Research article

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Patient as teacher sessions contextualize learning, enhancing knowledge, communication, and participation of pharmacy students in the United Kingdom

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Abstract

Purpose: This study aimed to evaluate the impact of Patient As Teacher (PAT) sessions on the knowledge, communication skills, and participation of pharmacy students in the United Kingdom.

Methods: During the academic year 2019-2020, year 1 and 2 pharmacy students at the University of Central Lancashire were invited to complete a questionnaire following PAT sessions. Data were analyzed by means of descriptive statistics, including mean and standard deviation (SD) for: continuous variables and reliability analysis. Pearson's Chi-Square or Fisher Exact Test, odds ratio, and Phi were used for analyzing dichotomous variables. Thematic analysis was used for free text comments.

Results: Sixty eight of 228 students participated, (response rate of 29.8%). No statistical difference was found between gender (p=0.090); a statistically significant difference was found between year (p=0.008). Cronbach's alpha (0.809) confirmed a good internal consistency. 97.0% of the students learned a lot, and 85.3% appreciated and valued the PAT sessions; 89.7% wanted more sessions. 92.7% perceived the sessions to contextualize their learning. Five questions were dichotomized by grouping the responses into negative and positive; 90.3% of responses were positive and did not show statistically significant differences in gender and year of study. Overall students' free text comments were positive, but active listening and consultation appeared in the positive and negative domains, highlighting the need for more student engagement.

Conclusions: PAT sessions had a positive impact on students' knowledge, communication skills, and participation, and contextualized learning. They provide a valuable contribution to the pharmcy students' experience in the United Kingdom.

Abstract word count: 248

Keywords: education, pharmacy, patients, communication, knowledge, United Kingdom

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Introduction

Background/rationale: The use of patients in healthcare education is well established in an acute setting; however, Patients as Teachers (PAT) in a classroom only started in the 1960s [1, 2]. The level of patient involvement in the classroom has since been increasing and now varies between being used for testimony, all the way to leading sessions; where they can tell their story, stimulate reflection and help students to problem solve [3]. Pharmacy education has traditionally been science-based, but is now more clinically driven by patient facing roles, as such the inclusion of the real-world context to the curriculum is of increasing importance. Increased classroom involvement of the patient as an "expert by experience" helps to address issues in textbook teaching of chronic illness, and discrepancies between theory and real-life [1, 4]. PAT sessions integrate students' learning by contextualising theory with real patients, a requirement for the training of pharmacy students in the UK [5]. The benefits of using PAT are well documented and typically show an increase in learner satisfaction, perceived relevance of learning and communication skills [6]. PAT sessions also provide a safe environment to practice being a healthcare professional [7]. Feedback from patients is overwhelmingly positive, feeling that they belong in the students' education, enjoying giving back to the community and reporting benefits to their self-esteem and personal health. Patient concerns focus on anxiety about communicating their story, engaging and educating the students [7]. These concerns are addressed with adequate patient selection and training; if done well, the patients become "colleagues in teaching" [4, 6]. PAT sessions are utilised in the training of healthcare professionals and have been extensively reviewed, showing good evidence of short-term benefit to learning and satisfaction and facilitating deeper learning, allowing the application of knowledge by "showing how" and "doing" rather than a simple factual recall according to Miller's pyramid [4, 7, 8]. However, the literature has focussed on the training of physicians and nurses, with the impact of such sessions on pharmacy students less thoroughly explored [1].

The PAT sessions delivered at UCLan cover ten areas: cardiovascular, central nervous system, endocrine, gastrointestinal, genitourinary, hearing, musculoskeletal, respiratory, sight, and skin. During the sessions, students spend time with different patients, practicing their clinical and communication skills, with elements that are: teacher-led, patient-led, jointly led by patients and teachers, and discussions. Similar

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PAT sessions are utilized at many UK pharmacy schools including the University of Sussex, Medway School of Pharmacy, and University College London.

Objectives: The study aimed to evaluate the impact of Patient As Teacher sessions on knowledge, communication skills, and participation of pharmacy students in the United Kingdom.

The key research questions of the study were as follows:

First, do PAT sessions contextualize learning? Second, do PAT sessions have an impact on students' knowledge, communication, and participation?

Methods

Ethics statement

The study was conducted in accordance with the Helsinki Declaration of 1975 as revised in 2008 and received ethical approval from the Health Ethics Review Panel of the University of Central Lancashire on January 6th, 2020 (No: HEALTH 0029). Informed consent was obtained from all individual participants included in the study. All data were handled following the requirements of the Data Protection Act (2018) and/or the General Data Protection Regulation (GDPR) 2016 according to European Union law; therefore, data were anonymized and stripped of any identifiable references to the participants.

Study design

This was an single institute survey-based study.

Population

In this study, first and second-year pharmacy students were invited to participate. These years were chosen as the sessions were comparable in delivery, allowing a combination of data. The 15 PAT sessions were delivered to first and second-year students in term one (September-December 2019) and term two (January-April 2020) and are summarised in Table 1. Ethics approval was received at the beginning of term two; therefore, the recruitment and the study were conducted in term two during the 2019-20 academic year.

Commensus at the University of Central Lancashire

Comensus (Community Engagement, Service User Support) is a service user, carer, patient and public group based at the University of Central Lancashire (UCLan), which was set up in 2004 [9]. The group

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currently works to embed authentic public voices and experiences in the teaching and learning of current and future professionals from individual perspectives [10]. These volunteers are recruited through these organisations, by staff and students in practice, from attendance at public engagement events, online marketing and word of mouth. The volunteers provide their time freely and are only paid theirs out of pocket expenses. They are supported by dedicated and experienced facilitators who recruit, train, support the volunteers and offer guidance and advice to staff within the schools around this area.

Table 1. Details of PAT sessions studied for pharmacy students at the University of Central Lancashire

Structure of PAT sessions	**Year 1** **Session 1**: Students are introduced to patients through as a meet and greet, and different styles of questioning and how to overcome barriers are taught. **Session 2:** The students carry out activities with the patients regarding active listening, questioning and consultations **Session 3**: Students participate in a Q & A session around medicine storage at home, medicine compliance and clinical trials. **Year 2** Students cover eight body systems and have one PAT session for each body system throughout the year. These sessions involve a patient discussing a condition linked to the relevant body conditions as single morbidities.
Delivery of PAT sessions	All PAT sessions are delivered in a similar format. The students are set pre-work, for example to research and think about the types of questions they would ask a patient with the condition that will be covered. In the classroom, students are split into groups (typically 4-6 students) and work with a patient for 20 minutes. Depending on what year group/session they are on, the students are set themes to cover and gain further information about from patients. The student groups then rotate,

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	allowing the students to meet different patients with different experiences. Sessions vary in the patients present depending on topics covered and availability, however, all patients receive the same training.
How often PAT sessions are delivered	In year 1, students have 3 sessions, 1 in the first semester and 2 in the second semester. In year 2, students have 10 sessions, 5 in each semester. All sessions are around 2 hours in length.

Measurement: The research instrument was a questionnaire previously used by Costello and Horne (2001) aiming at rating student's satisfaction, perception of learning, and level of involvement [6]. The questionnaire had 7 question items, which was a mix between a 5-point Likert scale and binary Agree/disagree options. The questionnaire also gathered students' comments on the PAT sessions. For our research, we added a demographic section (5 items) and four additional 5-point Likert scale items previously used in another project aimed at assessing the impact of PAT sessions on student's contextualization of learning, communication, confidence and enthusiasm [11]. Permission to use the questionnaire was received from the original publishers Elsevier. Following informed consent, students were invited to fill out an online questionnaire delivered through a web platform called Qualtrics available from https://www.qualtrics.com.

Study power

A post hoc power calculation was conducted using G*Power 3.1.9.4 [12], and Pearson's chi-square was the statistical test used. There was a sample size of Sixty-eight 68 students, the effect size (Cohen d) of 0.5, an alpha error of 0.05, the calculated power was 91% with a critical Chi-square of 11.07 and 5 degrees of freedom.

Data analysis

Descriptive statistics were used for presenting the table using categorical variables. Data were presented as a range, mean and standard deviation (SD) as suggested by Norman [13].

Reliability analysis

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Cronbach's alpha reliability coefficient normally ranges between 0 and 1. The closer Cronbach's alpha coefficient is to 1.0, the greater the internal consistency of the items in the scale. Field suggested that the value of alpha depends on the number of items on the scale [14]. For this reason, as the number of items on the scale increases, alpha increases too. If the number of items on the scale is less than 10, alpha should be ≥ 0.5. There is a formula for the calculation of alpha, $\alpha = rk / [1 + (k -1) r]$ where k is the number of items considered and r is the mean of the inter-item correlations the size of alpha is determined by both the number of items in the scale and the mean inter-item correlations. A general rule of thumb for internal consistency suggests that when alpha > 0.9=excellent, > 0.8=good, > 0.7= acceptable, > 0.6= questionable. It is important to note that while a high value for Cronbach's alpha indicates good internal consistency of the items in the scale (reliability), it does not mean that the scale is unidimensional.

Dichotomisation of the variables and measure of association

Some variables were dichotomized, polarising the responses into negative and positive as suggested by Aires et al. [1]. "Strongly agree" and "agree" were grouped as positive, adopting a conservative approach; "unsure" was grouped with, "disagree" and "strongly disagree" as negative. The dichotomization process allowed the measurement of the odds ratio (OR) and the association between categorical variables with a binary option (2x2). We used the phi (φ) coefficient (or mean square contingency coefficient) to measure the association between two binary variables. Phi is measured similarly to Pearson's correlation coefficient in its interpretation. Phi represents the chi-square-based measure of association. The chi-square coefficient depends on the strength of the relationship and the sample size. Phi eliminates sample size by dividing chi-square by n, the sample size, and taking the square root. The values of the Phi coefficient ranges between -1 (negative association) and + 1 (positive association).

Thematic analysis

The text responses to the questions were examined, and preliminary codes were given; the search for patterns was developed, and a mind map constructed. Common themes were identified and grouped. Participants' comments were grouped according to themes.

The analyses were conducted using IBM SPSS ver. 26.0 (IBM Corp., Armonk, NY, USA) and Microsoft Excel ver. 2016 (Microsoft Corp., Redmond, WA, USA). NVivo 12 (QSR International) was used for the

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generation of the mind-map and thematic analysis. A p-value <0.05 was considered to indicate statistical significance.

Results

Participants' demographic characteristics

The total number of students in years 1 and 2 was 228 (year 1=129; year 2=99). The number of students who participated in the study was 68, giving a response rate of 29.8%; 60.3% were female (p=0.090), and 66.2% were in the first year and 33.8% in the second (p<0.008). The percentage of female students in year 1 was 55.6 and in year two 69.6; the difference was not statistically significant (p=0.305) (Table 2).

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Table 2. Participants' demographic charateristics

Characteristics	N	%
Gender		
Female	41	60.3
Male	27	39.7
Age group		
>20	25	36.8
19	21	30.8
20	11	16.2
18	11	16.2
Ethnic group		
Asian/Asian British	50	73.6
White	9	13.2
Black/African/Caribbean/Black British	5	7.4
Chinese or other ethnic groups	2	2.9
Mixed/Multiple ethnic groups	2	2.9

Year		
First	45	66.2
Second	23	33.8

Internal consistency

The reliability of the questionnaire was assessed using Cronbach's alpha which measures the internal consistency of the scale, and therefore, how closely related a set of items (questions) are as a group. The questions not related to the PAT activities, such as demographic, were excluded from the analysis. Cronbach's alpha was assessed on nine items; the value obtained (0.809) confirming a good internal consistency (Table 3).

Appreciation of PAT sessions

Students were asked to rate their appreciation of the PAT sessions using a scale from 1 (least satisfactory) to 5 (most satisfactory). Over 38 percent (38.2%) rated five, four (47.1%), three (10.3%) and two (4.4%). Students suggested that the most worthwhile aspects of PAT were the joint elements run by both teachers and patients (55.9%), followed by patient-led (17.6%), discussion (16.2%) and teacher-led (10.3%).

Student responses to statements All the statements presented in Table 4 were very positive, suggesting that students learned from the sessions. Most of the students (97.0%) learned a lot, an adequate amount or a great deal; only 3.0% learned very little. The patient involvement helped the students to acquire a greater understanding of patient's problems, and 89.7% would like to see more PAT sessions. The PAT sessions contributed to contextualize students' learning, communication skills, confidence, and enthusiasm (participation) in 92.7% of the sample (30.9% strongly agree; 61.8% agree).

Table 3. Reliability analysis

	N	Mean	Variance	SD
Statistics for Scale	9	38.93	16.427	4.053

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	Mean	Minimum	Maximum	Range	Min/Max	Variance
Item Means	4.325	3.176	6.176	3.000	1.944	0.628
Item variances	0.512	0.297	1.133	0.836	3.817	0.066

Item Total Statistics	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
On a scale of 1 (least satisfactory) to 5 (most satisfactory) how would you rate the teaching session?	34.74	12.078	0.671	0.543	0.767
Which aspect of the session did you find the most worthwhile?	35.75	12.280	0.404	0.255	0.819
How much did you learn from the session about the care of the Patient?	35.04	12.640	0.612	0.464	0.776
The involvement of a patient in the session helped me to gain a greater understanding of the patients' problems	34.47	13.536	0.593	0.437	0.783
Would you like to see more of this type of session?	32.75	17.175	-0.231	0.168	0.856
Learning from expert patients helped to contextualise my learning	34.71	12.808	0.730	0.668	0.766
Learning from expert patients helped to improve my	34.53	13.238	0.585	0.540	0.781

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communication & consultation skills					
My confidence when talking to patients was improved by the patient encounter	34.75	12.907	0.738	0.597	0.766
The expert patient generated interest and enthusiasm during the session	34.68	12.939	0.596	0.392	0.779

Reliability coefficient for nine items	Alpha	Standardised Item Alpha
	0.809	0.813

Table 4. Student responses to statements

Statement	**N**	**%**
How much did you learn from the session about the care of the Patient?		
A lot	36	52.9
Adequate amount	17	25.0
A great deal	13	19.1
Very little	2	3.0
The involvement of a patient in the session helped me to gain a greater understanding of the patients' problems		
Strongly agree	34	50.0
Agree	31	45.6
Unsure	3	4.4
Would you like to see more of this type of session		
Yes	61	89.7
Not sure	5	7.4

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No	2	2.9
Learning from expert patients helped to contextualise my learning		
Agree	42	61.8
Strongly agree	21	30.9
Unsure	4	5.9
Disagree	1	1.4
Learning from expert patients helped to improve my communication & consultation skills		
Agree	32	47.1
Strongly agree	32	47.1
Unsure	3	4.4
Disagree	1	1.4
My confidence when talking to patients was improved by the patient encounter		
Agree	42	61.8
Strongly agree	19	27.9
Unsure	7	10.3
The expert patient generated interest and enthusiasm during the session		
Agree	34	50.0
Strongly agree	26	38.2
Unsure	7	10.3
Disagree	1	1.5

Dichotomized options

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Five questions were dichotomized for grouping the responses into positive and negative. The results presented in Tables 5 and 6 did not show statistically significant differences between gender and year of study. Nevertheless, both tables are showing a robust positive appreciation of the PAT sessions.

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Table 5. Binary options using gender as a dichotomous variable

Statement	**Binary option**	**Male**		**Female**		**Odds Ratio**	**Strength of association**	**X^2/Fisher**
		N	%	N	%	OR (95%CI)	Phi	p value
The involvement of a patient in the session helped me to gain a greater understanding of the patients' problems	Agree	22	81.5	38	92.7	2.879(0.627-13.223)	0.170	0.250
	Disagree	5	18.5	3	7.3			
Learning from expert patients helped to contextualise my learning	Agree	26	96.3	37	90.2	0.356(0.038-3.369)	-0.113	0.641
	Disagree	1	3.7	4	9.8			
Learning from expert patients helped to improve my communication & consultation skills	Agree	25	92.6	39	95.1	1.560(0.206-11.798)	0.053	1.000
	Disagree	2	7.4	2	4.9			
My confidence when talking to patients was improved by the patient encounter	Agree	25	92.6	36	87.8	0.576(0.103-3.208)	-0.077	0.694

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	Disagree	2	7.4	5	12.2			
The expert patient generated interest and enthusiasm during the session	Agree	22	81.5	38	92.7	2.879(0.627-13.223)	0.170	0.250
	Disagree	5	18.5	3	7.3			

P values are expressed as Pearson's chi-square (X^2) or Fisher Exact Test; statistically significant $p<0.005$

Phi shows the strengths of the association between two variables ($-1 \leq Phi \leq +1$)

Agree includes strongly agree and agree

Disagree includes strongly disagree, disagree and unsure

Table 6 Binary options using the year as a dichotomous variable

Statement	**Binary option**	**Year 1**		**Year 2**		**Odds Ratio**	**Strength of association**	**X^2/Fisher**
		N	%	N	%	OR (95%CI)	Phi	p value
The involvement of a patient in the session helped me to gain a greater understanding of the patients' problems	Agree	40	88.9	20	87.0	0.833(0.181-3.843)	-0.280	1.000
	Disagree	5	11.1	3	13.0			

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Learning from expert patients helped to contextualise my learning	Agree	43	95.6	20	87.0	0.310(0.048-2.004)	-0.156	0.327
	Disagree	2	4.4	3	13.0			
Learning from expert patients helped to improve my communication & consultation skills	Agree	43	95.6	21	91.3	0.488(0.064-3.712)	-0.085	0.599
	Disagree	2	4.4	2	8.7			
My confidence when talking to patients was improved by the patient encounter	Agree	41	91.1	20	87.0	0.065(0.133-3.188)	-0.065	0.681
	Disagree	4	8.9	3	13.0			
The expert patient generated interest and enthusiasm during the session	Agree	40	88.9	20	87.0	0.833(0.181-3.843)	-0.028	1.000
	Disagree	5	11.1	3	13.0			

P values are expressed as Pearson's chi-square (X^2) or Fisher Exact Test; statistically significant $p<0.005$

Phi shows the strengths of the association between two variables ($-1 \leq Phi \leq +1$)

Agree includes: strongly agree and agree

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Disagree includes: strongly disagree, disagree and unsure

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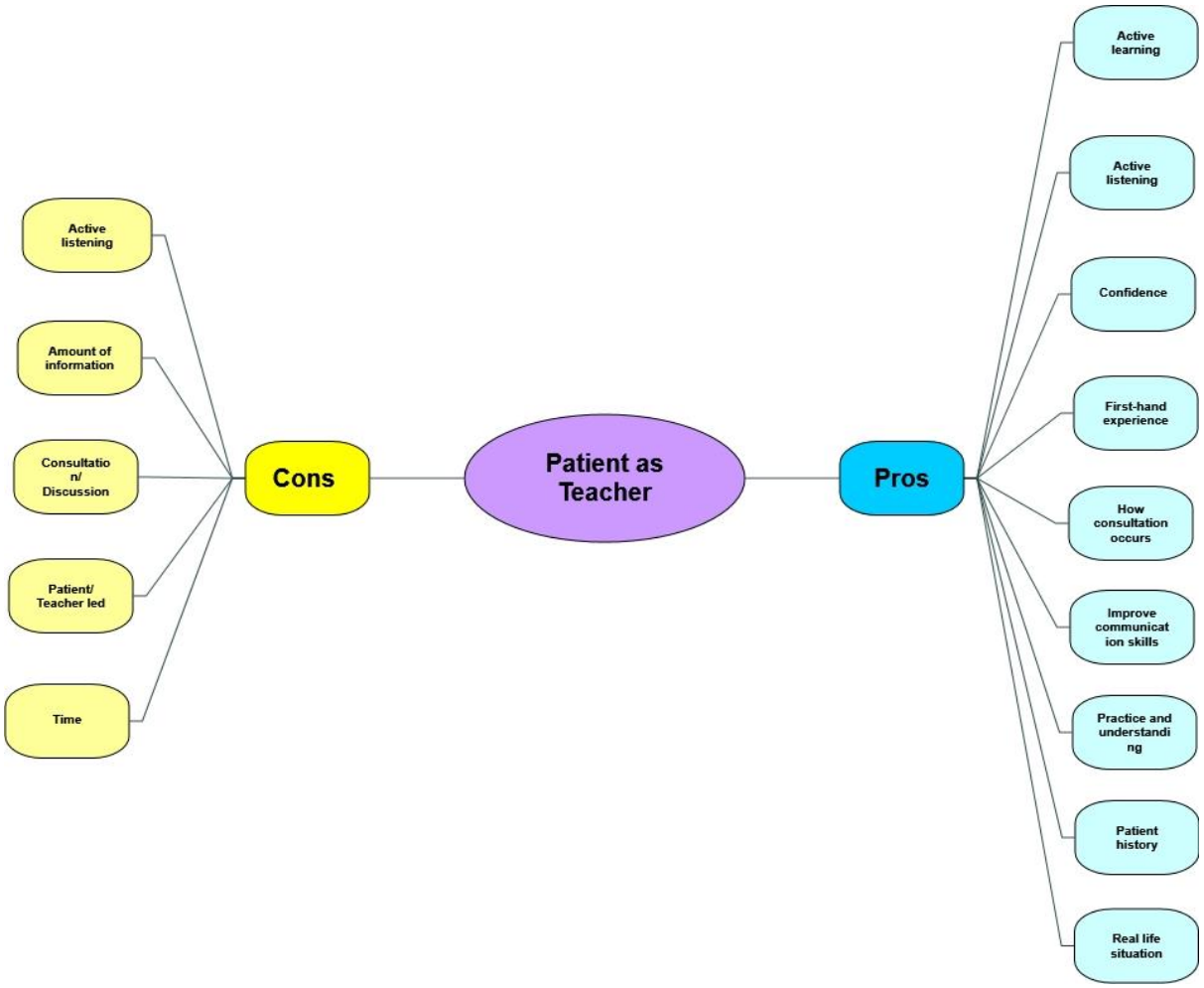
Thematic analysis

Students were invited to write comments regarding the PAT sessions. The PAT mind map (Fig. 1) is summarising the pros and cons perceived by students during the sessions, which have been grouped into themes and described in detail in Suppl. 1.

Fig. 1. Patient As Teacher, student comments mind map



Discussion

The student response rate was 30%, with 60% of respondents being female. Dichotomisation of data showed no statistically significant difference in response between gender and year, suggesting that PAT sessions were perceived equally by male and female, and first- and second-year students. 85.3% students rated their appreciation of the sessions as four or five (out of five), indicating that students appreciate

PAT sessions and recognized their value. These results were re-enforced by the much lower number of comments left in the negative feedback section (seven, with two of these being positive), compared to 41 positive statements. Aires et al., [1] conducted a study where PAT sessions were involved in training general practitioners in France; the results confirmed the appreciation of these sessions, which helped GPs to develop competencies by providing patient-specific content.

When asked to choose which part of the session was most worthwhile, students showed a clear preference for components led jointly by patients and teachers (55.9%), compared to solely patient-led (17.6%). This shows a difference to previous studies such as that by Towle et al., [2] which suggested the most worthwhile components of PAT sessions were those led by the patient. Towle's study predominantly included nursing, occupational therapy, and medical students, which focussed on PAT sessions led independently by patients, with students having multiple prolonged sessions with one patient. Whereas this research focusses on a more structured environment, with multiple shorter encounters with different patients and exclusively pharmacy students. Such differences might show the importance of the PAT session structure and the level of teacher involvement in how students perceive sessions and the relative differences in perception between students of different professions. The authors of an integrative literature review on the use of standardized patients in pharmacy education identified four themes, 1) student satisfaction, 2) effectiveness to confer knowledge, 3) skills and interprofessional practices, and 4) the use of PAT in assessment and the cost of the educational intervention. Themes 1, 2, and 3 were identified in this study too [15]. Student preference of the combined patient-teacher components was re-enforced by the thematic analysis. In contrast, the elements led by patients or teachers alone received negative feedback citing the amount of information presented and time spent with each patient as issues.

When students were asked to comment on the positive aspects of the PAT sessions, common themes emerged around confidence, communication, and contextualization (integration) of learning. Combined with the questionnaire responses, students perceive the PAT sessions to

> contribute greatly to learning, to help understand the patient perspective; taking learning beyond the textbook, and to improve the skills and confidence in communicating with patients

These results contribute to higher student satisfaction, with 89.9% of respondents wanting more PAT sessions. Furthermore, over 90% of respondents (92.7%) also agreed that the sessions contextualized

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their learning. This finding suggests that using patients as teachers is an effective way to integrate curriculum teaching into practice in a pharmacy course, as required by the General Pharmaceutical Council [5].

When looking at the themes arising in the positive and negative comments (Fig. 1), active listening and consultation can be seen to appear on both sides, highlighting the importance of incorporating a range of activities into sessions to engage all students.

Strengths and limitations: Data for this study was collected exclusively from years 1 and 2 pharmacy students over one term with the same patients for each session. This allows for a greater consistency that would not be possible over a longer time or with variation in patients and teachers; this does, however, mean that the data are less generalizable. A significant limitation of this study is the small sample size which means that it is difficult to draw strong conclusions..

Conclusion: The study has shown that PAT sessions are seen as valuable learning tools by pharmacy students, who perceived an improvement in their communication skills and confidence. Students also value them as a way to take contextualise learning, taking it out of the classroom and integrating knowledge into practice.

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Data curation: AM

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Visualisation: AM

Writing – original draft: AML, AM

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Conflict(s) of Interest

No potential conflict of interest relevant to this article was reported.

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Data availability

Data files are available from Harvard Dataverse: ~

Dataset 1. data file & data dictionary (Excel format 2016)

Supplementary materials

Data files are available from Harvard Dataverse: ~

Supple 1. Pros and cons of PAT sessions according to students' comments

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