

Education around medication review and deprescribing: a survey of medical and pharmacy students' perspectives

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Abstract: Research into the practice of medication review is developing across the world in response to the ever-increasing burden of inappropriate polypharmacy. Education, training and support of undergraduates and novice practitioners to equip them to participate in the medication review process could lead to long-term shifts in practice. The purpose of this study was to explore the awareness of pharmacy and medical undergraduates about medication review, deprescribing and polypharmacy, in order to inform improvement strategies. In November 2016, all final-year medical and pharmacy students at a London (UK) university were invited to complete a short questionnaire survey. Qualitative analysis inductively themed free-text comments and quantitative analysis used descriptive statistics to summarize responses, with chi-square tests used to indicate differences between the groups. The overall response rate was 34% (171/500). The terms 'medication review' and 'polypharmacy' were known to the students, whilst the term 'deprescribing' was unfamiliar with no difference between the groups. The term 'medication review' meant different things to the groups: pharmacy students suggested a focus on adherence and patient understanding, whilst medical students focused on interactions and whether medicines were still indicated. The groups differed in their perceptions of who they thought undertook reviews, who identifies potentially inappropriate medicines, who makes the final decision to deprescribe and the frequency of medication reviews. Both groups reported that on qualification they would not be comfortable stopping a medicine without discussion with a senior colleague, but would be comfortable prompting a senior colleague to review. Both groups had some awareness of medication review tools. The meaning of the term 'medication review' differed between the student groups. While medical students focused on clinical aspects, pharmacy students emphasized patient experience. Both groups anticipated a lack of confidence in deprescribing without senior support, highlighting the need for alignment between education and professional development syllabi in a way that combines the variety of professional perspectives. Prompts by juniors could lead to more medication reviews within existing practice, and may give them invaluable experience in reviewing medicines in their future careers as seniors.

Keywords: deprescribing, education, medication review, polypharmacy, undergraduate

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Introduction

The World Health Organization (WHO) has a global patient safety challenge 'medication without harm',¹ which focuses on improving medication safety by strengthening the systems for reducing medication errors and avoidable medication-related harm. Polypharmacy is included as a

key area for improvement, and reflects a growing recognition in the medical literature of the risks of patients taking multiple medicines. In the UK, 'problematic' polypharmacy has been defined as 'the prescribing of multiple medications inappropriately, or where the intended benefit is not realized'² and health policy advocates undertaking

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regular medication review with the aim of improving both outcomes and patient experience. In this context, the term ‘medication review’ refers to ‘a structured, critical examination of a patient’s medicines with the objective of reaching an agreement with the patient about treatment, optimizing the impact of medicines, minimizing the number of medication-related problems and reducing waste’.³ This may involve ‘deprescribing’, defined as the process of withdrawal of an inappropriate medication, supervised by a healthcare professional with the goal of managing polypharmacy and improving outcomes,⁴ starting medicines or adjusting doses, timings or preparations. Whilst embedding regular medication review into routine practice may support the WHO medication without harm challenge with respect to polypharmacy, barriers have been identified to making deprescribing decisions.^{4–6} Anderson *et al.* helpfully suggest further research to identify barriers and enablers that may inform the design of targeted deprescribing interventions.⁷

Literature around medication review and deprescribing appears mostly aimed at senior clinicians.⁸ Local initiatives supported by the National Institute of Health Research (NIHR) Collaboration for Leadership in Applied Health Research and Care Northwest London (CLAHRC NWL)⁹ developed a medication review tool used in acute, intermediate and outpatient settings to address problematic polypharmacy.^{10–12} To assist undergraduate and novice clinicians, work was undertaken to develop a bottom-up approach to education around medication review and deprescribing,^{8,13} aiming to inculcate a positive attitude to medication review in this group. It was hoped that this would lead to junior clinicians prompting their seniors to undertake review medication and to equip them with the expertise and confidence to review medicines themselves when they become more experienced clinicians (seniors).

One author (BJ) works in a UK university’s school of pharmacy and was interested in following up our earlier work by exploring the awareness and attitudes of undergraduates in the area of medication review, particularly given the paucity of similar studies or literature exploring junior clinicians’ awareness and views about medication review and deprescribing. While a variety of studies were found relating to educational interventions around prescribing and medication therapy management

in pharmacy and medical students and postgraduates, no studies were found that compared the curricula or teaching of pharmacy and medical students in relation to medication review, polypharmacy and deprescribing. An undergraduate student was therefore recruited to undertake the following proof-of-concept study with the aim of elucidating the views of final-year pharmacy and medical students in that university and comparing the two groups.

Methods

The study was carried out at King’s College London, a public research and teaching university in London, UK. Ethics approval was granted by King’s College London’s Biomedical Sciences, Dentistry, Medicine and Natural and Mathematical Sciences Research Ethics Panel (KCL Ethics Reference: LRU-16/17-3849). All 398 final-year medical students, hereafter referred to as ‘MBBS’, and 102 pharmacy (MPharm) students were invited to complete an anonymized survey.

Survey instrument design

The survey was adapted from a previous survey questionnaire targeted at junior doctors.⁸ It was an online questionnaire that was constructed following focus groups and piloting with senior pharmacists, a geriatrician, junior doctors and an undergraduate pharmacy student, with a pilot carried out among a small population of foundation year 1 doctors in a university hospital. The survey was revised by the researchers to ensure the content was equally applicable to the objectives of the study and appropriate to final-year MBBS and MPharm students. The survey comprised 15 questions and was designed with the online survey tool SurveyMonkey®. The survey was piloted in printed form on one preregistration pharmacist, three final-year MPharm students and five final-year MBBS students between 27 October 2016 and 7 November 2016. The online SurveyMonkey® link was piloted on two final-year MBBS students and two final-year MPharm students between 7 November 2016 and 10 November 2016. The survey remained unchanged post-pilot, as all participants stated that the questions were easy to understand and answer. Thus, pilot responses were included in the data collected. The survey was released online on 11 November 2016.

Survey instrument delivery

Having researched when it would be possible to access final-year MBBS and MPharm students at college, we identified that both groups attended interprofessional education (IPE) workshops, which for final-year students covered the topic of medication errors. With permission from workshop facilitators, our paper survey was circulated to MBBS and MPharm students attending nine IPE workshops between 8 November 2016 and 21 November 2016.

All MPharm and MBBS students that were not listed as attending IPE workshops were sent personalized emails with a request and link to the survey on 11 November 2016 (MPharm), 18 November 2016 (MBBS), and to both groups on 26 November 2016 stating that the survey would close on 2 December 2016.

Analytical methods

Partial responses were removed from the dataset.

Qualitative data. Free-text comments were inductively themed and coded by AJP, then recoded by EW and discussed by AJP and EW until resolved. Topics presented arose in the sample as a whole. A diagram in which the more commonly used words in a dataset were given increased size proportional to their usage (word cloud) was used to visualize the free text.

Quantitative data: statistical methods. Descriptive statistics were determined by question. Chi-square tests were used to test for associations between student type and the variable in question. A small sample correction using N-1 correction for 2×2 tables was employed if the expected values were above 1 and below 5.¹⁴ For chi-square tables where the small sample correction could not be used, categories were merged to ensure that the assumptions of the test were met. The test threshold, alpha, for all tests was set as 0.05. Estimates for margin of error for the sample as a whole and for each student group were calculated. Standard errors of the percentages were determined and plotted as error bars on graphs.

Results

Sample characteristics

After removing 7 partial responses, an overall response rate of 34% (171/500) was achieved with

117 of 398 MBBS students (29%) and 54 of 102 MPharm students (53%) completing the survey. The presentation of results considers each overarching theme in turn.

With 171/500 students in the sample overall, an estimated margin of error for the percentages was $\pm 6.1\%$ with 95% confidence interval (CI). For 117/398 MBBS students, the margin of error was $\pm 7.6\%$ with 95% CI. For 54/102 MPharm students, the margin of error was $\pm 9.2\%$ with 95% CI.

Findings from the questionnaire

The terms 'medication review' and 'polypharmacy' were familiar to students but the term 'deprescribing' was known only to a minority of students, despite the majority of students reporting that they had learned about stopping medications in their degree (Table 1). There were no differences in familiarity with terms between the groups, but some differences did exist between 'knowledge of tools' and 'stating support from seniors would be useful' (Table 1).

The difference between the questions about who undertakes medication reviews and who identifies potentially unnecessary/inappropriate medicines is one of formality. In England, medication reviews are an increasingly planned and formal process. However, a review will often occur, for example in an unplanned episode of care, where medicines will be reviewed as part of that process.

In terms of learning content, both groups of students ranked starting medicines as having been taught the most and stopping medicines the least. MBBS students ranked polypharmacy in second place, in contrast to MPharm students who ranked medication adherence in second place.

When asked what a medication review meant to them, five students (one MBBS, four MPharm) gave no answer. Analysis of the free-text comments found that the students mentioned 14 themes regarding what a medication review meant to them (Table 2).

The three most common themes for MBBS students were all described in theme 1 including whether medications are still indicated/up to date, interactions/contraindications and side effects. The MPharm students mentioned both themes 1

Table 1. Percentage of responses by survey question with statistical test of difference between student groups.

	Overall (%)		MBBS (%)		MPharm (%)		Difference	Chi-squared test df = 1	p value
Response rate	34	171/500	29	117/398	53	54/102	NS		
Familiar with the term. . .									
medication review	99	169/171	99	116/117	98	53/54	NS		
polypharmacy	95	162/171	96	112/117	93	50/54	NS		
deprescribing	15	26/171	13	15/117	20	11/54	NS		
Had learnt about. . .									
starting medications	98	167/171	99	116/117	94	51/54	NS		
stopping medications	94	160/171	95	111/117	91	49/54	NS		
medication adherence	94	160/171	92	108/117	96	52/54	NS		
polypharmacy	92	158/171	93	109/117	91	45/54	NS		
Percentage of students stating the professional groups that undertake medication review with older patients									
Consultant doctors	43	74/171	50	58/117	30	16/54	*	5.986	0.014
Registrar doctors	53	90/171	62	73/117	31	17/54	***	14.160	< 0.001
Trainee doctors	58	99/171	67	78/117	39	21/54	***	11.695	< 0.001
GP doctors	87	149/171	97	114/117	65	35/54	***	35.072	< 0.001
Hospital pharmacists	88	151/171	90	105/117	85	46/54	NS		
Community pharmacists	73	125/171	64	75/117	93	50/54	***	15.251	< 0.001
Percentage of students stating the professional groups that identify potentially unnecessary/inappropriate medications									
Consultant doctors	61	104/171	73	85/117	35	19/54	***	21.762	< 0.001
Registrar doctors	61	105/171	68	80/117	46	25/54	**	7.600	0.006
Trainee doctors	56	96/171	67	78/117	33	18/54	***	16.673	< 0.001
GP doctors	75	128/171	88	103/117	46	25/54	***	34.195	< 0.001
Hospital pharmacists	89	153/171	89	104/117	91	49/54	NS		
Community pharmacists	76	130/171	71	83/117	87	47/54	*	5.252	0.022
Percentage of students stating the professional groups that make the final decision to stop potentially unnecessary/inappropriate medications									
Initiating prescriber	39	66/171	35	41/117	46	25/54	NS		
Consultant doctors	85	146/171	91	106/117	74	40/54	**	8.082	0.0045
Registrar doctors	68	117/171	73	85/117	59	32/54	NS		
Trainee doctors	40	68/171	40	47/117	39	21/54	NS		
GP doctors	82	140/171	87	102/117	70	38/54	**	7.034	0.008

(continued)

Table 1. (Continued)

	Overall (%)		MBBS (%)		MPharm (%)		Difference	Chi-squared test df = 1	p value
Hospital pharmacists	37	64/171	38	44/117	37	20/54	NS		
Community pharmacists	23	40/171	25	29/117	20	11/54	NS		
Would be 'very uncomfortable or uncomfortable' stopping medications without discussing with a senior first on qualification	77	131/171	80	84/117	65	37/54	**	8.13 (df = 2)	0.0172
Would be 'very comfortable or comfortable' suggesting to a senior that a patient's medication needs to be reviewed or stopped	65	112/171	66	77/117	65	35/54	NS		
Aware of the existence of medication review tools	70	118/169	79	92/117	50	26/52	***	14.007	< 0.001
Stating support from seniors would make them more confident in suggesting medicines are reviewed or stopped	85	145/171	89	104/117	76	41/54	**	4.816	0.028

The columns' difference shows the results of chi-square tests of association of response with student group. df, degrees of freedom; NS, no significant difference at alpha=0.05; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$; where the test is not significant no further details are given.

Table 2. Themes students mentioned when asked what a medication review meant to them.

Theme	Illustrative quotes
<ul style="list-style-type: none"> • THEME 1: Checking/review of medication <ul style="list-style-type: none"> ○ Whether medications are still indicated/up to date ○ Stop ○ Start ○ Allergies ○ Optimize/improve medications ○ Dosing ○ Interactions/contra-indications 	<p>THEME 1: 'Checking prescribed medication to see whether it is necessary and appropriate. Checking doses to see they are safe and therapeutic. Checking medications to see possible interaction.' (checking; safety; interaction)</p> <p>THEME 1: 'Go over the patients medicines with them. Look through past medical history and current medicines, check if anything needs to be stopped/started.' (stop; start)</p>
<ul style="list-style-type: none"> • THEME 2: Adherence <ul style="list-style-type: none"> ○ Patient understanding/concerns/experience ○ Formulation ○ Safety (including errors) ○ Side effects 	<p>THEME 2: 'Going over with the patient to see how they are getting on with their medicines – whether they are taking it regularly, side effects, etc.' (patient understanding; side effects)</p>

and 2 including side effects, whether medications are still indicated/up to date (theme 1) and adherence, patient understanding/concerns/experience (theme 2). A word cloud highlights the most commonly used words, which include medications, patient, effects and checking (Figure 1).

Discussion

We believe this work to be the first exploratory study comparing MBBS and MPharm students at a UK university, in relation to curricula and teaching of medication review, polypharmacy and deprescribing. Our study indicates that many

In terms of which doctor should stop medications, MBBS students were more likely to see this as the role of the GP compared with MPharm students. This is interesting, given a view that GPs seem readily able to add to medication and that stopping treatments is often not considered at the same time.⁶ There is a need for professionals to encourage shifts in culture and attitude to deprescribing, with a view that 'less is more'.⁷

Both groups agreed that senior doctors need to be decision makers. However, differing results for 'who reviews' and 'who makes decisions' indicate that medication review may be viewed as more than a one-step process.

Our results suggest that both student groups acknowledge that their own and each other's professions have a role to play in medication review. Opportunities for further exploration can be found in the role of other professions in highlighting potential occasions for deprescribing.

Encouragingly, from a safety perspective, students reported that when newly qualified, they anticipated not feeling comfortable in stopping medicines without discussing with senior colleagues but would feel comfortable opening this dialogue and prompting medication review. It is encouraging that the students did not feel comfortable stopping medicines unilaterally as they will not have the necessary skills and experience to do so safely.⁸ Feeling comfortable opening a dialogue about medication review with senior colleagues would potentially allow them to learn from the decisions made and to incorporate their experiences into their own future practice as seniors. Practitioner experience and decision making are linked through the confidence gained in practice, and numerous strategies can be adopted to help minimize uncertainty.¹⁸ Findings in our earlier work that some junior doctors would feel more confident in making suggestions to stop medicines if 'my team [was] more open to medication review',⁸ suggest that more progress is needed to increase the empowerment of juniors.

While the majority of students were aware of medication review tools, it is interesting to note that there was a statistically significant difference between MBBS and MPharm students, with MBBS students having greater awareness of tools. The proliferation of medication review tools and guidance in the literature, for example, STOPP/

START¹⁹, STOPIT¹⁰ and NHS Scotland Polypharmacy Guidance,²⁰ should be reflected in teaching about medication review. Most students in this study were aware of medication review tools but had not used them in practice. This should guide the practice-based education that is provided to juniors, with opportunities to see medication review tools being used in practice.

We have written previously about the need for juniors to be supported to experience and make medication review and deprescribing decisions.⁸ In this study, support from senior colleagues and the use of medication review tools were seen to promote confidence in deprescribing. Interestingly, MBBS students were more likely compared with MPharm students to find the support of pharmacists useful to them, perhaps in acknowledgement of the medicines expertise of pharmacists.²¹ We consider that our bottom-up approach to education around medication review and deprescribing, and other educational strategies should be complemented by continuing to acknowledge barriers to deprescribing and how senior clinicians can, where appropriate, seek to overcome them. The outcomes of our study will include an undergraduate IPE on medication review at King's College London. We recommend that initiatives such as this are replicated to support current policy that medication review takes place routinely to improve the safety and efficacy of medicines; this should include the patient's agreement on what needs to be reviewed.^{1,22}

Limitations and recommendations

As a small, proof-of-concept undergraduate project aiming to explore further the educational imperatives associated with medication review, a number of limitations existed. There was insufficient time to explore cognitive testing, and the participants in both groups were self-selecting, identified from one learning environment (IPE), with different response rates between professional groups. As such, there may be a bias towards students who were interested in IPE topics, particularly the session used, which was on the topic of medication errors, even though the sessions are mandatory. This may render the results less representative of the whole cohort. The study was based on a cohort of students from one school of pharmacy and one school of medicine and the results are not generalizable to other educational institutions, particularly as curricula on this subject vary between institutions.

We acknowledge the poor response rate, despite the captive audience, and this might have biased the results as students may not have wished their knowledge to be assessed and therefore chose not to complete the survey. As this was a student-led project, we were unable to follow up nonresponders in the time allocated to increase the response rate. We hope that our work will promote discussions about the awareness of medication review and deprescribing in the medical and pharmacy undergraduate population, as well as for other juniors who work with medicines.

Conclusion

The quality improvement work undertaken by CLAHRC NWL has led to a particular interest in how juniors may be educated to contribute appropriately to the medication review agenda in order to contribute to tackling the polypharmacy challenge now and in the future. This small, exploratory undergraduate project piques interest in exploring the potential complementary roles of MPharm and MBBS students in medication review, for example, with doctors focusing on the clinical aspects of medication review and pharmacists placing greater emphasis on patient understanding and adherence. Development of a multiprofessional approach to medication review in this way could contribute to the delivery of holistic, patient-centred care and promote confidence amongst junior practitioners in the safe, effective management of polypharmacy.

In this study, participants reported a lack experience in the use of medication review tools, but felt confident in opening a dialogue about medication review with senior colleagues. This is a key element of our bottom-up approach to education around medication review and deprescribing. While evidence is still lacking, it is hoped that prompts by juniors could lead to more medication reviews within existing practice, and may give them invaluable experience in reviewing medicines in their future careers as seniors. To investigate this further we recommend repeating this exploratory study on a larger scale as well as conducting a longitudinal study to evaluate the impact of education received as juniors.

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