

Improving prescribing learning in problem-based learning

Stephanie Bull  | Laura Sims

University of Exeter Medical School, Exeter, UK

Correspondence

Stephanie Bull, University of Exeter Medical School, Exeter EX1 2LU, UK.
Email: s.a.bull@exeter.ac.uk

Abstract

Background: Prescribing errors are known to occur in clinical practice. To ensure prescribing competence, foundation doctors in the United Kingdom now need to pass a national Prescribing Safety Assessment (PSA). Medical students are requesting more prescribing learning. We propose that early year's problem-based learning (PBL) sessions in medical curricula may be a place where more prescribing-related material could be added to ensure preparedness to prescribe.

Approach: We modified existing PBL material by adding prescribing-related tasks within the patient cases. To ensure relevancy, the prescribing tasks were blueprinted to the assessment structure of the PSA. An example task would be to tailor prescribing, advise on required monitoring and provide information about medication to the (fictional) patients.

Evaluation: Free text questionnaires were sent to second-year medical students at two points in the academic year. Thirty-eight of 244 participants responded. Students expressed perceived deficits in their prescribing education both within PBL and in other curriculum areas. Students desired more faculty-led approaches to learning, yet acknowledged that the tasks introduced in PBL sessions, especially those that promoted use of clinical guidelines and national prescribing resources were useful.

Implications: Although students expressed a desire for increased faculty-led learning on prescribing, the introduction of prescribing tasks into early-year's PBL cases has a place. For example, tasks that promote students' use of prescribing and evidence-based resources may build their confidence in using them throughout their medical degree and within the PSA assessment (where the formularies can be used by candidates).

1 | BACKGROUND

Prescribing is a major medical intervention that is increasing in volume and complexity.¹ Prescribing errors frequently occur (~10% in prescriptions written by first year doctors).² Therefore, providing medical

students with sufficient prescribing training is of paramount importance.³ Since 2016, newly qualified doctors in the United Kingdom need to pass the Prescribing Safety Assessment (PSA). This assessment is usually taken in the final year of medical school⁴ and contains questions related to prescribing tasks expected of a newly qualified doctor. The assessment must be passed before students can progress to the second year of their postgraduate foundation training.

Stephanie Bull Co-first authors.

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Medical students and newly qualified doctors feel poorly prepared for their prescribing role; only 29% of students in the United Kingdom were confident that their undergraduate learning would ensure they achieved General Medical Council's (GMC) prescribing competencies.⁵ UK medical students wanted prescribing teaching to occur early in the curriculum, to be more visible and to have an emphasis on practical skill acquisition.^{6,7} In addition, students wanted repeated learning opportunities, as one-off sessions were perceived to be ineffective.⁶

Second-year medical students at the University of Exeter have problem-based learning (PBL) sessions based on patient cases as part of their taught curriculum. Students have 48 h of PBL spread across 24 weeks, working in small groups of student peers with a clinician facilitator. We propose that PBL case material could be developed to better align with PSA requirements. Furthermore, developing PBL material could meet the requests of students for early prescribing learning that is integrated within the curriculum and has a task-based emphasis. As students' timetabled hours are already allocated to PBL, there would no requirement to lobby for additional time within the medical curriculum. The Analysis, Design, Development, Implementation, Evaluation (ADDIE) model of instructional design was used to structure the intervention.⁸

2 | APPROACH

2.1 | Analysis (target audience, context)

Our learners were second-year medical students ($n = 244$ students) who mainly transition from secondary school educational approaches (teach-to-test and syllabus-defined assessments) to higher education ones (independent, directed self-learning and broad curriculum assessments). The PBL pedagogy is helpful in supporting students to set their own learning direction; a skill that is useful for success in assessments and in their future career development. Yet learners may find this challenging.

PBL cases are structured to promote the integration of knowledge from different disciplines, and hence, they provide an opportunity to bolster prescribing learning. We were, however, mindful of competing curriculum content and the need to ensure that we were modifying existing material relating to medications, rather than simply adding additional content.

2.2 | Design (learning objectives, sequence)

The goal of the intervention was to introduce prescribing-related tasks into PBL cases to make prescribing more visible within the early years of the course and to help students gain confidence and preparedness for completing the PSA. During Term 1 of the academic year, the second-year students worked with existing PBL cases and then in Terms 2 and 3, they used cases in which prescribing-related tasks were introduced. The students were invited to take a survey in Term 1 and in Term 3.

2.3 | Development (content)

PBL case material was reviewed, and relevant prescribing tasks were developed for each case by the clinical and academic PBL leads (LS and SB, respectively). We ensured that the tasks covered the eight sections of the PSA assessment structure (1. Prescribing, 2. Prescription review, 3. Planning Management, 4. Providing Information, 5. Calculations Skills, 6. Adverse Drug Reactions, 7. Drug Monitoring, 8. Data Interpretation).⁴ Summaries of the case material and the prescribing tasks are shown in Figure 1. Tutor notes were also created to support tutor facilitation of student learning around these tasks (Figure 2).

2.4 | Implementation (organisation and delivery tools)

The intervention was delivered to second-year medical students in the academic year 2021–2022. PBL facilitators were asked to facilitate the revised PBL cases by following the tutor notes. No further training was provided as facilitators are clinicians, are experienced in the PBL process and had responded positively to case modifications in previous years. Students were not aware that the case material had changed, and hence, no communication with them was required.

3 | EVALUATION

Ethical permission (University of Exeter Research Committee Aug21/D/290) was gained to evaluate students' perceptions of prescribing within PBL. Two surveys asking for free text answers to the questions outlined in Table 1 were sent by email to collect students' responses after 9 weeks and 24 weeks of PBL learning, respectively. Thirty-eight participants responded to the survey (31 answered the survey at both time points, and an additional seven students answered at week 24), with response rates of 15.6% and 18.4%, respectively.

Thematic analysis of the free text comments, both before and after the intervention, was conducted. LS and SB approached this inductively, using the steps of data familiarisation, coding and creation of themes.⁹ A reflexive approach was taken throughout as LS and SB were the curriculum leads for the PBL and were also responsible for creating the prescribing tasks. They were mindful that they may be drawn to seek out positive feedback over that which was negative and were careful to challenge themselves to look for both.

3.1 | Theme 1: coverage of prescribing learning within PBL

This theme describes how students perceived prescribing learning to be limited within PBL, with emphasis often being placed on understanding drug mechanisms, rather than features of prescribing: '[PBL is] successful in general awareness of drugs, general side effects and

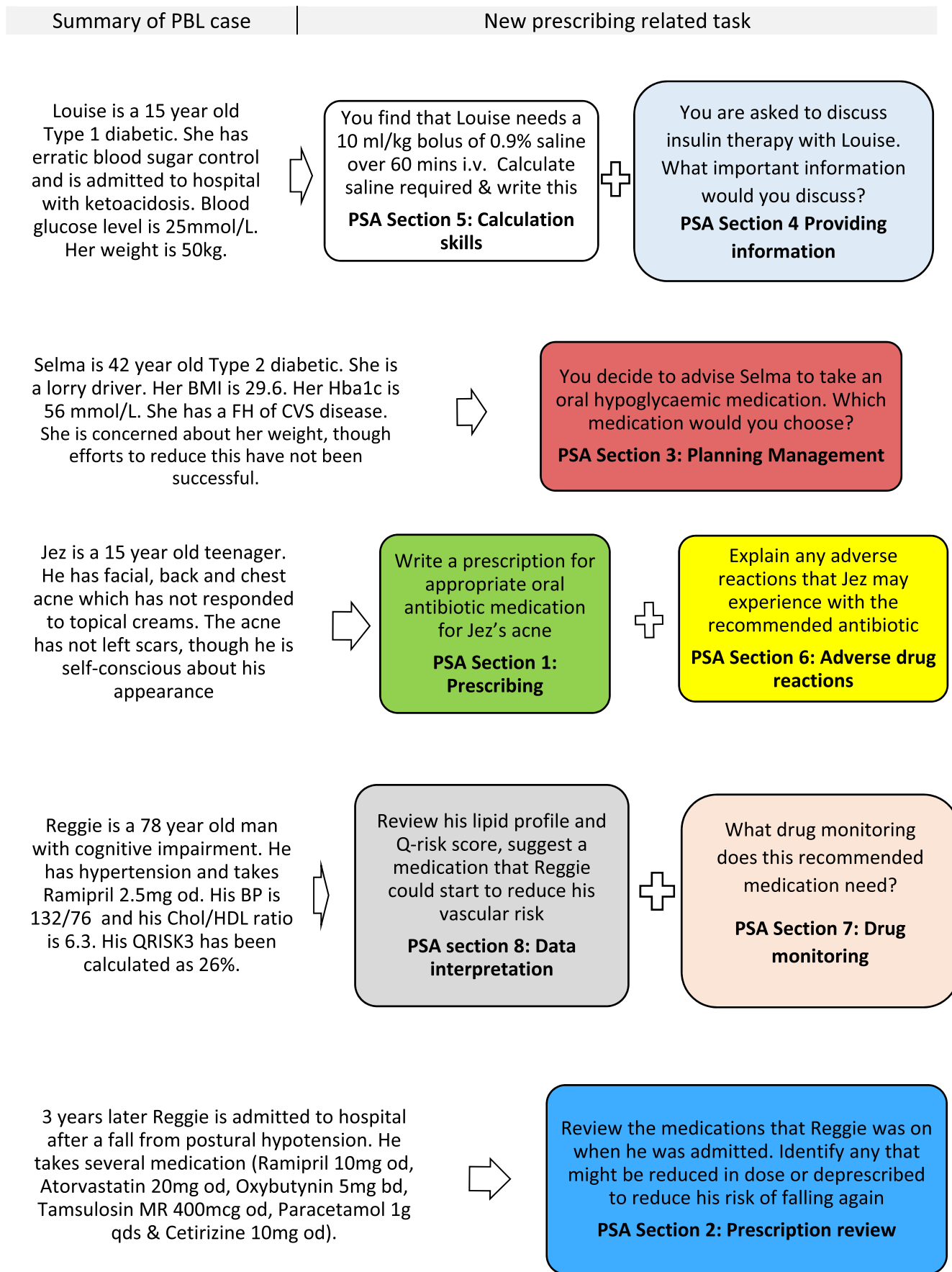


FIGURE 1 PBL prescribing tasks were developed aligned to PSA sections.

Student Task

Considering Reggie reason for admission do you think there any drugs that should be stopped before discharge? if so, why are you stopping them?

Note: The hospital team have advised that Reggie starts donepezil 5mg po nocte

Deprescribing suggestion for PBL tutor

- Reduce Ramipril as postural hypotension
- Realise that cetirizine is not required as the rash that it was prescribed for has settled

FIGURE 2 Example of PBL tutor notes.

TABLE 1 Survey questions.

1. 'Does PBL work help you to develop knowledge and skills in prescribing?'
2. 'If PBL work does NOT help you to develop knowledge and skills in these prescribing areas, please describe where it has been most deficient, and why/how'
3. 'Can you give any suggestions of how prescribing education in PBL could be improved or developed?'

N.B. The PSA subject domains were provided within the survey as a point of reference for students.

key contraindications but not very successful at making sure we know the specifics of drug dosing, regimens and interactions.' (P4). After the intervention, students still spoke of a deficit of prescribing learning in PBL and were concerned about learning gaps. Such concerns were propagated when they encountered questions that they could not answer within their applied knowledge assessments (multiple-choice questions set at the level of a graduating medical student): 'The limited knowledge in this area came to my attention in the recent [medical knowledge exam] where pharmacology and drug interaction questions were prevalent which I struggled a lot with.' (P14).

3.2 | Theme 2: ownership of prescribing learning

This theme describes students' thoughts about where the responsibility for prescribing learning lies. Many students wanted the faculty to lead their prescribing learning, rather than it being part of student-led activities; for example, they requested that they should be provided with a list of drugs that they should learn about and that their facilitators should teach them: 'Rather than us having to come up with questions and answer them, [we should] have parts of sessions where we are taught about these things.' (P23). Many students perceived the tasks as useful and wanted more of them within each PBL case: '[improvements could be made by] including tasks in every case where we have to write the prescription for the given diagnosis or fill in a fluid chart.' (P37). A few students felt that the tasks were narrow in spectrum and did not lend themselves well to being a group activity: 'The most successful aspect of this has been through [the] ongoing exposure to clinical guidelines explored in the case and not from targeted student tasks.' (P34).

3.3 | Theme 3: student suggestions for improving prescribing learning

This theme describes student suggestions for improving prescribing learning. Many of these aligned with the assessment structure of the PSA, and the tasks that we were creating as part of this intervention, for example, filling out prescriptions, conducting drug calculations, and making use of clinical guidelines: 'Maybe [create] a PBL case based around a patient with concerns around prescribed drugs.' (P3). There was a suggestion that other sessions, outside of PBL, should be modified to create the opportunity for more learning about prescribing: '[Improvements could be made by] replacing some sessions [in other areas of the curriculum] with additional targeted sessions on prescribing.' (P34).

4 | IMPLICATIONS

The aim of the intervention was to introduce prescribing-related tasks into PBL cases to make prescribing more visible within the early years of the course and to help students gain confidence and preparedness for completing the PSA. In many ways, we achieved our goal. We were able to create tasks that explicitly aligned to sections of the PSA, woven into patient cases and integrated with other medical science learning. These tasks shifted the focus beyond the mechanism of action of medications to activities that involved the students engaging with resources (such as clinical guidelines and national prescribing resources or role-playing writing prescriptions).

The tasks were well received by students, yet students still perceived that they had a deficit in their prescribing-related knowledge and skills and desired more prescribing content and for this to be delivered by faculty. The prescribing intervention, rather than boosting students' confidence in preparedness for prescribing, seemed to emphasise students' concerns about a perceived lack of prescribing knowledge across the course. This is perhaps unsurprising when we acknowledge that students find the transition away from syllabus-defined assessments challenging and that assessments often drive students towards a performance culture rather than an improvement and learning one (10). This, in turn, may provoke feelings of reduced self-efficacy.¹⁰ Might this explain why students did not see the tasks as scaffolded examples with formats that they could replicate in other problem-based cases (e.g., self-generate tasks to write prescriptions, calculate drug doses, consider communication with patients etc.)? Furthermore, students did not seem to consider that learning from PBL prescribing tasks could be useful preparation for work in other curriculum areas, such as clinical placements. We would therefore recommend that educators who might be encouraged to utilise our approach and examples (Figures 1 and 2) should also invest in communication strategies that describe how the tasks can form scaffolds to promote prescribing learning and confidence, outside of the context that they are encountered.

This work has emphasised that a multipronged approach across curricula areas is necessary for increasing students' confidence and

preparedness for prescribing. Yet introducing medication-based tasks in PBL can be beneficial. In our setting, we have continued to introduce prescribing tasks into some of the Year 1 PBL cases and will strive to understand the impact of these changes by conducting interviews and focus groups with students and PBL tutors.

The ultimate goal is that timely educational interventions promote knowledge and skills such as using evidence-based clinical guidelines and accessing relevant prescribing resources that can be honed during a student's medical course in preparation for future medical exams that involve prescribing and then in their future clinical practice.

AUTHOR CONTRIBUTIONS

Stephanie Bull: Methodology; investigation; formal analysis; project administration; writing—original draft; writing—review and editing; data curation; resources. **Laura Sims:** Conceptualization; investigation; formal analysis; project administration; writing—original draft; methodology; data curation; writing—review and editing; visualization; resources.

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CONFLICT OF INTEREST STATEMENT

The authors have no conflict of interest to disclose.

DATA AVAILABILITY STATEMENT

It is not possible to make data freely available as this would breach participants anonymity.

ETHICS STATEMENT

Ethical permission permission was granted by University of Exeter Research Committee (Aug21/D/290).

ORCID

Stephanie Bull  <https://orcid.org/0000-0002-1284-1902>

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