ABSTRACT

BACKGROUND

Pharmacists-led medication review services are recognized as a key to medicines management. Although some studies have identified the factors that hinder and facilitate its implementation, there is a paucity of evidence of implementation studies in pharmacy practice. The objective was to describe the implementation process of a Medication Review with Follow-up service in a community pharmacy setting and evaluate its implementation outcomes.

METHODS

An Implementation-effectiveness hybrid study was undertaken in a community pharmacy setting. A pharmacist-led medication review with follow-up was the innovation to be implemented. The implementation process was divided into four different phases; exploration and adoption, program installation, initial implementation, and full operation phase. A core set of implementation outcomes was measured, including penetration, implementation costs, feasibility, fidelity, acceptability, appropriateness and efficiency. The outcomes were evaluated using a mixed research methods approach.

RESULTS

The penetration rate of the service was 0.63 and the implementation costs were 57,359.67€. There was a high retention-participation rate of patients, equal to 0.94. For every month of service provision, there was a 1.27 increase in the number of patients requesting the service, compared to the number of patients being offered the service. The service was provided with a high fidelity and the time spent on service provision was 171.7 minutes per patient (DE: 123.7). The average patient satisfaction with the service was 4.82 (SD: 0.39, scale 1-5), and the acceptance rate of care plans by patients and general medical practitioners were

96.99% and 96.46 respectively. 408 negative outcomes associated with the use of medications were identified during the study (3.09 per patient), of which 96.3% were resolved. The average time per patient spent on service provision significantly decreased along the 18 months of service provision (p=0.001).

CONCLUSIONS

According to international vision and policy, the provision of professional services should be a priority for pharmacies and the health care systems. However, the implementation of these innovations has been slower than desirable. This case report can assist individual pharmacists and professional organisations interested in implementing evidence-based services, by offering an example on how to approach the implementation process in a systematic way.

KEYWORDS

Implementation, Implementation framework, implementation outcome, professional pharmacy service, medication review, community pharmacy.

Evaluation of the implementation process and outcomes of a professional pharmacy service in a community pharmacy setting. A case report.

INTRODUCTION

Medicines are the most frequent and cost-effective resource for treating chronic conditions. They usually represent a high cost in national healthcare systems. Suboptimal use of medications is usually associated with negative clinical outcomes and drug related problems [1]. These events are a significant public health problem, due to their prevalence and negative consequences. Community pharmacist-led medication review services have been proven to be a possible solution to address this problem. They are recognized as a key element of medicines management, as patient safety and healthcare costs are optimized [2].

There is evidence that pharmacy-led medication review services are associated with positive clinical, economic, and humanistic outcomes [3-6]. However these benefits cannot accrue unless there is an effective implementation of the service. In the case of pharmacy, as in other parts of the health care system, there is a large gap between the development of new health innovations and their incorporation to routine practice, mainly due to lack of implementation programs and the use of evidence-based strategies. Their implementation level is rarely defined or measured and its implementation success appears to be limited, highlighting that further research is required to assist the process of professional services implementation in pharmacy.

The discipline of implementation science has developed theories, models and frameworks aimed at describing, understanding and evaluating the translation of evidence into practice.

List of abbreviations

MRF: Medication Review with Follow-up, GP: General Practitioner

Implementation process models are used to describe and/or guide the process of implementation [7]. They have been acknowledged as a key element to facilitate the implementation of health innovations into practice [7], overcoming the current research to service gap [8]. Evaluation frameworks provide a structure for assessing implementation, through the measurement of implementation outcomes. They have been defined as "*the effects of deliberate and purposive actions to implement new treatments, practices, and services*" [9]. Implementation outcomes enable empirical assessment of the success of strategies used to implement new interventions or services and to compare their effectiveness. This allows an optimization of the service benefits, stimulates dissemination of findings into other settings and promulgates sustainability. However, in most initiatives to translate evidence-based interventions into real practice, implementation success is assessed exclusively using data on clinical outcomes [9].

In Spain, medication review with follow-up (MRF) has been identified as one of the main professional services to be provided by community pharmacists [10]. However, its implementation appears to be limited. Although some studies have identified the elements that hinder and facilitate its implementation [11], there is a paucity of evidence on implementation studies in a community pharmacy setting. The objective of the present study was to describe the implementation process of a MRF service in a community pharmacy setting and to evaluate its implementation outcomes.

MATERIAL AND METHODS

Study design

This paper is part of a larger study that used an effectiveness-implementation hybrid research design, which was intended to evaluate the effectiveness of both an intervention and an implementation strategy [12]. The full study methodology and the effectiveness

outcomes of the medication review with follow-up service have been reported elsewhere [13]. In this paper, only implementation processes and outcomes are reported for a case report.

Study setting

The study was undertaken in a community pharmacy of the province of Gipuzkoa, Spain. The pharmacy employing 4 pharmacists and 2 technicians was located next to a health care centre.

Description of the innovation

A pharmacist-led medication review with follow-up (MRF) was the innovation to be implemented [10]. It is a professional pharmacy service aiming at detecting drug related problems in order to prevent and solve negative outcomes associated with medications. The service starts with the patient recruitment, which is followed by a first patient interview in the pharmacy. The objective is to gather information about the clinical history and patients' concerns about their diseases and medications. A comprehensive medication review is then performed, and drug related problems and negative outcomes associated with medications are identified. A care plan targeted at the problems identified is agreed with the patient and other health care professionals if required. Finally, regular patient follow-up visits are scheduled in order to assess progress, outcomes achieved and/or detect new drug related problems [10] (Figure 1).

Process model for the implementation of the innovation

The implementation process was divided into four different phases following the framework designed by Fixen *et al* [8]. The first stage (exploration and adoption) involved the exploration and analysis of the system and pharmacy environment for the implementation of the MRF service, concluding with the pharmacy owner's decision to accept or reject it. The second

phase (program installation) involved the preparation of the pharmacy and service provider to deliver the MRF service. The third stage, known as initial implementation, aimed to trial the service provision to a small number of patients. The fourth stage, called full operation, included the full implementation and the provision of the service to a pre-defined target number of patients in the pharmacy. The model also considers a fifth stage, known as sustainability, that involves the integration and continuance in service provision, maintenance of the service environment, including the system capacity (support and funding) and maintenance of results. However, due to the lack of external reimbursement for service provision, this phase was not considered in this study.

Framework used for the implementation evaluation

The framework developed by Proctor *et al* [9] was applied to evaluate the implementation success of the service. It suggests the following core set of implementation outcomes: penetration, implementation cost, feasibility, fidelity, acceptability and appropriateness. Service implementation efficiency was also measured. The operational definition, method of assessment, and implementation stage at which the evaluation took place for each outcome is described in table 1. The outcomes were evaluated using a mixed research methods approach.

Statistical analysis

Statistical analyses were performed using SPSS for Windows 18.0 (SPSS Inc, Chicago, Illinois, USA). A p-value < 0.05 was considered to indicate statistical significance. Quantitative variables were expressed as the mean (SD), and Student's t-test for paired samples was used to compare them. A multivariate logistic regression analysis was performed to explore the association between the study period and patient recruitment (service offering by the

pharmacist or service request by the patient). Time spent on service provision according to the number of patients included was analysed using ANOVA.

Ethical approval

Approval for the study was given by the Ethics and Research Committee of the Virgen de las Nieves University Hospital in Granada, Spain (Approval number 10/092). A written information sheet was provided and informed consent was obtained from all participants.

RESULTS

Implementation process of the innovation

Exploration and adoption phase (analysis of the system and pharmacy environment for the implementation of the MRF service)

An exploration of external and internal support was undertaken before the start of the service implementation process. During this phase, a four-level analysis was performed to identify and assess barriers and facilitators for practice change [14]. For the purpose of this study, barriers were considered as elements that hindered the implementation of the MRF service whereas facilitators were considered as elements that could assist pharmacy and pharmacists in overcoming barriers and that could act as independent enablers of change [14].

The first-level analysis was targeted at the external system of the pharmacy. It involved semi-structured interviews with different stakeholders such as General Practitioners (GPs), representatives of professional bodies, pharmacy practitioners and strategists. It allowed the identification and prioritization of internal or external facilitators for the implementation of the MRF service. Internal facilitators were described as those within control of pharmacists and pharmacies, and could be modified to some extent to suit local needs. Changing the

pharmacy structure and adapting the internal organisation and management resources of the pharmacy were identified as the most applicable ones. External facilitators were described as those that existed at the organisational level and that were beyond the direct control of the individual pharmacy, for example changing University curricula, coordinating national leaders' messages, and modifying the pharmacy reimbursement system.

The second-level analysis was targeted at the local community and patients attending the community pharmacy, in order to assess their expectations and satisfaction with the professional pharmacy services. This assessment was undertaken in a random sample of 61 patients using a pre-designed questionnaire. Results showed that the most rated expectation of care in the pharmacy was 'having queries and questions about health problems addressed', and that patients valued 'seeking advice on health problems or medicines from the pharmacist' [15]. Based on these results, it was assumed that local patients would accept the MRF service if it was implemented since these were included in the MRF service objectives.

The third and fourth-level analysis was targeted at the pharmacy as an organisation and at the pharmacy staff. A systematic analysis of internal barriers hindering the implementation of the MRF service was undertaken following the model proposed by Roberts A *et al* [11]. Current organisational culture of the pharmacy, lack of an internal implementation champion, lack of priorities and goals, inappropriate layout (including the lack of a counselling room), lack of appropriate technology and resources, and lack of bibliographic resources and medicines-information support/assistance were identified as the major barriers in the pharmacy as an organization.

At the pharmacy staff level, lack of leadership, lack of staff awareness on the relevance of the service, lack of priority to implement the service, inadequate workflow, and lack of staff training to provide the service were identified as the major barriers.

Installation phase (preparation of the pharmacy and service provider to deliver the MRF service)

Based on the analysis undertaken in the exploration phase, the following changes were incorporated during the program installation phase.

A. Changes in the pharmacy as an organisation:

Organisational culture of the pharmacy: there was a shift in its orientation from product selling to patient care, aiming at achieving a high quality in the provision of professional pharmacy services and improve the health of the community. Monthly staff meetings were held with the objective of discussing and reinforcing the need of implementing professional pharmacy services, including MRF.

Nomination of an internal champion: An internal champion was nominated to support and drive the implementation of the MRF service, overcoming indifference or resistance that the service could generate within the pharmacy [16].

Setting priorities and goals: clear expectations in regards to work performance and results of the MRF service were set by the internal champion. The implementation of the service and its provision to a pre-defined target population was set as a priority in the strategic vision of the pharmacy. This was prioritised and balanced according to the other tasks undertaken in the pharmacy.

Pharmacy layout: a new private counselling room was added to the layout of the pharmacy, available for the provision of the MRF service.

Information technology: a new software program was specifically designed and incorporated into the dispensing software. A new computer was bougth. The objective was to monitor the patient recruitment rate and register all the data derived from service provision and patient follow-up.

Resources: New laboratory material was acquired to monitor clinical parameters of patients receiving the service. This included the Siemens DCA Vantage Glycated Hemoglobin Analyzer® (to measure HbA1c) and the Reflotron Plus® (a clinical chemistry system which allowed the measurement of some clinical parameters, such as liver and pancreas enzymes, metabolites, blood lipids, and glucose).

Bibliographic resources and medicines-information support: an agreement was achieved with the drug Information centre of the local professional pharmacy association to service the pharmacy providing evidence-based papers to support decision-making and in addressing medicine related problems.

B. Changes in the pharmacy staff:

Lack of staff awareness on the relevance of the service: a pre-implementation staff meeting was organised by the internal champion. The following concepts were covered: what the MRF was, the objectives of the service and the target population, staff re-organisation of activities during the implementation, the need to involve all pharmacy staff for successful implementation, implementation benefits for the pharmacy, implementation benefits for staff, implementation benefits for consumers, alignment with the new organisational culture and pharmacy business strategy. Monthly meetings were held with the objective of

223 reinforcing those concepts and providing continuous feedback on the implementation
224 process and outcomes.

225 Leadership: The internal champion led the process of creating the organizational culture and
226 climate conducive to adoption of the service and took ownership of the process
227 implementation.

228 Workflow: The workflow of the pharmacy and the employees' roles were reorganized. One
229 pharmacist was nominated to be the service provider. Her work time was equally allocated
230 to service provision and dispensing, being released from any other duties in the pharmacy.
231 Every staff in the pharmacy was in charge of recruiting patients during the dispensing of
232 medications.

233 Staff training: The service provider was specifically trained to deliver the MRF service. She
234 was enrolled in a Master of Pharmacy for one year consisting of 60 credits, which covered
235 the following contents: clinical management of patients with chronic conditions, MRF
236 method, communication and interviewing skills, collaboration systems with other health
237 care providers, and documentation of the service.

238 *Initial implementation phase (experimenting with the MRF service prior to a full*
239 *implementation)*

240 The initial implementation phase involved the service provision to ten patients, which was
241 the goal set by the internal champion for this phase. This allowed an initial assessment of
242 the feasibility of providing the MRF service in the pharmacy and the suitability of all the
243 changes incorporated during the program installation phase. At this stage, the service
244 provider spent an average of 550.43 minutes per patient (min 427.53, max 798.34, includes
245 first patient interview and comprehensive medication review). Although the time invested

was considered to be high, the internal champion and the pharmacy staff jointly agreed to keep on with the implementation process.

Full operation phase (full implementation and integration of the service in the pharmacy)

The full operation phase involved the service provision for at least one month to the target number of patients, set by the internal champion. The target number of patients was calculated based on the assumption that a full time pharmacist could provide the service to 237 patients a year. This was adjusted to 118 patients due to lack of external remuneration for service provision and allocation of 50% of a pharmacist´s time to the service. The full operation phase was reached after 12 months of service provision. During this phase, the internal champion monitored the patient recruitment ratio, fidelity of service provision, pharmacy workflow, patient satisfaction, availability of resources and continuous training of the service provider. Monthly staff meetings were organised in order to provide feedback about the service implementation process and outcomes, and reinforce the concept of its alignment with the new organisational culture of the pharmacy.

Implementation evaluation outcomes

Penetration (Understood as the integration of the MRF service within the pharmacy and its subsystems):

The total number of eligible patients was estimated to be equal to 211 taking into account the following data: (A) the average number of patients per pharmacy in Spain is 1272 [17], (B) the number of patients attending emergency departments is 576 per 1000 habitants [18, 19], (C) 35.7% of the emergency unit visits are caused by negative outcomes related to medicines [20], (D) 81% of them are preventable [20]. During the full operation phase, 132 patients received the service for 18 months. The penetration rate was therefore 0.625.

Implementation costs:

The implementation costs from the pharmacy perspective were estimated to be 27,550€ for the installation phase and 57,359.67€ for the initial implementation and full operation phase. A detailed description of implementation costs can be found in table 2.

Feasibility:

- *Patient recruitment and retention-participation rate*

Initially, 140 patients were recruited. However, two of them withdrew and six died. 132 patients received the service, which implied a high retention-participation rate of 0.94.

- *Service offering by the pharmacy/service request by the patient ratio*

For every month of service provision, there was a 1.27 increase in the number of patients requesting the service, compared to the number of patients being offered the service (IC95%: 1.14-1.43; p<0.001). The largest change was observed after eight months of patient recruitment, since the service-request rate was five times higher to the service-offering rate (IC95%: 1,29-19,44; p=0,020) (Figure 2).

Fidelity:

The number of times that each stage of the MRF service was undertaken is reported in table 3. During the study, 132 patient interviews, 1112 comprehensive medication reviews and 2213 care plan and follow-up visits were undertaken. MRF visits patients made to the pharmacy was 2213 (average 16.8; SD:12.5). The time spent on service provision during the study period was 2288 for the first interview stage, 53786.6 minutes for the comprenhensive medication review stage and 22668.2 minutes for the care plan and follow-

up visits. The time spent in each of the MRF stages and its average per patient is reported in table 3.

Acceptability

- Service acceptability by patients:

The results for the patient satisfaction questionnaire can be found in table 4. The item with the highest score was “I would keep on visiting my pharmacist to have my medication managed” [with an average of 4.98 (0.15)], followed by “I am satisfied with the service provided” [4.82 (0.39)] and “I would recommend my relatives and friends to request this service from my pharmacist” [4.80 (0.45)]. The item “I would ask my GP to keep on collaborating with my pharmacist in regards to my medications and health problems” got the lowest average score [3.36 (0.75)].

In terms of patient´s acceptability rate of the care plans, 622 interventions aimed at addressing drug–related problems were provided during the implementation program; 266 (36.32%) were targeted at the patient, of which 258 were accepted representing an acceptability rate of 97%.

- Service acceptability by physicians:

Of the 622 interventions provided, 396 (63.76%) were targeted at the physician with 382 accepted, representing an intervention acceptability rate of 96%.

Appropriateness

- Appropriateness for the pharmacy:

Based on the two following criteria the service was considered appropriate for implementation: (a) In Spain, the MRF service is one of three services defined in the Spanish National Strategic Consensus for implementation of professional pharmacy services [10], (b) At an international level, it has been recognized that there is an imperative need to shift pharmacist's focus away from dispensing medicines towards providing professional services.

- Appropriateness for the local community and consumers:

408 negative outcomes associated with the use of medications were identified during the study (3.09 per patient). Considering that 96.32% of them were resolved at the end of the follow-up period through the provision of the MRF service, it was considered appropriate for the local community. The full effectiveness results of the service have been reported elsewhere [13].

Service implementation efficiency

The average time per patient spent on service provision for the different stages of the MRF service significantly decreased along the whole operation phase for each patient (p=0.001) (Figure 3). For example, the average time spent per patient for the first patient interview was 23 minutes. This number constantly decreased for the follow-up visits down to 14 minutes (month 18). No significant differences were found on the time spent on service provision between different patients during the same period of the follow-up (p=0.495). A similar trend was found for the average length of comprehensive medication reviews.

A analysis of the time spent on service provision according to the number of patients included in the service was performed. The final sample of patients was divided into ten deciles (*i.e.* that each part represented 1/10 of the sample population), based on their order

of inclusion in the study. There was a significant decrease in the time spent on all the stages of service provision through all the study ($p<0.001$) (Figure 4).

DISCUSSION

The results of the present case report show innovative results of the implementation process and outcomes of a professional pharmacy service in a community pharmacy setting, based on two different implementation research approaches. The implementation process of a specific professional pharmacy service like MRF has been described conjointly with the assessment of the measurement of implementation outcomes. The need to use models and frameworks to facilitate the implementation of health innovations has been widely recognised [7]. It has been suggested that the use of theoretical implementation approaches will contribute to reduce the existing gap between evidence and practice in different disciplines like pharmacy. To our knowledge, no research has been undertaken on the implementation processes and outcomes of a professional pharmacy service like MRF. This study provides a novel evidence-based approach for the implementation of professional services in a community pharmacy setting.

The implementation process of the professional service evaluated in this case report was complex mostly due to the efforts required in the first two implementation phases, exploration and adoption, and program installation. However, considering their ultimate objective, to perform an analysis of the system and pharmacy environment for the implementation of the service and to prepare the pharmacy and the service provider to deliver the service, they did play a key and critical role in preparing for a successful implementation. The analysis of the exploration and adoption stage and the interventions undertaken in the program installation stage, made it possible to understand the complex needs and supports of the system, to determine what changes were needed to implement

the service, to examine the resources available and finally to decide to adopt or reject the further implementation of the service. In this case report, the whole process took into account, using an individualized approach, the context in which the service was implemented and delivered. Implementation in pharmacy is usually an ad hoc process, lacking from an initial analysis, and driven by financial elements. Despite their importance, little attention is paid to the initial pre-implementation phases. The analysis was undertaken taking into account the context in which the service was implemented and used, and importantly, using an individualized approach. Most implementation efforts in pharmacy have traditionally been focused on pharmacist training as a sole strategy, and lack of implementation has been attributed to practitioners [21]. This strategy, not unsurprisingly, has been proven to be ineffective. This case report provides evidence that with a holistic integrated approach, implementation can be successfully achieved. Factors such as those increasing capacity of the system, pharmacy, and staff to provide the service appear to be essential. The implementation process described in this case report has provided evidence that effective programs can be developed.

Implementation outcomes were evaluated at different levels and aimed at comprehensively evaluating different elements of the service implementation. MRF seemed to be well integrated within the pharmacy, with a penetration rate close to 0.7. A penetration rate equal to 1 could have been reached, through either allocating a full time service provider or adding another pharmacist to service provision. These options were discarded as the service was not remunerated and the implementation costs were high. The feasibility of the MRF service was proven, with retention-participation rate close to one with nearly all patients that were initially recruited for the service continued with the full follow-up. The offering-request rate was an interesting trend to observe. Although all patients were recruited through service offering at the beginning of the operation stage, this trend was reversed

after eight months of implementation. Patient awareness and perception of the necessity of the service and its benefits appears to be critical. Whether this reverse in trend in the offering-request rate was related to the high acceptability observed among the different stakeholders involved or the increase in their awareness remains unknown, although it appears logical to draw this inference. During the full operation phase, the service appeared to be provided with high fidelity, which is a key moderator and its intended outcomes [22]. This could have driven the positive clinical outcomes achieved [13]. A likely relationship to service outcomes was not assessed in this study. Finally, the implementation efficiency of the service seemed to improve as the number of patients and months of follow-up increased. This trend seems logical, since the service provider becomes more experienced and the service starts to integrate into routine practice. Although this process indicator is rarely reported or measured, it should be considered essential in economic studies where the cost-effectiveness or cost benefit is researched.

Professional pharmacy organisations, governments and consumers at an international level have encouraged the pharmacy profession to change its professional practice and incorporate new health services. There is a focus on the shift from medicines dispensing and supply, towards the provision of services aiming at medicines optimisation use. This change has been supported by an increasing body of evidence on the positive role and value of pharmacists in a variety of conditions [23], including diabetes [24], hypertension [25], dyslipidaemia [26] or asthma [27]. However, this evidence is usually generated through randomised controlled trials that aim to analyse the impact of the specific professional pharmacy services. Therefore, the provision and evaluation of these services is done under controlled environments for a limited period of time. Once the evaluation phase is over, little attention is paid to the implementation of the service, leading to low service implementation rates. Although numerous pharmacist-led medication review services have been assessed at an

international level showed positive outcomes [2, 28], their long-term implementation and sustainability is still patchy. The feasibility of their integration in routine practice of community pharmacy, evaluated through implementation outcomes remains unknown, highlighting a gap in the field of pharmacy practice research. Designing and evaluating interventions to improve health, as mentioned constantly in the literature, is only the first step in the process of health services research. Transferring evidence-based services into real world settings is a complex, long-term process that requires dealing effectively with the different stages of service implementation [29]. However this important concept is usually missing in a large number of health services and pharmacy research studies.

CONCLUSIONS

According to international vision and policy, the provision of professional services should be a priority for pharmacies and the health care systems. However, the implementation of these innovations has been slower than desirable. This case report can assist individual pharmacists and professional organisations interested in implementing evidence-based services, by offering an example on how to approach the implementation process in a systematic way, applying theoretical model and frameworks in a practical manner. As other health innovations, the implementation of professional pharmacy services is complex and represents an area in which community pharmacy has had limited experience. Having a better understanding of the implementation processes and outcomes should contribute to effective implementation of MRF and other pharmacy services.

427 **TABLES**

428 Table 1. Implementation outcomes

Outcome	Operational definition	Assessment	Level of analysis	Implementation stage at which it evaluation took place
Penetration [30]	Level of integration of the (MRF) service within the pharmacy and its subsystems.	• Penetration rate: Number of eligible patients who use the service/number of potential patients eligible for the service.	Pharmacy	Full operation
Implementation costs	Cost impact of the MRF implementation effort	• Direct measures of implementation costs, including the cost of the service provider and resources needed for service provision	Pharmacy	Installation Full operation
Feasibility	The extent to which the MRF service can be successfully used or carried out within the pharmacy	• Patient recruitment rate • Retention-participation rate • Service offering by the pharmacy/service request by the patient ratio	Pharmacy	Full operation
Fidelity	The degree to which the MRF service is implemented and provided as it was described. Domains: • Adherence: the extent to which MRF service provision is consistent with the service protocol • Dose: the amount,	• For adherence: Practitioner´s self-report data on the MRF service stages completed with each patient • For dose: Number of patient's visits to the pharmacy for service	Service provider Service provider	Full operation

Outcome	Operational definition	Assessment	Level of analysis	Implementation stage at which it evaluation took place
	frequency and duration of MRF service provision	provision and time per patient spent on service provision	Patient	
Acceptability	The perception among implementation stakeholders (patients and GP) that the MRF service is agreeable, palatable, or satisfactory.	Service acceptability by patients: • Patient satisfaction questionnaire [31] • Acceptability rate of patient-targeted care plans (a patient-targeted care plan was defined as any recommendation given by the pharmacist to the patient to prevent and/or solve a negative outcome associated with a medication).	Patient	Full operation
		Service acceptability by GPs: • Acceptability rate of GPs-targeted care plans (A GP-targeted care plan was defined as any recommendation given by the pharmacist to the GP to prevent and/or solve a negative outcome associated with a medication during multidisciplinary collaboration).	GP	Full operation
Appropriateness	The extent to which the MRF service is suitable, fitting, or proper for the pharmacy and for the local	Appropriateness for the pharmacy: • Alignment of the MRF service with national and international pharmacy guidelines	External system of the pharmacy	Exploration and adoption

Outcome	Operational definition	Assessment	Level of analysis	Implementation stage at which it evaluation took place
	community The perceived fit, relevance, or compatibility of the MRF service for the pharmacy; and the perceived fit of the innovation to address the drug related problems of the local community	and recommendations		
		Appropriateness for the local community and consumers: • Alignment of the MRF service with the needs of the local community attending the pharmacy	Local community and consumers	Full operation
Service implementation efficiency	The degree to which the service provider improves his/her skills and abilities to provide it	• Change in the time spent on the service provision through the implementation program	Service provider	Full operation
MRF: Medication Review with Follow-up; GP: General Practitioner				

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431 Table 2. Implementation costs

Implementation costs for the installation phase			
Item			**Euros (€)**
Information technology			
Software			16,000
Computer			800
Lab resources			
Siemens DCA Vantage Glycated Hemoglobin Analyzer®			800
Reflotron Plus®			4,450
Pharmacy layout			5,500
Total			27,550
Implementation costs for the initial implementation and full operation phase			
(1) Time spent on service provision		**Time (min)**	**Euros (€)**
Stages of the MRF service	First patient interview	2,288.0	869.44*
	Comprehensive medication review	53,786.6	20,438.90*
	Care plan and follow-up visits	22,668.2	8,613.92*
	Laboratory tests**	16,690.02	6,342.21*
(2) Resources for service provision			
Laboratory material			21,095.20
Results			
Total cost of service provision (18 months of follow-up) /132 patients			57,359.67
Annual cost / 132 patients			38,239.78
Monthly cost / 132 patients			3,186.65
Cost per patient per year			289.69
Cost per patient per month			24.14

MRF: Medication Review with Follow-up

*Based on the province collective agreement, the cost of the pharmacist´s time was estimated to be 0.38€/min. Total costs were calculated multiplying the time by the pharmacist´s costs (0.38€/min)

**This step is only recommended in the service protocol when lab tests are needed to assess a clinical outcome and they are not available from the patient or GP

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436 Table 3. Elements of the Medication Review with Follow-up service provided per patient

MRF service stage	Number of times undertaken	Average number of times undertaken per patient (SD)	Total time spent (minutes)	Average time spent per patient, minutes (SD)
Service offering/Service explanation	145	1.1	Not assessed	Not assessed
First patient interview	132	1 (0.0)	2288	17.3 (3.7)
Comprehensive mediation review	1112	8.4 (3.9)	53786.6	407.5 (263.5)
Care plan and follow-up visits	2213	16.76 (12.5)	22668.2	171.7 (123.7)
Laboratory tests**	831	6.29 (2.2)	16690.0	126.4 (50.2)

MRF: Medication Review with Follow-up; SD: Standard Deviation
**This step is only recommended in the service protocol when lab tests are needed to assess a clinical outcome and they are not available from the patient or GP

437 Table 4. Patient satisfaction with the Medication Review with Follow-up service

Item number	Item description	Mean (SD) (n=132)
Through the follow-up of my medication by my pharmacist, I:		
1	Have a better knowledge of the medications I am taking	4.70 (0.46)
2	Know how to use my medications	4.66 (0.52)
3	Have achieved that the medications I am using effectively treat my health problems	4.63 (0.48)
4	Know it is important to adherence to the treatment prescribed by my GP	4.75 (0.45)
5	Know what adverse effects my medicines may cause	4.61 (0.54)
6	Know how to minimise unwanted effects of my medications	4.39 (0.63)
Based on the results achieved:		
7	I would keep on visiting my pharmacist to have my medication managed	4.98 (0.15)
8	I would ask my GP to keep on collaborating with my pharmacist in regards to my medications and health problems	3.36 (0.75)
9	I would recommend my relatives and friends to request this service from my pharmacist	4.80 (0.45)
10	I believe this service should be funded by the national health care system	4.05 (0.60)
11	I am satisfied with the service provided	4.82 (0.39)

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Conflicts of interest

None

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