How do pharmacy students describe decision-making about drug therapy?

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**Abstract**

**Introduction:** Therapeutic decision-making is offered as a term to describe the responsibility that pharmacists have as medicines experts for making decisions about drug therapy for individual patients. There is a lack of research describing how pharmacy students learn to make therapeutic decisions.

**Methods:** Qualitative methods were used to interview twelve final-year undergraduate pharmacy students. Data were analysed inductively to identify the steps in the process, the definition, and attitudes students learned about therapeutic decision-making.

**Results:** According to these pharmacy students, the process and definition involve four steps: identifying medicines related problems via differential diagnosis, exploring treatment options, weighing up the options, and making a recommendation. Attitudes were confidence, open-mindedness, and bias awareness.

**Discussion:** These findings align with a proposed model for therapeutic decision-making in pharmacy practice, however, this study did not determine if the students could apply the model in practice.

**Conclusion:** These findings can be used as a benchmark for enhancing the pharmacy curriculum to include decision-making skills about drug therapy for future practice settings.

**Keywords:** pharmacy education; curriculum; student learning; therapeutic decision-making
Introduction

Clinical decision-making is a fundamental skill for all health care professionals. As experts in medicines use, pharmacists are often responsible for decisions related to drug therapy, termed ‘therapeutic decision-making’ (Wright, Anakin and Duffull, 2018) or ‘management decision-making’ in a medical context (Cook, Sherbino and Durning, 2018a; 2018b). Pharmacists routinely make therapeutic decisions when providing advice about minor ailments in a community practice setting. A pharmacist will go through a triage process, decide if referral to a physician is required, and if not, may recommend a suitable treatment from the limited range of medicines available without a prescription. While this decision-making scenario has been a routine part of practice for many years, the profession is currently undergoing a rapid change from one focused on the supply of medicines to a profession focused on the provision of patient-facing clinical services such as medicines assessment review and prescribing (International Pharmaceutical Federation, 2015). Practice settings are also expanding, with a trend in some countries for pharmacists to move away from the retail environment to non-dispensing roles in the primary care setting (e.g., GP practices) (Anderson et al., 2019; Hazen et al., 2018). These new roles will require a future pharmacy workforce with suitable skills and knowledge to take responsibility for drug therapy decisions in the face of uncertainty and to handle decisions for complex patients with multiple comorbidities. However, in practice, pharmacists appear to be reluctant to make drug therapy decisions and lack confidence when faced with situations of uncertainty (Gregory, Whyte and Austin, 2016; Sinopoulou, Summerfield and Rutter, 2017). Even pharmacists in advanced practice roles, who acknowledge that difficult therapeutic decisions are commonplace, lack the language to describe how decisions are actually made when designing a patient-centred treatment plan (Anakin, Wright and Duffull, 2018). There is, therefore, a need for a better understanding about how pharmacists learn decision-making about drug therapy so that current teaching models can be enhanced and revised. As a first step, the following study aimed to describe the process of decision-making about drug therapy for pharmacy practice learned by pharmacy students.

Methods

This study used qualitative interview methods (Denzin and Lincoln, 2018; Rubin and Rubin, 2012) to describe process of decision-making about drug therapy learned by final-year pharmacy students at the School of Pharmacy, University of Otago, New Zealand. Ethical approval was obtained from the University of Otago Human Ethics Committee (D19/069). The research team discussed the relevance of this study to Māori with the Ngai Tāhu Research Consultation Committee.

Convenience sampling was used to select participants from the population of 140 fourth-year pharmacy students in their final year of a four-year undergraduate pharmacy programme. This programme prepared students to complete their internship year, prior to registration as a pharmacist qualified to practice in range of care settings across New Zealand. A semi-structured interview protocol was constructed by the first and last authors and content validity was established by peer-review with pharmacy colleagues at the University of Otago. The protocol also included demographic questions (See Appendix 1).

Six of the study participants were co-researchers in this study (the second to eighth authors). Each of six student researchers interviewed one student researcher and one other member of their fourth-year cohort. Interviews were digitally audio recorded then transcribed verbatim by the student researchers. The transcripts were checked for accuracy by the research team and validated by participants who expressed interest in doing so. No participants made changes to their transcript. To maintain participant confidentiality, transcripts were anonymised for analysis and reporting. Transcripts were analysed thematically using a general inductive approach (Thomas, 2006). Each student researcher worked independently to code four transcripts. This procedure ensured that each transcript was coded independently by two different people to reduce bias in the coding procedure. To make the project
manageable, three features of therapeutic decision-making in the interviews were coded: the steps in the process, the definition, and attitudes. The research team met to discuss and define potential themes for each feature. A theme was defined when codes assigned to that theme was found in at least three transcripts. To make reporting manageable, similar themes were combined until between 3 to 5 themes remained for each feature of decision-making about drug therapy.

Results/Analysis

The twelve participants were aged between 21 and 26 years old and represented eight different ethnicities (5 New Zealand European, 2 Malaysian Chinese, 1 African, 1 African West Indian, 1 Chinese, 1 Korean, 1 Samoan). The gender ratio of females to males was 8:4. These demographics were generally representative of the cohort of fourth-year pharmacy students.

The decision-making process about drug therapy described by study participants generally consisted of four steps (see Table 1). The first step involved gathering relevant information from a range of sources. Sources included information about medicines from standard sources such as the New Zealand Formulary (NZF http://nzformulary.org/), and the Best Practice Advocacy Centre (BPAC https://bpac.org.nz/) New Zealand, as well as consultation with other healthcare practitioners and the patient. The second step required identifying treatment options and considering them in relation to the information gathered about the patient. The third step involved weighing up the pros and cons for each option and selecting the best option by considering the risk/benefit the medicine’s use for their patient specifically. The fourth step involved making a treatment recommendation to the patient or another healthcare practitioner and where the outcome may be unknown to the pharmacist who made the recommendation. Decisions were generally phrased as ‘suggestions’ (P2), ‘recommendations’ (P4) or ‘treatment option’ (P12).

<table>
<thead>
<tr>
<th>Theme</th>
<th>Representative Extract</th>
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| Gathering information to understand a patient’s problem by consulting with the patient and reading literature about medicines. | We spoke to a patient about his medications (P1)  
We have BPAC, NZF which can be accessed by anyone (P3)  
… finding all information possible and consulting anyone you think is appropriate (P9) |
| Identifying treatment options in relation to patient goals | … looking at all of the different options available for the patient (P4)  
… the patient’s goal, to see what actually bothers them the most and how long has it been, just to see what kind of treatment she’s looking for is a short duration of effect, and to see the treatment that meets the goal (P6)  
… patient’s preference matters as well (P8) |
| Weighing up the pros and cons for each option to select the best option | We chose the therapy specifically by weighing up contraindications, side effects, whether or not they have drug interactions with the current drug she’s taking (P5)  
We will talk about what are the advantages of each option to rule out to guide us to treatment options (P8)  
We were picking certain medications that he could have and ruling out certain ones that he couldn’t to make a definite yes or no list and then deciding from the yes list why I would choose one of those and what one was the best (P11) |
Making a treatment recommendation and the outcome may be unknown

| Suggesting to the doctor to lower her dose (P2) |
| Discuss with other colleagues and see what they have to say and what their recommendations are. Give him options that are suitable and discuss (P4) |
| I think the only way to know whether it was correct or not is if it worked for the patient (P10) |
| … it's hard to know whether they're satisfied with the treatment (P12) |

Therapeutic decision-making was defined by the study participants as a process that had two main features summed up by participant 6, ‘Making decisions is basically differential diagnosis and then treatment options based on the person’. First, it involved preforming a differential diagnosis because ‘it’s the process of eliminating things to get to the final decision’ (P5). This process involves ‘identifying the problem, gathering all the information for that problem’ (P7). Second it requires ‘looking at all of the different options available for the patient’ (P4) and ‘choosing which of those options is best for the situations presented (P12).

Attitudes associated with therapeutic decision-making were confidence, open-mindedness, and bias awareness. Confidence was expressed in terms of being ‘assertive about what I know but of course you have to be cautious about what you don’t know’ (P8). This tempering of confidence with cautiousness was expressed by participant 12 as ‘Confident but not over confident, being willing to ask for help or get a second opinion if you are not confident’. Open-mindedness concerned ‘what other health professionals think’ (P2) and that ‘other professions have other concerns that they might have that you won’t think about as a pharmacist (P3). Additionally, open-mindedness involved,

   Being open to different kinds of opinion, able to digest them and able to compromise and reach consensus … hearing other cases you haven’t encountered and put yourself in their shoes and see more possibilities and how other pharmacists deal with the problem and approaches (P5).

Bias awareness was also mentioned by participant 5 who said, ‘people might have biases, they might think a particular point weighs more than other points’. This attitude required listening to others and being willing to make compromises because, ‘you need to be balanced but not biased” (P7).

Discussion

Results of this study may be interpreted to suggest that final-year undergraduate pharmacy students at the School of Pharmacy at the University of Otago have learned a four step process for therapeutic decision-making. The four steps include information gathering, identifying options in relation to the patient’s goal, weighing options, and making recommendations.

The teaching model traditionally used for therapeutic decisions in the pharmacy programme at the University of Otago is based loosely on the Pharmaceutical Care concept (Hepler and Strand, 1990). The model has three steps, the so-called Problems-Options-Plan (POP) approach, where patient drug-related problems are identified, options for management are explored, and a treatment plan is constructed. While a reasonable teaching tool, the POP model lacks detail about how to manage patient complexity, and how a pharmacist or student might distinguish which of the options identified is optimal for a particular patient. To address this lack of detail, a new teaching model called therapeutic decision-making has been trialled based on a four step patient-focused process. The therapeutic decision-making model includes teaching about how to manage patient complexity, prioritisation of drug related problems, mapping of patient goals with medical goals and treatment options, as well as specific skills for
determining an optimal treatment plan and implementing a decision (Wright, Anakin and Duffull, 2018). The therapeutic decision-making model has been trialled in a new cohort of students who entered the pharmacy programme in 2018. It is important to note that the students interviewed for this study were in the cohort who entered the programme in 2017 so did not receive teaching using the therapeutic decision-making model. Therefore, the finding that these students described a four step process for making decisions about drug therapy that roughly mirrors the steps of the therapeutic-decision making model, came as a surprise to the research team. This finding may be explained by insider knowledge of the therapeutic decision-making model by the six of the participants who were also co-researchers in this study and because participating students may have looked at the new teaching materials that includes this model. While study participants appear to be able to describe the four steps, we have yet to determine if they can apply these steps when providing patient care. A future study that examines student performance when describing and using their decision-making about drug therapy via an assessment activity might help to clarify the depth of student knowledge about the therapeutic decision-making model and its use in practice.

The attitudes students reported learning along with the process of making decisions about drug therapy were confidence, open-mindedness, and bias awareness. These attitudes may be interpreted to suggest that pharmacy students learn to be cautious when making decisions. They emphasised the importance of consulting with other pharmacists. Language choices for their decisions included recommendation, suggestion, and option which may be interpreted to suggest that they were comfortable to relinquish responsibility of treatment decisions to other healthcare practitioners. This finding reflects the language used by advanced care pharmacist in New Zealand to describe their decisions (Anakin, Wright and Duffull, 2018).

Although the interview protocol was developed by experienced researchers, students inexperienced in research conducted the participant interviews, therefore, key information may not have been gathered as they may not be able to identify when to ask next questions or probe responses. Additionally, the interviews took place before participants’ fourth-year community pharmacy placements and, for some, hospital pharmacy placements, which may explain the high prevalence of examples of therapeutic decision-making based on a classroom experiences instead of from practice.

Despite these limitations, findings from this study will be used to enhance the new teaching model for making decisions about drug therapy. This enhancement will allow local pharmacy educators to address the need for explicit teaching about decision-making as pharmacists take on more patient-facing clinical services, prescribing, and move into non-dispensing roles where they will be responsible for patient therapy decisions.

The findings and the methods used in this study may be of interest to pharmacy educators internationally so they can investigate the process of decision-making about drug therapy for pharmacy practice learned by their pharmacy students. We encourage pharmacy educators to replicate this study at their institutions to determine whether similar views to those found in this study are shared by students at a similar level of pharmacy education.

**Conclusion**

Findings from this study describe four steps in the decision-making about drug therapy process learned by pharmacy students: information gathering, identifying options in relation to the patient’s goal, weighing options, and making a recommendation. Confidence, open-mindedness, and bias awareness were decision-making attitudes students learned for pharmacy practice that were also compatible duties performed in community practice settings. These findings can be used as a benchmark for enhancing the pharmacy curriculum to include the teaching of therapeutic decision-making skills that can be applied in a wider range of practice settings.
Take Home Messages

- The decision-making process about drug therapy described by final-year undergraduate pharmacy students has four steps.

- The four steps are information gathering, identifying options in relation to the patient's goal, weighing options, and making a recommendation.

- Confidence, open-mindedness, and bias awareness were the therapeutic decision-making attitudes that students learned for pharmacy practice.

Notes On Contributors

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Bibliography/References


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**Appendices**

**Appendix 1 – Semi-structured interview protocol**

**Introduction**

**Say:** Thank you for agreeing to take part in this study today. Please acknowledge that you understand the study as it has been outlined in the Information for Participants Sheet.

**Ask:** Do you have any questions about the study before we begin?
Do you consent for me to record this interview and use it for the purposes of this research?

**Demographic Information**
Ask: [ ] Because we have been requested by the Ngāi Tahu Research Consultation Committee, would you please state your ethnicity?

[ ] Please state your age.

[ ] How many years of health professional education did you have before starting the B Pharm degree (and not including HSFY)?

How did you enter the programme? If answer is graduate entry then ask:

What prior qualifications do you have?

[ ] Have you had any work experience in providing healthcare?

**Set the focus for the interview**
State: Decision-making is a cornerstone of practice in healthcare professions. Students in undergraduate health professional programmes at the University of Otago are taught to make decisions about patient care. Not known, however, is how students develop decision-making skills as individuals to work independently and in teams. Additionally, there exist no theoretical frameworks for comparing the conceptual and skill development of students who will work collaboratively to make decisions as future healthcare professionals.

**Section 1. Experiences of Therapeutic Decision-Making**
Ask: Think back over the past week. Tell me about a recent teaching/learning session where you witnessed someone making a decision about patient care or were involved in making a decision about patient care? This decision can be about a patient you have encountered in a clinical setting or an example in a lecture or tutorial

Encourage the participant to describe:

- Type of experience (i.e., lecture, tutorial, workshop, small group teaching session, bedside teaching on the wards, a clinic, community setting)
- Time, date, and duration of the experience
- Who was the teacher?
- Were there other learners involved?
- Was there a patient/person involved?
- What learning resources were used? (Can the research team access them?)
- What was the decision that had to be made?
- Why was this decision needed?
- What was your role in the decision? What contribution did you make to the decision?
- Who else was involved in the decision-making process?
- Do you think this decision was yours alone or that it was collaborative? Please explain why.
- Please describe the steps in the decision-making process you think was used in this case?
• How did you feel about your involvement in the decision-making process?
• What was the final outcome when the decision was made?
• How do you know if an appropriate/relevant/correct decision was made?
• How did you feel about the outcome of the decision?
• What would you do the same/differently if you encountered this decision-making opportunity again?
• What might you want your teacher do the same/differently to enhance your learning about decision making if you had this decision-making opportunity again?

Repeat the questions in section 1 to collect a second example of a decision-making experience. The example can be from any time during their clinical education.

Repeat the questions in section 1 to collect a third example of a decision-making experience. The example can be from any time during their clinical education.

Section 2. Conceptions of Therapeutic Decision-Making

State: Given the conversation we've had about your experiences about making (or witnessing) decisions related to patient care:

• What does the term ‘therapeutic decision-making’ mean to you?
• What knowledge do you associate with the term ‘therapeutic decision-making’?
• What skills do you associate with the term ‘therapeutic decision-making’?
• What attitudes do you associate with the term ‘therapeutic decision-making’?
• Are there any other ideas that you associate with the term ‘therapeutic decision-making’?
• What process do you think healthcare professional use to make decisions about patient care? Alone/individually? In teams/collaboratively?
• How might the process of decision making be the same/different when done alone/individually versus in teams/collaboratively?

Closure

Say: Thank you for your time today. We are using research methods in this study that includes participant checking as a step in the analysis procedure.

Ask: Would you like to see a transcript of this interview before we analyse it further?

Would you like to receive a copy of the report after it has been written/published?

Say: Thank you again for agreeing to take part in this study today. We anticipate that the findings from this study will be used to inform the pharmacy curriculum at the University of Otago. We also anticipate that pharmacy students, such as yourself, will be interested in the findings to better understand how healthcare providers learn to make decisions about patient

Declarations

The author has declared that there are no conflicts of interest.
Ethics Statement

Ethical approval was obtained from the University of Otago Human Ethics Committee (D19/069).

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