RESEARCH

Using 'Best Worst Choice' Methodology to Prioritize Pharmacy Practice Skills Teaching During Curricular Reform

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Objective. Curricular reform should be informed by many sources, including stakeholder feedback. The objective of this study was to employ Best-Worst scaling to prioritize practicing pharmacists' feedback for pharmacy practice skills inclusion in a new curriculum for pharmacy students in New Zealand.
Methods. A best-worst choice survey was informed by a literature search and review of pharmacy curricula for inclusion of pharmacy practice skills. A total of 16 skills were included in the final survey. The survey was sent to registered pharmacists and intern pharmacists in New Zealand for prioritization of all included skills.
Results. A total of 388 pharmacists responded to the questionnaire. Comprehensive chronic disease management, specialty medications, and medicines use review were the top three prioritized skills. Injections, independent prescribing, and specialty compounding were the least prioritized skills. Gender, age, setting, and ethnicity were found to influence skill prioritization.
Conclusion. The use of best-worst choice scaling found practicing pharmacists in New Zealand emphasize skills required for current practice and de-emphasize skills that may be required for emerging professional responsibilities. Results support the notion that if curricular reform is to include new skills that are largely unfamiliar (or deemed unimportant) by practicing pharmacists, quality assurance of students' experiential experiences paired with preceptor education about the expectation of students' skill sets must be adequately developed and addressed, in order to ensure students are provided opportunities to practice their full range of skills and receive fair assessment.
Keywords: professional skills; pharmacy practice; curricular reform; higher education

INTRODUCTION

The advent of expanding roles for pharmacists, use of digital technology in health care, empowerment of pharmacy technicians, and increasing collaboration as part of interprofessional teams are positive professional developments for pharmacists.[1,2] There is a directly associated demand, however, for pharmacist training programs to adapt and modernize curricula to equip graduates with the necessary skills and abilities to provide competent care in these changing settings.[3] Especially in the digital age, this need for curricular reform can come suddenly, unexpectedly, and frequently. Programs must therefore be ready to recognize rapidly changing professional landscapes and be ready to action processes and procedures to develop, implement, and evaluate curricular modifications.[4,5] Programs must also be prepared to remove curricular components that may be deemed to be outdated or irrelevant to modern pharmacy practice. One of the curricular components most likely to require frequent reform is the teaching and assessment of pharmacy practice skills.[6] As skills represent the most practical nature of professional practice, the teaching of skills may be especially vulnerable to changing professional landscapes.[6] During times of reform, programs must therefore prioritize which skills to include, exclude, or refine when developing new content.

Decisions regarding curricular reform should be informed by input from key professional stakeholders.[7] It can be difficult, however, to seek feedback that accurately reflects practice priorities, especially in settings of large numbers and/or diversity in practice settings. With respect to informing pharmacy practice skills, the input of practicing pharmacists across regions and practice settings is beneficial.[8] Conducting widespread surveys can be time consuming and difficult, however, and results collected from Likert-scales or rank ordering may not offer enough discrimination between

items (ie, skills) of interest.[9] The use of interviews and focus groups (including advisory boards) can provide useful information but may not be representative of the current state of practice and general population of interest.[10] A novel type of survey methodology, stated preference methods or choice experiments may account for these challenges by measuring and quantifying stakeholders' priorities and preferences. Best-Worst Scaling is one stated preference method that has gained momentum in the health literature.[11] The advantages to this approach include measuring the preferences for all the skills on the same scale and for collecting more data from each participant. As such, it may provide an efficient and discriminatory way to capture pharmacy stakeholders' perceptions in terms of prioritizing pharmacy practice skills for curricular reform.

Aside from using stakeholder data to inform inclusion/exclusion of learning outcomes/practice skills during curricular reform, capturing priorities may also help to guide development of quality assurance and assessment procedures.[12] If there is mismatch between stakeholder and university priorities, for example, findings may inform the need for education regarding a program's direction and/or emerging competencies required for practice. Given the importance of obtaining stakeholder input for curricular reform and in consideration of the challenges for obtaining accurate and representative feedback from these stakeholders, the purpose of this study was to employ Best-Worst scaling to prioritize pharmacy practice skills for inclusion in a new curriculum for pharmacy students in New Zealand.

METHODS

In order to determine the potential skills that could be taught in the new Bachelor of Pharmacy (BPharm) curriculum, a search of the literature was completed to get an overview of the skills typically taught in modern undergraduate pharmacy curricula. The following databases were searched: Pubmed, Ketu, Google Scholar and Ovid. Combinations of the keywords 'skills,' 'intern pharmacist,' 'undergraduate' and 'pharmacy' were used in each database. A web-based search of pharmacy curricula in Australian and North American entry level pharmacy programs was also conducted. From these sources, a list and description of 16 potential skills was compiled for evaluation in the best-worst choice analysis. A description of each skill was written to explain the skill in context, where necessary. Table 1 provides an overview of each skill and the matching description shown to participants during data collection.

Registered pharmacists and intern pharmacists (completed BPharm but not yet licensed to practice until completion of 1-year internship) in New Zealand were contacted by email through the Pharmaceutical Society of New Zealand who maintain a database of registrants. Each participant received a link via email which would allow access to the survey. The participants had access to the survey over a 2 month period. The total number of pharmacists invited to complete the survey was 3836.

Survey software (Qualtrics, Provo, UT) was used to design the survey and respondents were able to complete the questionnaire online. The survey consisted of demographic questions and a Best-Worst Choice survey regarding a pharmacist's preferences for skills to be taught in the undergraduate pharmacy program in the new curriculum at the School of Pharmacy, University of Otago. An example of a Best-Worst Choice question is provided in Figure 1. Sawtooth software (Sawtooth Software, Inc. Sequim,WA) was used to create the experimental design for the survey. In this algorithm, one-way frequency (how many times each item appears across the entire design), two-way frequencies (how many times each pair of items appears within the same set across the entire design), positional frequencies (report how many times each item appears in the first, second,…, fourth position) and connectivity (all items are linked directly) were considered. [13-15] The sixteen skills selected for the survey were presented in 20 choice sets consisting of four attributes per set. Each participant was asked to select the best (most preferred) and worst (least preferred) from the four attributes of each choice set. Participants were presented with repeated varying choice sets which revealed a ranking of items upon closure of the survey.

The demographics and professional backgrounds of the respondents were characterized using frequencies and means. Best minus worst scores (the frequency of choosing an item as 'the most important' minus the frequency of choosing it as 'the least important' one) were used to initially characterise preferences which have been shown to be a good approximation for results obtained from the logit models. A conditional logit model was used to estimate coefficients for the various skills. In both cases, higher scores represent higher preferences for the skill. For the conditional logit models, the scores (utility values) and p-values are relative to a reference score (the skill with the lowest preference) The influence of covariants (gender, ethnicity, location, age, and experience) was examined by using interaction terms. Age was categorized as less than 31 years, 31 to 40 years, 41 to 50 years, and greater than 50 years for this analysis. Locations were categorized as a city (>50,000 inhabitants), a town (1000 to 49,999 inhabitants) and rural (<1000 inhabitants).

Ethics approval was granted through the University of Otago Human Ethics Committee (D17/225) and this study was discussed with the Ngai Tahu Consultation Committee. Participants provided informed consent and were welcome to withdraw from the survey at any time. All responses were made anonymously.

RESULTS

A sample of 396 pharmacists started the questionnaire with 388 respondents fully completing. The demographics matched those typical of New Zealand pharmacists. The majority were female (69%) which mirrors the pharmacist population of New Zealand (65%). The average age of respondents was 42.4 years (range 20 to 99 years) and most identified as European (68%), Asian (9%), or Māori (4%). Most (65%) pharmacists' highest level of pharmacy education was an entry level qualification (diploma, BPharm or PharmD) with others having postgraduate certificates, diplomas or Master's degrees (33%) or a PhD (2%). The largest category of respondents were employee pharmacists in community practice (41%) followed by pharmacist owners (24%), dispensary managers or team leaders (14%), and interns (4%). Most participants worked mainly in a community pharmacy (67%), a hospital (20%) or a primary health organisation (3%) with others working in academia, government or industry.

Table 2 provides the results of analysing the conditional logit model based on Best-Worst Choice responses in terms of coefficient means. All of the coefficient means were significantly higher than the reference category coefficient mean (specialty compounding). On average, the importance of comprehensive chronic disease management for respondents was higher than other items. Respondents also placed high value on the provision of specialty medications that only pharmacists can provide (like trimethoprim for UTIs, oral contraceptives, etc). and Medicines Use Review (MUR). Conversely, independent prescribing and injections including vaccinations were considered relatively less important for respondents.

When examining the results by covariants, it was found that gender, age, location, and ethnicity had significant impacts on the preferences for the school to teach various skills. For example, gender had a significant influence on preferences for education of interprofessional health care (mean for males was 0.48 lower, p=.0001), chronic disease management (mean for males was 0.38 lower, p=.002), specialty medicines (mean for males was 0.39 lower, p=.0017), business skills (mean for females was 0.44 lower, p=.0008) and ordering and interpreting laboratory tests (mean for males was 0.33 lower, p=.0086).

Age had a significant impact on preferences for Medicines Use Review (mean increased by 0.17 for each of the age categories, (p<.01)), specialty medicines (mean increased by 0.14 (p<.01)for each age category), ordering and interpreting laboratory tests (mean increased by 0.14 (p<.05)for each age category) and technology and informatics for pharmacy (mean increased by 0.29 (p<.01)for each age category). Similarly, location of practice had a significant influence on preference for specialty medicines (mean increased by 0.28 for cities, p=0.03), Medicines Therapy Assessment (MTA) (mean decreased by 0.36 for cities, p=.0045), independent prescribing (mean increased by 0.25 for cities, p=.037), ordering and interprheting laboratory tests (mean increased by 0.38 for cities, p=.0025) and complementary medicines (mean decreased by 0.29 for cities, p=.02). Finally, ethnicity of respondents also appeared to influence preferences, with those of European descent placing higher preferences for skills in interprofessional health education (mean 0.09 higher, p=.013), comprehensive disease management (mean 0.37 higher, p=.0033), dispensing (mean 0.44 higher, p=.0033), medicines use review (mean 0.37 higher, p=.004), specialty medicines (mean 0.39 higher, p=.002), complementary medicines (mean 0.28 higher, p=.03), and technology and informatics education (mean 0.44 higher, p=.0006).

DISCUSSION

The purpose of this study was to use best-worst choice scaling to determine practicing pharmacists' preferences for prioritisation of pharmacy practice skills during curricular reform. The use of best-worst choice scaling was able to differentiate between prioritised skills. As shown in Table 2, the methodology was able to identify the priorities of practicing pharmacists with respect to pharmacy practice skills. Favoured skills were mixed between cognitive-based skills (such as comprehensive chronic disease management) and technical skills (such as dispensing). Skills that were not favoured included those that are perhaps more specialized and not necessarily generalizable to the larger population of practicing pharmacists. Examples of these types of skills were specialty compounding, independent prescribing, physical assessment, and business skills. As the largest group of respondents were employee pharmacists in community settings, it is not surprising that these specialized skills were not deemed of great importance. However, as staff community pharmacists make up the greatest percentage of pharmacists in New Zealand, these results are likely reflective of the current priorities of the largest practitioner group and, as discussed below, may have implications for curricular reform.

A notable finding from the best-worst choice analysis was that practicing pharmacists tend to prioritise duties/skills currently required of the profession, such as chronic disease management and dispensing, rather than emerging opportunities. New responsibilities of pharmacists in global settings, including injection training and prescribing, were not prioritised by this sample. There are many potential explanations for these findings, including the current scope of practice of pharmacists in New Zealand (ie, limited injection and prescribing roles), lack of training

opportunities for practicing pharmacists to upscale their own skills, limited reimbursement for expanded pharmacists services, or expectations that students are not yet 'practice ready' and will develop professional-oriented skills during the internship year.[16] The implications of these findings are interesting, as universities must balance stakeholder input with the need to train pharmacists for success in future practice. These results stress the need for universities to develop close ties with all stakeholders, including government and regulatory bodies, in order to better understand how the landscape of pharmacy practice may change and require different skills of pharmacists within the next 5-10 years.

The differences found with respect to participant demographics may also be important for educators, employers, and policymakers to consider. Results show that older participants preferred more practical skills, such as speciality medicines and technology/informatics. This finding may reflect older participants' awareness to learn skills required to enhance their practice, or it may be a function of younger participants' experiences with newer curricula that focus less on specific aspects such as specialty medicines. The differences in skill preferences by gender may suggest the need to consider how specific student populations are presented with the applicability of certain skills to practice. For example, females found interprofessional activities more important than males. Educators should be aware that these gender-based differences may apply to students in their undergraduate and postgraduate pharmacy programs and be ready to further investigate the reasons why this might be so. The same reasoning may be applied to ethnicity, where European descent pharmacists found skills such as interprofessional education, chronic disease management, and medicines use review more important. The reasons offered for the differences between these subgroups warrant further investigation because of the possible impacts these findings could have for experiential training and preceptor selection for assessment of program-required skill-based activities.

The results of this study have implications for curriculum reform. Teaching of pharmacy practice skills must be dynamic and respond to the emerging needs of society and the profession yet also ensure that graduates are equipped with the skills to satisfy expectations from preceptors, colleagues, and new employers when entering practice.[6] This study showed that some emerging skills are not yet preferred above some more traditional skills in the undergraduate curriculumby practicing pharmacists, and that training programs still need to ensure that graduates can function in traditional roles. Careful integration of new skills with traditional skills may therefore be required by programs to produce graduates that meet the expectations of the profession but who are also prepared for expanded responsibilities and practice niches. Therefore, the results of this study informed development of the skills program at the University of Otago but some 'newer' skills were also prioritized by program administrators to ensure preparation of the future workforce. Results also call for strengthening quality assurance mechanisms related to curricular to reform, in order to determine how changes to learning outcomes and pharmacy practice skills influences the perceived success of graduates in practice. Practice-based preceptors for the B.Pharm programme should be informed of curricular changes and expectations, in order to ensure students are fairly assessed across their full skill set. For countries that require internships or further training upon graduation from the university-based program, close relationships developed with these providers will help to ensure the continuum of skill development occurs until graduates are able to be deemed 'practice ready'. Lastly, this type of analysis may be considered for obtaining stakeholder input across different areas of curricular reform for programs seeking informed feedback.

The decision to sample pharmacists via email survey resulted in a small sample of mainly community employed pharmacists that reflects the practice setting of the majority of pharmacists in New Zealand. The small sample size may be driven by those interested in curriculum reform or those pharmacists who are linked to the program (eg, preceptors), which may have introduced selection bias. The group responding to the survey may have prioritised duties that they encounter in their daily practice. Future work could explore the perferences of pharmacists outside of the community setting by stratifying preferences of prescribing pharmacists and those working in primary care and hospital settings. Likewise, the sample of pharmacists was roughly representative of pharmacists in New Zealand; respondants were predominantly female, middle-aged, and identified as New Zealand European, therefore the views of male pharmacists, older pharmacists, and those identifying as non-New Zealand European merit further investigation. There were some differences in demographics of our sample and the profession including under representation of Asian ethnicity which accounts for 27% of the workfource but only 9% of our cohort. While the use of a Best-Worst choice scaling survey was an efficient way to collect data from a large number of pharmacists, it may not have included all skills that pharmacists might want to prioritise. It was also assumed that pharmacists would be familiar with the labels and descriptions of the skills when making their choices, however, it is possible participants may have conceptualized skills differently when making their choices about skills such as screening, technology, or infomatics.

CONCLUSION

Engagement of stakeholders is an essential component for curricular planning and reform. The use of best-worst choice scaling can efficiently capture input from large groups of people and can be used to discriminate between items

intended for rank ordering. When employed in this study, the use of this methodology found practicing pharmacists in New Zealand emphasize skills required for current practice and de-emphasize skills that may be required for emerging professional responsibilities. Results support the notion that if curricular reform is to include new skills that are largely unfamiliar (or deemed less important) by practicing pharmacists, quality assurance of students' experiential experiences paired with preceptor education about the expectation of students' skill sets must be adequately developed and addressed.

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Table 1. Pharmacy Practice Skills Included in the Study and Associated Descriptions

Skill	Description
Physical examination	The use of physical assessment knowledge and skills for disease management, injections and drug therapy evaluation and monitoring
Dispensing	Good dispensing practices ensure that an effective form of the correct medicine is delivered to the right patient, with clear instructions, and in a package that maintains the potency of the medicine. Includes all the activities that occur between when the prescription is presented and the time the medicine or other prescribed items are issued to the patient.
Specialty pharmacist only medications	Includes emergency contraception and trimethoprim for uncomplicated UTIs.
Business skills	Provides students with a working knowledge of important and fundamental aspects of pharmacy practice business including, but not limited to: management, marketing, strategic planning, motivational theories, and employment issues
Medicines Use Review (MUR)	MUR aims to improve understanding and adherence to medicines by identifying and addressing factors linked to non-adherence behaviours
Independent prescribing	Independent prescribing
Ordering of, and evaluating laboratory tests to monitor medications	Ordering of, and evaluating laboratory tests to monitor medications
Inter-professional health education	Occasions when two or more professions learn with, from and about each other to improve collaboration and quality of care
Complementary medicines	Complementary medicines
Medicines Therapy Assessment (MTA)	MTA is a systematic, patient-centred clinical assessment of all medicines and resolving medication-related problems
Optimising specific medicines	Specific medicines to be targeted for optimisation guided by defined testing/assessment criteria
Technology and Informatics	The use of information and communication technologies responsibly and effectively in patient care
Screening and intervention services	Targeted health screening/monitoring utilizing testing procedures available and appropriate in a pharmacy setting
Comprehensive Chronic Disease Management	Pharmacist provides a plan based on medicine history, drug related problem list with therapeutic goals and monitoring plan
Injections including vaccinations	Injections including vaccinations*
Specialty Compounding	Specialty compounding Pharmacy compounding is the art and science of preparing personalized medications for patients. Compounded medications are “made from scratch” – individual ingredients are mixed together in the exact strength and dosage form required by the patient.

UTIs=urinary tract infections; MUR=medicines use review; MTA=medicines therapy assessment
*Pharmacists in New Zealand can administer select vaccines but only after completing an approved, postgraduate vaccinator training course.

Table 2. Prioritization of pharmacy practice skills by best worst choice scaling relative to lowest ranked skill (specialty compounding)

	Coefficient Estimate	Standard Error
Comprehensive chronic disease management	2.34*	0.06
Specialty medications (like trimethoprim for UTIs, oral contraceptives, etc.)	1.99*	0.06
Medicines use review	1.71*	0.06
Dispensing	1.53*	0.06
Screening and intervention	1.42*	0.06
Optimising specific medications (such as oral anticoagulants)	1.39*	0.06
Interprofessional health education	1.23*	0.06
Medicines therapy assessment	1.10*	0.06
Business skills	0.91*	0.06
Ordering and interpreting lab tests for monitoring drug therapy	0.89*	0.06
Technology and informatics for pharmacy	0.87*	0.06
Complementary medicines	0.81*	0.06
Physical examination	0.28*	0.06
Injections including vaccinations.	0.28*	0.06
Independent prescribing	0.16$^{\phi}$	0.06

* all $p < .0001$ when compared to the reference category

$^{\phi}$ $p=.0052$ when compared to the reference skill

Figure 1. Example Survey Question Using Best Worst Choice Scaling