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Physical Assessment Skills Used by Registered Nurses

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Nursing educators must continually evaluate and adapt nursing curricula to ensure that the education prepares students for practice. Nursing acts and entry-to-practice competencies require nurses to undergo comprehensive nursing assessments post-licensure (Canadian Association of Schools of Nursing, 2015; Russell, 2017). To achieve this, nursing educators need to prepare students to think critically, use skills, meet competencies, and promote ongoing professional development to align their nursing practice with a rapidly changing health care system (Institute of Medicine Committee on the Robert Wood Johnson Foundation Initiative on the Future of Nursing, 2011).

Graduate nurses must be flexible and possess the ability to adapt their practice to meet the needs of complex patients. As such, graduate nurses must be proficient in performing physical assessment skills, an essential component of daily assessments. Physical assessment skills are taught in nursing curricula around the globe, with variations in the type and number and year taught. A scoping review found that 23 physical assessment skills were taught in 90% of Australian nursing programs, 30 core skills were routinely taught in Italy, and 99 skills were routinely taught in more than 50% of nursing programs across the United States (Morrell et al., 2021). Physical assessments require competency in inspection, percussion, palpation, and auscultation of various systems (Astle et al., 2019; Fennessey & Wittmann-Price, 2011; Jarvis et al., 2019).

The increasing complexity of patient care in health care settings and the risk of failure to rescue (Osborne et al., 2015) requires graduate nurses to be proficient in physical assessment skills to make appropriate clinical decisions and implement nursing interventions to ensure a safe and competent practice (Fennessey & Wittmann-Price, 2011). Local educators often decide on the physical assessment skills taught or added to nursing curricula, which may not necessarily reflect current practice. Therefore, it is necessary to explore physical assessment skills used by nurses in practice. This study aimed to determine which physical assessment skills nurses routinely performed in practice and whether the number or type of practice settings influenced which assessment skills were used.

Background

Nurses work in a wide variety of practice settings. Sixty-five percent of Ontario registered nurses (RNs) are employed in hospitals, 16% in the community, and 8% in long-term care (Canadian Institute for Health Information, 2020). Educators in nursing programs need to prepare their graduates with foundational knowledge of physical assessment skills, allowing them to competently assess various patients across the lifespan and across health care settings. Additionally, graduate nurses require the ability to readily interpret the findings of these physical assessments to plan, implement, and evaluate their care.

Eighty-eight percent of the RNs employed in Ontario receive their nursing education in Canada (Canadian Institute for Health Information, 2020). This fact provides many opportunities for educators at Ontario colleges and universities to shape nursing practice. Moreover, it is essential for nursing educators to continually evaluate and adapt nursing programs to ensure that the curricula prepare students to practise in a variety of health care settings. Nursing curricula need to provide students with both theoretical and practical application of physical assessment skills, ensuring they are competent to perform and interpret findings. Providing many opportunities for students to practise and master essential physical assessment skills throughout their educational program is critical to ensure appropriate application as graduate nurses (Douglas et al., 2015).

Nursing programs need to provide enough opportunities to solidify students' competency and confidence (Zambas, 2010).

The challenge for educators is determining the essential skills and level of knowledge required in nursing programs (Coombs, 2018; Hickey et al., 2010). New technology, increasing patient complexity, evolving models of care and settings, and expanding scope of practice all influence what and when content is added to nursing curricula (Baker, 2014; Birks et al., 2013; Canadian Association of Schools of Nursing, 2010; Collier, 2017). To prepare students for postgraduate practice, nursing educators may inadvertently oversaturate curricula by incorporating too much evidence-based knowledge.

Oversaturation can result in a theory-to-practice gap between physical assessment skills taught in the academic setting and those used by nurses in practice. Avoiding theory-to-practice gaps requires examining which physical assessment skills are routinely used by RNs in practice and refining nursing curricula to ensure graduates are competent to practise. Previous research found that RNs use 15.36% of the physical assessment skills taught in their nursing program (Shi et al., 2020). A global scoping review reported 10 out of 20 core physical assessment skills taught in nursing curricula were performed by RNs in practice (Morrell et al., 2021). We set out to explore which physical assessment skills were routinely performed by a group of RNs and whether the number or type of practice settings influenced which assessment skills were used. This study will inform curriculum development by providing information about the physical assessment skills currently used in practice and add to previous findings by exploring the relationship with type and number of practice settings to generate potential hypotheses for future research.

Methods

Study Design

We conducted a cross-sectional study at a mid-sized university in central Canada. Ethics approval was received (REB #18-065). Participants were informed during recruitment that the study was voluntary and that survey completion demonstrated implied consent.

Population

We distributed a survey link to access Qualtrics Survey Solutions to RNs with recent clinical experience employed by the university. To ensure clinical expertise, the university required hires to have at least five years of clinical experience. This group was selected because, as university educators, they had prior knowledge of how to accurately perform and interpret the physical assessment skills currently taught in the university curriculum. Study eligibility included persons who (a) had completed baccalaureate nursing degree, (b) had a minimum of 9100 hours of work experience as an RN, (c) were registered with their professional regulatory college and were entitled to practise with no restrictions at the time of survey completion, and (d) were currently employed as an instructor at the university.

Instrument

Qualtrics Survey Solutions, a password-protected software program, was used to create the survey. The physical assessment survey was derived using the physical assessment skills taught in the university nursing program. The physical assessment skills taught in the program are determined based on the competencies required for nursing licensure and the textbooks used in the university curriculum. The survey asked participants about their current or past clinical practice experience working as an RN. Participant identifiers or demographic information, including years

of practice and concurrent clinical practice, were not collected to prevent the identification of participants, given the faculty's relatively small size.

There were 35 physical assessment skills listed in the survey. As revealed in the hallmark survey developed by Giddens (2007), the skills taught in this university program were selected based on reviewing current physical assessment textbooks. Additionally, faculty at this university examined best practice guidelines and reviewed relevant global literature on the topic (Anderson et al., 2014; Cicolini et al., 2015; Douglas et al., 2015; Osborne et al., 2015; Kohtz et al., 2017). To determine content validity, university faculty members with clinical expertise and who currently or previously taught physical assessment skills provided input into the appropriateness of the material. Adaptions were made based on their suggestions.

The physical assessment skills were categorized under the following assessment categories: general, respiratory, cardiac, arterial, abdominal, head, eye, ears, nose, and throat (HEENT), and neurological. Respondents selected whether they performed any or all the physical assessment skills during their years of clinical practice. Likert scale items were used for these questions and included the following options regarding the frequency of clinical skills performed: 1 = never, 2 = occasionally, or 3 = routinely. Routinely was selected if the skill was performed every time or the majority of the time the RN worked. Before distribution of the final survey, a pilot version was anonymously completed by 37 participants. Changes to the survey were made based on the pilot and a new survey was distributed. These participants could have completed the final anonymous survey; however, we analyzed only responses from the finalized survey version. A Cronbach's alpha of .786 demonstrated the internal consistency of the survey items. An acceptable level of Cronbach's alpha is equal to or greater than .7 (Bannon, 2013).

Data Collection

Individuals who met the inclusion criteria were sent an introductory email by nursing administration, through the university email system, which provided a hyperlink to access the survey. A reminder was sent after two weeks. Online completion automatically forwarded the survey results to the principal investigator, and the findings were archived by Qualtrics Survey Solutions. Participants were prevented from completing the survey more than once. Alternatively, participants had the option of completing a paper version of the survey, if they had not previously completed the online version. Paper surveys were completed and collected by a research assistant during a faculty workshop. Consent was implied with survey completion and return. The survey was open to participants for one month; data were analyzed after the survey closing date. All study participants were offered a $2.00 coffee card upon completion of the survey.

Analysis

A power analysis was performed using G*Power 3. Using a conservative effect size of 0.2, a 95% confidence interval, and a power of 80% estimated for four site cohorts, we calculated the required sample size to be 320 participants. Before analysis, data were screened for the presence and pattern of missingness. Missing data were handled using a pairwise deletion approach to retain the sample size where possible. We elected to dichotomize Likert items assessing the use of physical assessment skills to prevent data truncation, given the small sample size. Assessment items were analyzed with the options of *routine* use or *occasional/absent* use of assessment skills. Measures of frequency and central tendency are reported to describe the participant's practice setting and physical assessment skills used. Given the small sample and cell sizes, a series of Fisher's exact tests were conducted to compare the proportion of RNs who routinely practised

assessment skills by the number of clinical practice sites. A Kruskal-Wallis test was conducted to determine the association between the number of clinical sites worked and the median number of skills implemented routinely in practice throughout the RN's nursing career. Statistical inferences were based on a two-tailed alpha of 0.05 or a 95% confidence interval (CI).

Results

The Physical Assessment Survey was sent to all nursing instructors meeting the inclusion criteria (N = 82). Forty-nine surveys were returned, generating a return rate of 59.8%. There was an even split between instructors who completed the online version (n = 24) and those who completed the paper version (n = 25). Missing data was scant (<1%). Two participants did not report their prior or current place of employment. Thus, these participants were excluded from all inferential statistics. One participant did not report on the use of the Romberg test in clinical practice. Most respondents reported having prior or current medical-surgical experience (n = 32; 65.3%), followed by critical care (n = 21; 44.7%). Experience in neonatal intensive care, neurology, and occupational health were each reported by only one participant. Table 1 displays the frequency and proportions of reported clinical experience.

Table 1

*Reported Nursing Practice Settings (*n = *47)*

Practice setting	*n* (%)
Medical-surgical	32 (65.3)
Critical care	21 (44.7)
Long-term care	11 (22.4)
Palliative care	11 (22.4)
Community	9 (18.4)
Mental health	7 (14.3)
Obstetrics/gynecology	7 (14.3)
Pediatrics	6 (12.2)
Other	12 (24.5)

Note. Participants may have multiple sites.

Other sites (*n*) = complex care/rehabilitation (3), oncology (2), neonatal intensive care (1), neurology (1), occupational health (1), post-operative acute care unit (1), undeclared (2)

Physical assessment skills were placed in categories based on median. Respondents identified 25 physical assessment skills as being performed *routinely* in their clinical practice, three were *done occasionally*, and seven were *not done at all*. Two of the skills were performed by 100% of the participants, while another nine skills were routinely performed by 80%. These skills included general survey, inspect and palpate skin, auscultate lungs and heart sounds (S1 and S2), palpate and auscultate abdomen, palpate peripheral pulses, assess peripheral edema and capillary refill, and assess any cranial nerves.

Assessing rebound tenderness, completing cerebellar testing, and performing a stroke assessment were reported as being performed occasionally. Respondents reported not performing lung percussion, measuring diaphragmatic excursion, or measuring jugular venous pressure. They

also did not perform abdominal tests (psoas, obturator, or Rovsing), measure ankle-brachial index, or perform internal eye or ear exams (see Table 2 for physical assessment skills routinely performed).

Table 2

*Assessment Skills Performed Routinely in Clinical Practice (*n = *49)*

Physical assessment	Done routinely *n* (%)
Inspect skin [a]	49 (100)
Palpate skin [a]	49 (100)
Auscultate lungs [a]	48 (98.0)
Auscultate abdomen [a]	48 (98.0)
Palpate peripheral pulses [a]	48 (98.0)
Assess peripheral edema [a]	48 (98.0)
Assess capillary refill [a]	46 (93.9)
Auscultate heart sounds (S1/S2) [a]	44 (89.8)
Palpate abdomen [a]	42 (85.7)
Assess any cranial nerves [a]	41 (83.7)
General survey (mental status, level of consciousness and speech) [a]	40 (81.6)
Auscultate heart sounds (murmurs, S3/S4)	36 (73.5)
Gait assessment	36 (73.5)
External eye exam	33 (67.3)
Chest expansion	32 (65.3)
External ear exam	24 (49.0)
Muscle grading	23 (46.9)
Spinal cord assessment	21 (42.9)
Inspect jugular vein distention	18 (36.7)
Palpate lymph nodes	15 (30.6)
Reflexes	15 (30.6)
Romberg test [b]	11 (22.4)
Percuss abdomen	10 (20.4)
Palpate thyroid	10 (20.4)
Assess Murphy’s sign	8 (16.3)

[a] Skills reported as routinely done by > 80% of participants.
[b] One participant did not respond.

When specifically examining practice settings, the total number of practice settings per RN ranged from one to six, with the median number of practice settings being two (n = 17, 32.7%). Nine participants worked in only one area (19.1%), while another nine worked in four or more clinical settings (19.1%). The participants working in one setting varied from medical-surgical (n = 5), pediatrics (n = 1), critical care (n = 1), and obstetrics/gynecology (n = 2). The median number of skills routinely used for those who practice in one, two, three, or four-plus settings were 15, 17, 17, and 14, respectively. The interquartile range for all values was 2.

Comparisons were made between skills identified as routinely performed in practice (see Table 2). One hundred percent of the participants who had one practice setting routinely performed 6 out of the 11 skills, and >80% routinely performed 8. One hundred percent of participants who practised in three settings routinely performed 6 skills; 11 skills were routinely performed by >80%. Of those who practised in four or more sites, >80% of the participants routinely used 9 of the 11 skills (see Table 3). The median number of core skills routinely performed in clinical practice was not statistically significant (x^2 = 4.03; p = .25).

Table 3

*Routinely Performed Assessment Skills by the Number of Practice Sites (*n *= 47)*

Physical assessment	One site *n* (%)	Two sites *n* (%)	Three sites *n* (%)	Four + *n* (%)
General Assessment				
Inspect skin [a]	9 (100)	16 (100)	13 (100)	9 (100)
Palpate skin [a]	5 (55.6)	14 (87.5)	11 (84.6)	8 (88.9)
General survey [a]	8 (88.9)	15 (93.8)	13 (100)	9 (100)
Respiratory assessment				
Auscultate lungs [a]	9 (100)	15 (93.8)	13 (100)	9 (100)
Chest expansion	6 (66.7)	10 (62.5)	8 (61.5)	7 (77.8)
Cardiac assessment				
Auscultate heart sounds (S1/S2) [a]	8 (88.9)	15 (93.8)	11 (84.6)	8 (88.9)
Auscultate heart sounds (murmurs, S3/S4)	6 (66.7)	14 (87.5)	10 (76.9)	5 (55.6)
Inspect jugular vein distention	3 (33.3)	7 (43.8)	5 (38.5)	3 (33.3)
Arterial/venous assessment				
Palpate peripheral pulses [a]	9 (100)	15 (93.8)	13 (100)	9 (100)
Assess peripheral edema [a]	9 (100)	15 (93.8)	13 (100	9 (100)
Assess capillary refill [a]	9 (100)	15 (93.8)	12 (92.3)	8 (88.9)
Abdominal assessment				
Auscultate abdomen [a]	9 (100)	15 (93.8)	13 (100)	9 (100)
Palpate abdomen [a]	7 (77.8)	14 (87.5)	12 (92.3)	7 (77.8)

Percuss abdomen	1 (11.1)	5 (31.3)	3 (23.1)	1 (11.1)
Assess Murphy's sign	0	3 (18.8)	3 (23.1)	4 (22.2)
HEENT assessment				
External eye exam	6 (66.7)	12 (75.0)	10 (76.9)	4 (44.4)
External ear exam	3 (33.3)	11 (68.8)	6 (46.2)	3 (33.3)
Palpate lymph nodes	0	7 (43.8)	4 (30.8)	4 (44.4)
Palpate thyroid	0	7 (43.8)	1 (7.7)	2 (22.2)
Neurological assessment				
Assess any cranial nerves [a]	7 (77.8)	15 (93.8)	11 (84.6)	7 (77.8)
Gait assessment	6 (66.7)	14 (87.5)	6 (46.2)	8 (88.9)
Romberg test [b]	1 (12.5)	6 (37.5)	2 (15.4)	1 (11.1)
Muscle grading	4 (44.4)	8 (50%)	7 (53.8)	4 (44.4)
Spinal cord assessment	4 (44.4)	6 (37.5)	6 (46.2)	5 (55.6)
Reflexes	3 (33.3)	4 (25.0)	5 (38.5)	3 (33.3)
Total	132	278	211	146

[a] Skills reported as routinely done by >80% of participants in Table 2. [b] One participant did not respond.

Discussion

This study examined routine physical assessment skills used by RNs in practice. Results revealed that 25 of the 35 core physical assessment skills were routinely performed in practice. Furthermore, 11 of the skills are routinely performed by more than 80% of participants. Findings regarding physical assessment skills performed by RNs in this study are consistent with prior studies from around the world: Anderson et al. (2014), United States; Birks et al. (2013), Australia; Giddens (2007), United States; Oh et al. (2012), Korea; and Osborne et al. (2015), Australia. These studies were mainly based on 30 physical assessment skills established in a hallmark study conducted in the United States by Giddens in 2007. Similar results were also found in a study conducted by Oh et al. (2012), who ranked the frequency of the same 30 physical assessment skills. In 2014, Anderson et al. added seven skills to Giddens's original 30. Again, findings were the same as our study except for the inspection of male genitalia, which was in the study by Anderson et al. Of 13 core skills reported by Birks et al. (2013), 10 were similarly performed by participants in our study. A global scoping review conducted by Morrell et al. (2021), found that RNs routinely performed 39 physical assessment skills, 11 of which were considered core skills (performed across all studies). Six of these core skills were similar to skills routinely performed by participants in our study.

Although many similarities were found between the above noted studies in comparison to ours, there were also some differences. Assessment with the Glasgow Coma Scale is routinely performed in most of the studies discussed above; participants in our study did not routinely use the Glasgow Coma Scale. The Glasgow Coma Scale is designed to assess for impaired consciousness in patients with brain injuries. Although the scale has been updated, it is still recommended for use only in the care of patients at risk for acute brain damage (Teasdale et al., 2014). The study by Osborne et al. (2015) included taking vital signs in physical assessment skills.

Taking vital signs was in the top five regularly performed skills in Osborne's study. Many authors do not include the taking of vital signs as physical assessment skills. To be consistent with the majority, we elected not to include vital signs in our survey.

A novel feature of this study is the comparison of skills across multiple clinical practice areas. Participants in our study worked in various health care settings, ranging from one to six, with most having a medical-surgical background. Many of the routine physical assessment skills in our study were performed most often by participants who worked in three settings in their practice. This finding is similar to Osborne et al. (2015), as they reported that the use of physical assessment skills differed by clinical area, with RNs working on surgical units performing the highest number of physical assessment skills and RNs working on mental health units performing the least. Interestingly, the participants in our study who worked in four or more settings used fewer skills than those who worked in two or three areas. Though not an objective of this study, a qualitative component could have provided participants' perspective regarding the decreased use of skills with multiple practice sites. There could be various reasons, such as the small number of participants working four or more settings, the specific setting or patient population in the area, or the fact that nurses working in multiple settings do not have time to familiarize themselves with context-specific competencies. Future mixed methods studies could explore this topic further. It was not surprising that RNs working in only one practice setting used fewer skills than those who practised in two or three settings.

Nursing educators must continually evaluate their curricula to determine whether the physical assessment skills taught are reflective of current practice. Educators must consider incorporating input from RNs who practise in various settings when determining which physical assessment skills are essential for undergraduate nursing curricula. Identifying physical assessment skills routinely used in practice can help direct curricula revisions as the information gathered from RNs provides an accurate reflection of the skills used by today's nurses.

Implications for Practice

Results from this study can be used to guide undergraduate nursing curricula development and revisions. Educators should examine the physical assessment skills that are taught in curricula and compare them with the skills that are currently performed by RNs in practice. This process would allow educators to determine which physical assessment skills are essential to include in nursing curricula. Additionally, including physical assessment skills in nursing curricula that reflect skills performed in various settings ensures that nursing curricula are diverse enough to meet practice expectations in various health care sectors. Nurses graduating from programs with established core physical assessment skills can increase the consistency in the provision of patient care.

Implications for Research

Future research studies examining physical assessment skills are suggested using larger samples sizes. Additionally, studies completed at multiple sites across Canada, would provide information regarding the physical assessment skills used in various practice settings and organizations. Future studies can expand on physical assessment skills by including wound and lesion assessments and vital signs. Furthermore, to gain insight about differences between RN career lengths and physical assessment skill use, future studies should include questions about years of nursing experience. A mixed methods approach would also provide the perspective of RNs in practice, which would add richness to the findings.

Limitations

Despite the unique nature of the research question, this study has limitations. First, our study was underpowered based on our sample size calculation. The exploratory nature of this study negates the significance of this calculation, given that this study was purposed to provide novel findings and the first of its kind to support hypothesis generation moving forward. The limited sample size also inhibited the statistical adjustment for potential covariates. It is possible that persons who completed the pilot survey also completed the finalized survey although this is unlikely given the difficulties experienced with recruitment.

Further, data collection from a single site limited the external validity of findings. Collecting data from additional sites and geographical locations may produce different results and allow for examination of the study site as a potential moderating effect. Another limitation of this study was the use of an online version of the survey, which required access to a computer for completion. A paper version was offered to mitigate the requirement for a computer; however, participants were required to attend a workshop to complete it. Both the online and the paper versions limited participation to RNs with computer access or those attending the workshop. Finally, we were unable to collect data on participant demographics, given that an instructor could easily be identified within the small pool of clinical instructors.

Conclusion

The ability of RNs to care for patients in a wide array of clinical settings is often viewed as beneficial by nursing employers and clinicians. Nurses must be able to function competently within an evolving health care system and possess the ability to safely care for patients across the lifespan and across sectors. Accordingly, it is critical that nursing educators establish and deliver a diverse, didactic, and comprehensive nursing program, one that ensures graduates are competent to practise in a variety of health care settings. Competency in performing and interpreting physical assessment skills that are routinely performed in a practice will lead to well-prepared nursing graduates who can practise in a wide variety of settings, greater consistency in care, and ultimately improved patient outcomes.

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