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A qualitative study on pharmacists' perceptions about service innovation

Artemisa R. Dores [a,b,*], Miguel Peixoto [a], Irene P. Carvalho [c,d], Maria Castro [b], António Marques [a,b]

[a] Laboratório de Reabilitação Psicossocial, Centro de Investigação em Reabilitação (CIR), Escola Superior de Saúde, Instituto Politécnico do Porto (E2S-IPP), 4200-072 Porto, Portugal
[b] Escola Superior de Saúde, Instituto Politécnico do Porto (E2S-IPP), 4200-072 Porto, Portugal
[c] Clinical Neurosciences and Mental Health Department, Faculty of Medicine, University of Porto, 4200-319 Porto, Portugal
[d] CINTESIS@RISE, Faculty of Medicine, University of Porto, 4200-450 Porto, Portugal

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ABSTRACT

Background: Expanded services provided at pharmacies show numerous improvements in health outcomes. However, attempts at implementing new services in pharmacies are met with several barriers, among which is the failure to update the pharmacist's role.
Objective: This study aimed to explore pharmacists' perceptions about the role of pharmacies and the effects of, and barriers to, service expansion.
Methods: Four focus groups were conducted with pharmacists from across Portugal, and an inductive content analysis was applied to the transcribed sessions.
Results: The content analysis results were organized into three main categories: the Role of Pharmacy, Potentialities of Service Innovation, and Service Innovation. The results emphasize the importance of enhancing pharmacists' training, establishing supportive legal frameworks, prioritizing funding for technological advancements, promoting interprofessional collaboration, and embracing innovative practices to advance healthcare innovation and improve patient outcomes.
Conclusions: The identification of several tasks indicates that, in pharmacists' perspectives, the Role of Pharmacy ranges from dispensing medication to aiding/monitoring patients at various stages of their health conditions. Expanded services were associated with several emergent Potentialities of Service Innovation, namely, enhancement of health outcomes and help to main healthcare facilities dealing with an increased number of patients. For Service Innovation, several factors emerged that need consideration, such as the conditions and the difficulties found associated with new service implementation. These pertain to pharmacists, legislation, and resources.
Public Interest Summary: Background: Expanded services provided at pharmacies show numerous improvements in health outcomes. However, several barriers should be addressed. Objective: This study sought to explore pharmacists' perceptions about the role of pharmacies and the effects of, and barriers to, service expansion. Methods: A content analysis was applied to four focus groups conducted with pharmacists from across Portugal. Results: The three main emerging categories were: The Role of Pharmacy, divided into assessment, referrals, therapy monitoring, educating/informing, prescribing, and registering; Potentialities of Service Innovation, divided into proximity, improvement, and competitiveness; Service Innovation, divided into conditions for implementation, implementation difficulties, activation of the new services, and adherence-promoting factors. Conclusion: The pharmacy role goes beyond dispensing medication. Tied to this expanded role, pharmacists identified several advantages that the services could provide and several barriers to Service Innovation. Factors that promote adherence need more extensive study.

* Corresponding author at: Rua Dr. António Bernardino de Almeida, 400 4200 - 072, Porto, Portugal.
E-mail address: artemisa@ess.ipp.pt (A.R. Dores).

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Introduction

Services offered at pharmacies have been gradually expanding in the last decade, and, despite being most commonly associated with medication dispensing [1], evidence has been surfacing about the effect of pharmacies on public health. With the continuous changes that have occurred in society, the role of pharmacists is growing beyond more than medication dispensing, also including the no less important administrative role comprising tasks such as stock controls, procurement, reports, and other duties, including cleaning [1].

Aligned with a more comprehensive view of pharmacies, there is also a trend toward a patient-centred approach in the services provided [2]. This approach emphasizes the consideration of the patient's context and specificities, a greater focus on the relationship established with the patient, and collaboration with other healthcare professionals to better tackle the patient's needs [2–4]. Hu et al. (2020) exemplify pharmacies' wider approach to patient care by identifying four categories of services provided by community pharmacies, namely, in the case of chronic obstructive pulmonary disease (COPD), which is a chronic inflammatory set of progressive, irreversible, lung conditions that limit the airways and cause respiratory distress, involving recurrent support [5–8]. The four categories are primary prevention (education of the public about health risk behaviors), early detection (to identify patients in high-risk contexts), therapy management (related to medication dispensing and selling of other products, and managing health behaviors), and long-term health management (referring to further monitoring of the patient's condition). The provision of these services has been shown to improve clinical (e.g., quality of life and reduced symptom severity), humanistic (e.g., patient satisfaction), and economic (e.g., healthcare costs) outcomes [9].

The COVID-19 pandemic exposed the fragility of the main healthcare systems in several countries, and how important the contribution of community pharmacies could be, especially for more vulnerable populations, like the elderly and people living in isolation [10–12]. During this period, pharmacists showed their capabilities in managing minor ailments, as well as educating and reassuring the public about the continued supply of medication, thereby promoting adherence, and providing new ways to deliver medication while ensuring social distancing [13]. The use of digital technologies that enable the provision of remote services, namely, telepharmacy and home delivery services, constitutes an advantage in community practice that can be one of the ways to improve pharmacy services, allowing at-distance monitoring of patients and their conditions [14].

Beyond the pandemic, the rise in the number of elderly people and the prevalence of chronic diseases, along with the growth of novel substance uses, such as image- and performance-enhancing drugs (IPEDs) or complementary and alternative medicine (CAMs), as well as the increase in healthcare costs at an unsustainable pace, further justify a paradigm shift and innovative solutions. For example, healthcare professionals, and particularly pharmacists, play an important role in educating the public on all aspects related to complementary and alternative medicine intake [15], with some reports indicating that pharmacists offer great insights into these products and their safety [16].

These aspects emphasize the importance of pharmacies in helping the population while implementing services that contribute to the sustainability of the main healthcare systems in the long run [17]. With a growing body of evidence, it is clear that there is a need to implement a wider variety of services to better assist the general population and to relieve the burden off of the main healthcare centers and hospitals. It is of the public's interest that pharmacies are further provided with the necessary technologies to better address public health demands. Pharmacists are at the forefront of patient care and wield substantial influence in educating the public about several conditions [18–22]. They can promote change in professional practices considering the context and needs of end-users. Their insights are thus crucial for informing policy decisions and technological developments aimed at enhancing patient care and optimizing healthcare delivery, thus ensuring the best solutions while reducing resistance to change mainly due to inadequate solutions developed without their involvement [23–26].

The purpose of this study was to explore pharmacists' perspectives about the role of pharmacies, their potential to expand and provide new services, to incorporate technological innovation, and anticipated barriers.

Methods

Participants

This study comprised pharmacists and pharmacy technicians (henceforth referred to as pharmacists, for simplification) who took part in focus groups. Participants were selected from a pool of pharmacies across Portugal to represent the country's territorial diversity, urban and rural contexts, and the different patient profiles served in pharmacies and services provided.

Procedure

Data were collected through focus groups, which consist of a qualitative technique that is useful for gathering the views and experiences of a group of people about a certain topic, in their own words [29]. The 13 open-ended questions that guided each focus group addressed the areas of interest in this study and were pre-tested with a small group of six people under similar conditions to those of the final application [27]. This pre-test was based on the method of spoken reflection, or "thinking aloud" [28], which targets the content and form of the questions regarding their clarity and understandability.

Four focus groups with six participants, each, was conducted in this study. The focus groups were conducted via Zoom [30] teleconference, lasting a maximum of one hour and 30 minutes. The sessions were recorded and transcribed *verbatim*, with transcriptions then checked for accuracy.

For the focus groups, a Management Consulting Board for Health Centers/Hospitals was responsible for identifying the willingness of the pharmacies to participate from its network of contacts. The university team contacted the pharmacies identified from all over the country, which received information about the study's goals, data anonymity and confidentiality, request to record the sessions, as well as other legal and ethical aspects. Those who agreed to participate integrated one of the focus groups at their own convenience. The study was approved by the local research ethics committee (Ethics committee registration number: CE0093B) and complies with the Declaration of Helsinki.

Analysis

Data were analyzed in WebQDA-Qualitative Data Analysis software [31] using the qualitative method of content analysis [32,33]. This method involves four phases: organization of the materials, coding, categorizing, and inference. The content analysis of the transcribed sessions was carried out inductively, that is, with themes and insights identified from the raw data without the use of predetermined hypotheses or theories [34]. In this approach, rather than imposing preconceived notions, researchers immerse themselves in the data, systematically organizing and coding it to uncover emerging patterns, themes, and categories. Through an iterative process of data coding, categorization, and interpretation, inductive analysis aims to generate new understandings and theories grounded in the very data. By allowing themes and patterns to emerge organically from the data, inductive analysis enables researchers to explore the complexity and richness of the phenomena under study, ultimately contributing to deeper insights and understanding. An inductive analysis is often chosen over a deductive analysis when researchers seek to explore new phenomena, comprehend complex issues, or investigate areas with limited existing

research, as is the case here. By embracing the inherent complexity and diversity of qualitative data, inductive analysis facilitates the discovery of nuanced relationships and themes, ultimately contributing to the advancement of knowledge in the field [34].

The content analysis was conducted by two independent researchers. Disagreements were solved by a third party who was an expert in the field.

Results

The results from the content analysis were organized in three main categories: a) the Role of Pharmacy, b) Potentialities of Service Innovation, and c) Service Innovation. These categories and respective emerging subcategories, as well as participants' quotations, are presented in Table 1.

The role of pharmacy

The Role of Pharmacy included the following emerging subcategories: (a) Assessment, (b) Referrals, (c) Therapy monitoring, (d) Educating/informing, (e) Prescribing, and (f) Registering. The assessment was further divided into (assessing) patient complaints, (assessing) adherence, and (assessing) physiological parameters.

Regarding the sub-category of complaints, pharmacists viewed their role as including the need to assess patients' complaints ("It would be important to assess the complaints that people have"). In the subcategory of adherence, pharmacists viewed assessing adherence to the treatment as one of their roles ("One of the roles of pharmacy professionals is to try to understand whether or not the users have adhered to non-pharmacological measures"). Assessing physiological parameters was the third sub-category of assessment and referred to aspects that ranged from oxygen tests, for example, for COPD ("Rapid oxygen tests"), to blood pressure monitoring, for example, in such cases as herbs/dietary supplements-drug interactions (HDSIs) ("In a situation that interactions can possibly happen … we can monitor the blood pressure").

The second sub-category, referrals, was directly related with the previous sub-category. Based on the knowledge that pharmacists have, they can adequately refer patients to a healthcare professional ("To be able to refer the person to a doctor, if [pharmacists] saw it fit").

The third sub-category was therapy monitoring. Pharmacists suggested that therapy monitoring at pharmacies could increase patient adherence ("If pharmacies would do it [monitor therapy], maybe it would be a closer way to make the person commit themselves to controlling this parameter"). Therapy monitoring was divided into pharmacological and non-pharmacological therapies. Monitoring pharmacological therapies included monitoring the use of devices, namely, to promote adequate uses ("The use of the oximeter, to see if the person knows how to use it, to see if the person knows what the values that may or may not be considered as normal"). Pharmacists recognized that they frequently are unable to explain the correct use of the devices to the patient at the moment ("Because of pressure from the [hurried] customer, we do not explain to the person the correct use of this type of inhaler"), and the subsequent monitoring of the use of the devices could help to bridge this gap. Pharmacological monitoring also referred to monitoring patients' health conditions and medication-associated health ("Sometimes there is an interaction, possibly an increase in the toxic effect of the medicine itself"). Monitoring non-pharmacological therapies included services addressing lifestyle activities, such as physical activity ("That weekly physical activity control of the non-pharmacological plan"), nutrition ("Specialized nutrition service for specific pathologies"), which is a service that participants explained to be already frequent in pharmacies ("A service that is done a lot in pharmacies"), and smoking cessation ("It's the follow-up, smoking cessation and rapid oxygen tests").

The fourth sub-category, educating/informing, was directly related to all the other sub-categories. For example, assessment of the customer's adherence to the inhaler, and monitoring of the use of the inhaler, can provide the basis for informing patients about possible herb-drug interactions and for raising awareness of potential health problems that might ensue.

Prescribing was the fifth sub-category. In participants' perspectives, the role of pharmacists could include the ability to prescribe, depending on the medical conditions ("COPD, diabetes, both being chronic diseases, all pharmacy professionals should be qualified to make prescriptions").

In the sixth sub-category, registering, participants indicated that recording everything that they control and evaluate could serve as evidence that might help to raise patients' awareness to their conditions ("The recording of adverse interactions"; "Recording creates evidence and, by creating evidence, the person will be more sensitive to their health condition").

Potentialities of service innovation

The second main category inferred from the transcribed sessions was Potentialities of Service Innovation, further divided into the following emerging sub-categories: (a) Proximity, (b) Improvement, and (c) Competitiveness. The sub-category of proximity was divided into accessibility and relationship. Participants revealed that pharmacies are of easy access to customers, namely, due to their (and pharmacists') physical proximity in the community ("In proximity, at least to the customer and in a situation where transportation [to the Health Centre] may be an impediment"). In addition, a relational proximity is established with the patient, which also contributes to this proximity ("A pharmacist is also a person who is close to the customer"; "We have great proximity with the clients. We are the first and the last professionals to contact the customer").

The improvement sub-category referred to the improvement in time and resources through new services offered at pharmacies ("We are saving the doctor time"). Additionally, new services could represent further improvements in regard to faster intervention processes ("It would be easier and faster to make an appointment for counselling at the pharmacy than to go to the Health Centre") and resource-related expenditures ("You save resources").

The third sub-category was competitiveness, involving factors that promote the value of pharmacies. These include proper training on various topics. In participants' views, not only do these factors promote pharmacies by adding value to their services, they also add differences among pharmacies ("Added value, I think it's a way to differentiate pharmacies because there are more and more pharmacies [in competition]").

Service innovation

The third category was Service Innovation, composed by the following emerging sub-categories: (a) Conditions for implementation, (b) Implementation difficulties, (c) Activation of the new services, and (d) Adherence-promoting factors. Conditions for implementation involved formal and legal requirements, training, specialized human resources, physical space, management computer systems, health equipment, and support for financial charges. Formal and legal requirements referred to such aspects as data sharing, privacy, and authorizations, potentially associated with the provision of new services ("Privacy conditions because if there will be information sharing, those requirements must be met").

Training was another condition associated with further service innovation, including as pertaining to the logistics of the services ("Training to put services into practice") and as pertaining to specific topics ("More intensive training in the area of [supplement-drug] interactions"). As the third condition for service innovation, participants called attention to the necessity of specialized human resources ("Our human resources have been scarce, we don't have enough people"), who

Table 1
Qualitative analysis categories.

Main categories	Categories	Subcategories		References
Role of pharmacy	Assessment	Patient complaints		*"It would be important to assess the complaints that people have regarding their diseases."*
		Adherence		*"One of the roles of pharmacy professionals is to try to understand whether or not the users have adhered to non-pharmacological measures."*
		Physiological parameters		*"Rapid oxygen tests."***"In a situation that interactions can possibly happen and increase blood pressure, we can monitor the blood pressure."* **(HDSI)***
	Referrals			*"With the knowledge that the pharmacist has, to be able to refer the person to a doctor, if [pharmacists] saw it fit."*
	Therapy monitoring	Pharmacological therapy		*"Follow up on the therapy: whether you are using the inhaler well or not, and whether you are really doing it right."; "The question of pharmaceutical intervention, if the doctor has advised the use of the oximeter, to see if the person knows how to use it, to see if the person knows what the values that may or may not be considered as normal."; "If pharmacies would do it, maybe it would be a closer way to oblige the person to commit themselves to controlling this parameter."; "There is support for the implementation of this service, even the spirometry service, and even the use of the oximeter itself... it can be used in the pharmacy and be regulated in the pharmacy itself."; "If we had some diagnostic aids like spirometers."; "It is important that we are the ones to give the example and, many times, because of pressure from the customer, we do not explain to the person the correct use of this type of inhaler. Besides, there is a huge variety of inhalers."; "Especially in COPD, because a new therapy, there was an inhaler pump, only then does it require our intervention and it is essential."; "People misuse the devices."; "Also by monitoring the therapy, sometimes there can also be abandonment of the therapy and the picture worsens."; "Do drug-therapy monitoring services."; "In this case, it is the follow-up smoking cessation and rapid oxygen tests."* **(COPD)****
Role of pharmacy	Monitoring therapy	Pharmacological therapy		*"People buy a product in the herbalists' shops, they talk about it and sometimes they realize that the drug effect is being diminished because they are drinking a tea, and sometimes there is an interaction, possibly an increase in the toxic effect of the medicine itself. Or lowering too much because of the hypertensive if there is an effect."* **(HDSI)***
		Non-pharmacological therapy	Physical activity	*"We can also do that weekly physical activity control of the non-pharmacological plan."; "Should do smoking cessation and if someone who has COPD doesn't do smoking cessation, I also have doubts that he will acquire habits like exercising."* **(COPD)****
			Nutrition	*"Specialized nutrition service for specific pathologies."; "One service that is done a lot in pharmacies is nutrition."*
			Smoking cessation	*"We can also do that weekly physical activity control of the non-pharmacological plan."; "You have COPD, you should do smoking cessation and if someone who has COPD doesn't do smoking cessation I also have doubts that they will acquire habits like exercising."; "It's the follow-up, smoking cessation and rapid oxygen tests."* **(COPD)****
	Educating/ informing			*"It is important that we are the ones to set an example and, many times, even by pressure from the client, we do not explain to the person the correct use of this type of inhaler and then there is a huge multiplicity of inhalers."; "Especially in COPD, because a new therapy had an inhaler pump, just there it requires our intervention and it is fundamental."; "To advise in the best way and to follow up on the therapy: whether you are using the inhaler well, whether you are not."* **(COPD)****
	Prescribing			*"COPD, diabetes, being two chronic diseases, all pharmacy professionals should be qualified to make prescriptions."*
	Registering			*"Our role is very much about recording."; "The recording of adverse interactions."* **(HDSI)***; *"Recording, creates evidence, recording allows for evidence, and, by creating evidence, the person will be more sensitive to their health condition."*
Potentialities of service innovation	Proximity	Accessibility		*"In proximity, at least to the counter, and in a situation where transportation may be an impediment."; "A pharmacist is also a person who is close to the customer."*
		Relationship		*"The proximity we have with users is very great, as the colleague said, we are the first and the last professionals to contact the user."; "That we can give that person a more differentiated and more personalized counselling."*
	Enhancement	Time		*"We are saving the doctor time."; "Speed up the whole process* [of monitoring and adherence to therapy]*."; "It would be easier and faster to make an appointment for counselling at the pharmacy than to go to the Health Centre."*
		Resources		*"No more wasted travelling, and the person also gains with this kind of remote service."; "You save resources."*
	Competitiveness	Competitiveness-promoting factors		*"To have training for a certain type of therapeutic classes."; "The value of the sale because we get paid for the sale."*
		Effects		*"Add value, I think it's a way to differentiate pharmacies because there are more and more pharmacies."; "Make us more relevant, more useful."*
Service innovation	Conditions for the implementation	Formal and legal requirements		*"Privacy conditions because, if there will be a sharing of information, those requirements must be met."; "We have to make a series of authorizations."; "Authorization and the Data Protection Act requires that this authorization be made."*
		Training		*"Have more intensive training in the area of [supplement-drug] interactions."* **(HDSI)***; *"In the case of COPD, spirometries, we need all the material and understand how everything work."* **(COPD)****; *"Training to put services into practice."*

(*continued on next page*)

Table 1 (*continued*)

Main categories	Categories	Subcategories		References
		Specialized human resources		*"Our human resources have been scarce, we don't have enough people."; "Human resources and training to put the services into practice."; "Therapy is what was prescribed and we need to have knowledge of the therapy that the user is taking."; "These things should always go through the qualified healthcare professional."*
Service innovation	Conditions for the implementation	Physical space		*"Physical space, I think most have an office."*
		Management computer systems		*"The computer system should be properly prepared to be able to upload data and to do the monitoring with more accuracy."; "...there would have to be the software for recording and reporting...to have paper records or computer records."; "...a tool where you record the supplements you are consuming and that tool somehow has a link with our software."* **(HDSI)***
		Health equipment		*"If we had some diagnostic aids like spirometers."; "Oximeters, spirometers, placebos, for the costumer to train in the pharmacies."; "Spirometers, oximeters, all the devices and the various pumps for COPD so that we could explain the use to the user. For interactions a cheat sheet of the various interactions."* **(COPD)****
		Support for financial charges	Pharmaceutical Industry	*"The pharmaceutical industry."*
			Pharmacies	*"I think some pharmacies would be available to support, at an early stage."; "Maybe by the pharmacy itself."*
			The State	*"The state."; "Or a reimbursed service, as are the tests."; "Reimbursed by the state, or by insurance companies."*
			Insurance Companies	*"Reimbursed by the state, or by insurance companies."*
			The Patient	*"But things will inevitably have to shift to being paid for either by the user."*
			Several entities	*"Everyone. The state, the user, the pharmacy. Some more, others less."; "A partnership with the ministry of health that shared a part, the user with another, we provided the work, it was great."; "At the beginning, it would have to be shared."; "If the National Health Service is going to gain, it has to be seen this way, it should be shared."; "A part for the user, we have had positive feedback with Médis [insurance company] and we work a lot at the level of services and have a partnership with the NHS."*
Service innovation	Implementation difficulties	Increased workload		*"They present an increased burden, service burden on the job, it's one more function to perform in the pharmacy."; "Implies a lot of management and a lot of homework."*
		Costs of intervention/services		*"The lack of co-payment is a big barrier."; "The main problem would be the investment it would have behind it."*
		Confidentiality of data		*"For people's privacy in using certain devices, they may not agree."; "There has to be special care in handling the information of what goes from the pharmacy to the doctor."*
		Lack of training		*"It is necessary that the person who is doing that follow-up has experience and knowledge in that area."* **(COPD)****; *"There are many parameters and that we also have no knowledge or training."* **(COPD)****; *"Lack of knowledge and lack of information about the possible [supplement-drug] interactions."; "As we don't have much training between the interaction of supplements."* **(HDSI)***
		Lack of resources		*"It's going to be difficult, either in terms of means, or because they don't have a computer, or also because they don't know how to use this type of computer."*
	Activation of the new services	At Diagnosis		*"The initiation of a therapy, you've been diagnosed with COPD, you're going to start a pharmaceutical consultation service."*
		Starting therapy		*"Because there is a start of a therapy or a change in therapy."; "The start of therapy, you've been diagnosed with COPD, you're going to start a pharmaceutical consultation service, the exacerbation, or the change in therapy."; "A new drug and we must give a therapeutic drug follow-up, first take, unexpected adverse reactions, uncontrolled disease."*
Service innovation	Activation of the new services	Therapy maintenance		*"The maintenance also, because it can come to the risk of the person thinking that they're fine with that, the prescription is constantly renewed, there's no monitoring and nobody knows."; "The change of device used in the therapy."*
		Change in therapy		*"Because there is a start of a therapy or a change in therapy."; "The start of therapy, you have been diagnosed with COPD, you will start a pharmaceutical consultation service, the exacerbation, or the change in therapy."; "When we have some prescription for a new medication."*
		Dispensing of medication		*"In the act of dispensation."*
		Patient complaints		*"When there is a complaint, because the customer doesn't know how to use it, or it's not working, or it's not having the intended effect."*
		Health equipment misuse		*"When there is a complaint, because the customer doesn't know how to use it, or it's not working, or it's not having the intended effect."*
		Uncontrolled disease		*"A new drug, and we must provide therapeutic drug follow-up; first take, unexpected adverse reactions, uncontrolled disease."*
		Adverse Reactions		*"A new drug, and we must provide therapeutic drug follow-up; first take, unexpected adverse reactions, uncontrolled disease."*
		Exacerbation of the problem		*"An exacerbation, or because there is an initiation of a therapy or a change in therapy."; "The initiation of therapy, you have been diagnosed with COPD, you will start a pharmaceutical consultation service, the exacerbation, or the change in therapy."*
	Adherence-promoting factors	More training for professionals		*"More skilled professionals."; "We could have training in the sense of knowing these values [inhaler use, previous medication, oxygen levels, heart rate, and respiratory crisis.] and then we'd have another capacity to respond."*

(*continued on next page*)

Table 1 (*continued*)

Main categories	Categories	Subcategories	References
		Acceptance by physicians	*"I believe that doctors, particularly the younger ones, are receptive to this because one can also see that they start to need to follow up the patient more closely."; "Younger doctors are more open to facilitating this adherence."; "It is the "doctors" who have to be more open."*
Service innovation	Adherence-promoting factors	New computer tools/programs	*"Computer tools. CLINICAL SIFARMA."; "Speak the same language, important that the different tools communicate or, at least, have the same language."*
		Discounts or free services	*"To captivate the patient in the sense that there is some discount."; "If the service were free, you may believe, many people would join."; "The adherence of people if it is the free-of-charge service, or a co-payment (the insurances, for example) ."*
		Co-participation of services	*"Or a co-payment (the insurance, for example) ."*
		Perception of benefits	*"If everyone can see the added value, and if they can see what each person gains from it."*
		Consent	*"An informed consent, which will be within the scope of an x service that will be asked for some clinical data and for the person to give consent."*

*(HDSI) Herbs/dietary supplements-drug interactions; **(COPD)- Chronic obstructive pulmonary disease

would oversee the process ("These things should always go through the qualified healthcare professional"). Physical space to receive the customer (e.g., a service office) was also brought up as another condition for innovation, as was the need for management computer systems and other Information and Communications Technology (ICT) for data processing ("The computer system should be properly prepared … for increased monitoring accuracy"). Participants also mentioned the need for health equipment, like diagnostic aids for screening and training ("Oximeters, spirometers, placebos, for the costumer to practice in the pharmacies"). Another condition for Service Innovation was support for financial charges, with several entities being suggested as potential supporters. These included "The pharmaceutical industry", individual pharmacies ("Some pharmacies would be available to provide support, at an early stage"), "The state", "Insurance companies", or the patient, as the bearers of the costs, and some pharmacists defended the co-participation of several financiers ("Everyone … Some more, others less").

Difficulties associated with Service Innovation were divided into increased workload, intervention/services costs, data confidentiality, lack of training, and lack of resources. In participants' views, service innovation entails increased workload, with additional management activities and take-home tasks ("It involves a lot of management and a lot of homework"). The costs of the interventions/services and, again, the question of funding for materials and human resources also emerged as a difficulty in service implementation ("The lack of co-payment is a big barrier"). Another problem was the confidentiality of the data. Due to the necessity of acquiring costumers' data for use in certain devices, and the potential presence of personal information, careful management of the patient's data was viewed as necessary ("There has to be a special care in handling the information of what goes from the pharmacy to the doctor"). Lack of training was viewed as another difficulty in the implementation of new services ("There are many parameters and we also have no knowledge or training"). Additionally, lack of resources was presented as another difficulty in Service Innovation due to lack of technological equipment and to lack of knowledge about the usage of certain computer programs or applications among the diverse parties, from patients to pharmacists and to physicians ("It's going to be difficult because they don't have a computer, or also because they don't know how to use this type of computer").

The activation of new services was another sub-category of Service Innovation, referring to the points, during the patient follow-up, at which the new implemented services can be activated. In participants' view this activation can occur at the moment of the diagnosis ("You've been diagnosed with COPD, you're going to start a pharmaceutical consultation service"), when starting a therapy ("The patient is starting a new drug and we must give them a therapeutic drug follow-up"), with therapy maintenance ("Because it can be risky, the person thinking that they're fine with that, the prescription is constantly renewed, there's no monitoring, and nobody knows"), with changes in therapy ("When we have some prescription for a new medication"), in the act of dispensing medication, or with patient complaints, which are sometimes associated with health equipment misuse ("Because the customer doesn't know how to use it, or it's not working, or it's not having the intended effect"), with uncontrolled diseases, or adverse reactions ("The first take, unexpected adverse reactions, uncontrolled disease"), and with the exacerbation of the problem ("You will start a pharmaceutical consultation service due to the exacerbation of the medical condition").

The fourth sub-category consisted of factors that promote adherence. In participants' perspectives, these included more training ("We could have training in the sense of knowing these values [inhaler use, previous medication, oxygen levels, heart rate, and respiratory crisis]"), acceptance of new services by physicians ("I believe that doctors … are receptive to this because one can also see that they start to need to follow up the patient more closely"), new computer tools/programs ("It is important that the different tools communicate or, at least, that they have the same language"), discounts or free services, or co-participation of services ("To captivate the patient in the sense that there is some discount"), perception of benefits and of new services as an "added value" ("If everyone can see the added value, and if they can see what each person gains from it"), and consent gathered from the patients by defining exactly the scope of the service provided and the personal data required to do so.

Discussion

This paper was aimed at studying pharmacists' perceptions about the possibility of new services being offered in pharmacies, as well as the possibility of technological innovation, through the exploration of pharmacists' role, and the potentialities and barriers of service innovation. The three major categories identified through content analysis, the Role of Pharmacy, Potentialities of Service Innovation, and Service Innovation, provide important insights into how new services can be introduced in the context of community pharmacies.

The role of pharmacy

The recent changes in how pharmacies operate reflect a patient-centred approach, which extensive evidence shows has multiple benefits for the patient [9]. The role of pharmacists, assessed through a content analysis, included listening to the patient's complaints to assess the patient's condition, and ranged from testing physiological parameters to tracking adherence to therapeutic plans. Referring patients to physicians or to other healthcare professionals, as appropriate, also emerged as part of the Role of Pharmacy in this sample, and this collaboration with other healthcare professionals further reinforces the adoption of a patient-centred approach [3]. Monitoring the patient's condition is a very important task that pharmacists have the ability to perform because they can follow the patient at various stages [9,35], and

that participants viewed as part of the role of pharmacists. In their perspectives, pharmacists monitor both pharmacological and non-pharmacological therapies, including lifestyle habits. These services offered in pharmacies are documented in the literature (e.g., smoking cessation) [36]. Dispensing medication is the typical function most frequently associated with pharmacists [1], and its appearance in the content analysis was expected. Even though less commonly associated with pharmacists, participants also viewed educating/informing the patients as one of their roles, a role that is shown to have positive effects on health outcomes [37]. Lastly, participants explicitly brought up the task of registering patients' information and possible outcomes as part of the Role of Pharmacy. Registering information is an important aid for early diagnostic purposes [35] and for continued support provided by various pharmacists [9,35], and one which the participants in this sample espoused, including for these purposes and also for increasing the patient's awareness about the condition and its progress. Thus far, pharmacists' views about their roles, along with other healthcare professionals' and patients' perspectives about the role of pharmacists, and the new possibilities that pharmacies can offer were still unknown [38]. The exploration of pharmacists' perspectives in this study contributed to bridge this gap, with participants viewing their role as manifold and as including activities that are both more typically and less typically associated with pharmacies.

Potentialities of service innovation

The second category identified in this investigation was pharmacies' Potentialities of Service Innovation, showing various advantages that new services can bring to both the pharmacy and the patient. One of these advantages has to do with the physical and relational proximity that pharmacists have with patients. This proximity identified in this sample is one of the reasons that make pharmacists' role to be so essential in aiding patients, namely, because pharmacists often are the healthcare professionals with whom the public comes into contact most frequently [3,4]. Participants also mentioned time and resource saving improvement as potentialities that new services can bring to pharmacies, to patients, and to the healthcare system. Numerous studies document the important role that new services in pharmacies can have on time and resources, especially as regards alleviating the workload off of main healthcare facilities [10–12], and this is the view that pharmacists in this study also shared. In addition, participants viewed new services at pharmacies as potentially increasing the pharmacy's competitiveness, not only in general, but also in relation to other pharmacies, namely, through aspects such as further training for specific conditions, which work as competitiveness-promoting factors. This is an important point because more adequate training has been associated with better performance by pharmacists [39], differentiating that pharmacy from the rest, thus contributing to the "added value" that participants mentioned as an effect of service innovation. Indeed, the literature underlines the importance of service expansion for the growth of pharmacies and also to promote the patient's loyalty through the implementation of services that more closely cater to their needs [4].

Service innovation

Service Innovation, itself, was the third category identified in this study. For pharmacies to invest in new services, participants identified conditions that are necessary for service implementation, difficulties, situations that trigger the activation of these new services, and factors that promote adherence, namely, by other key health professionals and by patients.

In this sample, the conditions for the implementation of new services at pharmacies involved formal and legal requirements, chief of which were participants' concerns about the handling of patients' data and privacy issues. Such formal and legal requirements, namely, the creation of laws and legislations that allow pharmacies to grow, have been part of the considerations about the conditions for new service implementation in the literature [38]. The literature has also highlighted training as an important condition for implementing new services [38,40,41], necessary for the production of higher quality work, and specialized human resources that allow pharmacists to meet NICE's [17] requirement of referring the person to healthcare professionals who are deemed appropriate for the improvement of the patient's health outcomes [17], as well as physical space for the new services to operate [4]. Pharmacists in this study concurred with these conditions described in the literature. In particular, in some cases, the training that pharmacists have is often not enough, for example, in the HDSIs area [14,40,42,43]. In addition, the pharmacists in this study considered the presence of computer systems, other ICT and digital technologies as conditions for service innovation, namely, to be able to monitor the patient's status more accurately. Remote monitoring is growing in pharmacies [16] with positive results [44]. However, to our knowledge, previous studies have not yet evaluated pharmacists' perspectives on the implementation of this kind of technology. Addressing this topic with pharmacists is important for the development of remote tracking services that are beneficial for both pharmacists and patients alike. The need for healthcare equipment as another condition for service innovation that emerged in this sample was in line with participants' perspectives on the role of pharmacists, namely, in regard to having to register health parameters. Also, in their views, appropriate and accurate tools (e.g., spirometers, oximeters) afford them more effective means for monitoring, also aiding pharmacists in their role of educating, for example, in the usage of an inhaler, since face-to-face illustration improves the procedure done by patients [37]. The final condition for the implementation of new services in this study was support for financial charges. Participants proposed a wide range of possible sources of funding for new services, and the lack of consensus among them is an important issue to be addressed, calling for the need of further research and regulation.

In this study, Service Innovation was associated with certain conditions for implementation, but also with difficulties. In pharmacists' perspectives, increased workload was one of the difficulties associated with the implementation of new services. The literature corroborates this perspective, namely, that lack of time [38] and increased service intensity [41] pose difficulties to service implementation. The remaining difficulties emerging in this study were related with the conditions for implementation of new services, described above. These same aspects, including the cost of interventions [4,45] and lack of training [4,38,41,45], for example, in the HDSIs area [14,40,42], are also documented difficulties in the literature. Furthermore, lack of physical space [45,46], lack of privacy [47], and lack of access to users' medical data [45] are also difficulties that must be addressed. Given all the conditions that are currently necessary to assure data confidentiality, the fact that participants identified this aspect as a difficulty was to be expected. To address these challenges, in addition to the creation of laws and regulations that can aid pharmacies [38], there are various aspects to consider when handling information. These can include the use of signed agreements by patients or relatives, with the storage of information managed only by entities that are also obliged to protect the data [48]. Finally, lack of resources, namely, on the part of the patient, can make the implementation of new services difficult. For example, the use of remote devices could be beneficial for the elderly population, but there are several barriers to the adoption of these means [49].

Another category found in our study (i.e., Activation of new services) refers to the several points of the patient's follow-up at which the new implemented services could be activated to respond to that patient's needs. Several authors have proposed different stages at which pharmacists can intervene in the health process, from the pre-emptive stages of clinical conditions to their follow-up [9,35], and the results in this study showed that pharmacists concur. Thus, in participants' perspectives, the activation of new services could occur at any of these stages that are part of the services offered by pharmacists. Monitoring patients

throughout these stages often leads to positive results in various health outcomes, such as hospitalization time [50].

The final sub-category of Service Innovation pertained to adherence-promoting factors. Participants agreed with the benefits of involving patients, physicians, and pharmacists themselves, for a successful adherence. More training for pharmacists was another factor that, according to participants, can promote their adherence to new services. Additionally, one of the roles of pharmacists uncovered in this sample, and also described in the literature, was to educate/inform, which is shown to correlate positively with treatment adherence [51,52]. Therefore, receiving training on new services improves pharmacists' ability to educate/inform patients more accurately about these services, which, in turn, improves patients' adherence to the services. The literature shows that physicians lack knowledge about the role of pharmacists [38]. Thus, in participants' points of view, physicians' acceptance of new services at pharmacies is crucial for their adherence to said services, as it is for a collaborative, patient-centred approach [2]. The usage of new computer tools/programs and other technologies that allow a more effective shared access to patients' information, and a greater articulation with other professionals, was also viewed as an adherence-promoting factor among participants. Even though these tools are shown to help promote adherence to medication [53], there is a lack of studies that investigate the specific benefits of using these types of tools for treatment adherence, at least in the context of community pharmacies. In participants' perspectives, discounts or service fees and financial co-participation of services were other ways to promote adherence to new services in pharmacies. The impact of financial incentives on treatment adherence is not well documented, especially for pharmacies. There is some evidence indicating that financial incentives for both physician and patient are beneficial for treatment adherence, but this occurs only when both, instead of just one of them, receive incentives [54]. Outside of healthcare, evidence shows that price discounts are perceived by patients as a gain, producing positive feelings [55], thus, the possibility of increasing the acquisition of a product. However, these studies do not confirm the effect that a discount or a free service could have on adherence to new services, showing an important gap in the literature.

Overall, the literature is lacking in studies that evaluate factors that might predict adherence to a treatment or service offered by pharmacies. From a cognitive-behavioural approach to adherence, patients' perspectives on a given treatment or service, or even a disease, influences their adherence to a therapeutic plan. These beliefs combine the perception of susceptibility, seriousness, barriers, and benefits [56]. Participants in this study considered that the perception of benefits was an adherence-promoting factor. Perception of benefits is described in the cognitive-behavioural approach as a promoter of adherence [56]. Discounts or other financial benefits can, thus, be included within this sub-category of factors, if they are perceived as gains, as can all other adherence-promoting aspects uncovered in this study. Thus, trained professionals who are capable of informing appropriately, computer tools/programs that make the access to patient information and to other professionals easier and faster, and acceptance of pharmacies' new services by these other professionals, can all contribute to the perceived "added value" of new services that, in participants' views, promotes adherence. The last adherence-promoting factor identified in the focus groups was informed consent obtained from the patients, for which, like for most adherence-promoting factors uncovered in this study, literature is lacking.

This study constituted an important step toward the understanding of new service implementation that allows the expansion and innovation of pharmacies. Given the complexity of service expansion, it was based on a participatory model that included the main actors, pharmacists, whose perceptions must be considered for improved decision making and choice of the best solutions for innovation. Inquiring into the perspectives of pharmacists who are going to put innovations into use provides an accurate view of the necessities as they are handled and anticipated in practice. Through their perceptions, pharmacists contributed to a better understanding of their role, to find potential benefits of implementing new services, and the experienced or anticipated opportunities and difficulties. This knowledge is crucial as part of the process for future service innovation and for technological development, which is ongoing in the ForPharmacy: Future pharmacy as a plug-and-play ecosystem project (POCI-01-0247-FEDER-070053). In future studies, it will be important to investigate the perceptions of customers and of other professionals for a more comprehensive and integrated understanding of the key stakeholders involved in the processes of change and innovation.

Based on the findings, this study underscores the importance of enhancing pharmacists' training to effectively introduce new services, thereby improving service quality and patient care outcomes. It also highlights the necessity of establishment of supportive legal frameworks that facilitate the expansion of pharmacy services while ensuring compliance and legal certainty. Policymakers are urged to work on such aspects and to prioritize funding for technological advancements and infrastructure development within pharmacies to enhance service delivery and safeguard patient data. Furthermore, promoting interprofessional collaboration among healthcare providers is crucial for fostering holistic patient care and optimizing healthcare delivery. Lastly, practitioners are encouraged to embrace innovative practices that meet evolving patient needs, enhance service quality, and maintain pharmacy competitiveness. These recommendations aim to guide strategic decisions for advancing healthcare innovation and improving patient outcomes.

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Ethical approval

The study was approved by the local research ethics committee (Ethics committee registration number: CE0093B) and complies with the Declaration of Helsinki

CRediT authorship contribution statement

Artemisa R. Dores: Conceptualization, Data curation, Formal analysis, Funding acquisition, Investigation, Methodology, Project administration, Resources, Supervision, Visualization, Writing – original draft. **Miguel Peixoto:** Writing – original draft, Writing – review & editing. **Irene P. Carvalho:** Writing – review & editing. **Maria Castro:** Data curation, Formal analysis, Writing – original draft. **António Marques:** Conceptualization, Funding acquisition, Project administration, Resources, Writing – review & editing.

Declaration of competing interest

The authors declare no conflicts of interest.

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