Setting priorities for physical examination in pharmacy education: A Delphi study

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The study aimed to define the role of physical examinations in drug therapy management, addressing variances among pharmacists' opinions. Its focus was on guiding educators to incorporate relevant examination skills into pharmacy programs.

L'étude visait à définir le rôle des examens physiques dans la prise en charge de la pharmacothérapie, en abordant les écarts entre les avis des pharmaciens. Son objectif était d'aider les éducateurs à intégrer les compétences pertinentes aux examens dans des programmes de pharmacie.

ABSTRACT

Background: As the scope of pharmacy practice is expanding, a growing number of pharmacists perform physical examination (PE) to gather additional information to monitor the effectiveness and safety of their patients' therapy. This professional activity calls for the development of comprehensive and valuable PE training. We sought to determine by consensus which PE tests should be given teaching priority in pharmacy education.

Methods: Using existing PE literature in pharmacy, we conducted an online Delphi survey from December 2021 to April 2022 with 16 pharmacists who practise in a variety of settings and/or who are considered experts in PE.

Results: After 2 Delphi rounds, consensus was reached to either include or exclude 27 PE tests in entry-to-practice programs. One last round allowed prioritizing the agreed-upon PE tests in terms of educational needs. Clinicians agreed that measuring blood pressure is indispensable and should be given teaching priority, followed by pulse rate, weight and blood glucose measurements. Endocrine system and head and neck examinations should be included in pharmacy programs, but their clinical usefulness was considered less important.

Discussion: We compared our results with PE literature in other health care disciplines. We found that only a few PE tests truly influence drug therapy management, that some examinations can be quite difficult to perform accurately and that without proper training and opportunities to retrain, skill decay can lead to dangerous misinterpretations. Pharmacy programs should consider focusing on teaching PE tests supported by evidence as having an impact on drug therapy management. *Can Pharm J (Ott)* 2024;157:70-76.

Introduction

In January 2021, new legislation defining the scope of practice in pharmacy in Quebec came into force and explicitly stated that pharmacists can assess the physical and mental state of their patients to optimize medication management.[1] Following in the footsteps of other provinces, Quebec pharmacists conducting their medical history interview can now perform physical examination (PE) to complete their data collection.[1] Although the concept of pharmacists performing PE is not novel,[2] this professional activity provokes a wide range of reactions in the pharmacy community, from enthusiasm to skepticism to incomprehension.[3] Traditionally, PE was performed by other health care professionals, such as physicians, but as pharmacists' expertise is expanding to include new professional activities, many pharmacists consider PE to be an essential skill.[4,5]

For practising pharmacists and pharmacy students, there is a need for comprehensive PE training to better integrate these skills into their practice.[6] PE involves systematically assessing the body and its functions and usually consists of 4 generic skills: inspection, palpation,

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KNOWLEDGE INTO PRACTICE

- Physical examination (PE) can be performed in pharmacies to assess patients' therapy, although there is no consensus within the pharmacy community regarding the relevance of PE tests.
- A consensus is necessary to help establish teaching priorities for which examinations to include in pharmacy curricula.
- PE training should prioritize examinations that (1) clearly demonstrate an added value in terms of drug therapy management, (2) can be easily implemented and adapted in a pharmacy setting, (3) offer high opportunities to practice and (4) have a low risk of misinterpretation and error.

MISE EN PRATIQUE DES CONNAISSANCES

- L'examen physique peut être effectué en pharmacie afin d'évaluer le traitement des patients, bien qu'il n'y ait pas de consensus au sein de la communauté des pharmaciens concernant la pertinence de ces examens.
- Un consensus est nécessaire pour aider à établir des priorités en matière d'enseignements concernant les examens à inclure dans le programme de pharmacie.
- Les formations sur les examens physiques devraient prioriser les examens qui 1) démontrent clairement une valeur ajoutée en termes de gestion du traitement médicamenteux, 2) qui peuvent être facilement mis en œuvre et adaptés à un milieu pharmaceutique, 3) qui offrent de nombreuses possibilités de s'exercer et 4) qui présentent peu de risque de mauvaise interprétation et d'erreurs.

percussion and auscultation.[7] Over the last decade, many initiatives have attempted to develop specific PE training for pharmacy practice.[8] Most of this training has demonstrated mixed results in terms of transfer of learning and persistent use in practice.

Despite formal PE training, many pharmacists still resist including PE in their practice. One possible explanation for these varying results can be that the content of current PE training might not be developed using a hypothesis-driven approach. In medical education, students are taught to perform hypothesis-driven PE[9]—as opposed to routine examination with no hypothesis in mind—to avoid misinterpreting the results and generating an incomplete diagnosis. Learning to perform PE without connecting it to a global patient assessment will most likely lead to poor change in practices.

Another reason why PE training is not consistently successful in pharmacy education might be the lack of focus on examinations that directly influence drug therapy management. Although the list of possible examinations to be performed by health care professionals is extensive, evidence is scarce as to which PE tests truly influence the decision-making process in pharmacy, as opposed to making a diagnosis. Moreover, some techniques used during PE require frequent training to prevent skill decay,[10,11] which can also explain why some pharmacists were uncomfortable performing certain examinations despite having completed a formal training.

Considering the lack of conclusive scientific evidence regarding PE in pharmacy, it seems pressing to obtain an expert consensus on PE tests that influence drug therapy management to better inform training for practising pharmacists and entry-to-practice programs. The purpose of this study was to reach a consensus regarding relevant PE tests in pharmacy practice that should be included in pharmacy curricula.

Methods

An online Delphi survey was designed and conducted following the recommendations of Hasson et al.[12] and Humphrey-Murto et al.[13] and published examples of Delphi surveys with similar research questions.[14]

Panelists were preceptors in our entry-to-practice program at the Faculty of Pharmacy at Laval University. The internship team at the Faculty of Pharmacy provided a list of potential panelists who act as role models regarding pharmacy practice. They were contacted through email. Sixteen pharmacists who practise in a variety of settings (community, hospital, rural, urban, etc.) and who are considered experts in this area in the province of Quebec agreed to participate in the Delphi survey. Participants remained anonymous during all rounds of the survey, with the aim that they could express opinions without fearing external pressures. The researchers remained blind during the analysis; only a research assistant had access to personal information and made sure to extract anonymous data from LimeSurvey[15] prior to analysis.

The initial survey was guided by a systematic evaluation of the literature on PE tests proposed for pharmacists[16-19] and by the result of a national survey on what pharmacy schools currently teach.[20] A list of 49 PE tests was generated covering all body systems (see Table 1 for the complete list). The data collection was conducted from December 2021 to April 2022. We originally planned 2 or 3 rounds to reach consensus on most of the potential PE tests. We anticipated that a few examinations would remain without consensus, typically the ones that are not commonly used in current pharmacy practice. When we believed that an additional round would not allow us to obtain more consensus due to attrition and considering the nature of the remaining tests, we planned to continue with the last phase

TABLE 1 List of physical examination tests proposed for pharmacists[16-20]

Temperature	Peripheral pulse
Respiratory rate	Abdominal examination
Pulse	Kidney punch
Blood pressure	Postural evaluation and gait
Skin inspection	Muscle and joint examination
Eye (visual inspection)	Spine examination
Visual acuity	Shoulder examination
Visual fields	Elbow examination
Eye palpation	Hand examination
Ear visual inspection	Carpal tunnel examination
Ear palpation	Hip examination
Otoscopy	Knee examination
Auditory acuity	Ankle and feet examination
Air and bone conduction of the ear	Neurological examination
Head and neck inspection	Extrapyramidal symptoms
Nasal cavity inspection	Extremities (hand and foot) examination
Sinus transillumination	Thyroid examination
Oxygen saturation	Endocrinology visual examination (hair, nails, eye)
Peak flow meter	Blood glucose
Pulmonary examination	Breast examination
Weight	Female genitalia
Cardiac auscultation	Male genitalia
Jugular venous pressure	Femoral and inguinal regions
Hepatojugular reflux	Prostate examination
Peripheral edema	

of the Delphi survey and ask participants to prioritize the agreed-upon PE tests in terms of clinical usefulness and potential teaching priority. Figure 1 illustrates the study design.

In the first Delphi round, participants were asked to rate the extent to which each 49 PE tests should be included in entry-to-practice pharmacy programs on a 5-point Likert scale ("definitely include," "possibly include," "neutral," "possibly exclude," "definitely exclude"). In addition, the panelists were invited to provide additional PE tests that might have been foreseen or any comments related to the research question. The questionnaire used for the rating procedure was sent via email as a LimeSurvey[15] link after it had been tested among work group members for comprehensibility. If individual ratings were missing or questionnaires were not returned, reminder emails were sent to inquire whether the panelist was still willing to continue the study.

After completion of the first iteration, the research team compiled results and eliminated from the questionnaire the PE tests for which a consensus was already reached. We defined consensus as an agreement of 70% or more to either definitely/possibly include a PE test or to definitely/possibly exclude a PE test[13] (i.e., if >70% of the participants agreed to either definitely include and/or possibly include blood pressure measurement in pharmacy programs, we considered this result consensual).

The questionnaire for the second Delphi round comprised the PE tests for which no consensus was reached after the first round plus any additional tests suggested by the respondents after the first round. In the second round, participants rated the remaining PE tests on a 4-point Likert scale regarding the extent to which they should be included in entry-to-practice programs. We removed the item "neutral" from the list of possible answers to optimize the chances of reaching a consensus. The second round resulted in consensus on 7 additional PE tests.

For the third and last Delphi round, we provided a list of all PE tests that reached consensus to definitely/possibly include after the first 2 iterations and asked participants to prioritize them in terms of clinical usefulness to help determine which should be taught as a priority in pharmacy programs. The list comprised 15 examinations.

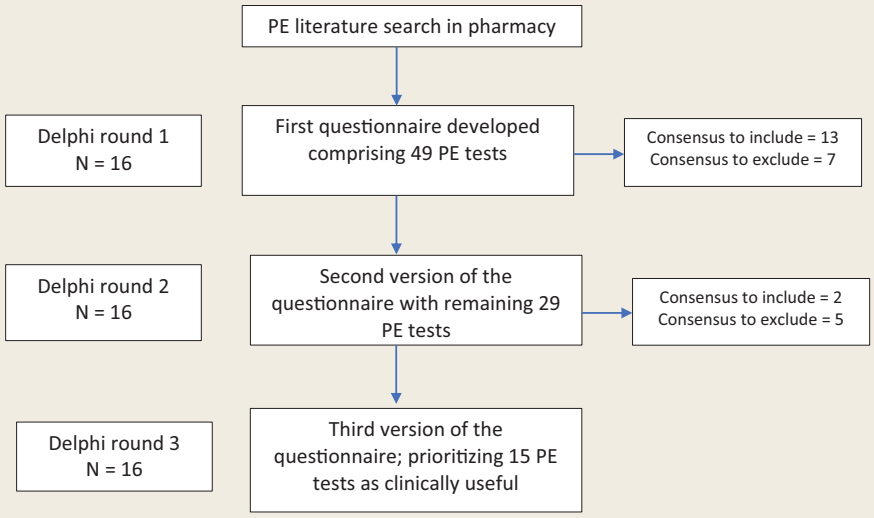
Ethics approval was granted by the ethics review board at Laval University (2021-204/08-11-2021).

Results

Sixteen pharmacists practising in Quebec agreed to participate in this study out of the 42 originally solicited. The majority had between 5 and 20 years of experience (69%). Most of the participants (75%) had a bachelor's degree or a PharmD and 19% had a master's degree. Nine were practising in community settings (56%), 3 in rural settings (19%) and 3 in hospital settings (19%). One panelist was working mostly in academia (6%).

After the first Delphi round, 20 PE tests yielded consensus to either include[13] or exclude[7] them from entry-to-practice pharmacy programs (Table 2). The second round led to an agreement on 7 additional PE tests to either include[2] or exclude[5] from pharmacy programs. Twenty-two PE tests remained with no agreement after 2 Delphi rounds. Considering that participants did not change their answers between the first 2 rounds regarding these examinations and that some were even unanswered, we decided to continue with the final round and ask panelists to prioritize in terms of clinical usefulness the 15 PE tests for which an agreement to include was obtained, thus concluding the Delphi rounds. Table 3 shows the priority order

FIGURE 1 Study design



for the agreed-upon PE tests relevant to pharmacy education. The top 5 tests are blood pressure, pulse, weight, blood glucose and temperature.

Discussion

In this study, we found that there was strong agreement among our panelists about performing many PE tests in community pharmacy and that these same examinations should be taught as priorities in entry-to-practice pharmacy programs. PE tests that were prioritized during the third Delphi round are typically ones that are already widely performed in community pharmacy, such as blood pressure and blood glucose measurements. It is therefore not a surprise to find these examinations at the top of the list, considering that pharmacists feel comfortable performing the tests in their clinical setting and already use the information to manage patients' therapy. However, many clinicians and health care students fail to accurately measure high blood pressure in either a simulated or a real setting despite being trained,[21,22] suggesting that the proper technique is actually more challenging than it seems. Moreover, a one-time blood pressure measurement in a medical office is, in most cases, not accurate enough to confirm high blood pressure.[23] Home blood pressure monitoring better informs the decision-making process, and evidence suggests that a 24-hour ambulatory blood pressure monitoring remains the standard of reference to guide further management.[23] For all these reasons, if blood pressure measurement should be taught in pharmacy programs to better inform our decisions, proper training needs to be developed, including repeated practise and a variety of cases. Opportunities to retrain this skill must be available.

Our panelists also strongly agreed to exclude male and female genitalia and breast and prostate examinations from pharmacy programs. These results were not surprising, considering that very few pharmacy schools include these examinations in their curriculum[8,18] despite their being listed in patient assessment references.[19] Some of these examinations are considered invasive and could therefore not be performed in community pharmacies in Quebec, as stipulated in the current legislation. Moreover, these PE tests are typically less sensitive than more advanced technology[24] and/or add very little relevant information that would directly influence drug therapy management.[25,26] Supported by PE literature and as recommended by our panelists, these examinations can probably be left out of pharmacy curricula to allow us to concentrate our efforts on developing PE training that impacts drug therapy management.

Even after 2 Delphi rounds, our panelists did not reach an agreement on eye examination. After the second round, our results were approaching a consensus to exclude it from the program, which was unexpected, considering the prevalence of consultations in pharmacy regarding eye symptoms[27] and the in-class time allotted to eye problems in pharmacy training. In addition, a visual inspection of the eye can provide very relevant information when it comes to establishing a diagnosis[28] and recommending over-the-counter medication in pharmacy. This surprising result can potentially be explained because a comprehensive eye examination would comprise eye palpation and visual field and visual acuity assessment; these examinations are typically not performed in pharmacy.

After the first Delphi round, otoscopy was considered important to include in entry-to-practice pharmacy programs. Our panelists believed that this examination could improve patient management even though it is not yet

TABLE 2 Agreement (percentage) to include or exclude PE tests in entry-to-practice pharmacy programs for the first 2 Delphi rounds ($N = 16$)

	% Agreement
First Delphi round	
Consensus to include	
Temperature	88
Respiratory rate	81
Pulse	100
Blood pressure	100
Skin inspection	88
Ear visual inspection	88
Otoscopy	75
Oxygen saturation	88
Weight	100
Peripheral edema	100
Extrapyramidal symptoms	81
Endocrinology visual examination (hair, nails, eye)	81
Blood glucose	100
Consensus to exclude	
Eye palpation	75
Abdominal examination	75
Breast examination	100
Female genitalia	100
Male genitalia	100
Femoral and inguinal regions	94
Prostate examination	88
Second Delphi round	
Consensus to include	
Head and neck inspection	94
Peak flow meter	75
Consensus to exclude	
Visual fields	75
Air and bone conduction of the ear	81
Sinus transillumination	75
Spine examination	75
Hip examination	75

TABLE 3 Clinical usefulness and teaching priority of PE tests for entry-to-practice in pharmacy programs as determined through the third Delphi round

Rank	PE examination
1	Blood pressure
2	Pulse
3	Weight
4	Blood glucose
5	Temperature
6	Respiratory rate
7	Skin inspection
8	Oxygen saturation
9	Ear visual inspection
10	Peripheral edema
11	Otoscopy
12	Peak flow meter
13	Extrapyramidal symptoms
14	Endocrinology visual examination (hair, nails, eye, skin)
15	Head and neck inspection

implemented in community pharmacy in Quebec due to lack of formal training. Interestingly, evidence indicates that lack of improvement in acute otitis media after 3 days of an appropriate antimicrobial regime suggests either antimicrobial resistance or misdiagnosis, in which case otoscopy does not bring discriminating information.[29] Otoscopy in pharmacy does not seem to contribute significantly to drug therapy management, in addition to being rather difficult to interpret accurately.[30] Therefore, although our panelists considered this examination helpful, evidence is not convincing regarding its relevance to pharmacy practice, and it should probably not be prioritized in PE training considering its limited value.

In many pharmacy programs, pulmonary and cardiac examinations, including auscultation, are taught[20] to help assess a variety of problems, such as pneumonia, chronic obstructive pulmonary disease and congestive heart failure. In our Delphi survey, our panelists did not reach a consensus to include these PE tests in the pharmacy curriculum. Of note, the presence of grunting, intercostal drawing and nasal flaring appear more specific than auscultation to confirm pneumonia[31] and there does not seem to be a specific sound that can either confirm or exclude a diagnosis of pneumonia.[32]

There is no evidence indicating that pulmonary auscultation can inform drug therapy management, as opposed to diagnosis. Regarding congestive heart failure, cardiac or pulmonary auscultation can inform the decision to modify the drug therapy only if other data (weight, peripheral edema, laboratory results, radiographs) are collected and corroborate the evaluation.[33] Furthermore, false-positive results are frequent, and consequences of misinterpreting the results can be quite damaging for the patient. The skill must be learned through extensive training and must be frequently practised and retrained after time to prevent skill decay. The added value of pulmonary and cardiac examination performed by pharmacists in community settings for drug therapy management has yet to be demonstrated.

Contrary to other pharmacy programs, our panelists did not perceive the value of examining the extremities of diabetic patients. After the first round, the results almost yielded a consensus, but in the second round, it seemed that some participants changed their mind, leaving the matter unresolved. This result is surprising, since the examination is rather simple to execute and requires very little material (examination room, monofilament and gloves). Moreover, the results of this test can be very revealing and can prevent complications when problems are detected early.[34] Pharmacists are in a good position to include diabetic foot screening in their pharmacies and can play a crucial role in preventing serious complications.[35] Despite our panelists' opinion, the literature suggests that pharmacists should consider implementing diabetic foot screening in community settings.

Limitations

The main limitation of this study is that although the panelists were selected based on their high quality of practice and expertise in the field, there may have been some lack of knowledge regarding certain examinations, explaining some discrepancies within the results. For example, eye palpation was excluded in the first round, and eye examination has not yielded consensus. We can also assume that the potential clinical value for pharmacists of some of the tests included in the questionnaire was unknown for some panelists, as they preferred not to answer or rank certain tests. Finally, the survey reflects the current practice in the province of Quebec only. Other provinces have a longer history of PE in pharmacy, and the potential value of certain examinations might be clearer in these provinces.

In conclusion, PE plays a role in patient assessment in pharmacy, combined with other objective and subjective data. It is therefore important to include PE in pharmacy curricula to better prepare future pharmacists in evaluating their patients. Students must be provided with sufficient practice and a variety of situations to master the techniques and have frequent opportunities to maintain their skills in clinical practice. As educators, PE training should prioritize examinations that (1) clearly demonstrate an added value in terms of drug therapy management, (2) can be easily implemented and adapted in a pharmacy setting, (3) offer high opportunities to practise and (4) have a low risk of misinterpretation and error. PE training for pharmacists and pharmacy students should focus on reconciling these important variables, even if this means limiting the number of examinations included during this training to the most relevant ones. ■

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