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## Research Note



# “They wanted to know what it was like through my eyes”: Patients and carers views, experiences, and perceptions of active involvement in the delivery of an undergraduate pharmacy curriculum

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## ABSTRACT

**Introduction:** There is an increasing policy and practice imperative for involving patients and carers in health-related undergraduate courses. The School of Pharmacy and Life Sciences at Robert Gordon’s University, United Kingdom launched a module where patients and carers are actively involved in the delivery of the curriculum by sharing their experiences of their condition and its management with final year student pharmacists. This study aimed to evaluate this initiative by exploring patients’ and carers’ views and experiences of their active involvement in the delivery and their perceptions of potential future involvement in the design of the pharmacy curriculum.

**Methods:** Face-to-face semi-structured interviews were carried out with patients and carers who were actively involved in the delivery of the pharmacy course. The interview schedule was developed based on the research aim, an extensive literature review, and peer discussion before it was piloted. All interviews were digitally recorded and thematically analysed by two independent researchers.

**Results:** Seven of eight patients and carers involved in the module agreed to be interviewed. Five themes were identified: reasons for engagement with active teaching, perceived impact of active teaching on students, perceived impact of active teaching on patients and carers themselves, perceived opportunity to improve care of future patients, and challenges and suggestions for improvement.

**Conclusions:** Overall, patients and carers had a positive view of their active involvement with delivering the undergraduate pharmacy curriculum; they were however unsure about involvement in curriculum design.

## Introduction

There is a growing drive in health care education to prepare students for delivering person-centred care.<sup>1–3</sup> Since the introduction of the concept of pharmaceutical care by Hepler and Strand,<sup>4</sup> there has been a paradigm shift towards a person-centred focus with

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pharmacists involved in rationalising medicines and spending much more time communicating with patients about their medicines rather than compounding them. Professional development of student health care professionals (including student pharmacists) for current practice requires a greater emphasis on “power skills” (previously referred to as “soft skills”), for example empathy, communication, reflexivity, and adaptability.<sup>5,6</sup> Schools of pharmacy in the United Kingdom (UK) are at the forefront of transforming their curricula to provide opportunities to develop the skills, attitudes, and knowledge to deliver person-centred care, and it can be argued that a crucial element of this is direct experience with patients, their carers, and the public.<sup>7</sup>

The General Pharmaceutical Council (GPhC), the regulatory body for pharmacy in Great Britain, accredits all master of pharmacy (MPharm) courses. These standards highlight the importance of students gaining practical experience of working with patients and carers, with Standard 5 stating that this “...may include off-site placement visits, using patients, carers and other health care professionals in-class, and simulations.”<sup>8</sup> In 2021, these standards were updated, but having “student pharmacists exposed to an appropriate breadth of patients and people in a range of environments (real-life and simulated)” is still considered key to enable them to develop the required skills and competencies.<sup>9</sup>

The patient as the focus of undergraduate teaching is emphasised in Robert Gordon University’s (RGU) undergraduate pharmacy course (MPharm) Teaching, Learning, and Assessment Strategy, which emphasises the importance of the patient at the heart of all learning.<sup>10</sup> Use of simulated or standardised patients (someone who has been trained to portray a character in a scripted case scenario)<sup>11</sup> is well established within the MPharm curriculum at RGU, but there was less established patient and carer involvement (PCI) in sharing their own experiences during class teaching. PCI in the form of testimonials employs a cognitive teaching method by providing a real-world example.<sup>12</sup> This allows teaching to be more engaging and relevant to student pharmacists and provides them a way to better bridge the gap between academic learning and practice. It supports the more recent adult learning theory based on situated cognition where learning and knowledge are inseparable from context, in this case the patients that pharmacists will interact with in their future work. It also aligns with the principle of andragogy that adult learners are looking for immediate application of their knowledge and will remember more if they view the learning as significant and relevant.<sup>13</sup>

Towle et al<sup>14</sup> describe the “patient share[ing] his or her experience with students within a faculty-directed curriculum” as active involvement of patients in teaching and assert that there is a persuasive rationale for this in health professional education. Much of the available literature focuses on PCI in curriculum delivery.

Shah et al<sup>7</sup> have explored patients’ experience of educating student pharmacists, finding that patients enjoyed contributing their experience and expertise. Patients perceived their contribution as beneficial to increase student self-confidence and improve their communication skills. The authors concluded that “patients are an untapped resource in pharmacy education and they should be used more extensively.”<sup>7</sup> The authors did not explore patient involvement in design of the curriculum. Becket et al<sup>15</sup> also described their approach to involving patients and the public in the delivery of pharmacy education, but like Shah et al.,<sup>7</sup> focused on delivery rather than design. In an opinion paper, Grimes et al<sup>16</sup> explored the benefits and challenges of using patients in the design and development of learning programs for qualified pharmacists. More recently, Keating et al<sup>17</sup> reported positive perceptions of patients and carers in potentially helping to shape the undergraduate pharmacy curriculum, specifically in relation to mental health. However, there is very limited literature overall on whether patients and carers perceive their involvement in teaching to benefit future pharmacist activities; gathering evidence will strengthen recommendations to increase PCI in the design and delivery at every stage of the pharmacy curriculum.

The RGU MPharm course was first accredited to the 2011 GPhC standards in 2013 and as part of this, a module was introduced called Specialist Pharmaceutical Care. This final year module involves students studying six specialist topics in-depth, including stroke, palliative care, dementia, epilepsy, health care-associated infections, and paediatrics. A variety of teaching methods are employed within this module to encourage students to take on a deeper approach to their learning.<sup>18</sup> This is the final clinical module that student pharmacists study prior to starting pre-registration training. To better equip them for their future, it was considered beneficial to invite patients and/or their carers to share their experiences of living with a long-term condition. These patients and carers were identified through different national associations, charities, local specialised clinics, and by word of mouth, and they contributed their time on a voluntary basis with payment of expenses only. It is mandatory for students to attend the teaching sessions with patients and carers and they are asked to provide questions beforehand to allow participants time to prepare and consider their response. Sessions are structured such that patients and carers provide a brief narrative of their experiences and any interaction they may have had with a pharmacist; this is followed by responses to questions. Students are also provided with an opportunity to ask questions at the sessions; a staff member is present to facilitate if necessary.

There is a lack of information on how patients and carers may be incorporated into pharmacy programmes effectively, both in the design and delivery of the undergraduate curriculum. This paper focuses on exploring patients’ and carers’ views and experiences of their active involvement in the delivery of the MPharm curriculum at RGU to inform future delivery of undergraduate pharmacy education and provide evidence on innovative teaching methods employed in pharmacy curricula. Furthermore, it seeks to explore patients’ and carers’ perspectives on potential future involvement in the design of the pharmacy curriculum. It forms part of a wider research project also exploring views of students and graduates about this topic.<sup>19,20</sup> The study aims to add to the body of literature on pharmacy education since no studies in the literature report carer involvement in education and training of student pharmacists. This study is also novel in that it is exploring perceptions of PCI in the design of the curriculum, an area that is not well researched within pharmacy and beyond, with published studies reporting involvement exclusively in mental health services.<sup>21</sup>

## Methods

This study utilised a phenomenological qualitative approach of face-to-face semi-structured interviews with patients and carers actively involved in the delivery of the MPharm programme at RGU. Data generation took place in the School of Pharmacy and Life

Sciences within RGU, UK. All patients and carers that were involved in the active teaching initiative as part of the Specialist Pharmaceutical Care module ( $N = 8$ ) were invited to participate in this study. Ethical approval was received from the School of Pharmacy and Life Sciences RGU Ethics Panel. Written, informed consent was obtained from all research participants following provision of a participant information sheet before commencing the interviews.

#### *Interview schedule development*

The interview schedule was developed by academic pharmacists who are members of the research team; one (AT) developed this innovative module and another (RE) was course leader at the time of research conduct. The schedule was based on the research aim, an extensive literature review, and peer discussion and then piloted to ensure its credibility and validity. Based on the pilot interviews, no changes were made to the questions. An overview of the interview key questions is presented in [Box 1](#).

#### *Data generation*

All patients and carers who were involved in active teaching were contacted by the research team and asked to participate. Once they agreed, a suitable date and time was determined for the face-to-face semi-structured interviews. Interviews were conducted by three final-year MPharm students. Students worked in pairs and interviews were conducted in a pre-booked quiet room specifically intended for conducting research and within the university library. Interviewers were trained and provided with supervision and support by two pharmacists in academia (AT, RE) who also oversaw the project. Interviews lasted 15 to 30 min and were digitally recorded to allow for verbatim transcription. All transcripts were checked for accuracy.

#### *Data analysis*

Thematic analysis was conducted according to the steps outlined by Howitt.<sup>22</sup> On completion of transcription, all interviews were first analysed to identify key codes, then similar codes were grouped into overarching themes. The analysis was independently conducted by two researchers (TJ, AT) with any disagreements resolved through discussion.

### **Results**

All eight patients and carers who were involved in active teaching were invited. All agreed to participate; however, one carer could not attend due to other commitments. Seven were subsequently interviewed (three patients and four carers – see [Table 1](#)). Analysis of interviews highlighted five key themes: reasons for engagement with active teaching, perceived impact of active teaching on students, perceived impact of active teaching on patients and carers themselves, perceived opportunity to improve care of future patients, and challenges and suggestions for improvement (see [Fig. 1](#)).

#### *Reasons for engagement with active teaching*

The interviewees highlighted different reasons for their involvement in active teaching. For some, it was previous positive experience with active teaching that led them to being part of the MPharm teaching.

#### **Box 1**

##### Semi-structured interview key questions.

- 
- How did you become involved in delivering the pharmacy course?
  - Can you describe to me your involvement in teaching pharmacy students?
  - Do you think patients and carers should be involved in pharmacy education? Why?
  - Do you think that teaching by patients will have an impact on the students? How?
  - How do you feel your own personal involvement impacted on the learning of students?
  - What do you think patients and carers can gain from being involved in the teaching?
  - Is there anything you personally gained from participating in the course? Is there anything you did not gain but expected to gain from participating in the teaching?
  - Do you think there is a role for patients and carers in informing what is included in the pharmacy course? Describe further.
  - Do you think there is a role for patients and carers in preparing teaching materials for pharmacy students? Describe further.
-

**Table 1**  
Interview participants.

Code	Interviewee details	Sex
P1	Patient with stroke; patient with type 1 diabetes	Male
P2	Patient with haemorrhagic stroke	Female
P3	Carer and husband of P2	Male
P4	Patient with stroke; patient previously physically very fit and also suffers from epilepsy secondary to stroke	Male
P5	Carer for patient with dementia; dementia was Lewy body dementia associated with Parkinson's disease	Female
P6	Carer for patient with epilepsy	Female
P7	Carer for paediatric patient with palliative care needs; patient required care since birth and requires assistance with all daily living needs including bathing and feeding	Female

“I have done a few at XX hospital with nurses, carers, physios [physiotherapists] and they enjoyed it. Because I had gone through and they wanted to know what it was like through my eyes kind of thing. And I quite enjoyed it so I just said right.” [P2, patient]  
Others envisioned that exposing students to real-life patients will positively contribute to the learning process which can subsequently positively reflect on their future provision of care.

“I am hoping to help pharmacy students so that [they] get their degree and then move on to be a pharmacist and understand how they may need to help people who have got the kind of illnesses that I have had so they can understand and recognise and help them.” [P1, patient]

Carers in particular were viewed as an important player in active teaching as they sometimes tend to have a better understanding of the patient's circumstances.

“I do think carers should be involved...because the carers are living with the person who has, well in my case, epilepsy all the time and you see so many different things which I think is very important in both diagnosis and care of epilepsy.” [P6, carer]

Consequently, they were willing to share their experiences and interaction with the different health care providers regarding their medical condition.

“Well I was asked by Epilepsy Scotland if I would be prepared to do it and I have quite a lot of issues to do with epilepsy care that I'm fairly happy to voice so yes I was happy to do it.” [P6, carer]

For one interviewee, it was their previous experience as a student with active teaching that encouraged him to be involved in teaching current pharmacy students.

“I, having been a student long ago and then becoming unwell, I felt it was important that if I could be of any assistance to any new students that would be something worth doing.” [P4, patient]

On the other hand, interviewees felt that it should be up to the academic staff to design the content of the curriculum due to the patients and carers lack of understanding of the required standards for the education and training of pharmacists.

“I think there is a definite positive side of it if patients are included in things like this but as of saying what should be included I don't think that would be up to patients.” [P4, patient]

#### *Perceived impact of active teaching on students*

All interviewees perceived a need to involve patients and carers in the delivery of the MPharm curriculum. This was mainly driven by the expansion in role for pharmacists such as delivering new services and interacting with more diverse patient populations. This can help students be more reflexive in learning how to better respond to different patients.

“I think that you [pharmacists] are getting that much to do and you need to know everything [be]cause you don't know who is going to come in and see you, what is the matter...You have got to know everything really.” [P2, patient]

Active teaching was overwhelmingly perceived to have a positive impact on students particularly by enriching their learning process and improving their knowledge of these medical conditions.

“I think they enjoyed listening to the [information] that we gave...It is quite good to educate everyone about what palliative caring for children is because a lot of people don't have that understanding.” [P7, carer]

It was also noted that their involvement can help improve students' learning by helping them develop their skills and map their theoretical knowledge to real-life scenarios.

“The involvement of patients and carers I think may make what was only theoretical up to that point may make it a bit more real for the students...the perspective of the patient and/or carer will be different from the professional, clinical, and so on.” [P6, carer]

In particular, interviewees reported that active teaching can help students develop their power skills in order to deliver a more person-centred approach to care by helping them understand that different people can have different needs and experiences with the same medical condition.

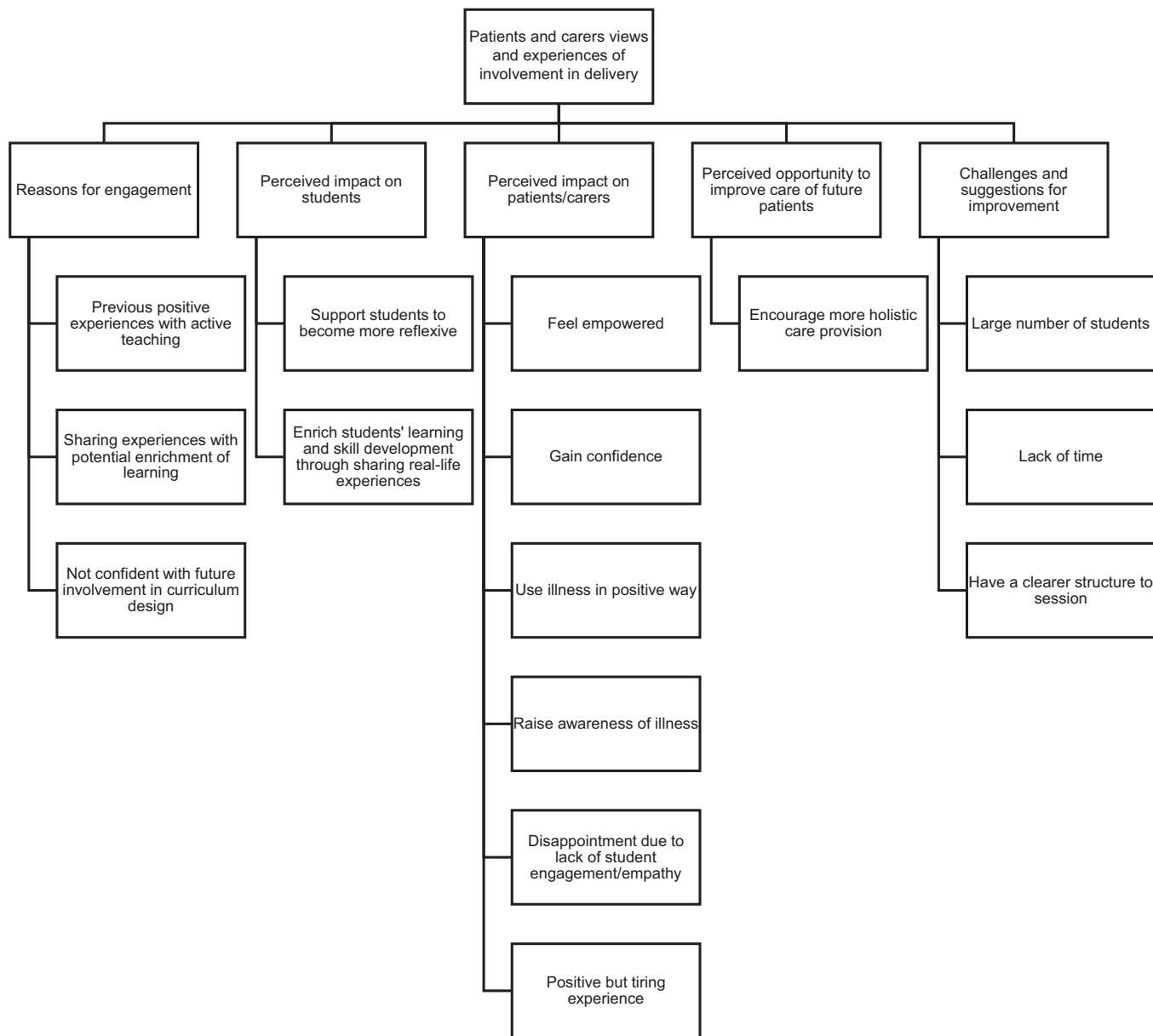


Fig. 1. Summary of key themes and subthemes identified.

“Everybody has an individual response to illness and recovery...and as professionals that is something that you would then be working out for this particular person.” [P4, patient]

All highlighted benefits of having patients and carers involved in teaching MPharm students through active delivery. Some perceived that it will have a better impact on students’ future practice if they have this at an earlier stage of their pharmacy education.

“If you can share knowledge and experience with people, whether it will be first year, second year, third year, fourth year, it can only be a good thing, it is a better thing if it is first year...you are trying to say – look this is something you don’t need to be scared of it.” [P5, carer]

#### *Perceived impact of active teaching on patients and carers*

Most reported a positive impact from their involvement with active teaching. Many felt empowered that this provided them with the opportunity to share their experiences with students.

“Possibly by being allowed to express what they have felt regarding their own personal experience of health care. Again, it is back to everyone may be similar but there will be differences in health care and services provided so they will have stories to tell.” [P4, patient]

On a more personal level, some patients believed that speaking to students about their conditions allowed them to gain more confidence.

“Before this I would never have spoken to a lot of people.” [P2, patient]

Interviewees, especially the carers, also felt a sense of improved well-being associated with this active involvement.

“There is always a little bit of guilt with you, remains with you, when your loved one has passed on. And you sort of wonder did I do enough, should I have done more, should I have spoken up sooner, lots of questions, and I think that when you are given an opportunity, like sharing with yourselves, it in some small way redeems you.” [P5, carer]

Some also noted that active teaching provided an opportunity for them to use their illness and experiences in a positive way.

“They certainly can feel that they are contributing in some way because sometimes you can feel very, very helpless as far as improving the situation, in my case for a child, for whoever the family member is and it does at least give a feeling of contributing a bit.” [P6, carer]

This was reiterated by others who also felt a sense of satisfaction knowing that their participation was well received and that they helped raise awareness about certain circumstances surrounding their medical condition that might not have been well known before.

“I was very pleased that it was received well...One of the students came to me at the end and said that exactly the same things is happening with a relative of hers... she felt, I don’t know, some measure of reassurance that it wasn’t just her family...So that was quite a satisfying thing to come from it, I think.” [P6, carer]

On the other hand, others reported that their expectations of active teaching were not met mainly due to the lack of interactions and questioning from students.

“I thought that they would ask a lot more questions but then perhaps they didn’t like to but I did say ask me anything you’d like to.” [P2, patient]

This potentially led to a perceived lack of empathy on the part of the students.

“We told them everything that had happened but nobody came out and asked “How do you feel about that?”” [P3, carer]

Some found the experience was very tiring in light of their medical condition.

“It was quite a lot, it was three different groups [of students] and I was finding it really tiring actually...I get tired from trying to get words.” [P1, patient]

#### *Perceived opportunity to improve care of future patients*

Interviewees also believed that active teaching enriches students’ knowledge and thus will help improve the future care they, and others who suffer from similar conditions, will receive.

“I think we get a feeling, a bit of hope and a little bit of satisfaction, knowing that you, the younger generation, that are going to be involved with these people are going to be having far more knowledge much earlier on than lots of people will ever have.” [P5, carer]

This was perceived to subsequently improve their future care provision by allowing students to focus on a more holistic approach to disease management.

“Of course, you can look at the medical aspect of it and so on but then there are other aspects: how it impacts on family, social aspects, that sort of thing as well. So, I think probably by talking to carers and patients you get a much more rounded view of the condition.” [P6, carer]

Other interviewees also highlighted that active teaching can prompt students to improve their communication skills and build better rapport with their future patients particularly those with complex health needs in order to provide optimal care.

“I think it’s actually listening to the patients; especially when they are very complex. It is just understanding the patient rather than the list of drugs that comes over the counter. It is just building that relationship with the person rather than being someone who just hands them over something.” [P7, carer]

### *Challenges and suggestions for improvement*

Despite the overwhelmingly positive feedback received from patients and carers involved in active teaching, some challenges were highlighted. For example, few interviewees commented on the large number of students per session which they believed affected the delivery of the active teaching.

“The problem was there were about 40 maybe 50 [students] so it was difficult, it would have been probably easier, better not necessarily for me but for them, if I was in a smaller group, so that they can then maybe ask more questions.” [P1, patient]

Lack of time was also noted to be a key challenge. This was perceived as hindering the ability to create an environment conducive to learning with potential implications on the students.

“I think time is always difficult. I mean I could sit here and talk to you and answer questions for four, five, or six hours but you guys don’t have that time...If students feel comfortable with someone they may feel able to ask more questions but if time is restricted that might be lost.” [P4, patient]

Many also voiced concerns over a lack of clear structure of the sessions with neither them nor potentially the students having any experience of active teaching. This may inform planning of future sessions.

“It was new to me, well it was new to [the students] and I wasn’t quite sure what to expect or how much involvement or interaction there would be. I wasn’t quite sure. And maybe they didn’t themselves know how far they could go, I don’t know...I could have done more, I could have delivered differently if someone had said to me they want real-life stories” [P5, carer]

### **Discussion**

Overall, this research shows that PCI in active teaching was viewed as a positive experience by patients and carers. This was both with respect to the recognised impact on self and the perceived impact of sharing their own experiences with students. The latter was viewed as an opportunity to better prepare students for their future role. This included having a better understanding of and being able to respond to different patients’ needs, having an awareness that different patients with the same condition may have different needs, and better developing other skills such as communication and relationship building. Despite asking questions specifically focused on curriculum design, there was little discussion generated, and none felt this was a role for patients and carers.

The qualitative approach taken in this research allowed for in-depth discussion, particularly since face-to-face interviews were conducted. To reduce the risk of acquiescence bias, MPharm students conducted the interviews rather than staff delivering the module; thus, participants were not pressured in any way to provide only positive experiences of participation in the teaching. This study, though of small scale, also involved carers and allowed their thoughts to be discussed, providing a unique perspective; studies identified in the literature focused only on patients. More recent standards for pharmacy education are aimed at producing pharmacy professionals “to meet diverse and changing patient needs.”<sup>23</sup> Consequently, findings from this study are still relevant and contribute to the very limited evidence base of active involvement of patients and carers in the undergraduate pharmacy curriculum.

Patients and carers in our research expressed a genuine interest in involvement in the student educational process and wanted to play a role in nurturing future pharmacists. They perceived that their experiences would complement information from textbooks and highlight that each patient is an individual with their own needs. This role, identified by patients and carers, is similar to that reported by Shah et al<sup>7</sup> where patients had a vision of an “ideal pharmacist” and wanted their contribution to support the development of power skills such as communication and increase the confidence of students. Jha et al<sup>24</sup> reported that medical students and educators believed patients add value to their knowledge and complement their understanding of the theory behind their condition. Our research adds to existing literature supporting the effectiveness of using patient experiences as an educational tool from a patient and carer perspective. Participants in our study overwhelmingly perceived that their involvement in the delivery of student pharmacist education will contribute to better person-centred care in the future, offering a distinct aspect to learning. However, there is limited literature seeking to evaluate attitude change in student pharmacists and those available focus mainly on patients with mental health needs. In a small trial by Bell et al.,<sup>25</sup> student pharmacists showed a more positive attitude towards mental health when patients were involved. Overall, further research involving pharmacy students is required to evaluate whether this active PCI in teaching facilitates a shift towards more person-centred care resulting in improved future professional practice. This evaluation will help to inform the expansion of PCI in pharmacy undergraduate curricula.

There is very little published data about PCI in pharmacist education from the perspective of design and delivery despite this involvement ensuring that patient needs are met.<sup>16</sup> Towle et al<sup>14</sup> describe a level of patient involvement where “patient-teacher(s) [are] as equal partners in student education, evaluation and curriculum development.” Yet, patients and carers in our research were not keen to be involved in curriculum design, perceiving themselves as not knowledgeable enough. This provides insight into the potential future challenge to involve patients at this development stage and demonstrates a need to establish further and broader engagement with patients and carers. Convincing educators to meaningfully involve patients and carers in curriculum development may be an added challenge with Jha et al<sup>24</sup> reporting that educators were not convinced that it is appropriate to involve patients in the development of curricular materials.

**Box 2****Recommendations to support broadening PCI in MPharm curricula.***Impact of PCI on students*

- Evaluate using a structured approach whether PCI in active teaching has any effects on subsequent professional practice; this will strengthen the evidence for the benefits of this active teaching and support broadening of the programme
- Provide training programmes for both students, patients, and carers prior to involvement in sessions

*Ways of broadening patient involvement and engagement*

- Determine ways of effectively engaging patient and carer groups to support increased involvement in curriculum design and development
- Engage more effectively with the community and broaden recruitment of patients and carers to ensure that culturally- and ethnically-diverse populations are included
- Ensure sustainability of programme by having an increased pool of patients and carers
- Have a more structured approach towards patient training as a way of reducing patient anxiety and uncertainties about their role

MPharm = masters of pharmacy; PCI = patient and carer involvement

Some of the experiences of PCI described in this research are similar to those reported elsewhere in the literature. Positive outcomes of PCI, including empowerment and a sense of contribution and giving back to the community through sharing their experiences with students and a raised self-esteem, were also reported by Towle et al.<sup>14</sup> Participants commented negatively about repeating their “story” over and over again, a pitfall also reported by Grimes et al.<sup>16</sup> Jha et al.<sup>24</sup> reported that the impact of the teaching is reduced when the patient repeats the narrative many times. Patient stamina was also a concern identified in our research and reported elsewhere.<sup>15</sup> This identifies the need to think of other innovative ways of delivery which may include use of virtual platforms and enabling a single delivery to a larger cohort of students. This mode is now more prevalent following the worldwide COVID-19 pandemic such that patients, carers, and students may be more receptive. To ensure sustainability of the programme and address the issue of patients delivering the same “story” repeatedly, it is necessary that a large enough pool of patients is available to maintain and expand the programme. There may also be a need to include a more diverse and inclusive spectrum of participants to support the ever-changing needs of the patient population likely to be encountered by pharmacists.<sup>23</sup> Broadening recruitment to include culturally- and ethnically-diverse populations is an issue that needs to be addressed.

Patients and carers in our research perceived an element of poor student engagement through lack of asking questions. Shah et al.<sup>7</sup> also reported patients expressing confusion and being unsure as to why students did not engage and questioned whether they had learnt anything from the experience. This should be kept in mind when improving this programme in the future; for example, students may be provided with more training on how the sessions will be run and encourage further interaction with the patients and carers. To further increase the benefit of the teaching, patients and carers may also be provided with structured training. Increasing the patient pool and allowing a decrease in the student tutorial size may also facilitate better student engagement by potentially creating a “safer” environment more conducive to asking questions. Interestingly, other studies, particularly from the medical literature, report patient and carer concerns about consent and confidentiality and the way they will be judged by the students, together with issues of privacy and embarrassment.<sup>14,21</sup> These concerns did not emerge in our research and may point towards the trusting relationship forged between the academic staff and the volunteer patients and carers. Recommendations based on results from this study have been used to formulate recommendations to support increased PCI in pharmacy curriculum design and development (Box 2).

**Conclusions**

Active teaching was deemed necessary by the patients and carers interviewed to promote patient-centred care as part of the delivery of the pharmacy curriculum due to its perceived benefits to students and patients. However, patients and carers were not so keen in involvement in curriculum design and this needs to be addressed in future research.

**Disclosure(s)**

None.



## Author statement

All persons who meet authorship criteria are listed as authors, and all authors certify that they have participated sufficiently in the work to take public responsibility for the content, including participation in the concept, design, analysis, writing, or revision of the manuscript. Furthermore, each author certifies that this material or similar material has not been and will not be submitted to or published elsewhere.

Conception and design of study: AT, RE

Acquisition of data: AT, RE

Analysis and/or interpretation of data: AT, TJ

Drafting the manuscript: TJ.revising the manuscript critically for important intellectual content: AT, RE

Approval of the version of the manuscript to be published: AT, TJ, RE

## Declaration of competing interest

None.

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