AUTHOR(S):

TITLE:

YEAR:

Publisher citation:

OpenAIR citation:

FAMILY PRACTICE

TITLE

Evaluating pharmacist input into the pharmaceutical care of patients in dispensing medical practices in remote and rural areas of Scotland

RUNNING TITLE

Evaluating pharmacist input into remote and rural areas

ARTICLE CATEGORY

Health services research

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Abstract

Background

The Highlands and the Western Isles are the two most remote and rural areas of Scotland, with many medical practices in areas where pharmacies would not be viable. Recent regulations state that that dispensing medical practices in these areas must receive pharmacist support for patients who would benefit.

Objective

This study aimed to evaluate pilot services, which centred on the provision of patient centred pharmaceutical care.

Methods

A realist type evaluation was conducted by an independent research team comprising collecting quantitative data around what occurred during the consultation followed by interviews with purposive samples of staff (n=14) and patients (n=18).

Results

A total of 873 medicines related issues were identified in 473 patients reviewed, with the main issue being 'inappropriate dose, frequency, duration'. Just under half (39.7%) of issues were managed by the pharmacist without any medical input. Interviews indicated a high level of appreciation, although there was an increase in workload for some staff. While the need for telephone based pharmacist consultations for some patients was understood, there was a preference for face to face. All were supportive of continuing and extending the service

Conclusion

The clinical pharmacist service was both needed and valued highly by staff and patients. In Scotland, this aligns with the Government vision and action plan, 'Prescription for Excellence', that by 2023 all patient facing pharmacists will be independent prescribers with those in remote and rural areas entitled to 'equity of access to such expertise'.

Background

Access to healthcare can be problematic for those living in remote and rural areas. While there is a limited evidence base, qualitative studies with older people in Australia (1), Canada (2, 3), England (4) and Scotland (1,5) have reported issues of: difficulties in accessing care; the continuity and efficiency of care; balancing trade-offs; travel costs incurred in accessing care; and centralisation of services.

The Scottish Highlands and Western Isles

The Scottish Highlands and the Western Isles are the two most remote and rural areas of Scotland. NHS Highland is the largest geographical health board in the United Kingdom (UK), covering approximately 32,500km^2 and representing 41% of the entire land mass of Scotland. The population is, however, only around 320,000 which is less than 10% of the Scottish population. Only 25.8% of the Highland Council population live in 'urban areas' (defined as settlements ≥10,000 people (6) compared to 69.5% of the entire population of Scotland. Moreover, within Highland 40.4% of the population live in 'remote rural' locations (defined as areas with a population of less than 3,000 people, and with a drive time of over 30 minutes to a settlement of 10,000 or more) (7). NHS Western Isles covers approximately 3,071km² with a population of approximately 27,400. Stornoway, with a population of approximately 7,500 is the only town in the Western Isles which has any 'urban' characteristics. Around 8,000 live within the Greater Stornoway area, with the remainder of the population scattered throughout over 280 townships spread over the 15 inhabited islands with more than 50 substantial uninhabited islands (8).

Dispensing medical practices

Given the reduced access to healthcare generally, and the lack of access to community pharmacies specifically, medical practices in remote and rural areas can be designated as dispensing practices. There are 41 such practices in NHS Highland and all but one of the nine practices in NHS Western Isles are dispensing practices. Historically, these practices are in geographical areas where a pharmacy would not be viable and thus play an essential role in the supply of prescribed medicines. Computerised prescribing and dispensing systems in these practices are similar to non-dispensing medical practices and community pharmacies. Regulations in Scotland which control entry to the pharmaceutical list were revised in 2014 (9), with a notable new provision that,

'dispensing practices must receive the support of an appropriately qualified pharmacist for patients who would benefit'…'and we would anticipate their role to be in the monitoring and the safe and effective prescribing and use of medicines to improve health outcomes for patients. This would include, for example, medicines reviews with patients and better management of patients on multiple medicines'. This new provision was introduced to ensure that those served by dispensing medical practices received more equitable access to high standards of pharmaceutical care across Scotland.

It is therefore acknowledged that while the dispensing practice could meet the supply needs of patients, there is a requirement for additional pharmaceutical care services. This provision also aligns directly to other key strategic Scottish Government documents.

Prescription for Excellence

'Prescription for Excellence, A Vision and Action Plan for the right pharmaceutical care through integrated partnerships and innovation', published in 2013, articulates the strategic direction for pharmacy practice over the next decade (10). It outlines that pharmacists providing NHS pharmaceutical care will be NHS accredited clinical pharmacist independent prescribers working in collaborative partnerships with patients, medical practitioners and other health and social care professionals to obtain optimal outcomes with medicines and eliminate adverse events whenever possible. It acknowledges that dispensing medial practices play an essential role in the supply of medicines in remote and rural areas but that there is a need for patient focused pharmaceutical care support, '….it is essential that NHS boards ensure all patients have access to NHS pharmaceutical care from a pharmacist so that where the population is served by a dispensing doctor then clinical pharmacist input is available'.

Pharmacist independent prescribing

Independent prescribing, defined as, 'prescribing by a practitioner responsible and accountable for the assessment of patients with undiagnosed or diagnosed conditions and for decisions about the clinical management required, including prescribing' was introduced in 2006 and allows suitably trained pharmacist independent prescribers to prescribe, within their competence, the same range of medicines as doctors (11).

Pharmaceutical care within remote and rural areas will also be enabled through developments in information technology. The McClelland report into e-Infrastructure in Scotland (12), and the Ehealth Strategy (13) all envisage greater adoption of technology

to support integrated health and social care while making better use of workforce skills in providing patient-centred care in the community.

While there is a wealth of literature on patient specific pharmaceutical care activities and pharmacist prescribing in the UK (14-16), there is a dearth of any research literature on the delivery of pharmaceutical care within remote and rural dispensing practices.

This study aimed to evaluate pilot services launched within NHS Highland and NHS Western Isles, which centred on the provision of pharmaceutical care to patients registered with dispensing practices.

Methods

Pharmaceutical care service

Selection and recruitment of practices

All ten dispensing practices in the Caithness and Sutherland districts of NHS Highland were invited to participate. Of the six practices expressing interest, four were selected by the project lead pharmacist to provide a range of practice sizes and geographical locations. All nine dispensing practices in Western Isles were invited to participate. Of the four expressing interest, three were selected by a group comprising the of the primary care lead for prescribing, the area chief pharmacist and a lead manager for primary care, also to provide a range of practices sizes and geographical locations. In addition, consideration was given to the stability of the GP workforce. The number of practices for the pilot was limited by the available funding. Practice demographic information is provided in Table 1. Practice patient populations ranged from 512 (served by two part-time GPs) to 2855 (served by two full-time and one part-time GP).

Pilot service

The pilot service involved one of four clinical pharmacists, three of whom were independent prescribers, conducting medication reviews for targeted patients, either face-to-face at the medical practice or remotely via video-conferencing or telephone. Prioritisation of patients for review was discussed with each practice individually. Patients were sent information describing the aim of the review, likely content and duration in advance of the appointment. A standardised protocol and patient specific templates were used to support the reviews, which also followed the systematic approach described within the 'Scottish Polypharmacy Guidance' (17), and 'Room for review. A guide to medication review: the agenda for patients, practitioners and managers' (18). The review was based on the information derived from the patient's medical notes and the patient consultation. The scope of pharmacist prescribing was agreed in advance of commencing the service and allowed the pharmacist to alter dose and formulation. All changes were documented by the pharmacist in the patients' medical notes and prescribing records. Other prescribing activities such as commencing medicines were to be referred to the doctor. If necessary, a patient follow-up appointment could be arranged. The clinical pharmacists were employed and salaried by the National Health Service. The pilots took place over three to six month periods during 2015.

Study design, research evaluation

The research evaluation was undertaken by an independent academic research team, who had no role in service planning or delivery. A realist type evaluation (19) was conducted comprising the collection of quantitative data around what occurred during the consultation and the pharmacist actions followed by a qualitative component to provide in-depth understanding of the perspectives of the service from a variety of perspectives.

Quantitative phase

The first phase involved quantitative analysis of a database comprising data routinely collected by the clinical pharmacists. During the consultation, the pharmacist recorded the following anonymised data on a pre-piloted Excel spreadsheet: number of prescribed medicines; number of issues relating to medicines, termed 'pharmaceutical care issues' (based on a dropdown list of standardised categories (20) such as relating to medicines appropriateness, adherence etc., along with free text entry to describe the issue); pharmacist action (prescribed or altered repeat prescription; and provided advice to patient). The results were analysed using descriptive statistics.

Qualitative phase

Interview schedule development

A semi-structured interview schedule, which focused on views, experiences (positive and negative), the use of technology and future service provision, was developed, reviewed for credibility by and piloted with one staff member and one patient.

Sampling and recruitment

Telephone interviews were conducted with a purposive sample of practice staff (strata of professions) and a purposive sample of patients (strata of medical practices; those terminally ill or deemed unsuitable to participate by members of the healthcare team were excluded). Potential interviewees were mailed an invitation letter, participant information leaflet and consent form, which had to be completed and returned to the researchers prior to conducting the interview. Sampling and recruitment continued to the point of data saturation following the approach recommended by Francis et al (21), with an initial analysis sample of ten from both staff and patients, and interviews progressing until no new themes were identified from three further consecutive interviews.

Data generation and analysis

The interviews, which lasted between 15 and 20 minutes, were audio-recorded (with permission) and transcribed verbatim. Reliability of transcribing was confirmed prior to analysis. The framework approach to data analysis was employed with steps of: familiarisation; identifying a thematic framework; indexing; charting, and mapping and interpretation (22). Two researchers constructed coding frameworks independently, with the final version agreed by consensus. A clear audit trail was maintained with documented details of data collection and analysis to promote dependability.

Ethics

The evaluation was reviewed and approved by a UK university ethics committee, the North of Scotland Research Ethics Committee (reference 182816) and the Research and Development Committees of NHS Highland and NHS Western Isles.

Results

Quantitative phase

Patients were targeted largely based on the number of medicines prescribed, as well as specific targeted high risk medicines such as lithium, methotrexate, hypnotics and long-term antibiotics. Four hundred and seventy-three patients were reviewed during the period of the pilots, with all consultations conducted face-to-face in Highland (n=294) and most (n=153) in Western Isles by telephone, with the remainder (n=26) via video conferencing.

A total of 873 pharmaceutical care issues requiring alteration of medicines was identified across the seven practices (mean of 1.8 per patient, range 1.0-2.5), with the main care issue category being 'inappropriate dose, frequency, duration' (25.1%). There was variation in care issue category per practice; for example, 'drug use, no indication' ranged from 41.6% of issues in one practice to 5.3% of issues in another; 'untreated indication' ranged from 28.3% to 1.9%. Just under half (39.7%) of these care issues were managed by the pharmacist without any GP input. A further 468 issues (mean of 1.0 per patient, range 0.5-2.2) were managed by providing direct advice to the patients at the time of the consultation. The quantitative data are provided in Table 2.

Qualitative phase

Thirty-two participants (no refusals) were interviewed, with data saturation occurring after 14 staff interviews (6 doctors, 4 practice managers, 2 pharmacists delivering the service, 1 practice nurse and 1 dispenser) and 18 patients.

Staff

Key themes emerged around: service design; service benefits and challenges; and future service provision.

<u>Service design</u>

There was clear emphasis on a team approach at each practice to selecting the patient groups to be targeted, with evidence of shared decision-making,

'…we sat down at practice meetings and decided which patients would be involved…'

[Nurse 1]

Patients tended to be targeted based on the number of prescribed medicines, with consideration of issues of drug interactions, adverse effects and adherence. Other criteria used included patients on narrow therapeutic index drugs (e.g. lithium and anticoagulants). These patients were thought to be of at higher risk, more vulnerable and more complex,

'…so that would include patients who are on a list of 8-10 or more medications and high risk patients as well… most of them, yeah, the more complication or more vulnerable.'

[GP 1]

'…as well the staff had suspicions of some patients how compliant they were or they thought they might be struggling they would target the patients…'

[Pharmacist 1]

While the preference of all was for the pharmacist patient review to be conducted face-to-face, it was acknowledged that telephone based reviews could be considered for those more remote, unable to travel or working. Several noted that some older patients may struggle with a telephone consultation, especially for a new service with an unknown practitioner and several that face-to-face was essential for aspects of patient assessment,

'I think face-to-face if possible; a lot of our patients are elderly and they would probably struggle with having someone to discuss their medication that they never met before. During the course of the discussion there may need to be things that are checked, for example blood pressure or just any sort of examination…" [GP 2]

While some commented on the potential for internet based patient reviews,

'…if we had the option of video link, a few of our patients would be happy with this and a few of our patients are already Skyping' [GP 3]

Others were more reluctant due to issues of poor broadband connectivity or reliability,

'No, we don't have wifi here and the internet is really, really slow…. we've got a VC in the practice and obviously a computer but we have so much stuff on our computers we have lots of episodes where it crashes and we do get a few power cuts…'

[Practice Nurse 1]

Service benefits

There was overwhelming appreciation of the service from all staff, with many benefits cited,

'No, just to reiterate what a positive experience it was for staff and patients…absolutely a positive beneficial experience for staff and patients' [Practice Nurse 1]

Many felt that patient care had been improved,

'…patients who have chronic pain medication and that, was really useful and for those sort of patients who said they really enjoyed having their medication reviewed and liked to talk to somebody about their pain medication and get a good understanding of how their medication worked' [GP 3]

Several of the GPs commented on the medicines related expertise of the pharmacist, and the ability to focus more on medicines issues which they considered to be outwith their own knowledge and skills,

'I think the main thing is, it is good because it's impossible to know off the top of your head drug reactions potentially for all drugs, especially when there is four or more tablets. I mean, some of the patients are on 10 or more, so when you are given a number like that

you really are not great at knowing potential interactions and the side effects. It's very good just to have someone point out certain things that we may miss'

[GP 2]

Several GPs also remarked that their own knowledge and practice around medicines had improved by working alongside the pharmacist,

'…my awareness of some of the problem drugs that the pharmacist highlighted have increased so it has improved my knowledge and practice'   [GP 3]

<u>Service challenges</u>

There were, however, several challenges described, the main being the additional workload for a range of staff,

'It did give me a lot of work but it only lasted for a wee while so it was alright…it wasn't a big deal'   [Practice Manager 2]

'…while it was running our workload definitely increased and that was quite frustrating'

[GP 3]

One GP described the workload involved in reviewing the pharmacist recommendations and the subsequent impact on patients,

'…we could see the recommendations that were made but it still left us, the GPs, then to have to look at all those prescriptions and then decide because as the prescriber you are responsible for the signature on the prescription. What we actually ended up doing was revisiting with the patients all the recommendations made…people that perhaps had a lot of medication and maybe were quite frail and did not have a lot of stamina and in fact had one had said she found the telephone consultation very tiring and found it more so as she had to go through it all again with her GP'   [GP 3]

This duplication of effort was voiced by another,

'..as the pharmacist, they are a bit limited like, as with the drugs they are not going to be able to manage and the changes that are needed…the final decision is made after examining the patient'   [GP 2]

One pharmacist described how patients attempted to obtain medicines which had been denied previously by the GP,

'...sometimes it was a little bit challenging if the patient approached me to obtain something which the GP had told them 'no'...they thought they could try and see if I would be easier to get round so that was a little bit challenging'   [Pharmacist 1]

Future service provision

All interviewed were keen to see the service extended, with many GPs suggesting extending the prescribing activities of the pharmacists thus removing some of the additional GP workload,

'If the pharmacist could do the prescribing as well, be a non-medical prescriber so if they were making a change they would know the patient and feel it was appropriate to make that change rather than just recommending it to somebody else and then for us to have to follow it through and see if the prescription was appropriate' [GP 3]

This GP also proposed a service model,

'I would like to see the project roll out to having a community based pharmacist that is working in general practices, perhaps shared across two or three small practices...so they could be working in the practices and prescribing so instead of them reviewing and me having to re-review and prescribe that they would just be able to do the whole thing...'

[GP 3]

The other main area of comment was around the need to increase patient and public awareness of the skills of pharmacists generally and around the medicines review service specifically,

'I think that would be great, yeah so I guess this means a lot of understanding from patient. They may think a medication review is just with the doctor so there should be more of a public perception of what a pharmacist is and could do...promote the public perception of what a pharmacist is, that they know more than GPs about medication'

[GP 1]

Patients

Key themes emerged around: patient expectations; service benefits and challenges; and future service provision.

<u>Expectations</u>

Patients were generally unaware of what to expect from the pharmacist review, describing that they participated largely because they had been asked to do so by their medical practice. Some were also curious to see what was involved and the potential benefits,

'I was just curious to see what difference, what they would do and I was happy with what I got anyway, with what they recommended and they changed a few of the things I was on anyway so that was good'   [Patient 2]

<u>Service benefits</u>

Patients were generally very positive about the current service they were receiving from their medical practice,

'...always when I'm down at the surgery, if I'm seeing a nurse she asks me how I'm getting on. If I'm seeing the doctor the same; we have a wonderful surgery'   [Patient 3]

They did, however, value greatly the medicines review consultation with the pharmacist, which they perceived as enhancing their care, knowledge of medicines and lifestyle generally,

'She [the pharmacist] *stopped one tablet, but I don't remember which one that was...my stomach is much better'*   [Patient 4]

'I was on different kinds of painkillers...she recommended that I take paracetamol on top of what I was on, like in between other medications I was. Yes, definitely, it makes sense to speak to somebody about it, the tablets and getting them to go over things with you'

[Patient 2]

They also commented on the thoroughness of the review,

'Well, she was very thorough and went through everything separately' [Patient 7]

There were mixed views of whether the patients would prefer a doctor or pharmacist led medicines review. Those opting for the doctor cited reasons of familiarity and more in-depth knowledge of the patient history while those preferring the pharmacist gave reasons of knowledge of medicines and access to advice. While some patients were ambivalent and did not state a preference, others commented that the best option was the doctor and pharmacist working together,

'I was happy with the pharmacist…I would probably say it's the doctor's job … I think the doctor because he knows more about your medical history than probably a pharmacist would' [Patient 3]

'I would say it's a good thing because the pharmacists are the experts in the tablets and although the GPs are experts they are not as knowledgeable as the pharmacist on medicines' [Patient 8]

'I don't really know. I don't mind if it's reviewed by a pharmacist or the GP. I think I would probably consult my GP and take it on the pharmacist recommendation for something new but I suppose they would work together' [Patient 1]

Service challenges

Few patients described any challenges or limitations associated with the pharmacist medicines review. While those who had received a telephone consultation were largely happy, some would have preferred face-to-face,

'Well again, it would be great to go face-to-face but I found it equally as good over the 'phone…it wasn't rushed, everything was explained to me and I found it very good. I would rather have a video conference because at least you are seeing the person and although sometimes the reception is not all that good you can at least see the person and you get a little bit more out of it rather than over the phone' [Patient 9]

Future service provision

Patients were very supportive of the service continuing, although a few were more ambivalent about their own need for further medicines review,

'... if it happened again I would sit with them and go through everything again...oh yes, I would speak to a pharmacist and she did say I could phone her anytime if I had any queries'

[Patient 5]

'I think there is room for the pharmacist doing reviews now and again, yeah'

[Patient 3]

Discussion

Key findings of this research evaluation are that a high number of pharmaceutical care issues were identified in all seven medical practices. While the frequencies per patient and categories of issues varied across all seven practices, the key categories were 'inappropriate dose, frequency, duration' and 'drug use, no indication'. Many of these issues were managed by the pharmacist without any need for further GP input and almost all patients were provided advice on issues relating to adherence to prescribed medicines. The qualitative findings indicate a high level of appreciation of the pharmacist input from staff and patients alike, although there was a noticeable increase in workload for some staff. While the need for telephone based pharmacist consultations for some patients was understood, there was a preference for face to face. All were supportive of continuing and extending the service.

Strengths and weaknesses

The mixed methods approach allowed quantification of the pharmacist activities which was complemented by the qualitative interviews providing valuable insights into the experiences and perspectives of staff and patients in remote and rural areas. Additional study strengths are that the evaluation was conducted by a research team independent to the service providers. Adopting the approach recommended by Francis et al. (21) is likely to have resulted in data saturation for both staff and patients. Attention was paid to aspects of research trustworthiness (credibility and dependability) throughout (23). There are, however, several study strengths hence the findings should be interpreted with caution. The quantitative data were self-reported by the pharmacists over a relatively short period of time with incomplete information on GP acceptance of pharmacist referrals and none on clinical impact. The data were collected from specific patient groups in seven remote and rural practices hence quantitative findings may not be generalisable and qualitative findings not transferable to other dispensing medical practices in Scotland or beyond. However, the evaluation methods employed are appropriate to any development related to clinical pharmacist activity or pharmacist prescriber activity in any setting or country. Conducting robust and rigorous evaluation is fundamental given that pharmacist prescribing is being implemented around the world (16).

While one limitation is the absence of a control group of standard care, this approach is supported by a systematic review of 38 controlled studies of aspects of effectiveness of clinical pharmacist services delivered in primary care general practice clinics. Twenty-

nine of the 38 studies recruited patients with specific medical conditions, most commonly cardiovascular disease and/or diabetes. The remaining nine studies recruited patients at general risk of medication misadventure. The majority of studies were conducted in the United States, United Kingdom or Canada. The review authors concluded that pharmacists delivered a range of interventions, with favourable results in various areas of chronic disease management and quality use of medicines (15).

Interpretation

The quantitative and qualitative findings are encouraging, particularly given that staff and patients in these areas will have had no or little prior experience of clinical pharmacist services. Given the issue of non-viability of community pharmacies in the most remote and rural areas, dispensing medical practices perform an essential role in the supply of prescribed medicines. There is, however, a need to ensure that these patients receive the highest level of pharmacist input and pharmaceutical care which is equitable to those residing in more populous areas. This is articulated clearly in Scottish regulations and other healthcare policies (7,2).

The results of this evaluation provide evidence of both the need for and value of clinical pharmacist input. Embedding clinical pharmacist activities in medical practices is also supported by professional bodies. In 2015, The Royal College of General Practitioners and the Royal Pharmaceutical Society disseminated a 'Policy Statement on GP Practice Based Pharmacists', supporting the inclusion of a practice based pharmacist within the primary healthcare team. The aim is to improve patient care by making full use of the pharmacist's knowledge and skills relating to medicines, thereby alleviating the workforce pressures in general practice medicine (25).

The quantitative findings revealed major differences between the practices in terms of the number and categories of care issues. There may be a number of reasons to explain these variances including: the specific populations of patients selected for review which were based on criteria such as the numbers of prescribed medicines and specific targeted medicines; the needs of these populations; the levels of services already provided by the practices; and the experiences of these involved. One factor impacting the types of pharmacist activities is that not all pharmacists were independent prescribers and the prescribers were restricted in the scope of prescribing. This restriction was a deliberate attempt to introduce the practice of pharmacist prescribing gradually. However, the qualitative findings indicate support for expanding the scope of prescribing and this would, in turn, reduce GP workload and duplication in reviewing and

implementing pharmacist recommendations. This move is entirely compatible with the aspirations of Prescription for Excellence (10) and indeed there are now in excess of 750 registered pharmacist prescribers in Scotland, equating to almost 20% of all pharmacists.

A study of the prevalence and nature of prescribing and monitoring errors identified through review of patients' medical notes was conducted in 15 English general medical non-dispensing practices (26). Prescribing and/or monitoring errors were detected in 4.9% (296/6048) of all prescription items (95% confidence interval 4.4%-5.5%). While this is much lower than the mean of 1.8 pharmaceutical care issues per patient in this study, there are key differences between the outcome measures of prescribing errors ('when, as a result of a prescribing decision or prescription writing process, there is an unintentional, significant reduction in the probability of treatment being timely and effective or increase in the risk of harm when compared to generally accepted practice') and pharmaceutical care issues ('issues relating to medicines, based on a dropdown list of standardised categories'). Furthermore the English data were derived from the total practice population of patients rather than the targeted patients included in the pilot study. There are therefore no international or national data of pharmaceutical care issues and subsequent actions with which the study data could be compared.

In our study, patients generally had little idea of what to expect from the pharmacist consultation and participated for reasons of interest and faith in their GPs. While this is not an unexpected finding in dispensing practices, similar findings were found on implementation of pharmacist prescribing in non-dispensing practices (27). Similarly, the qualitative findings highlighted that although patients were supportive of the pharmacist, some would still prefer to consult with their GP. Again, this was identified in research with pharmacist prescribers (27) and is also expected on introducing a new health professional into an established GP-patient relationship. Very remote and rural patients received a telephone rather than face-to face-consultation and while they expressed a preference for face to face, they appreciated the logistical issues. Given that the pharmacist consultations would not involve diagnosis, it may be that a telephone consultation could be as effective as face-to-face. A systematic review of comparing the effectiveness of telephone consultation to face to face in patients discharged from hospital following surgery identified only five studies, which were of low methodological quality and reported heterogeneous outcomes. The authors concluded that further research was required (28).

The overwhelming support to continue and expand the service is likely due to several key factors. There was a multidisciplinary team approach to service design and patient

targeting which will have engendered coherence around the aims of the service. Much effort was expended in defining the place of the pharmacist in patient care, how this aligned to the work of other members of the team and the specific pharmacist role. These aspects relate to cognitive participation and collective action. Furthermore, there was monitoring and evaluation of the service. Coherence, cognitive participation, collective action and reflexive monitoring are the four constructs of Normalization Process Theory (NPT). NPT is a set of sociological tools developed by May et al., explaining '…the social processes through which new or modified practices of thinking, enacting and organising work are operationalised in healthcare and other institutionalised settings' (29). NPT offers an explanation of three obstacles: implementation - the social organisation of bringing practices into action; embedding - the process through which practices become incorporated routinely; and integration - the process by which practices are sustained (29,30). Designing services around the principles of NPT is more likely to result in successful implementation and sustainability.

Implications for further research

Further quantitative and qualitative research is required to evaluate the pharmacist service in remote and rural areas to ensure that similar outcomes are achieved and sustained as the service is expanded across all remote ad rural areas. There is also a need for long term clinical outcomes and economic modelling of service data.

Conclusion

The quantitative and qualitative data indicate both the need for clinical pharmacist input to the care of patients in remote and rural areas and that the service was valued highly by both staff and patients, with support for continuing and expanding beyond the seven test practices. In Scotland, this aligns with the Government vision and action plan, 'Prescription for Excellence', which states that by 2023 pharmacists in Scotland will be 'clinical pharmacist independent prescribers managing caseloads of patients …'and that patients in remote and rural areas are entitled to equity of access to such expertise.

Ethics

The evaluation was reviewed and approved by a UK university ethics committee, the North of Scotland Research Ethics Committee (reference 182816) and the Research and Development Committees of NHS Highland and NHS Western Isles.

Disclosure

The authors have no conflicts of interest to declare.

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Table 1 – Demographic information of the seven pilot practices

	Practice 1, Highlands	Practice 2, Highlands	Practice 3, Highlands	Practice 4, Highlands	Practice 1, Western Isles	Practice 2, Western Isles	Practice 3, Western Isles
Population density (patients/km^2)	2.3	14.4	14.4	14.4	9	9	9
Number of patients registered	805	2855	1248	512	1361	2344	1217
% patients aged ≥ 65 years	28	25	26	31	31	17	30
Practice deprivation, based on Scottish Index of multiple deprivation quintile (1-5, 1 most deprived)	3	2	2	2	3	3	3

Table 2 – Pharmaceutical care issues identified by clinical pharmacists in seven dispensing medical practices, and subsequent actions over three to six month periods during 2015

	Practice 1, Highlands	Practice 2, Highlands	Practice 3, Highlands	Practice 4, Highlands	Practice 1, Western Isles	Practice 2, Western Isles	Practice 3, Western Isles	Total
Number of patients reviewed	48	95	112	39	97	72	10	473
Median (IQR, range) number of medicines prescribed per patient	7 (5-10, 2-17)	13 (11-17, 5-24)	6 (5-9, 4-23)	9 (6-11, 4-28)	9 (6-11, 2-19)	8.5 (6-11, 1-17)	9.5 (7.5-11, 3-13)	9 (7-13, 1-28)
Total number of care issues identified requiring alteration of medicines (mean per patient)	48 (1.0)	106 (1.1)	198 (1.8)	59 (1.5)	240 (2.5)	167 (2.3)	19 (1.9)	837 (1.8)
Care issue types, n (%)								
Drug use, no indication	8 (16.7)	44 (41.6)	18 (9.1)	4 (6.8)	21 (8.8)	12 (7.2)	1 (5.3)	108 (12.9)
Drug selection not evidence based/	6 (12.5)	16 (15.1)	4 (2.0)	0	20 (8.3)	13 (7.8)	1 (5.3)	60 (7.2)

according to guidelines								
Pharmacological duplication	0	0	2 (1.0)	0	2 (0.8)	6 (3.6)	0	10 (1.2)
Inappropriate dose, frequency, duration	20 (41.7)	27 (25.5)	50 (25.3)	17 (28.8)	52 (21.7)	38 (22.8)	6 (31.6)	210 (25.1)
Inappropriate formulation	0	2 (1.9)	4 (2.0)	2 (3.4)	7 (2.9)	1 (0.6)	0	16 (1.9)
Suspected adverse drug reaction	7 (14.6)	4 (3.8)	18 (9.1)	4 (6.8)	17 (7.1)	16 (9.6)	4 (21.1)	70 (8.4)
Potentially harmful drug-drug interaction	1 (2.1)	6 (5.7)	5 (2.5)	2 (3.4)	3 (1.3)	10 (6.0)	0	27 (3.2)
Untreated indication	4 (8.3)	2 (1.9)	61 (30.8)	16 (27.1)	20 (8.3)	18 (10.8)	3 (15.8)	124 (14.8)
Other*	2 (4.2)	5 (4.7)	36 (18.2)	14 (23.7)	98 (40.8)	53 (31.7)	4 (21.1)	212 (25.3)
Actions								
Managed** by pharmacist with no GP input	43 (89.6)	79 (74.5)	107 (54.0)	27 (45.8)	39 (26.3)	33 (19.8)	4 (21.1)	332 (39.7)
Referred to GP, accepted and implemented	5 (10.4)	22 (20.8)	72 (36.4)	28 (47.5)	152 (63.8)	93 (55.7)	2 (10.5)	374 (44.7)

Referred to GP, acceptance unclear***	0	3 (2.8)	2 (1.0)	0	18 (7.5)	7 (4.2)	13 (68.4)	43 (5.1)
Referred to GP, not accepted	0	2 (1.9)	17 (8.6)	4 (6.8)	31 (12.9)	34 (20.4)	0	88 (10.5)
Direct advice given to patients e.g. issues relating to medicines adherence (mean per patient)	25 (0.5)	80 (0.8)	95 (0.8)	19 (0.5)	141 (1.5)	86 (1.2)	22 (2.2)	468 (1.0)

* Other included (in order of frequency): monitoring required (biochemical, haematological, therapeutic drug monitoring); adherence and prescription ordering related; recommendations from secondary care outstanding; need removal of items from repeat prescribing list; and need to confirm diagnosis. ** managed either by prescribing or updating repeat prescription record. *** no data as to whether or not accepted by the end of the study. IQR=interquartile range.