NURSES' KNOWLEDGE OF GERIATRIC NURSING CARE IN CANADIAN NICHE HOSPITALS

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ABSTRACT:

The purpose of this study was to explore the association between geriatric nursing knowledge, nurse characteristics and institutional characteristics among a sample of registered nurses and registered practical nurses working in 14 NICHE member hospitals in three Canadian provinces. This research study employed a mixed-methods approach to analyzing the current study objectives. This was a secondary analysis of quantitative and qualitative data from the Geriatric Institutional Assessment Profile (GIAP). Mixed methods analysis focused on quantitative data about knowledge assessed using the geriatric nursing knowledge scale and qualitative data from open-ended questions about the most pressing issues nurses face. Among the 482 nurses, nurses working in teaching hospitals scored higher in geriatric knowledge than those working in non-academic settings. Implications for enhancing Baccalaureate and Registered Practical Nursing education and future implications for nursing policy and research are discussed.

INTRODUCTION

The Canadian population is aging. In 2011, 5 million adults aged 65 and older represented the fastest growing age group, a statistic expected to double in the next 25 years. By 2051, about 25% of Canadians are expected to be aged 65 and older (Statistics Canada, 2011).

Older adults are the most frequent users of Canada's health care system. Compared with other age groups, older adults use a disproportionate amount of hospital services. For example, although they comprise only 14% of the population (Statistics Canada, 2011), older adults accounted for 40% of acute hospital stays (Canadian Institute for Health Information [CIHI], 2011). Older adults' hospital stays are longer and more resource-intensive with an average length of stay in hospital is 9 days, compared with an average length of stay of 6 days for adults under age 65 (CIHI, 2011).

Gerontological content in baccalaureate nursing programs

Since older adults are the greatest users of the Canadian healthcare system, it is essential that nurses are educated to meet older adults' health care needs. However, geriatric content in baccalaureate nursing school curricula across the country still remains surprisingly low. Baumbusch and Andrusyszyn (2002) found that among Canadian baccalaureate nursing programs, only 8% of clinical practicum hours focused on nursing care of older adults, and only 5.5% of students chose geriatrics for their final clinical placement prior to graduation. Hirst and colleagues (2012) found similar results more recently, with 6% of students selecting a gerontological setting for their final consolidation practicum. These comparisons show little improvement in building geriatric nursing capacity in Canadian nursing programs, and are not surprising since less than 10% of faculty (Masters and Doctoral level) report a specialization in gerontology.

NICHE AND GIAP

One idea proposed to improve nurses' preparation to care for older adults and enhance geriatric nursing knowledge is the *Nurses Improving Care for Healthsystem Elders* (NICHE) program. NICHE was established in the United States, and has since been implemented in more than 450 hospitals across the U.S. and Canada. NICHE provides training, tools, resources, and a community network to help healthcare facilities increase nurses' abilities to provide care to older adults (Capezuti et al., 2012; Capezuti, Bricoli, & Boltz, in press). In Canada, NICHE has been implemented in 41 health care settings across 5 provinces: Alberta (4), Manitoba (8), Ontario (8), New Brunswick (13), and Nova Scotia (8). While one study has examined outcomes of the NICHE program in Canada, the study was limited to one province (McKenzie, Blandford, Menec, Boltz, & Capezuti, 2011). Furthermore, the study focused primarily on nurses' perceptions of the geriatric nurse practice environment (e.g., the extent to which a hospital supported aging-relevant care for older adults) and did not examine nurses' knowledge of geriatric content related to common conditions such as pressure ulcers, sleep, incontinence, and physical restraints. Nurses'

knowledge of this content is important as it identifies gaps in geriatric care competencies, attitudes towards caring for older adults, care practice issues and concerns, and organizational characteristics relevant to older adult care (NICHE, 2013).

Given the increasing demand for nurses to demonstrate basic competencies in geriatric nursing, the purpose of this study is to explore the association between nurses' knowledge levels, nurse characteristics, institutional characteristics, and nurses' perceptions of the most pressing issues faced by nurses providing geriatric care in Canadian hospitals.

METHODS

Overview of study design

This was a secondary analysis of an existing data set that focused on quantitative data and included qualitative data (concurrent nested mixed methods study). Quantitative and qualitative data were collected in the same data collection session using the Geriatric Institutional Assessment Profile (GIAP). The qualitative data about pressing issues in geriatric care were collected using open-ended questions on the GIAP survey that elicited comments from the nurses. The data provided insight into the association of nurse respondent and institutional characteristics, including knowledge and pressing issues related to geriatric care perceived by nurses in Canadian hospitals. This study is theoretically guided by the Geriatric Acute Care Model framework that highlights the importance of geriatric guiding principles, leadership, organizational structure, physical environment, patient- and family- centred approaches, aging sensitive practices, geriatric staff competence, and interdisciplinary resources and processes (Boltz, Capezuti, & Shabbat, 2010).

Measures

The GIAP is a survey tool NICHE uses to assess knowledge, attitudes, and perceptions about geriatric care among nurses prior to full implementation of the NICHE program, and after, implementing the NICHE program, in order to identify gaps and specific practice issues (Capezuti et al., 2013). The 133-item GIAP consists of nine scales (and four subscales) that measures knowledge of geriatric conditions and perceptions of: professional issues that influence how staff work with older adult patients; specific practice issues and concerns; appropriate use of treatments; and hospital organizational attributes relevant to geriatric care (Boltz, Capezuti, Kim, Fairchild, & Secic, 2009; Tavares & Silva, 2013). The literature has reported good construct validity and reliability (Boltz et al., 2009) as well as reported internal consistency reliability to range between 0.66 to 0.93 (Kim et al., 2007). Open-ended statements are also included at the end of the tool to provide the nurse with the opportunity to provide comments on specific aspects of geriatric care in their workplace.

The Geriatric Nursing Knowledge/Attitudes Composite Scale consists of 22 items and provides content addressing nurses' knowledge of, and confidence in the care provided toward common geriatric conditions: pressure ulcer management (6 items); sleep management (4 items); incontinence care (7 items); and restraint use (4 items). Examples of items include, "Regular massage over bony prominences reduces skin breakdown" and "Most sleeping problems in hospitalized older adults require the use of sedatives" (Boltz et al., 2009). Respondents were asked to rate each item on a Likert scale (from strongly agree to strongly disagree) which were subsequently dichotomized.

The geriatric knowledge composite variable has a range of possible scores from 0-10, with 0 as worst and 10 as best. Earlier research has reported a mean score of 4.9 (SD 1.7-1.8) and an intra-class correlation coefficient at 0.87. Cronbach's alpha has ranged from 0.60-0.65 (Boltz et al., 2008b). The most recent mean reported (up to March 2013) for the overall score among all respondents (n=90,183) participating from all NICHE hospitals was 3.84.

Nurse characteristics included: highest education level (e.g., RN-Baccalaureate), years of experience, years employed in their current institution, and age in years. Institutional characteristics included: hospital location defined by the province in which the hospital was located; affiliation (defined by presence of an accredited medical school); bed size defined by the number of beds in the hospital; the type of hospital unit (e.g., medical, surgical). These demographics were obtained through self-report during the survey process.

Data collection

Data collection occurred at each site and was coordinated by the site's NICHE coordinator. The NICHE coordinator distributed the GIAP survey to nurses either through email with a uniform resource locator (URL) or had the information technology department designate computers in the hospital for data collection. The NICHE coordinator tracked the response rate of participants and generated reports for benchmarking as well as tracked the response rate of participants. The New York University Committee on Activities Involving Human Subjects approved this secondary analysis of the GIAP survey data as exempt.

SAMPLE

The sample included staff nurses [registered nurses (RNs) and registered practical nurses (registered practical nurses)] from 14 Canadian acute care hospitals who completed the

GIAP between February 2009 and February 2011, prior to the hospital implementing their NICHE program (baseline data). Nurses who provided a valid response (i.e., pressing issues comments, and not comments about the GIAP survey) to the open ended statements at the end of the survey, "What are the most pressing issues you currently face in caring for older adults?" were also included.

Between 2009 and 2013, 4561 respondents across 14 Canadian NICHE hospitals completed a baseline GIAP survey. Canadian staff nurses who completed the GIAP worked in direct care roles on units that primarily care for older adults were included. These units included, for example, medical-surgical, critical care, and specialty units such as oncology or geriatrics. Exclusion criteria included nurses who did not work on such units or completed the baseline GIAP prior to February 2009, as well as those who did not provide a response to the open-ended question about the most pressing issue. Nurses who worked on complex continuing care or long term care units were also excluded from the study. After accounting for these inclusion and exclusion criteria, the final sample was 482 nurses.

ANALYSIS

This study employed a mixed methods approach for data analysis. Investigators remained blinded to the data, and quantitative and qualitative analyses were conducted independently. In the final analysis phase, data were integrated in order to gain a greater understanding of the relationship of nursing and institutional characteristics, knowledge, and pressing issues.

Quantitative analysis

Descriptive statistics (mean, median, standard deviation, and frequency) were used to describe the sample of hospitals and nurses as well as the GIAP knowledge composite (total) score and subscale scores. Inferential statistics (e.g., Analysis of Variance [ANOVA], correlations) were used to identify associations between geriatric nursing knowledge, and nurse and institutional characteristics. To conduct these analyses, the composite score of the GIAP knowledge variable was examined with higher scores indicating greater knowledge of geriatric conditions (e.g., incontinence). Tukey's post-hoc tests were conducted to identify where differences between means existed when ANOVAs were significant. Because the geriatric knowledge scores have not been reported with Canadian NICHE data, the item-scale internal consistency reliability was determined using Cronbach's alpha. For all quantitative tests, p values less than .05 were interpreted as statistically significant. Quantitative data analysis was completed using SPSS software for Windows, version 20.

Qualitative analysis

Qualitative data were analyzed using Dedoose. Dedoose is a web-based platform application that was used to analyze qualitative, quantitative, and mixed methods data (SocioCultural Research Consultants, 2013). Valid responses to the open ended statements had a character count that ranged from 7 to 3664. Preliminary coding was based upon a priori codes derived from a grounded theory framework (Glaser & Strauss 1976) that guided the development of the GIAP survey. Additional codes that emerged during the analysis and in discussions with the research team were added to the code book and entered into the Dedoose software.

Preliminary coding resulted in data clusters and patterns of co-occurring codes reflecting the pressing issues related to geriatric care. Any coding discrepancies were discussed and resolved by consensus. Based on an interactive process, the level of agreement was compared between coders. In the first round, Kappa results were 0.53; 0.57; 0.58 indicating the codes needed further clarification. The second round of Kappa results were 0.75; 0.76; 0.73, indicating good to excellent agreement between coders (Cohen, 1960).

Themes that emerged from the analysis were examined across cases to identify commonalities and variations (Ayres et al., 2003). Methodological rigor was ensured in this study by maintenance of an audit trail of coding decisions, regular research team meetings and periodic peer debriefing where coding scheme and findings were discussed with colleagues knowledgeable about geriatric care (Connelly & Yoder, 2000).

Data integration

Data were integrated in the last (interpretation) stage of analysis using Dedoose software. First, the quantitative data were uploaded into DeDoose and linked to the qualitative data. Using the descriptor by code(s) tool in Dedoose, the themes that had emerged from the qualitative analysis, including perceptions of pressing issues, were re-examined across quantitative data characteristics to explicate the results. For example, variation in the qualitative themes were examined by nursing education level (e.g., BScN), institutional characteristics (nursing unit type, size of hospital) and total knowledge scores (calculated using the sample's median split cut-off score of <5 indicating low knowledge and > 5 indicating adequate knowledge).

RESULTS

The 482 nurses were, on average, 40.33 (SD 11.71) years old with a median of 14 years of experience and a median of 8 years working in their current institution. Most registered nurses possessed either a baccalaureate

degree (n=210, 43.6%) or a diploma (n=208, 43.2%) in nursing. Participants were primarily female (n=430, 89.2%) and employed in academic medical centers or teaching hospitals (total 95%) that were mostly (71%) in size range of 201-400 beds. Almost one-third of participants worked on general medical units (n=155, 32.2%). Almost 60% of participants were nurses in New Brunswick (58.9%, n=284) across 7 hospitals. The remaining hospitals were in Ontario (n=6) and Alberta (n=1).

The mean total GIAP knowledge score was 4.81 (SD 1.69). The mean subscale scores were 5.26, 4.78, 4.26, and 5.16, for pressure ulcers, sleep, incontinence, and restraint knowledge, respectively. There was a weak significant positive correlation between nurses' older age and greater total geriatric knowledge (r=0.121, p=0.017). See Table 1 for a summary of the comparisons of geriatric nursing knowledge by nurse respondent and institutional characteristics. Nurses' level of geriatric knowledge did not differ by institutional characteristics such as bed size, province, or type of hospital unit (p> 0.05). However, there were significant differences between hospital type and nurses' level of total geriatric knowledge (p< 0.05). Tukey's post hoc testing revealed that nurses employed at academic teaching hospitals scored significantly higher in total geriatric knowledge (p=0.003) compared to nurses employed in non-academic non-teaching hospitals.

Registered nurses with a diploma degree had the highest level of geriatric nursing knowledge (mean 4.98); however, no significant group differences were observed between registered practical nurses, or baccalaureate prepared RNs. Using Tukey's post hoc testing, we found significant differences in total geriatric knowledge between the registered practical nurses and diploma RNs (p<0.021). There were also significant differences in nurses' education level and geriatric nursing knowledge. Post-hoc analysis further revealed that registered practical nurses had significantly less geriatric nursing knowledge than diploma prepared RNs. There were no significant differences in the knowledge scores between the other levels of registered nurses' education.

Qualitative

The overarching themes about pressing issues faced by nurses caring for older patients in Canadian hospitals was an imbalance in the resources available to provide quality care to older patients and the increasing complex demands of this specialized patient population. Most commonly cited were lack of staffing and too little time to provide quality nursing care, accounting for 35% and 25% of comments, respectively. Lack of knowledge about geriatric care and inadequate education of nursing personnel in the unique care needs of older adults were reported in 18% of the comments. In addition, a lack of resources

for transitional and palliative care (including insufficient care in long-term care) was perceived as contributing to the resource imbalance faced by nurses. The increasingly, complex demands faced by nurses to provide quality care for the growing number of older patients were reported as increased patient acuity and clinical characteristics (e.g., confusion, risk for falls, and pressure ulcers, for which nurses felt unprepared).

There were two prominent categories of pressing issues identified by the nurses. First, geriatric care is a nursing specialty that requires fundamental knowledge about general care of older adults, as well as targeted content and ongoing, accessible continuing education. A general need for fundamental knowledge was described by one respondent as *"Lack of knowledge on the care of the older adult. This would include MDs and nursing staff. Our PSW (aides) really need special education in geriatric care as their education does not include the importance of ambulation, skin care, dementia and delirium [and a]lack of understanding by health care workers that the older adult is a specialized person, not unlike pediatric patients…."*

Citing increased numbers of older adults with increased acuity levels, nurses described needing more focused education on the care of confused patients (e.g., delirium, fall risk), use of restraints, sleep disturbances, behavioural problems and medication effects in older adults such as *"…evidence based practice related to use of sedatives, delirium and aggression".* In addition to the recognition of knowledge deficits and educational needs, nurses identified the need for accessible and up-to-date educational activities that considered location, shift, and time constraints.

Communication issues between healthcare providers, nurses included, as well as with family and patients were identified as a second pressing issue. In addition to the need for enhanced knowledge of interdisciplinary communication, nurses described a need to improve their ability to: facilitate communication between other healthcare providers and families; deal with challenging family interactions; and ease communication barriers with patients who are confused or have difficulty communicating (e.g., dysphasia, language) such as *"…how to deal with patient confusion…and family members getting upset when the patient is restrained in bed, or in a geri-chair, and questioning why no staff is able to "sit" with the patient…."* One nurse, discussed their important role as a patient advocate throughout the continuum of care, *"…patients/families are not given enough information about the complications…so that they can make an informed decision… it seems like possible complications are brushed over quickly and elderly patients are not well-enough informed before making a decision…"* Having a geriatric nurse specialist was identified as a resource to aid in these processes.

INTEGRATED DATA RESULTS

Qualitative themes across nursing and institutional characteristics

Generally, there was very little variation in the key themes of most pressing issues when examined across nursing education level (registered practical nurse diploma, RN-diploma , RN-BScN), nursing unit (general medical/surgical units, critical care, emergency room) or institutional characteristics. A higher percentage (47%) of nurses responded about educational issues from teaching hospitals compared to non-teaching and academic hospitals. Interestingly, baccalaureate nurses' comments reflected additional educational needs related to inter-disciplinary communication issues and the need for evidence based guidelines while diploma-prepared RNs and registered practical nurses' comments reflected the need to improve transitional care for older patients. The most prevalent educational need reported by registered practical nurses related to patient care issues including use of restraints, dealing with behavioural problems, and confused patients, which were also commonly cited by registered nurses.

Qualitative themes by knowledge

The median score for total knowledge (5.0) was used as a cut off for adequate knowledge in this sample. Among those with a knowledge score less than 5.0 (41.1% of participants), the most pressing issues were consistent with general themes of staffing and time. Notably, the comments about education and specific patient characteristics were general in nature (e.g., *"education… tips in care of elderly"*). One respondent explained that she was *"inexperienced with geriatric nursing….new to facility and geriatrics…so do not have answers…need education in geriatric nursing"*.

Although those with adequate knowledge (≥ 5.0) levels (58.9% of participants) also cited staffing issues and time as the most pressing issues, it was within the context of complexity of the geriatric patient. For example, a BScN nurse with a high knowledge score commented *"…Education recommendations: about evidence based practice related to [the] use of sedatives, delirium and aggression."* Comments reflected a need to provide more comprehensive care to meet complex needs of older patients such as caring for those who are *"…risk of falls, pressure ulcers, inadequate nutrition due to poor appetite, inability to swallow or chew…"* and also include the need for *"delirium protocols"*, the importance of critical thinking in caring for elders who have *"decreased metabolism and [are taking] narcotics"*, and caring for *"frail elderly patients who are thrombocytopenic"* and continuing education.

DISCUSSION

Given the increasing population of older adults accessing health care services across Canada, this study highlights the important pressing issues nurses face in caring for acutely ill elders. In summary, mid- and late-career nurses and those with a RN-diploma nursing degree had greater knowledge of common geriatric issues. It is likely that these characteristics, collectively, were significant given the invaluable experiences and expertise mid/late career nurses provide in hospital settings (Mion et al., 2006). Furthermore, another key finding was that nurses who scored a high level of geriatric knowledge identified the need for continuing geriatric nursing education and provided more specific examples and acknowledged a deeper understanding of their knowledge deficits.

In general, the most pressing issues nurses reported were those involving staffing and lack of time to provide adequate patient care. Considerable research in Canada has been conducted to link nurse staffing with patient outcomes data; this research has concluded that higher proportions of RNs are associated with positive outcomes such as lower medication errors and infections (e.g., McGillis-Hall, Doran, & Pink, 2004). In addition, a considerable amount of research has examined the critical role that nursing work environment plays in fostering nurses' ability to provide adequate nursing care (Peter, Macfarlane, & O'Brien Pallas, 2004).   This study is one of the first studies in Canada to explore both nurse and system characteristics and their relationships to geriatric nursing knowledge. Future research in Canadian hospitals needs to explore the impact of nurse sensitive outcomes specific to geriatric care (e.g., mobility and functional status) and system and nurse characteristics that serve as both facilitators and barriers to enhancing geriatric care outcomes in hospitals.

While registered practical nurses comprised a smaller proportion of the nursing workforce in the study hospitals, this group reported the lowest level of knowledge scores. As registered practical nurses are most often actively engaged in caring for older adults, the need for a strong foundation in geriatric care concepts is critical. However, registered practical nurses graduate with a two-year practical nursing diploma, and these programs prepare them with the foundation to care for less complex patients. Thus, though this study examined registered practical nurses working in hospitals, their education is not likely to have prepared them to care for older adults in any setting. Subsequently, there are strong beliefs by registered practical nurses that they are not practicing to their full scope of practice, and these nurses have expressed great disappointment regarding the lack of an educational infrastructure to address their educational needs (Harris et

al., 2013). Since geriatrics is the primary area of practice for registered practical nurses, further research and policy work is needed to educate this valuable sector of the nurse workforce.

Communication challenges with both patients and families were also highlighted in the qualitative findings. These challenges varied widely with regards to nurses' concerns in their ability to care for older adults who experienced communication barriers due to language or aphasia. Hospital nurses also frequently interact with highly frail older adults who may be experiencing delirium, dementia, or sensory impairment (McGilton et al., 2009). Therefore, providing nurses with enhanced tools such as education and role modeling effective behaviours can help improve care (McGilton, Sidani, Boscart, Guruge, & Brown, 2012). Nurses in this study also expressed communication difficulties with family members and discomfort in dealing with difficult family interactions. Our finding concurs with prior research in Ontario long term care settings that identified nurses lack training in communicating difficult information (e.g., medication error) to family members, and often delegate difficult discussions to a nurse manager or leader (Wagner, Harkness, Hébert, & Gallagher, 2012).

The integrated results of this mixed methods study suggest that nurses need more education ranging from fundamental knowledge to specialized geriatric knowledge and professional role development that supports professional interdisciplinary communication and patient advocacy roles. These educational needs can be met through an organized program of continuing education (e.g., NICHE webinars) and adopting best practices in caring for older adults with behavioural issues such as confusion and restraint use through the use of clinical practice guidelines (Registered Nurses' Association of Ontario [RNAO] 2004; RNAO, 2012). However, in order to meet the needs of nurses across Canada, a variety of accessible methods of education are needed as identified by the nurses in this study.

There are several limitations of this study. Our analysis is limited to NICHE affiliated hospitals; thus, the results may be biased toward hospitals with an existing underlying philosophy of care towards improving care to older adults. Furthermore, this study cannot be generalized to all non-teaching hospitals, rural hospitals, and in hospitals where English is not the nurses' primary language spoken.

The implications from this research are numerous. This study adds to the body of Canadian nursing research highlighting the urgent need to increase nurses' knowledge of geriatric nursing principles and that a national agenda on increasing geriatric nursing capacity is urgently needed. It is imperative that nurse leaders in practice and education examine the current preparation of nurses to ensure they are equipped with knowledge and skills to care for older adults and are able to handle unique situations pertaining to the older adult with confidence and professionalism as they move into practice. Currently, only 15 to 20% of the test items on the Canadian Registered Nurse Exam (CRNE) pertain to individuals older than 65 years of age (L. Patry, personal communication, June 27, 2013), despite the fact that two-thirds of new nurses' care of older Canadians (Wendt, 2003).

One way of engaging stakeholders to increase geriatric nursing knowledge has been through the development of geriatric competencies. The National Initiative for the Care of the Elderly (NICE) has published general inter-professional competencies to provide students with a basic set of knowledge, skills, and attitudes toward care of older adults (NICE, 2009). The American Association of Colleges of Nursing (AACN) and the Hartford Institute of Geriatric Nursing (HIGN) has disseminated a comprehensive set of 19 nursing specific competencies and curricular guidelines essential to baccalaureate education for professional nursing practice (AACN & HIGN, 2010). Furthermore, the Canadian Gerontological Nursing Association (CGNA) has published practice standards to help facilitate gerontological nurses' care of older Canadians (CGNA, 2010). Many of these gerontological competencies encourage programs to introduce content about geriatric models of care such as NICHE, and offer specific recommendations for educating nurses about common geriatric issues such as restraints, pressure ulcers, sleep, and incontinence.

As of 2000, the baccalaureate degree is now the entry to practice requirement for RNs in all Canadian provinces and territories except Quebec. Unfortunately, the Canadian Association of Schools of Nursing (CASN), the accrediting organization for baccalaureate and graduate schools of nursing, has no specific guidelines or recommendations on geriatric nursing content in baccalaureate programs (Potter et al., 2013). Without such recommendations, curriculum changes and integration of geriatric competencies into the current baccalaureate programs are not likely to occur.

Nurses across Canada need to further expand their mentoring group and identify ways to build capacity to address such gaps in knowledge. One existing method is through certification. As of December 31, 2012, there are only 2357 certified gerontological RNs in Canada (L. Vachon, personal communication, June 27, 2013). This certification exam has a similar list of competencies to the AACN/HIGN competencies and can serve as an additional resource for nursing programs and health systems that aim to increase geriatric nursing capacity. In our own research, we found that U.S. NICHE hospital units with a lower percentage of certified nurses (though not specifically those certified in gerontology) experienced more falls (Boltz et

al., 2013). Thus, the impact of gerontological certification on nurse sensitive outcomes in Canada also warrants future research.

CONCLUSION

In conclusion, this study offers insight into the nurse and institutional characteristics influencing nurses' knowledge of common geriatric nursing conditions.

The time has come for nurse leaders in all domains of practice, education, research, policy, and leadership across Canada to come together to identify innovative models to build capacity and support for future and current nurses to competently care for this growing population. The implementation of NICHE is one model of care that health systems may consider.

Table 1: Comparisons of Geriatric Nursing Knowledge by Nurse and Institutional Characteristics

N=482 nurses

Highest Education level	n%	Mean±SD	Test statistic (df)	p value
Registered practical nurse-Diploma	51 (10.6)	4.22 (1.58)	$F_{(3, 478)} = 2.82$	0.039
RN- Diploma	213 (44.2)	4.98 (1.76)		
RN- Baccalaureate Degree	210 (43.6)	4.78 (1.63)		
Masters/Doctorate Degree	8 (1.6)	4.75 (1.83)		
Hospital type				
Academic Medical Center	207 (42.9)	5.09 (1.74)	$F_{(2, 479)} = 5.306$	0.005
Teaching Hospital	251 (52.1)	4.58 (1.63)		
Non-Teaching Hospital	24 (5.0)	4.75 (1.73)		
Bed size				
Small (1-200)	80 (16.6)	4.81 (1.88)	$F_{(2, 479)} = 0.114$	0.892
Medium (201-400)	341 (70.7)	4.79 (1.69)		
Large (401 and greater)	61 (12.7)	4.90 (1.55)		
Province				
Ontario	162 (33.6)	4.98 (1.67)	$F_{(2, 479)} = 1.550$	0.213
New Brunswick	284 (58.9)	4.69 (1.72)		
Alberta	36 (7.5)	4.94 (1.66)		
Unit				
General Medical/Surgical	247 (51.2)	4.88 (1.63)	$F_{(5, 476)} = 1.485$	0.193
Emergency Room	68 (14.1)	4.69 (1.64)		
Critical Care Unit	58 (12.0)	4.55 (1.57)		
Non-critical Care Specialty	29 (6.1)	5.17 (1.91)		
Geriatric Unit	33 (6.8)	5.18 (2.05)		
Ambulatory Care	47 (9.8)	4.43 (1.82)		

Note. An *Academic Medical Center* is an accredited medical school (including a university, when appropriate) or an accredited academic hospital (a hospital or a health system that sponsors four or more approved medical education programs). A teaching hospital does not include an accredited medical school.

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