Brito GC, Santos LMC, Marques TC, Balisa-Rocha B, Pimentel D, et al. Establishment, Implementation, and Consolidation of Clinical Pharmacy Services in Community Pharmacies. *Qual Health Res.* 2017; 27: 363–373. <https://doi.org/10.1177/1049732315614294> PMID: [26658232](#)
52. Carter BL. *Evolution of Clinical Pharmacy in the USA and Future Directions for Patient Care.* Drugs and Aging. Springer International Publishing; 2016; 33: 169–177. <https://doi.org/10.1007/s40266-016-0349-2> PMID: [26895454](#)
53. Knoer SJ, Eck AR, Lucas AJ. A review of American pharmacy: education, training, technology, and practice. *J Pharm Heal Care Sci. Journal of Pharmaceutical Health Care and Sciences;* 2016; 2: 1–7. doi: <http://dx.doi.org/10.1186/s40780-016-0066-3>
54. El Hajj MS, AL-Saeed HS, Khaja M. Qatar pharmacists' understanding, attitudes, practice and perceived barriers related to providing pharmaceutical care. *Int J Clin Pharm.* Springer Netherlands; 2016; 38: 330–343. <https://doi.org/10.1007/s11096-016-0246-0> PMID: [26758716](#)
55. Acheampong F, Anto BP. Perceived barriers to pharmacist engagement in adverse drug event prevention activities in Ghana using semi-structured interview. *BMC Health Serv Res. BMC Health Services Research;* 2015; 15: 361. <https://doi.org/10.1186/s12913-015-1031-9> PMID: [26345278](#)
56. Siden R, Tamer HR, Skyles AJ, Dolan CS, Propes DJ, Redic K. Survey to assess the role of pharmacy technicians and nonpharmacist staff in the operation of research pharmacies. *Am J Heal Pharm.* 2014; 71: 1877–1889. <https://doi.org/10.2146/ajhp140007> PMID: [25320138](#)
57. Frost TP, Adams AJ. Expanded pharmacy technician roles: Accepting verbal prescriptions and communicating prescription transfers. *Res Soc Adm Pharm.* Elsevier Ltd; 2016; <https://doi.org/10.1016/j.sapharm.2016.11.010> PMID: [27923641](#)
58. Schultz JM, Jeter CK, Martin NM, Mundy TK, Reichard JS, Van Cura JD, et al. ASHP statement on the roles of pharmacy technicians. *Am J Heal Pharm.* 2016; 73: 928–930. <https://doi.org/10.2146/ajhp151014> PMID: [27261243](#)
59. Alcântara T dos S, Onozato T, Araújo Neto F de C, Dosea AS, Cunha LC, de Araújo DCSA, et al. Perceptions of a group of hospital pharmacists and other professionals of the implementation of clinical pharmacy at a high complexity public hospital in Brazil. *BMC Health Serv Res.* 2018; 18: 242. <https://doi.org/10.1186/s12913-018-3036-7> PMID: [29618345](#)
60. Fecomecio. Brazilian retail should lose more than R \$ 10 billion in 2017 due to national holidays [Internet]. 2017.
61. Brito G. *Clinical Pharmacy Services in units of Farmácia Popular do Brasil Program in state of Sergipe: establishment, implementation and consolidation.* Universidade Federal de Sergipe. 2015.
62. Singer A, Duarte Fernandez R. The effect of electronic medical record system use on communication between pharmacists and prescribers. *BMC Fam Pract. BMC Family Practice;* 2015; 16: 155. <https://doi.org/10.1186/s12875-015-0378-7> PMID: [26507839](#)
63. Sheu L, Fung K, Mourad M, Ranji S, Wu E. We need to talk: Primary care provider communication at discharge in the era of a shared electronic medical record. *J Hosp Med.* 2015; 10: 307–310. <https://doi.org/10.1002/jhm.2336> PMID: [25755159](#)
64. Cerqueira Santos S, Boaventura TC, Rocha KSS, de Oliveira Filho AD, Onozato T, Lyra DP. Can we document the practice of dispensing? A systematic review. *J Clin Pharm Ther.* 2016; 41: 634–644. <https://doi.org/10.1111/jcpt.12462> PMID: [27671224](#)
65. Detoni KB, Nascimento MMG Do, Oliveira IV, Alves MR, GonzÁles MM, Oliveira DR. Comprehensive medication management services in a brazilian speciality pharmacy: a qualitative assessment. *Int J Pharm Pharm Sci.* 2017; 9: 227. <https://doi.org/10.22159/ijpps.2017v9i3.16398>

66. Satiani A, Satiani B. Marketing strategies for vascular practitioners. *J Vasc Surg. Elsevier Inc.*; 2009; 50: 691–697. <https://doi.org/10.1016/j.jvs.2009.03.026> PMID: 19700101
67. Bobocea L, Spiridon S, Petrescu L, Gheorghe CM, Purcarea VL. The management of external marketing communication instruments in health care services. *J Med Life*. 2016; 9: 137–140. PMID: 27453742
68. Iliopoulos E, Priporas C-V. The effect of internal marketing on job satisfaction in health services: a pilot study in public hospitals in Northern Greece. *BMC Health Serv Res. BioMed Central Ltd*; 2011; 11: 261. <https://doi.org/10.1186/1472-6963-11-261> PMID: 21981753
69. Nik J, Lai PSM, Ng CJ, Emmerton L. A qualitative study of community pharmacists' opinions on the provision of osteoporosis disease state management services in Malaysia. *BMC Health Serv Res. BMC Health Services Research*; 2016; 16: 448. <https://doi.org/10.1186/s12913-016-1686-x> PMID: 27577560
70. Born A, Pinto D, Sharrel L, Patel D. Patients' Awareness, Perceived Benefit, and Intent to Participate in Pharmacy Services. *Innov*. 2016; 7. Available: http://pubs.lib.umn.edu/innovations/vol7/iss3/10/?utm_source=pubs.lib.umn.edu%2Finnovations%2Fvol7%2Fiss3%2F10&utm_medium=PDF&utm_campaign=PDFCoverPages
71. Sabater-Galindo M, Fernandez-Llimos F, Sabater-Hernández D, Martínez-Martínez F, Benrimoj SI. Healthcare professional-patient relationships: Systematic review of theoretical models from a community pharmacy perspective. *Patient Educ Couns. Elsevier Ireland Ltd*; 2016; 99: 339–347. <https://doi.org/10.1016/j.pec.2015.09.010> PMID: 26475728
72. Murgic L, Hébert PC, Sovic S, Pavlekovic G. Paternalism and autonomy: views of patients and providers in a transitional (post-communist) country. *BMC Med Ethics*. 2015; 16: 65. <https://doi.org/10.1186/s12910-015-0059-z> PMID: 26420014
73. Pomey M, Ghadiri DP, Karazivan P. Patients as Partners: A Qualitative Study of Patients' Engagement in Their Health Care. 2015; 1–19. <https://doi.org/10.1371/journal.pone.0122499> PMID: 25856569
74. Vahdat S, Hamzehgardeshi L, Hessam S, Hamzehgardeshi Z. Patient Involvement in Health Care Decision Making: A Review. *Iran Red Crescent Med J*. 2014; 16: 1–7. <https://doi.org/10.5812/ircmj.12454> PMID: 24719703
75. Parand A, Dopson S, Renz A, Vincent C. The role of hospital managers in quality and patient safety: a systematic review. *BMJ Open*. 2014; 4: e005055–e005055. <https://doi.org/10.1136/bmjopen-2014-005055> PMID: 25192876