Comparisons of Knowledge of Dutch Nursing Students and Hospital Nurses on Aging

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Abstract

Background: Although there is a growing population of older adults admitted to hospitals, the literature demonstrates knowledge deficits of nurses regarding older patients. This study investigated knowledge levels of both nursing students and RNs about older hospitalized patients in relation to their educational level and work experience.

Method: First- and final-year vocational and bachelor nursing students, and associate degree and bachelor degree nurses working in the hospital setting with 0 to 5 years, 6 to 15 years, and more than 15 years of experience, have completed the Knowledge about Older Patients–Quiz (KOP-Q). The KOP-Q has a clearly described theoretical base finding its origin in knowledge regarding nursing care for older patients and shows good content and construct validity.

Results: A substantial proportion of participants in all groups demonstrated insufficient knowledge about older patients. A difference in knowledge exists among nurses with different educational qualifications, and a link between years of experience and higher knowledge levels of nurses is found.

Conclusion: Throughout the nursing career, basic care topics in relation to care for older patients should play a key role in basic nursing education programs, as well as for continuing education programs provided in hospitals for nurses.


The world population is aging (United Nations, Department of Economic and Social Affairs, Population Division, 2015). In the Netherlands, 18% of the population is aged 65 years or older, and this predicted to rise to 26% by 2040 (Centraal Bureau voor Statistiek, 2016). This increase of older people is also reflected in the number of older patients admitted to general hospitals (Gonçalves, 2009; Holroyd, Dahlke, Fehr, Jung, & Hunter, 2009). In 2012, more than half of all hospital beds were occupied by patients 65 years or older (Statistics Netherlands, 2011), and all predictions point out that this number will rise.

Older patients in the hospital setting are considered highly complex, being more likely to develop one or more postoperative complications (Creditor, 1993; Parlevliet, 2014), such as delirium, pressure ulcers, and infections (Gavazzi & Krause, 2002; Saxena & Lawley, 2009; Schoonhoven, Bousema, Buskens, & prePURSE-Study Group, 2007). These complications have a negative effect on recovery of patients and are associated with functional and cognitive decline, institutionalization, and mortality after discharge (Boyd et al., 2008; Creditor, 1993;
McCusker, Kakuma, & Abrahamowicz, 2002). Given the changing population and increase in complexity, the need is growing for RNs who are knowledgeable and committed to work with older patients (Plonczynski et al., 2007), as older patients are highly dependent on knowledgeable and competent nurses for a good recovery (Graf, 2006). The key role that nurses play in delivering care to older people is that they are accountable for providing physical, social, psychological, and emotional care (Drennan, Levenson, Goodman, & Evans, 2004; Jacelon, 2002). Although nurses are encouraged to update their knowledge and maintain clinical competence throughout their career, evidence on whether and how nurses do this is minimal, to the authors’ knowledge.

Knowledge regarding older people is investigated in only a few studies (Liu, Norman, & While, 2013). Results from the studies reviewed by Liu et al. (2013) indicate that nurses and nursing students have low to average knowledge levels with regards to physical, psychological, and social aspects of aging and key clinical areas of geriatric nursing care. Moreover, several misconceptions, such as wrong social-economic perceptions, still exist (Lamb, Greenhill, & Chew, 2007). These results, however, are based on measurement instruments that are considered outdated and insufficiently validated; too country specific; mix the measurement of knowledge with measurements of opinions, beliefs, and experiences; or lack inclusion of care perspectives (Courtenay, Tong, & Walsh, 2000; Liu et al., 2013) and should therefore be interpreted with caution. Today, an increase in educational programs based on continuing professional development is reported in literature, and nurses expect and express the need for on-going professional development (Price & Reichert, 2017). However, often a measurement of current knowledge is lacking, resulting in maintenance of fundamental questions regarding the impact of education and what happens with nurses’ knowledge gained in school after graduation (Griscti & Jacono, 2006).

The aim of this study is to gain insight into the level of knowledge about elderly care in hospitals. Furthermore, the dependence of educational level and work experience to nurses’ knowledge regarding older patients was measured by using the recently developed Knowledge about Older Patients–Quiz (KOP-Q) (Dikken, Hoogerduijn, & Schuurmans, 2015; Dikken, Hoogerduijn, Kruitwagen, & Schuurmans, 2016).

### METHOD

#### Design

The study followed a cross-sectional design. This design follows the intended use of the KOP-Q as a single self-assessment measurement at one point in time to determine the knowledge levels of nursing students and RNs.

#### Setting and Participants

First- and final (fourth)-year students in nursing following a vocational program (associate degree [AD]) were recruited at eight different schools at the end of the second semester. Schools were recruited through the MBO Raad (the Netherlands Association of VET Colleges), representing all government-funded colleges for secondary vocational education and training and adult education in the Netherlands. Participating schools were verified on diversity in location and metropolitan versus rural. First- and final (fourth)-year bachelor of nursing (BN) students were recruited at one university of applied sciences at the beginning of their first semester. The university was recruited by the main researcher to participate. Students were asked to participate by e-mail and during regular education lessons to complete the questionnaire online. All students participated voluntarily, and permission was received from the responsible course managers. Over a 3-month period, registered nurses (AD and BN) working with older patients on different wards at two general hospitals were recruited to participate by the main researcher. Nurses received an e-mail from their ward manager inviting them to participate and asking them to complete the questionnaire online. This study was reviewed and approved by the medical review board of the University Medical Center Utrecht. All participants provided informed consent.

On the first page of the questionnaire, permission was digital, requested Associate Degree and Bachelor of Nursing in the Netherlands. Both the AD (terminal/vocational program) in nursing and the BN are 4-year educational programs. Students enrolled in the AD program are between 16 and 35 years old. Prior to the AD education program, students followed a 4-year lower vocational education program. Students can enroll in the BN program after they followed a 5-year higher general secondary education program or when they received their AD in nursing. After completion of bachelor's degree (i.e., the regular program is 4 years), students can enroll in a (professional) master's program (1 to 2 years). Hospitals currently do not differentiate between nurses having an AD or a BN degree regarding their tasks and responsibilities.

#### Data Collection: The KOP-Q

To measure knowledge, the KOP-Q was used. The KOP-Q, which was developed and validated in the Netherlands, has a clearly described theoretical basis finding its origin in nursing care knowledge regarding older patients and has good content and construct validity results (Dik-
The KOP-Q measures knowledge about normal aging, a variety of geriatric conditions signaling problems in old age, and interventions and family interventions (Dikken et al., 2015). The KOP-Q contains 30 dichotomous items (true or false), with every correct answer assigned 1 point and incorrect answer assigned 0 points. The KOP-Q demonstrated adequate face validity, good readability, a good scale-content validity index/average (S-CVI/average = .91), good item characteristics (psychometric validity), and reliability for the knowledge items (Kuder-Richardson Formula 20 = .70). The KOP-Q measures a second construct certainty. The certainty scale provides insight into nurses’ ability to reflect on their own knowledge by asking how certain respondents are about every answer given (ranging from 0% to 100% certainty). The certainty items demonstrated excellent reliability (Cronbach’s alpha = .94). A previous study on the KOP-Q presented norm groups to compare individual scores on the KOP-Q (Dikken et al., 2016).

To explore and denote group mean scores, KOP-Q sum scores of participants were converted to the Dutch grading system (Table 1 provides a full conversion overview of Dutch grades). The following formula was used:

\[ \text{Grade} = \frac{(x - 15)}{1.5} \]

where \( x \) is the number of points achieved by the respondent and 1 is the minimum grade a student can receive. Dutch grades range from 1 (extremely poor) to 10 (outstanding). The lowest passing grade is 5.5.

**Analysis**

The data analysis was performed using SPSS version 22.0. The sum scores from the first- and final-year nursing students and RNs on the KOP-Q were compared. An independent samples \( t \) test was used to determine whether the knowledge regarding older patients of nursing students or RNs was different between the first-year students, final-year students, and nurses with 0 to 5 years of experience, 6 to 15 years of experience, and more than 15 years of experience. A difference was statistically significant for \( p \) values less than .05.

**RESULTS**

Of the participating sample, list-wise deletion was used when nonresponse occurred; this was the case for the following table: **Characteristics of First- and Final-Year Nursing Students and Hospital Nurses**

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Female Gender (%)</th>
<th>Mean Age, Years (SD)</th>
<th>Mean Years of Experience as a Nurse (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>First year AD (( n = 117 ))</td>
<td>87.2</td>
<td>18.0 (2.6)</td>
<td>—</td>
</tr>
<tr>
<td>First year BN (( n = 126 ))</td>
<td>87.3</td>
<td>19.9 (1.8)</td>
<td>—</td>
</tr>
<tr>
<td>Final year AD (( n = 111 ))</td>
<td>90.1</td>
<td>26.1 (10.1)</td>
<td>—</td>
</tr>
<tr>
<td>Final year BN (( n = 85 ))</td>
<td>90.6</td>
<td>22.5 (2.5)</td>
<td>—</td>
</tr>
<tr>
<td>Hospital nurses AD (( n = 171 ))</td>
<td>91.8</td>
<td>39.8 (12.6)</td>
<td>15.6 (12.4)</td>
</tr>
<tr>
<td>Hospital nurses BN (( n = 140 ))</td>
<td>92.2</td>
<td>36.5 (11.5)</td>
<td>13.1 (10.9)</td>
</tr>
</tbody>
</table>

Note. AD = associate degree in nursing; BN = bachelor degree in nursing.
22 first-year AD nursing students (15.8%), 24 final-year AD nursing students (17.8%), four first-year BN students (3%), five final-year BN nursing students (5.6%), and 47 hospital nurses (13.1%). All other participants were complete cases on the KOP-Q items and therefore were included. Characteristics of the first- and final-year AD and BN nursing students and hospital nurses are presented in Table 2.

Knowledge About Older Patients

Figure 1 shows that all groups have a substantial proportion of participants demonstrating insufficient knowledge about older patients. Almost all first-year students (both AD and BN) score insufficient to extremely poor (< 5.4). More than 50% of the final-year BN students and 75% of final-year AD students score insufficient to extremely poor (< 5.4). Most nurses working in the hospitals pass the KOP-Q, although a considerable proportion still scores insufficient to extremely poor (ranging from 10.4% to 54.4% in different groups).

During the 4-year vocational and bachelor program, there is a steep increase in knowledge about older patients (Figure 2). During the whole educational period, there is a significant difference in knowledge between AD and BN students (±2 points, p < .001). After graduation, this steep increase in knowledge continues for AD nurses in their first 5 years of working in practice, whereas for BN nurses there is a smaller increase of knowledge. The group of nurses (both AD and BN) with 6 to 15 years of experience have the highest mean knowledge score.

The mean difference in knowledge between AD and BN nurses remains significant (p < .001) in the first 15 years of experience, but is no longer significant between nurses having more than 15 years of experience (p = .257).

Certainty Regarding Own Knowledge About Older Patients

Figure 3 presents insight in the certainty levels of nursing students and RNs regarding their knowledge about older patients. During the 4-year educational programs, students’ certainty increases, which is consistent with the steep increase in knowledge. Final-year BN nursing students present significant higher certainty levels than final-year AD nursing students (p < .001). This difference is the same for AD and BN nurses with less than 5 years of experience in nursing. The certainty regarding their knowledge stabilizes after working in clinical practice for 5 years, and no differences between AD and BN nurses with more than 5 years of experience is observed (p > .050).

DISCUSSION

This study described the current nursing student and RN knowledge and certainty regarding older patients in relation to their educational level and years of experience. Several results should be discussed further. First, a substantial proportion of students and nurses demonstrated insufficient knowledge about older patients. With the increase of elder patients in care, this insufficient knowledge should improve at both the student level and nurse level.

The KOP-Q is designed to measure basic care topics, such as normal aging, various geriatric conditions signaling problems in old age, interventions, and fam-
ily care (Dikken et al., 2015). These topics are already taught in the first year of education, and nurses encounter these care topics throughout their career from the start of their education until retirement. Despite this frequent exposure, it is not reflected in the results. Therefore, basic care topics are not only important for nursing students but should play a key role in nurse education programs and continuing nursing education programs in hospitals.

Second, the study from Aiken et al. (2014), which included the Netherlands as one of the nine European countries, presented that every 10% increase in bachelor’s degree nurses is associated with a decrease of likelihood in mortality of older patients by 7%, indicating that educational qualification is important in relation to patient outcomes. That study confirms there is a difference in educational qualification as results show higher knowledge scores of BN students compared with AD nurses, obviously with the largest knowledge difference existing between the first-year student groups. This study confirms that BN students who did not follow any lessons regarding older patients still scored significantly higher than AD nursing students who followed one year of education (two semesters) including a 10-week internship (mostly in a nursing home). To close the knowledge gap, educational efforts should start at the beginning of the 4 years of AD education, as recommended by Tullo, Spencer, and Allan (2010). Additional research is needed to establish more insight in possible didactic strategies to enhance learning of AD nursing students.

Third, after graduation, the slope of the knowledge levels declines in both groups as they gain more years of experience, indicating that learning opportunities regarding basic care themes is insufficient in clinical practice. Furthermore, the differences in knowledge about older patients between AD and BN nurses declines with increased years of experience, possibly indicating that nurses learn mostly from each other, resulting in a general mean knowledge level even though baseline qualification differs.

Results from this study demonstrated that most nursing students and RNs are certain about their answers given on the KOP-Q, even when answers were wrong. Insight in certainty of nursing students and RNs can be a useful addition for educational interventions. The certainty results can be used by educators to provide them with meaningful feedback, because it is unlikely that motivation for learning increases when people think they already possess the knowledge needed for providing optimal care (Pintrich, 2003).

LIMITATIONS
Several limitations of the current study should be mentioned to interpret the results. The mean age of final-year AD nursing students was significantly higher than the mean age of final-year BN students. Almost 30% of the AD final-year students was older than 25 years, indicating that this subgroup followed an educational program before and probably had more practice experiences than other final-year students. However, no differences were found in knowledge and certainty levels between the final-year AD nursing students (<25 year or ≥25 years of age), which is why the final-year AD nursing students group remained one group in the analysis of this study.

Second, the number of participants per school (educating AD nursing students) and the two hospitals was small, possibly resulting in an overestimation of effect with the better (more motivated) students and nurses participating in the study. Although the performance of analysis was not affected by sample size, the overestimation should be taken into consideration when interpreting the results, and generalizability is therefore limited.

Finally, this study followed a cross-sectional design, providing insight into the current knowledge and certainty levels of students and nurses. A longitudinal design would provide more conclusive information regarding the development of knowledge and certainty levels through a nursing career, but this is often expensive in time and money. An opportunity for using this design lies in clinical practice. When individuals are obligated to keep track of what they learn during their nursing career, they continue to demonstrate what they have.
learned, ensuring that learning does not stop after graduation, possibly motivating a lifelong learning attitude.

CONCLUSION

The current study investigated the knowledge levels of nursing student and RNs about older hospitalized patients. Knowledge levels were assessed in relation to their educational level and work experience. Three important results were found. First, in all groups a substantial proportion of participants demonstrated insufficient knowledge about older patients. Second, results demonstrated higher knowledge levels for BN students compared with AD students, confirming that educational qualifications play a role in the quality of care older people receive. Finally, the learning curve of nurses in clinical practice declines as they gain more years of experience, emphasizing the importance for a focus on lifelong learning in the nursing profession.

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