BMJ Open

Research is 'a step into the unknown': an exploration of pharmacists' perceptions of factors impacting on research participation in the NHS

Richard Lowrie,[1] Graeme Morrison,[1] Rosalind Lees,[1] Christopher H Grant,[2] Chris Johnson,[1] Fiona MacLean,[1] Yvonne Semple,[1] Alison Thomson,[1] Heather Harrison,[1] Alexander B Mullen,[3] Norman Lannigan,[1] Sara Macdonald[4]

To cite: Lowrie R, Morrison G, Lees R, *et al*. Research is 'a step into the unknown': an exploration of pharmacists' perceptions of factors impacting on research participation in the NHS. *BMJ Open* 2015;**5**:e009180. doi:10.1136/bmjopen-2015-009180

▸ Prepublication history and additional material is available. To view please visit the journal (http://dx.doi.org/10.1136/bmjopen-2015-009180).

Received 29 June 2015
Revised 1 October 2015
Accepted 12 October 2015

[1]NHS Greater Glasgow and Clyde Pharmacy and Prescribing Support Unit, Glasgow, Scotland
[2]College of Medicine and Veterinary Medicine, The University of Edinburgh, Edinburgh, UK
[3]Strathclyde Institute of Pharmacy and Biomedical Sciences, University of Strathclyde, Glasgow, UK
[4]Institute of Health and Wellbeing, General Practice and Primary Care, University of Glasgow, Glasgow, UK

Correspondence to
Dr Richard Lowrie;
Richard.lowrie@ggc.scot.nhs.uk

ABSTRACT

Objective: This study explored National Health Service (NHS) pharmacists' perceptions and experiences of pharmacist-led research in the workplace.

Design: Semistructured, face-to-face discussions continued until distinct clusters of opinion characteristics formed. Verbatim transcripts of audio-recordings were subjected to framework analysis.

Setting: Interviews were carried out with 54 pharmacists with diverse backgrounds and roles from general practices and secondary care in the UK's largest health authority.

Results: The purpose and potential of health services research (HSR) was understood and acknowledged to be worthwhile by participants, but a combination of individual and system-related themes tended to make participation difficult, except when this was part of formal postgraduate education leading to a qualification. Lack of prioritisation was routinely cited as the greatest barrier, with motivation, confidence and competence as additional impediments. System-related themes included lack of practical support and pharmacy professional issues. A minority of highly motivated individuals managed to embed research participation into routine activity.

Conclusions: Most pharmacists realised the desirability and necessity of research to underpin pharmacy service expansion, but a combination of individual and professional level changes is needed to increase activity. Our findings provide a starting point for better understanding the mindset of hospital-based and general practice-based pharmacists towards research, as well as their perceived barriers and supports.

Strengths and limitations of this study

- We selected a diverse sample of pharmacists from the largest health board in the UK.
- Semistructured discussion schedules gave participants a platform to follow their own interests; present contrary views; and generate new data, while use of the framework enabled a review of interpretations through a systematic approach.
- Themes of motivation and a need for practical support were so persistent that we are confident that we captured common aspects of pharmacists' perceptions and experiences of research.
- Our findings provide a starting point for better understanding the mindset of hospital-based and general practice-based pharmacists towards research, as well as their perceived barriers and supports.
- There may have been an implicitly positive view of research in the questioning, particularly as pharmacists were asked, in general, why they had not participated.

INTRODUCTION

Health Services Research (HSR) is a multidisciplinary approach to identifying effective ways to organise/manage/finance and deliver high-quality care, reduce medical errors and improve patient safety.[1] It can provide an evidence base for appropriate, targeted, cost-effective, efficient and acceptable services.[2] Changes to the structure and function of healthcare services, including pharmacists' roles responding to patient need,[3 4] have led to calls for increased HSR activity among pharmacists,[2 5–10] particularly in the UK.[11 12]

Rigorous pharmacy-led HSR underpins several pharmacy services.[13–20] Neutral findings consolidate the status quo[21] and negative results can signal directional changes.[22 23] However, these examples are few relative to the number of services delivered routinely by pharmacists in settings where the status quo may not be ideal.[24] The lack of empirical evidence for pharmacy services may be seen as an impediment to progress.[25] Benefits for improving research into pharmacy services include patient outcomes,

encouraging multidisciplinary teamworking, improving the knowledge/visibility of services and provide a wider view on patient care and how pharmacy fits within that.[26] Evaluations have concluded that research in pharmacy is lacking in terms of community pharmacy service impact on health promotion and disease management.[27]

In the UK, the three main areas in which pharmacists work are in community pharmacy, hospital and general practice (primary care)[28]; and proportions undertaking research are unknown.[29] Community pharmacies are independent contractors and act on behalf of the National Health Service (NHS) for the provision of NHS prescriptions and other services. Hospital-based and general practice-based pharmacists differ from community pharmacists in that they are employed directly by the NHS, based in hospitals or general practices, working within multidisciplinary teams of healthcare professionals, have career pathways defined by NHS job roles and research is included in their job roles.

The various areas of career progression in NHS pharmacy are based on specialist knowledge and experience. Within pharmacy in the UK NHS hospitals and general practices, the career structure begins at a band 6 general pharmacist. Progression into a higher band first requires a vacancy in that band, and to be eligible to apply for the vacancy, the pharmacist must possess a higher level of training (qualifications), skills and experience.[30] Moving up to a higher band can be achieved without undergoing training or developing skills and experience in research.[31] While research participation forms part of the job description of NHS employee pharmacists,[32] other than voluntary pursuance of some postgraduate qualifications, there is no external pressure to conduct research. Few NHS pharmacists are thought to participate in research and the reasons for this are poorly understood. Reasons for community pharmacists not participating in research include a lack of time,[33–41] expertise,[25 26 28] monetary reimbursement,[27] prioritisation and management support.[42]

Previous research has suggested that these differences result in enablers and barriers, which are unique to the experiences of community pharmacists, and therefore have limited analytical or theoretical extrapolation to NHS employee pharmacists practising in hospitals and general practices.[11 12 29] We therefore chose to focus on NHS employee pharmacists in this study.

Given the need to ensure optimal use of NHS resources and demonstrate the efficacy of delivered models of care, pharmacists' participation in research in the NHS is necessary and desirable. With a lack of research into the effectiveness of pharmacy services within healthcare, there may be a suggestion that pharmacists are reluctant to develop and implement research ideas. We aimed to explore factors influencing research participation by NHS pharmacists in the largest NHS health board in Scotland, UK.

METHODS

Following piloting and modification, a flexible semistructured discussion schedule was developed for interviews. Initially, five NHS Greater Glasgow and Clyde (GGC) pharmacists from different sectors and with different levels of research experience were approached. Using these five pharmacists, we identified more participants to achieve a maximum variation sample.[43] For pragmatic reasons, we used a chain referral recruitment strategy, where research participants were asked to identify additional potentially suitable participants.[44] We approached pharmacists with a range of roles, years qualified, level of seniority and experience of research. All those identified were telephoned and agreed to participate in this service evaluation. The GGC Ethics Committee Scientific officer deemed that the study could proceed without Ethical Committee consideration and management approval was obtained.

On the basis of qualitative pooling data and expert opinion,[45] we aimed to recruit between 30 and 60 participants to ensure consistency across questions asked. We concluded recruitment when we felt this point was reached.

Participants agreed on a convenient time and location for face-to-face interviews with (RL and GM), lasting between 20 and 90min.

PROCEDURE

It was explained to each pharmacist that the reason for the interview was to explore their personal views and experiences of HSR and to consider factors that may hinder or support participation. Respondents' identities were anonymised prior to analysis.

All interviews were audio-recorded, anonymised and transcribed verbatim by an independent researcher (MS) and checked for accuracy/completeness by the interviewer. We took an inductive approach to analysis but utilised our sampling criteria, research questions and a priori codes to inform the coding frame and index to analyse the data. An inductive approach together with a priori concepts informed the search for associations and the understanding of findings.[46] Framework analysis began after transcripts were checked, involving GM, RL and HT: noting initial ideas directly onto the transcripts and indexing interesting and relevant features of the data. Transcripts were then uploaded to text management software (NVIVO V.10, QSR 2012) where data were categorised, sorted and organised to enable application of initial codes across interviews which were then collated into potential themes.[47] Discussions were analysed separately and then compared for experiences, beliefs and attitudes. Patterns of data were formed into concepts and themes, through checking and interpretation of agreed themes applied across different transcripts (see online supplementary appendix).[48] Data were subjected to cross-sectional thematic analysis.[49 50] Interim thematic maps were created,

reviewed and revised by RL, GM and HT. Refinement continued until clear definitions, names and a hierarchical structure were agreed on. Interpretation differences were resolved collectively. Interviews continued until RL, GM and HT felt that no more new themes of relevance to the research question were emerging and they had a reasonable collection of views across the various attributes of pharmacists.

Sample quotations are given under thematic headings to express a range of perceptions and experiences that were deemed to be of relevance to the research objectives. Where multiple examples of a shared view or experience were expressed, we selected some based on their level of lucidity. Deviating accounts were also included under thematic headings to adequately reflect diversity (see online supplementary appendix). Results are also summarised as frequency tables of themes reported across the different areas of practice, years qualified and involvement in research.

FINDINGS

Themes and detailed characteristics were established after 54 interviews. These were conducted between 23 August 2013 and 13 March 2014. The characteristics of participating pharmacists are described below (table 1).

CHARACTERISTICS OF PARTICIPANTS

Themes and detailed characteristics were established after 54 interviews. These were conducted between 23 August 2013 and 13 March 2014. The characteristics of participating pharmacists are described below (table 1).

Participants were predominantly female, varying in NHS setting and research experiences. The majority were over 10 years qualified. Approximately equal numbers practised in hospital or primary care (general practice). Less than half declared engagement in research activity at the time of the interview, and of those, the majority were involved in research connected to a postgraduate degree (either their own or supervising others). Three declared involvement in research that was not linked to a formal qualification. In almost all of those not currently involved but who had had previous research experience, the previous experience was in connection with personal postgraduate education. Five participants had never been involved in any form of research.

Table 1 Research-related characteristics of 54 participating pharmacists

Characteristic	N (%)*
Gender	
Female	37 (68)
Years qualified	
1–10	11 (20)
11–20	13 (25)
21–30	17 (31)
31+	13 (24)
Sector of work	
Hospital	19 (36)
Primary care	21 (39)
Public health	3 (5)
Mental health/addictions	5 (10)
Education and training	3 (5)
Other	3 (5)
Research activity	
Current	20 (37)
Postgraduate pharmacy education	12/20 (60)
Pre-registration pharmacist project	5/20 (25)
HSR unrelated to qualification	3/20 (15)
No current; previous only	29 (54)
Postgraduate pharmacy education	27/29 (93)
Other	2/29 (7)
Years since previous activity	
1–5	16/29 (55)
6–10	5/29 (17)
11–15	2/29 (7)
≥15	6/29 (21)
No current or previous activity	5 (9)

*Expressed as proportion of 54 participants unless stated otherwise.
HSR, health services research.

UNDERSTANDING OF RESEARCH

While most viewed HSR as a powerful tool for service change, there were a range of views about the purpose of research. Many had been involved in audit and it was sometimes challenging to distinguish differences between audit and research. Often, research experience was gained via the process of academic qualifications and as such was characterised as a 'means to an end'.

Participants were asked to describe what they felt constituted HSR. Some pharmacists experienced difficulty distinguishing between different forms of investigation:

> Research within the NHS…? Probably… traditionally, as a pharmacist… audit… service development, em… nothing necessarily high profile. (P38)

However, most pharmacists articulated the role of research in terms of adoption of learning across a wider audience and generation of an evidence base for pharmacy services, though some questioned their engagement in 'proper research':

> Things that go on for years having an outcome which might or might not influence practice. So I guess that is what I think of initially when I think of research. (P10)

> If you're without good research you can't progress your service. (P43)

> I've been involved in quite a lot of audit, but probably not anything that you would classify as proper research. (P51)

> Well, I think if we are going to survive as a profession we have to have [research]. We have to develop as a profession. (P12)

> It's that classic line, 'audit is making sure we're doing the thing right and research is about doing the right thing'. (P33)

> [Research is about developing] a better way of working to achieve the objective of improving healthcare of patients. (P35)

> In the context of my work I would imagine research is looking into why we do what we do. Em… I'm imagining… how we can do things better, what we can learn from what we're doing, understanding why we do something… (P21)

> Audits are very good for specific local areas, but to be able to apply it to a wider… you'd need the evidence base from research to be able to prove that. (P52)

Much of the interview discussion centred on the barriers to being research active and the key themes are grouped around 'individual elements' and 'contextual domain'.

Three distinct themes emerged which were directly located within the individual: motivation, personal professional factors and confidence/competence. Together, these appeared to contribute much to an individual's likelihood of interacting with research and the research process.

INDIVIDUAL ELEMENTS

Motivation

Active engagement in research is set out as a part of the role and remit of pharmacists working in the UK NHS. Interviewees, however, typically saw research as an activity that involved substantial personal cost for limited personal gain. Pharmacists did not describe external drivers but instead focused on personal motivation (or lack thereof) when discussing participation in research. For many, previous research activity was confined to postgraduate study and that experience was rarely positive. Nevertheless, the inherent value of research, in abstract terms, was frequently mentioned, though there was little desire to 'gamble' on research that may result in negative outcomes and few were willing to assume principal investigator roles. When research was valued, interviewees recognised the worth it demonstrated:

> It's become clearer and clearer is that we need to do a lot more practical research to make sure that we're giving the best care to patients and my main role now is to improve the quality of care. (P8)

Motivations despite having a positive impact on involvement in research were affected by barriers. There was a fear, feeling of no support and going against the culture hindering practice improvement:

> I want to deliver something quickly and relatively easily, so I don't want to do a full-blown research project around it. I just want to do it and get it done because I've messed about with it for a few months. (P12)

PERSONAL PROFESSIONAL FACTORS

Pharmacists acknowledged the importance of research to their professional standing and potential for contribution to patient care. However, a lack of time or prioritising their immediate, core daily clinical activities explained the low rates of participation for many.

> I think people in the past have seen research as interesting, good to do, but don't have the time. (P8)

> [Research is] just not seen as part of the job, part of the routine job, of the pharmacy… I'm aware of the pressures… the management pressures. (P3)

> You are getting paid to deliver a service. So you don't give [research] priority, therefore, you don't do it. (P41)

> What they were doing was, essentially, a fishing exercise to see if they could find a research question. I don't particularly want to be wasting time doing stuff like that. (P7)

A few sufficiently internally motivated pharmacists prioritised research, changing their working practices to enable research to take place. Conducting research within regular hours was seen as a luxury for most. This meant that for some, research had to compete with other demands within the work–life balance conundrum.

> Even maybe just fitting it in to your normal job would be challenging if you have a topic or something that you were wanting to look into you would have to, sort of, work out how you were going to do it along with your other job. (P15)

> I'm taking every second Friday off as annual leave to work on [my MSc]… I haven't got the time in work… I just kind of assumed it had to be your own time… You do get study leave… I haven't thought about study leave for this… (P24)

> What I've done is I've agreed with [my manager] to work the compressed hours so 4 days a week which would free up a day [for research]… not formalised but agreed. (P17)

> I think if you become so interested in [a research topic] you can often find [the means] to make it happen… so I don't think there any major barriers to doing [research]. I think it would work as long as I was really interested in it… You tend to be able to create time when you have to. (P39)

> I think once I've had a break [I would consider project work] because I think it does massively disrupt your personal life, I would say. (P30)

Responding to immediate patient care and service needs dominated pharmacists' minds and daily activities, making the long-term gain and prospects of developing an evidence base for service change relatively less important. Research inactivity was seen by some as a more general problem across the NHS, where system pressures force a focus on immediate tasks rather than longer term impacts. A consensus appeared to emerge on the need for protected time for research with additional funding key to ensure continuity of delivery of existing roles through backfill arrangements; suggesting that a pharmacy culture change is required.

Nevertheless, this 'priorities' barrier may be based around a personal preference or just holding out for the right project to grab their attention rather than the service:

> It would have to be something that was relevant to my current work and it think then they probably would be fairly supportive. (P33)

It would seem that in order to overcome priorities, either perceived by the service or personal commitments, research projects have to be targeted at the interests and career of the right pharmacist as well as the potential benefit to the service in question.

COMPETENCE AND CONFIDENCE

Several participants confided that they did not perceive themselves to have the required knowledge and skills to enable research participation. Such skills were rarely required in routine core roles and interviewees felt that any skills they may possess would be quickly lost if not used regularly. Given that most pharmacists' experience of research was judged to be 'low level', a preference for undertaking small studies could be consolidated to build overall capacity and, crucially, confidence was exposed. Interviewees were fearful of their ideas being dismissed and there was a 'fear' of entering into the 'unknown'. This fear of the unfamiliar was coupled with expectations that research would be completely independent work:

> It scares me a bit, research…(1) I am not sure if my brain works in the right way and (2) The lack of experience in it and knowing what or how to do it, and how to do it properly… I suppose my experience and lack of exposure of having to do things myself is an issue and that is one of the reasons why I probably wouldn't go down that route because I don't feel comfortable. (P10)

Generating research ideas was particularly problematic and the perceived inability to develop a good idea appears to stifle research. Experience appeared to mediate this concern and interviewees with a postgraduate qualification were more likely to be involved in research (ie, within 1–5 years; table 2).

However, these deterrents were referred to as false reasons for preventing participation by a few interviewees. With encouragement, many pharmacists believe that research would grow within the profession:

> I think if it (research) was a bit less like that ('MSc is quite a solitary thing') and a bit more of a team involvement, I wouldn't have any objections to being involved in (research). (P16)

Paradoxically, experiences of research during the pursuit of postgraduate qualification (which is often necessary for career progression within the NHS) suggested that it acted as a disincentive for research in the workplace:

> [Research] is just is not on my radar, to be brutally honest. I'd rather just go out there and do what I have to do and try to develop what we're doing… Maybe I'm being coloured by bad guidance or leadership back at the time when I was doing [my MSc]. (P11)

> I think some people might be like "that [MSc in clinical pharmacy] was awful, I would never do that again" or "I wish I never did that. (P30)

> I guess my exposure to [research] has been to do with further education etc, rather than properly integrated into the heart of what you do as your work. I guess, in my head, I probably have seen it as a separate entity, which I know it shouldn't be… (P10)

> It took a lot of my time, you know, I… for six months probably had to give up most evenings. Probably not that… until the last three months I didn't have to give up so many weekends. I wouldn't be overly enthralled at the idea of doing that again, particularly, if there wasn't a qualification at the end of it for me, which is probably a bit selfish, but it was a lot of time. (P16).

Contextual domain

As well as individual level influences on research participation, the environment or context in which pharmacists are is equally important. Key among those was the structure or professional hierarchy together with the ability to engage with research experienced colleagues.

PRACTICAL SUPPORT

Participants acknowledged the need for support, particularly during the early stages of the research process. The need for research networks and peer support were also highlighted, given that many individuals perceived themselves to be isolated from research active peers:

> I think it is quite hard for people to come up with [research topics] in isolation. I think if you get people in a group and they say "Oh, you thought of that, oh right, ok" and then feed off each other and maybe come up

Table 2 Research involvement status in areas of practice and prior experience

Time since last research involvement	Area reported to be practising (n=84 reports) n (% of each group) *†				Research experience n (%) total number of participants			
	Primary care (17)	Hospital (28)	Education (9)	Other specialisations (including management) (29)	Postgraduate degree only (n=27, 50%)	Other research experience only (n=10, 19%)	Postgraduate degree and other experience (n=12, 22%)	No research experience (n=5, 9%)
Currently involved	5 (29)	14 (50)	6 (86)	15 (52)	11 (41)	4 (40)	7 (58)	3 (60)
Within 1–5 years	8 (47)	8 (29)	1 (11)	7 (24)	10 (37)	3 (30)	2 (17)	0
Between 6–10 years	3 (18)	2 (7)	0	3 (10)	2 (7)	2 (20)	1 (8)	0
≥11 years	2 (12)	2 (7)	1 (11)	4 (14)	4 (15)	0	2 (17)	1 (20)
None	0	1 (4)	0	0	0	1 (10)	0	0
Not specified	0	1 (4)	1 (11)	0	0	0	0	1 (20)

*Totals based on frequency reports of areas worked—some overlap between participant's areas of work, for example, if a participant works in primary care and another specialisation and is currently involved in research, then a tally was put into both primary care current and other specialisation current research box.
† Percentages are calculated on the basis of the total number of participants reporting working in that area, that is, 5 participants are working in primary care and currently involved in research. Of the 17 reported to be working within primary care, these 5 make 29% of the 17.

with what the barriers are and they might come up with a few really good ideas to come up with to drive forward… [Mentors] would be needed as part of the formula [to engage pharmacists in research]… just to be able to bounce off someone there for a bit of practical support, to keep the whole thing having a bit of momentum behind it. (P23)

For some, having learnt from mistakes made within a postgraduate qualification context, accessing the right support at the right time was seen as critical. Pharmacists' concerns around research knowledge and expertise together with a lack of confidence translated into expressions of the need for help and assistance from colleagues:

> I probably would be happy to lead on something if I knew I had the support of a team and it wasn't just me doing something. (P16)

The idea of a centralised research support facility was considered as an answer to the overwhelming need for research guidance on a diverse range of issues, including protocol development, funding, ethics approval and statistical analysis, to name but a few:

> If you had a centralised body where someone would say "I've got this idea, it might be a bit mad", talking it through with somebody and then it's passed as a good idea and it's actually aligned to the direction of the organisation or something that's strategically important… but then the organisation can support that by putting a collective of people together, or perhaps directing them towards resource that might be external as well as internal, to allow it to be realised. Some nominal centralisation where there's maybe an initial screening of an idea. And at that point you could either have a local support network or if it's something that centrally seems to be very important then you could coordinate the degree of support or resources allocated from a central perspective. (P1)

Acknowledging a lack of research leadership, one participant stated the case for job roles which oversee research activity within each site:

> I think within each of our teams, our sites, you know, we should have 2 or 3 people—I mean, I think everybody should be involved, but I think within each site, within each hospital, within each team, prescribing support, etc, there should be 2 or 3 people with a, kind of, responsibility for overseeing research projects in that team and everybody within the team should have some kind of input and responsibility. Because if you don't have the people to make it happen, then it won't happen. (P42)

One individual suggested a database of research activity, which could be used to match pharmacists with potential collaborators:

> I mean the thing is if you have somewhere where you go and have a look and see what has been done previously… and then if you saw something similar to what you were

> thinking of what you would like to do, you maybe know who had done it before and you contact and speak to them, or something like that. (P15)

For most of those interviewed, their experience of research was gained during postgraduate study where levels of support varied. A wide range of support needs were expressed, for example, research design, ethical guidance, statistics and scientific writing. This suggests a widespread lack of experience in HSR despite participation in postgraduate work and enthusiasm to participate in research in the NHS. Peer support and research networks were also put forward as valuable resources that could allow pharmacists to identify research opportunities and combine resources to solve practice-related research questions. The few who had managed to conduct research within their roles had built their own support networks:

> I've more or less just met [collaborators] along the way and sometimes things produce fruit and sometimes they don't. (P17)

Interviewees also cited examples of research activity that had not resulted in any meaningful output. Failure to produce and disseminate findings served only to reinforce negative views of research and the research process:

> Yes, but we have to be able to share that expertise and knowledge and we need to basically get it out there somewhere and, how we do that, I'm not quite sure. (P21)

> I think it's just getting that initial push and thinking about publication etc., but I think we're a bit lost about how to do that, what journals we should be approaching. (P54)

> I think it would be good to [publish]. Usually, if I say I'm going to do something I'll do it, but I don't think I'd be willing to maybe do it as quickly as I did my write up for the MSc. (P30)

PHARMACY PROFESSIONAL ISSUES

Pharmacists recognised the importance of supportive line management to enable research to flourish in their workplace. Management support was seen as a necessary pre-requisite to research involvement:

> (what is required for research) I think allocated time, support from your line manager. (P53)

A perceived mixed opinion to research by management was due to a potential threat to patient services if time on clinical practice was reduced:

> I am very much part of the clinical team. I am not just here as a person who oversees everything. I am providing clinical services as the culture of my job. It restricts the amount of time that you have at the desk to do other things. It certainly restricts the amount of time that you would have to dedicate to research. (P49)

> [Research is] very much on the periphery, something that interests me but I wouldn't know where to start and would have a lot of difficulty fitting it into my job plan which is fairly full. (P33)

> It's that bit that's going to take your average practitioner away from the wards and away from patients. And when they're doing something else like writing something up, either nobody's going into that ward, or someone is having to cover over and above their own ward. There's only so much with annual leave, sick leave, mat leave and everything else that's going on, there's only so much people can manage. (P8)

At a basic level, management support is likely to involve agreement on a particular research question and a favourable response to a request by the pharmacist for protected time to develop a research plan and meet with potential collaborators. However, this type of discussion, while considered necessary, did not appear to have taken place in the majority of cases, reinforcing the belief that the culture was unfavourable or most pharmacists were not ready:

> You'd have to maybe arrange it… like protected time, with your manager. You would talk about it and decide if it was worthwhile or something or see if you can negotiate some sort of time, I would imagine. (P15)

> It's discussions the service haven't previously had… we need that recognition of agreement that it is appropriate for clinical services to dedicate an agreed proportion of their time to this function and this means that we can either stop doing something and chase that…I suppose it's about perhaps echelons of power within our organisation, saying "Ok" That's a commitment we're saying is acceptable. (P7)

> We haven't planned in that people will have emm, one session or a half day a week for their research activity. And it's that kind of language that we need to start thinking about. (P28)

> I think that's the key… protected time, but we don't have the flexibility within the current service to provide that, as far as I can see. (P43)

One pharmacist took a fatalistic approach while commenting on the risks of working up a project only for more senior colleagues not to support it:

> I would be gutted if I did a lot of planning to get the project ready for [management] to say no. I suppose that's inevitable. (P19)

There was some evidence that the passive-receptive approach to research by management may be due to a perceived threat to patient services, which were believed

to be at risk of suffering if pharmacists spent less time on clinical duties and time on research:

> I've been told I have to fit [research] into the job. I was told in no uncertain terms that the job had not to suffer on the strengths of this, so I had to make time to do it. (P20)

One divergent view arose, suggesting management support was adequate:

> I've been given plenty of opportunities to concentrate on my research and Manager A is very supportive of… anyone doing postgrads, so yeah, very encouraging of it, so yeah, no barriers. (P53)

Receptivity and support of research ideas appeared to be conditional on aims/objectives aligned with the priorities of pharmacists and their departments. Pharmacists have support available but are unaware of it and therefore do not protect the time due to fear and against the culture of their job:

> I would say it's largely external to the work plan of the team…I don't know if we truly integrate any sort of research attitude to what we do. We have our on workplace which, as I said, is predominately driven by the needs of the sector, which can be financial. (P25)

Organisational culture appeared to mitigate against attempts to become research active. Research was not perceived to be an important factor in the NHS pharmacists' professional career structure, which acted as an organisational barrier and gave pharmacists no extrinsic reward for research activity:

> Our career progression is towards management and administration. It is not towards practice and research. (P5)

> The [pharmacy] career framework we've got is either clinical or managerial. [Research] is not seen as a career objective. (P47)

> We get our MSc [students] to do [research] but then I don't know… it just doesn't happen. I suppose there has been no incentive. (P22)

> If [research] was part of [pharmacists'] career development, they would be falling over themselves to do research. (P44)

> I think if there isn't a reward for what you're doing then [research] will not be done. (P36)

> I mean, [research] is not in my PDP, nothing like that. I haven't got any pressure to do research.
>
> Interviewer: Is it in your job description?
>
> It is in the job description. (P22)

Most pharmacists had teaching commitments either within the NHS or neighbouring universities. For one pharmacist, a lack of available time on research was as a consequence of an increase in teaching responsibilities:

> Am I involved in research with MScs ? No. Am I involved in the teaching of the MScs? Yes. Am I involved in teaching undergraduates? Yes. Am I involved in teaching pre regs? Yes. Am I involved in teaching stage 2 trainees? Yes. Teaching has mushroomed. Now why has it done that? Because maybe we appointed very early on, we appointed education pharmacists, education and training and that is really…that has blossomed. So we now have far better education and training, far more in-house training undergraduates, we take 3rd years, we take 4th years, we take…all the way through right up to stage 2 training. So, the teaching has multiplied. (P5)

The need to create capacity through organisational change was suggested but in practical terms assumed to be improbable:

> If we're going to create [research active] people at any level, whether it's people at senior level like myself, or even higher, or the troops on the ground, creating capacity is the key. Finding the capability to say "Ok", as I say, for example, <NHS Pharmacy> is going to come out of that… "anyone with a band 8a or 8b has a protected research component to their job". How would you achieve that? (P7)

One interviewee described tacit acceptance among pharmacists, of the culture of prioritising patient facing roles above all else, including research:

> I think we struggled to get people to take responsibility for research because to take responsibility is to, we all have it in our job descriptions and we all know that it's probably the one bit of our job descriptions that we're failing at, and that's simply because at some point you've got to make a decision around what you prioritise, and their core jobs are patient care. (P50)

Other respondents cited multiple contextual barriers, many of which were considered endemic and organisational:

> I do think about it, but… I don't feel like line management are showing much drive in that direction either. That's not to say that I shouldn't be encouraging it, but maybe that…maybe the feeling of research as this… you know, something that we should be doing and I think it is. Em… if it's not running entirely throughout our organisation at the moment then, if there's no pressure from beneath, it's easy to deprioritise it, because there are things that are important to my team members and that's not… it doesn't seem to be one of them… I suppose money comes in to it as well. But em… if the pressure is only from above and within then you want to do the best thing for your team members, but it doesn't seem like something that they are interested in and I haven't had the time to sit down and have the same kind

of conversation that you're having with me then it just falls off everybody's radar. (P37)

People are just fire fighting in the role we have. So, before we even think about getting more people involved we need to persuade people it's the right thing to do, because I think most people aren't interested. (P42)

Our hierarchy is not practice or research led, so how can [individuals in senior roles] expect people below them to take on that role, when they don't do it? (P5)

If I was in a research environment… everybody's mindset would be the same. We would all be talking about that sort of thing, and access to the people with [research] expertise would be there on a day to day basis. So, if you were having a problem or a question you could go and get some advice right from the word "go". Whereas, that is not readily available. I mean, yes, you can go and ask. But you have got to go out of your way… (P41)

[Research is] just not seen as part of the job, part of the routine job, of the pharmacy… I'm aware of the pressures… the management pressures. (P3)

A lot of the new pharmacists probably think that if they're interested in research, they will need to pack in the job and go to University. (P47)

There must be a huge number of Band 7 and Band 8A who are sitting there doing their job that… could be stretched further… Would they want to go on and do something like this? (P39).

OVERALL TRENDS IN REPORTS

To understand the different characteristics of those involved and not currently involved in research, we compared motivation and barrier reporting of these two groups. From reports of research involvement and areas of practice, those reporting least current involvement mainly worked in general practices (table 2). Overall, pharmacists reported a higher number of personal (intrinsic) elements compared to contextual elements (total frequency of reports 67 vs 46, respectively (table 3)).

Participants currently involved in research reported a higher proportion of motivational factors than any other group (table 4).

Nevertheless, across all participants, internal motivators for research were more frequently reported than external motivators (total reports of n=49 and 37, respectively; table 4). In this population, pharmacists with at least 21 years' postqualification experience were most likely to be involved in research; those with 11–20 years' postqualification also had a high proportion of being currently involved (table 3). However, the group trends towards the personal barrier aspect, but differs in motivations. Pharmacists who had been qualified for longer, had more contextual motivations than personal (intrinsic) motivations. This finding was reversed to

Table 3 Years qualified and frequency of types of barriers and motivations reported

Years qualified	Total in group	Number currently involved in research (% in group)	Frequency of barrier types reported				Frequency of motivation types reported			
			Intrinsic		Contextual		Intrinsic		External	
			Currently involved in research	Not currently involved in research	Currently involved in research	Not currently involved in research	Currently involved in research	Not currently involved in research	Currently involved in research	Not currently involved in research
≤10	11	3 (27)	4	12	1	9	3	12	0	8
11–20	12	3 (25)	2	12	1	11	10	10	6	6
≥21	31	17 (55)	20	17	11	13	8	6	10	7

Table 4 Research involvement status with barriers and motivations reported

Time since last research involvement	Total in each group	Number in each group with a postgraduate degree	Number of each participant in group reporting barriers	Number reporting motivations	Frequency of barriers reported across all participants*		Frequency of motivation types reported	
					Internal N total Median (IQR)	Contextual N total Median (IQR)	Internal	External
Currently involved	25	18	23	12	291 (1–2)	171 (0–1)	18	16
Within 1–5 years	15	12	14	8	201 (1–2)	151 (0–2)	14	14
Between 6–10 years	5	3	5	2	52 (0–2)	61 (1–2)	4	4
≥11 years	7	6	6	1	81 (1–2)	51 (0–1)	3	2
None/not specified	2	0	2	2	52.5 (2–3)	42.5 (2–2)	10	1

*Frequency is based on the total number reported by all of the participants, that is, 2 barriers reported by one participant and 3 by another would give a total of 5.

personal motivations for those who had been qualified for less time (table 3).

Overall, this group concurs on barriers to research being more a personal element, although when we compare research statuses, those that are not currently involved in research demonstrate a higher level of contextual barriers to research than those currently involved (table 4).

All these issues have left research culture in pharmacy severely lacking. In order for research to expand, services have to address these issues and push for research to be an integral part of pharmacy culture.

DISCUSSION

The need for the NHS to meet its objectives by promoting research has been enshrined in policy for over 20 years.[51 52] Acknowledging the need to change the status quo, The Scottish Government's *Prescription for Excellence* (2013) action plan sets out the vision for a new integrated role for pharmacists in Scotland, demanding 'new ways of thinking, new ways of working and new models of care'; and HSR is acknowledged as a means of demonstrating new and established pharmaceutical care services.[4] Pharmacists are aiming for recognition as clinicians, but in the current healthcare environment where multidisciplinary teams of specialist and generalist clinicians provide care through established pathways, with scarce resources, robust evidence of added value from pharmacists' input is needed to change pharmacy practice in the NHS. This requires the active participation of NHS employee pharmacists.

Participants expressed an understanding of the relevance, importance and value of research within pharmacy practice. This, however, did not necessarily lead to undertaking research. A lack of time was viewed as the greatest impediment to conducting research. This served to mask a multitude of factors constraining research participation, including: prioritisation of clinical services, fear of research encompassing a reluctance to apply for ethical approval, asking more experienced clinicians for support or conducting statistical analyses. A lack of locatable and accessible practical support was acknowledged. A lack of time (real/perceived) is a consistent theme in the literature.[26–29 33–36 53] One study suggested that 'time pressure' has become a socially acceptable justification which healthcare professionals draw on in order to mitigate responsibilities when their behaviour is questioned.[54]

Although there were a variety of experiences and opinions towards research, generally participants reported that there were more personal than contextual factors influencing participation in HSR. When we looked at barriers reported by those currently and not currently involved in research, we found that more contextual barriers were reported in those currently not involved. This suggests that perceived contextual barriers are outweighing the personal elements to participate in research.

Individual motives for engaging in research were discussed in terms of personal and external rewards. Those actively participating in research or evaluation did so largely because of potential benefits to the service or interest in the research area. However, outside a postgraduate qualification, tangible benefits were lacking, not affecting career development. While rewards may factor into an individual's decision to change practice, they are unlikely to change professional attitudes and values, that is, the pharmacy culture.[55] Perceived lack of support from senior managers was often cited as a significant barrier to research engagement, linked to poor accessibility to role models, although very few respondents had approached their managers to make the case for protected time. A lack of confidence to raise the issue may stem from senior management and pervade through to lower grades. With longer qualified pharmacists reporting external motivations, it could suggest that research is more of a personal gain when beginning a career but becomes part of the job when moving up, perhaps due to increased autonomy. Priorities often reflected assumptions for patient care, as well as the relative priority of tasks. Most participants acknowledged that research was not a priority with clinical service taking precedence (consistent with survey findings).[28]

Pharmacists regarded research as a level of difficulty not associated with their routine jobs; in contrast, finding time and prioritisation appeared less of a problem when research was within the postgraduate qualification context: research is tightly managed and time limited by university tutors. Given the lack of confidence and competence to starting and leading research, this highlights the importance of adequate, accessible practical research support in the workplace. Our results suggest that an underlying fear of failure or movement out of a comfort zone, created by practice culture and a lack of incentive, may account for the low uptake.

Our findings compare with previously published evidence gathered over the past 20 years involving pharmacists in community pharmacies and show common barriers to participation in research. These include time constraints;[34 37 53 56] reports of being too busy attending to patients' needs;[37] questionable motivation;[37 57] and a lack of experience and training.[33 34] We found that pharmacists employed by the NHS and community pharmacists also shared perceptions of the importance of research, and both groups struggled to incorporate research into practice.[34 37 42] Unlike community pharmacists, research activity forms part of the job role of NHS employee pharmacists; however, we found this apparent advantage to be insufficient to ensure the practice of research in the majority of cases. Teaching is included in NHS employee pharmacists' work plans, and routinely delivered, whereas research is in job descriptions, but rarely in work plans or delivered. Traditional teaching methods and research both reduce patient contact, but teaching is accepted while research is not prioritised. By implication, there may be a need to revise the organisational and cultural environment around these activities, if research is to flourish. The explicit inclusion of research into NHS employee pharmacists' job roles, personal development and appraisal may encourage research activity, while also having the advantage of linking research to career progression and forcing a conversation about research between pharmacists and their line managers.

The multidisciplinary environment within which hospital-based and general practice-based pharmacists work, in theory, might be regarded as optimal to conduct HSR, in comparison to the relative professional isolation experienced by community pharmacists. However, only highly motivated individuals had taken the opportunity to collaborate and develop research active networks, perhaps because pharmacists lacked confidence and perceived themselves as not sufficiently competent in research, a finding from previous work involving hospital pharmacists in Thailand.[41] Others may have feared rejection, or venturing into unfamiliar territory, thereby jeopardising professional relationships with peers or practitioners from other disciplines.

The few pharmacists who had managed to incorporate research into their roles appeared to draw on their internal drive to conduct research, rather than their job role or other external incentives, for example, demands from their peers, managers or pursuit of career progression. One implication of this finding is that sufficiently motivated individuals will be able to overcome obstacles that others find limit research activity. Peer-to-peer discussion involving research active pharmacists with research inactive pharmacists may therefore offer a means of improving the uptake of research in pharmacy in the NHS.

Most of the NHS pharmacists interviewed either had previously undertaken or were currently undertaking research in part fulfilment of a workplace-based postgraduate pharmacy qualification, which includes a research component. Commonly, the qualification is a Master of Science in Clinical Pharmacy. A relevant postgraduate qualification is necessary for career progression in NHS Pharmacy. Given the high proportions of participants with research experience, the emergence of lack of competence as an impediment to undertaking research suggests that the learning received during postgraduate qualification did not equip pharmacists for the subsequent practice of research in the workplace. Further exploration of the reasons for this are required to enable research learning to translate into practice. In addition, it appears that if research participation became a prerequisite to career progression, uptake would most likely increase. In comparison, the medical profession has incentivised research participation by linking it to career progression, suggesting that the creation of clinical research posts would encourage increased engagement by a greater number of pharmacists.

As far as we are aware, only one previous study, published over 25 years ago, examined research activity by

experienced NHS hospital pharmacists in the UK.[36] Through questionnaires and interviews, the authors found that most projects had been initiated as part of an imposed postgraduate (or pre-registration) project. The majority regarded research as a low priority, with time presenting the biggest barrier, and insufficient expertise. These findings resonated with ours, suggesting that pharmacy and pharmacists' reasons for low research uptake are endemic and persistent. The career structure of pharmacy in the NHS has not changed significantly during this period; however, the need for more robust evidence to inform pharmacy practice has increased because of the prevailing fiscal climate. A revision to NHS pharmacists' career structure may be needed if employees are to establish new ways of working through robust evidence of effectiveness and cost-effectiveness, in a spirit of self-determination and self-reliance.

Our findings, which included the perceptions of primary care-based pharmacists, may be seen in the context of research activity being problematic for other healthcare professionals, particularly in primary care.[58–60] For many, it appears there are multiple and competing priorities preventing participation, suggesting the need for a multifaceted approach (including structural and individual elements) to increase activity. Salmon *et al* describe research as an alien field for physicians, and a lack of time for research was reported by nurses.[54 61] Given the perception held by physicians and nurses, together with the pervasive themes describing multiple difficulties associated with research participation emerging from our findings, it may be the case that generation of evidence-based working practices through HSR will remain the preserve of a few highly motivated individuals.

Positive and negative views were expressed within each theme with unanimously positive expressions in the minority. Participants who were not research active tended to describe a pattern of obstacles conspiring to prevent activity. These included professional issues, a reluctance to seek practical help and expressed lack of confidence and competence. However, for a small number of motivated participants, research had found a place in their existing value systems and job roles, actively competing with work and personal life priorities, reflected by a willingness to re-negotiate working hours with management to free up time for research and a vigorous defence of planned research time. This suggests that a minority of pharmacists can 'find the time' where research is valued, while tacitly accepting the need to spend additional time on research.

The lack of research in pharmacy culture is a combination of contextual barriers that may be based on fear and going against the normal culture, and a more individual element such as lack of confidence or poor time management. The introduction of multifaceted changes at the organisational level that offer practical, accessible support for committed individuals may gradually lead to a reappraisal of how best to use non-patient facing time. In the short term, however, it may be necessary to incentivise the process to produce a cultural shift that sees the majority of pharmacists move from their current research inactive position into one of research activity.

Our findings may be weakened by several methodological factors. All participants were drawn from one NHS organisation, which may differ from others in relation to employees and context. However, our organisation is the largest in the UK, and pharmacists' roles and responsibilities are shared across the NHS. There may have been an implicitly positive view of research in the questioning, particularly as pharmacists were asked why they had not participated. As the study focused on perceptions of research, in theory, participants may have been vulnerable to the social desirability effect. Although generalisations cannot be inferred from our findings, our findings do represent the views of NHS employee pharmacists, and can be used to stimulate further work.

CONCLUSION

HSR for most pharmacists, for multiple reasons, was viewed as an exceptional activity rather than a core role. In order to develop and test sustainable, new models of pharmacists working in relation to patient benefit and answer calls for innovation, pharmacists may need to let go of their research related fears and modify what may be regarded as a restrictive professional NHS environment.

Acknowledgements The authors would like to thank Lee Fitzgerald, Helen Thomson (HT) and May Skelly for support with data collection and transcription.

Contributors RLowrie conceived the work. RL, SM and RLees made substantial contributions to the design of the work; the analysis and interpretation of data, drafting the work and revising it critically for important intellectual content. GM, CHG, CJ, FM, YS, AT, HH, ABM and NL contributed to the design of the work and interpretation of the data, drafting and revisions. All authors provided final approval of the version published.

Competing interests None declared.

Provenance and peer review Not commissioned; externally peer reviewed.

Data sharing statement No additional data are available.

REFERENCES

1. Agency for Heathcare Research and Quality. *Factsheet: improving health care quality*. U.S. Department of Health and Human Services, Public Health Service, 2002:1–6.
2. John DN, Krska J, Hansford D, *et al*. How have the pharmacy practice research trust grants supported the development of research capacity? *Int J Pharm Pract* 2009;17:133–4.
3. Elliot RA, Boyd MJ, Waring J, *et al*. *Department of health policy and research programme project: understanding and appraising the new medicines service in the NHS in England (029/0124)*. England: Nottingham University School of Pharmacy, 2014:1–120.
4. The Scottish Government. Prescription for excellence: a vision and action plan for the right pharmaceutical care through integrated

partnerships and innovation. 2013. http://www.gov.scot/publications/2013/09/3025
5. Pharmacy practice research resource centre established. Pharmaceutical Journal 1991;246,550. Pharmacy Practice Research Trust. http://www.pprt.org.uk (accessed Nov 2013).
6. Ambler S, Sheldrake L, Allen B. A decade of investment in research capacity building in pharmacy: maintaining the momentum. *Int J Pharm Pract* 2009;17:131–2.
7. Secretary of State for Health. *Pharmacy in England—building on strengths; delivering the future. Cm 7341*. London: Department of Health, 2008.
8. Roberts R, Kennington E. Pharmacy practice research has an impact on each and every pharmacist. *Pharm J* 2010;284:267–8.
9. Blenkinsopp A, Bond C, Celino G, *et al*. *National evaluation of the new community pharmacy contract*. London: Royal Pharmaceutical Society, 2007.
10. The Royal Pharmaceutical Society (RPS). *Improving patient outcomes: the better use of multi-compartment compliance aids*. London, England, 2013. http://www.rpharms.com/support-pdfs/rps-mca-july-2013.pdf
11. Anderson C, Blenkinsopp A, Armstrong M. *The contribution of community pharmacy to improving the public's health: literature review update 2004–07*. London: PHLink, 2008.
12. Anderson C, Blenkinsopp A, Armstrong M. *Summary report of the literature review 1990–2007*. London: PHLink, 2008.
13. Sinclair HK, Bond CM, Lennox AS, *et al*. Training pharmacists and pharmacy assistants in the stage-of-change model of smoking cessation: a randomised controlled trial in Scotland. *Tob Control* 1998;7:253–61.
14. Paudyal V, Watson MC, Sach T, *et al*. Are pharmacy-based minor ailment schemes a substitute for other service providers? A systematic review. *Br J Gen Pract* 2013;63:e472–481.
15. Matheson C, Anthony GB, Bond C, *et al*. Assessing and prioritizing the preferences of injecting drug users in needle and syringe exchange service development. *J Public Health (Oxf)* 2008;30:133–8.
16. Hall S, Matheson C. Barriers to the provision of needle exchange services: a qualitative study in community pharmacies. *Int J Pharm Pract* 2008;16:11–16.
17. Bond C, Matheson C, Williams S, *et al*. Repeat prescribing: a role for community pharmacists in controlling and monitoring repeat prescriptions. *Br J Gen Pract* 2000;50:271–5.
18. Reddy A, Watson M, Hannaford P, *et al*. Provision of hormonal and long-acting reversible contraceptive services by general practices in Scotland, UK (2004–2009). *J Fam Plann Reprod Health Care* 2014;40:23–9.
19. Mackie C, Lawson D, Campbell A, *et al*. A randomised controlled trial of medication review in patients receiving polypharmacy in a general practice setting. *Pharm J* 1999;263:R7.
20. Lowrie R, Lloyd SM, McConnachie A, *et al*. A cluster randomised controlled trial of a pharmacist-led collaborative intervention to improve statin prescribing and attainment of cholesterol targets in primary care. *PLoS ONE* 2014;9:e113370.
21. Lowrie R, Mair F, Greenlaw N, *et al*. Pharmacist intervention in primary care to improve outcomes in patients with left ventricular systolic dysfunction. *Eur Heart J* 2012;33:314–24.
22. Holland R, Lenaghan E, Harvey I, *et al*. Does home based medication review keep older people out of hospital? The HOMER randomised controlled trial. *BMJ* 2005;330:293.
23. NHS Health Scotland. *The impact of keep well: an evaluation of the keep well programme from 2006 to 2012*. Edinburgh: NHS Health Scotland, 2014.
24. Andrews J, Butler M. *Trusted to care: an independent review of the Princess of Wales hospital and Neath Port Talbot hospital at Abertawe Bro Mortannwg University health board*. Welsh Government. Wales: NHS Wales, 2014.
25. Richardson E, Pollock AM. Community pharmacy: moving from dispensing to diagnosis and treatment. *BMJ* 2010;340:c2298.
26. Roberts R, Kennington E. What are the benefits for pharmacists of engaging in practice research? *Pharm J* 2010;284:291–2.
27. Newton J, on behalf of Task 3 Group of the Pharmacy and Public Health Forum. *Consolidating and developing the evidence base and research for community pharmacy's contribution to public health: a progress report from Task Group 3 of the Pharmacy and Public Health Forum*. LondonUK: Public Health England, 2013. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/271682/20140110-Community_pharmacy_contribution_to_public_health.pdf
28. The Royal Pharmaceutical Society. Careers in pharmacy. (accessed 22 Jun 2015). http://www.rpharms.com
29. Coulman SA, Chong WH, John D. Are pharmacists in Wales undertaking practice research? *Int J Pharm Pract* 2010;18(Suppl 1):7–10.
30. http://www.nhscareers.nhs.uk/explore-by-career/pharmacy/pay-for-pharmacy-staff/ (accessed 28 Sep 2015).
31. NHS Education for Scotland. Education and Training: Pharmacy. Vocational Training. (accessed 22 Jun 2015). http://www.nes.scot.nhs.uk/education-and-training/by-discipline/pharmacy/pharmacists/vocational-training.aspx
32. NHS staff council: Job evaluation group. NHS Job evaluation Handbook Forth Edition. 2013. http://www.nhsemployers.org/your-workforce/pay-and-reward/pay/agenda-for-change-pay
33. Ellerby D, Williams A, Winfield A. The level of interest in pharmacy practice research among community pharmacists. *Pharm J* 1993;251:321–2.
34. Liddell H. Attitudes of community pharmacists regarding involvement in practice research. *Pharm J* 1996;256:905–7.
35. Rosenbloom K, Taylor K, Harding G. Community pharmacists' attitudes towards research. *Int J Pharm Pract* 2000;8:103–10.
36. Davies G, Dodds L, Fleet E, *et al*. Pharmacy practice research in the hospitals of South East Thames regional health authority, England. *Int J Pharm Pract* 1993;2:184–8.
37. Krska J, Kennedy E, Hansford D, *et al*. Pharmacists' opinions on their involvement in a community pharmacy based practice research study. *Pharm J* 1998;261:54.
38. Simpson SH, Johnson JA, Biggs C, *et al*. Study of Cardiovascular Risk Intervention by Pharmacist Investigators. Practice-based research: lessons from community pharmacist participants. *Pharmacotherapy* 2001;21:731–9.
39. Saini B, Brillant M, Filipovska J, *et al*. Factors influencing Australian community pharmacists' willingness to participate in research projects-an exploratory study. *Int J Pharm Pract* 2006;14:179–88.
40. Peterson G, Jackson S, Fitzmaurice K, *et al*. Attitudes of Australian pharmacists towards practice-based research. *J Clin Pharm Ther* 2009;34:397–405.
41. Kanjanarach T, Numchaitosapol S, Jaisa-ard R. Thai pharmacists' attitudes and experiences of research. *Res Soc Adm Pharm* 2012;8:e58–59.
42. Ogunrinde A, Kayyali R, Patel N. Evaluation of community pharmacists' opinions and engagement in practice research. *Int J Pharm Pract* 2013;21:91.
43. Marshall MN. Sampling for qualitative research. *Fam Pract* 1996;13:522–5.
44. Biernacki P, Waldorf D. Snowball sampling: problems and techniques of chain referral sampling. *Sociol Methods Res* 1981;10:141–63.
45. Adler PA, Adler P. Limitations to sample pools. In: Baker SE, Edwards R, eds. *National centre of research review paper: how many qualitative interviews is enough? Expert voices and career reflection on sampling and cases in qualitative research*. Published by National Centre for Research Methods, 2012:10.
46. Ritchie J, Spencer L. Qualitative data analysis for applied policy research. In: Bryman A, Burgess B, eds. *Analysing qualitative data*. London, England: Routledge, 1994;173–94.
47. Ward DJ, Furber C, Tierney S, *et al*. Using framework analysis in nursing research: a worked example. *J Adv Nurs* 2013;69:2423–31.
48. Ritchie J, Spencer L. Qualitative data analysis for applied policy research. In: Huberman M, Miles MB, eds. *The qualitative researcher's companion*. Sage Publications, 2002:305–29.
49. Spencer L, Ritchie J, O'Connor W, *et al*. Analysis in practice. In: Richie J, Lewis J, McNaughton Nicholls, Ormston R, eds. *Qualitative research practice: a guide for social science students and researchers*. 2nd edn. London, England: Sage Publications, 2014:295–346.
50. Joffe H. Thematic analysis. In: Harper D, Thompson AR, eds. *Qualitative research methods in mental health and psychotherapy: a guide for students and practitioners*. Chichester, England: Wiley Publications, 2011:209–24.
51. Research for Health. *A research and development strategy for the NHS*. Department of Health. 1991.
52. Peckham MJ. Research and development for the National Health Service. *Lancet* 1991;338:367–71.
53. Armour C, Brillant M, Krass I. Pharmacists' views on involvement in pharmacy practice research: strategies for facilitating participation. *Pharm Pract* 2007;5:59–66.
54. Salmon P, Peters S, Rogers A, *et al*. Peering through the barriers in GPs' explanations for declining to participate in research: the role of professional autonomy and the economy of time. *Fam Pract* 2007;24:269–75.

55. Nimmo C, Holland R. Transitions in pharmacy practice, part 5: walking the tightrope of change. *Am J Health Syst Pharm* 2000;57:64–72.
56. Mottram DR, Jogia P, West P. The community pharmacists attitudes toward the extended role. *J Soc Admin Pharm* 1995;12:12–17.
57. Grewar J, Matthews J, McMahon AD, *et al*. Capturing data on over the counter medicines in community pharmacies: a methodological study. *Pharm J* 1997;259:736–9.
58. Bateman H, Walter F, Elliot J. What happens next? Evaluation of a scheme to support primary care practitioners with a fledgling interest in research. *Fam Pract* 2004;21:83–6.
59. Foy R, Eccles M. Structured career pathways in academic primary care. *Fam Pract* 2008;25:63–7.
60. [No authors listed]. Is primary care research a lost cause? *Lancet* 2003;361:977.
61. Edwards N, Webber J, Mill J. Building capacity for nurse-led research. *Int Nurs Rev* 2009;56:88.