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ORIGINAL PAPER

SLOVENIAN NURSING STUDENTS' COMPETENCE IN RESEARCH UTILIZATION, AND THE SUPPORT THEY RECEIVED DURING CLINICAL PRACTICE

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Abstract

Aim: Research utilization is at the core of evidence-based practice. The aim of the study was to describe Slovenian nursing students' competence in research utilization (attitudes, knowledge, and skills) on graduation, and the support they received in learning research utilization during clinical practice. *Design:* A descriptive, cross-sectional study design. *Methods:* The participants were graduating Slovenian bachelor-level nursing students (n = 220). Data were collected using the Competence in Research Utilization instrument, and analyzed statistically. *Results:* Students' attitudes to research utilization were positive, but their knowledge was rather limited. Skills were self-assessed as above moderate. The majority of the students had received support in learning research utilization during their most recent clinical practice period. The support received was related to students' attitudes and skills. *Conclusion:* Educational institutions should pay attention to improving nursing students' competence in research utilization, especially regarding their knowledge. Further research is needed to explore the most effective pedagogical strategies, including clinical practice, to improve students' competence in research utilization and to gain a better understanding of multidimensional research utilization competence assessment.

Keywords: competence, evidence-based practice, nursing education, nursing student, research utilization.

Introduction

Being the largest group of healthcare professionals in Europe, nurses are key actors in providing effective and safe healthcare services (World Health Organization, 2015). During nursing education, students should, therefore, acquire good professional competence, including evidence-based practice (EBP), by which the best research evidence is combined with clinical expertise, and patient values and preferences (Melnyk et al., 2014).

In Slovenia, there are eight educational institutions teaching undergraduate nursing programs, seven of which are faculties, and one a college. After Slovenia became a member of the European Union in 2004, the study programs were harmonized according to the directives (European Union, 2005, 2013) and guidelines of the European Federation of Nurses Associations ([EFN], 2015) in terms of the scope of theoretical and practical study hours (4,600 hours) and content (Bohinc & Cibic, 2005).

In undergraduate nursing education, the directives (European Union, 2005, 2013) define EBP knowledge as obligatory across Europe. The Slovenian Quality Assurance Agency for Higher Education has accredited all study programs in compliance with the directives (European Union, 2005, 2013). At bachelor level education, the EBP contents are offered as individual subjects (e.g., Fundamentals of Research, Introduction to Research in Nursing) in three faculties. In all other educational institutions, the EBP content is integrated into other subjects, such as Nursing and Research, or Research and Informatics. The objective of these studies is to ensure that nursing students: understand the importance of research in providing safe and evidence-based care (Brooke et al., 2015); know how to find the evidence required for practice; and know what the characteristics of qualitative and quantitative research designs consist of. Students then demonstrate the research knowledge and skills they have achieved in their diploma or bachelor theses. In addition to theoretical courses, EBP should also be part of clinical practice so that students can appreciate its significance (Fiset et al., 2017; Ramis et al., 2018).

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The study by Skela-Savič et al. (2020), including data from Slovenia, reveals insufficient integration of EBP into curricula, and variability in teaching across universities and educators. The teaching of EBP competencies should be a high priority in undergraduate nursing education (Patelarou et al., 2020). In Slovenia, EBP is a relatively new discipline in nursing education (Brooke et al., 2015; Skela-Savič et al., 2020). Hence, it is desirable to assess nursing students' EBP competence at graduation, and related factors, to explore the outcomes of nursing education, and to gain knowledge that may help to develop education in this area.

The focus of this study is on research utilization (RU), which is a fundamental part (Aglen, 2016) of EBP. RU can be seen as the direct application of research results to practical decisions and activities (Strandberg et al., 2014). Furthermore, as in this study, RU can be defined as a process (Strandberg et al., 2014) involving the acquisition, critical reading, and application of appropriate research knowledge (Florczak, 2016; Heikkilä, 2005). Nursing students' competence in RU influences their intentions to use research after graduation (Blackman & Giles, 2017; Ramis et al., 2018). In this study, competence comprises attitudes, knowledge, and skills (EFN, 2015; Melnyk et al., 2014) characterizing common approaches (EFN, 2015; Kajander-Unkuri et al., 2014).

Nursing students' attitudes towards RU are generally positive, and they appreciate the implementation of research in nursing care (Heikkilä et al., 2018, 2019; Leach et al., 2016; Ross & Burrell, 2019; Ryan, 2016). However, previous research (Al Qadire, 2019; Heikkilä et al., 2018; 2019; Labrague et al., 2019) has shown that nursing students' RU knowledge and skills range from low to moderate, whether based on tests or self-assessment, although results are not directly comparable due to use of different concepts, research designs, and measurement tools. Nevertheless, there is evidence that students have inadequate skills in terms of the formulation of questions to retrieve research literature (Florin et al., 2012), the performance of database searches (Florin et al., 2012; Lam & Schubert, 2019) and the critical appraisal of research evidence (Al Qadire, 2019; Lam & Schubert, 2019; Leach et al., 2016). Students consider it difficult to read and understand research reports (Brooke et al., 2015; Leach et al., 2016) and implement the results in practice (Leach et al., 2016). In addition, since most research is published in English, students in non-English speaking countries do not feel confident when searching for and reading articles in English (Smith-Strøm et al., 2012). Meanwhile, access to sources of scientific literature on the Internet predicts students' RU competence (Labrague et al., 2019).

Clinical practice provides authentic learning opportunities for students to explore, appraise, and (especially) apply research findings in the field (Jansson & Ene, 2016; Lam & Schubert, 2019; Moore & Tierney, 2019). Research indicates that supervision, reflection, and feedback are supportive elements during clinical practice, playing a significant role in students' learning and empowerment by encouraging positive attitudes and dispelling misunderstanding about RU (Adamson et al., 2018; Jansson & Ene, 2016; Kajander-Unkuri et al., 2014). Successful learning of RU requires practicing nurses to use research, act as role models, and motivate students to embrace RU (Ryan, 2016; Smith-Strøm et al., 2012). However, according to previous research, students receive insufficient feedback (Lam & Schubert, 2019) and support (Fiset et al., 2017; Ryan, 2016) from their supervisors regarding the application of research findings to clinical practice. In Slovenia, there is a lack of research related to nursing students' competence in RU and the support they receive in clinical practice. Nevertheless, some Slovenian studies have focused on nurses' implementation of EBP (Skela-Savič et al., 2016, 2017).

Aim

The aim of this study was to describe Slovenian nursing students' competence in RU on graduation, and the support they received in learning RU during clinical practice.

Methods

Design

A descriptive, cross-sectional study design.

Sample

All eight Slovenian educational institutions offering bachelor-level nursing education were invited to participate in the study in 2017. Based on a power analysis (Chi-square test; statistical level of significance: 0.05, strength: 90%, and effect size: 0.1), the required number of observations (sample size) was 245. Five institutions consented to the study, and all of their graduating nursing students (n = 334) were invited to participate. The inclusion criteria were: being a full-time or part-time bachelor-level student, and studying in the final semester. A total of 220 graduating nursing students completed the questionnaire (66% response rate).

Data collection

At each participating institution, instructions were given to the students, both orally and in writing, by a contact person. Students completed a paper questionnaire sent to their institutions. The completed questionnaires were returned to the contact person, who then forwarded them to the project leader for analysis.

The Competence in Research Utilization (CompRU) instrument (Heikkilä, 2005; Heikkilä et al., 2018) was used for data collection. The CompRU instrument measures Attitudes to RU, Knowledge related to RU, and Skills related to RU. A five-point Likert scale was used for Attitudes to RU and RU Skills (Table 1). A knowledge test was used to assess RU Knowledge, with a point awarded for each correct answer. In addition, ten items regarding support received in learning RU during clinical practice, based on earlier research findings, were added to the instrument. Students assessed the support received in relation to their most recent clinical practice (minimum duration three weeks) by the same five-point Likert scale used for evaluating Attitudes to RU. The instrument also contained six questions on demographics (Table 2).

The CompRU instrument's content validity was evaluated in 2003 (Heikkilä, 2005) and re-evaluated in 2012 (Heikkilä et al., 2018). The English version of the CompRU instrument was translated into Slovenian through the following steps (adopted from Maneesriwongul & Dixon, 2004):

1. forward translation (independently) by two researchers;
2. back translation by an expert in English;
3. comparison of the original and translated versions by another two researchers;
4. revision of the translated questionnaire to achieve equivalence between the original and target languages; and
5. pre-testing of the translated questionnaire for clarity of expression by two nursing students.

The consistency of the Slovenian version was tested by Cronbach's α coefficient, and by examining the compatibility of single questions within the scale through item analysis. Satisfactory values for Cronbach's α coefficient were achieved (0.75–0.95) regarding attitudes to RU, RU skills, and support received in learning RU during clinical practice (DeVellis, 2012). It was not necessary to exclude any questionnaire items to improve the Cronbach's α coefficient. Construct validity of the Slovenian version was measured using principal component analysis (Promax with Kaiser rotation, eigenvalues over one as a criteria), which explained 51.7% (RU attitudes), 60.6% (RU skills), and 67.3% (Support received) of the variance of the data, indicating support for the theoretically formed categories.

Table 1 Nursing students' competence in research utilization (n = 187–220)

Sections Categories (I–III) *Sub-categories*	number of items	mean	correct answers (%)	SD	range	n
Attitudes to research utilization[a]	16	3.80		0.59	1.63–5	220
I Appreciation of research utilization	7	3.97		0.63	1.43–5	220
II Commitment to research utilization	9	3.60		0.69	1.50–5	220
Knowledge related to research utilization[b]	31		22.51	13.20	0–62.96	220
I The acquisition of research knowledge	4		21.48	22.32	0–100	220
Information sources	2		15.00	24.87	0–100	220
Methods of information acquisition	2		27.95	32.44	0–100	220
II The process of producing research	23		22.49	13.86	0–68.48	211
Structure of research articles	4		36.67	29.50	0–100	205
Research terminology	8		14.85	17.94	0–75	187
Research approaches	3		23.40	26.81	0–100	198
Data collection methods	3		21.75	26.11	0–100	200
Data analysis methods	5		21.05	21.10	0–80	191
III The assessment criteria for research	4		29.72	26.43	0–100	196
Reliability	3		31.12	26.81	0–100	196
Clinical relevance	1		25.39	54.28	0–100	193
Skills related to research utilization[c]	16	3.71		0.57	1–5	218
I Acquisition of research knowledge	4	3.87		0.62	1–5	218
II Critical reading of research	8	3.61		0.62	1–5	218
III Application of research	4	3.78		0.69	1–5	218

© Heikkilä 2005. *[a]Five-point Likert scale: 1 – disagree completely; 2 – disagree partially; 3 – neither agree or disagree; 4 – agree partially; 5 – agree completely; [b]Knowledge test scoring: one point for correct answer; [c]Five-point Likert scale: 1 – very poor; 2 – rather poor; 3 – neither well nor poorly (moderately); 4 – rather well; 5 – very well; SD – standard deviation*

Table 2 Characteristics of the sample (n = 217–220)

Characteristics	n	%	mean	SD	range
Age (years)	218		23.5	4.05	19–44
Gender					
female	168	76.7			
male	51	23.3			
Nursing educational institution[a]					
H	25	11.4			
I	69	31.4			
J	45	20.5			
K	62	28.2			
L	19	8.6			
Prior vocational qualification in health care					
yes	172	78.2			
no	48	21.8			
Working experience in health care					
yes	61	28.1			
no	156	71.9			
Length of working experience in health care (years)	58		5.4	5.5	0.08–22.50
< 1 year	9	15.3			
1 ≤ 2 years	9	15.3			
2 ≤ 3 years	8	13.6			
> 3 years	33	55.9			

[a]*H–L – codes for nursing educational institution; SD – standard deviation*

Data analysis

SPSS 25 software was used for statistical analysis. Sample characteristics were reported using descriptive statistics. Sum variables were formed based on RU and competence definitions in this study. Knowledge sum variables were reported using percentages of correct answers. Multifactor Analysis of Variance was used to find connections between background factors and sum variables (Main effect model: continuous variables used as covariates, and categorical variables used as fixed factors). Sidak adjustments for multiple comparisons were used for pairwise comparisons. Spearman correlation coefficients were used to evaluate dependencies between sum variables. Differences in means of categories within attitudes, knowledge, and skills were tested using paired T-tests. Bonferroni-corrected p-values were reported if there was more than one pair to test (Skills). The statistical test was considered to be significant if the p-value was ≤ 0.05.

Results

Students' demographic characteristics

Respondents' ages ranged from 19 to 44 years (mean = 23.5; SD = 4.05), and 76.7% were female (Table 2).

Students' competence in research utilization

The nursing students' attitudes to RU had a positive tendency (mean = 3.8; SD = 0.59). However, appreciation of RU (mean = 3.9; SD = 0.63) was found to be higher than commitment to RU (mean = 3.6; SD = 0.69) (Table 1). The difference was statistically significant (p < 0.001).

The knowledge test revealed poor knowledge of RU: only slightly above a fifth (22.5%) of students gave correct answers to the test questions. Students' knowledge was best regarding the structure of research articles (36.6% scoring correctly) and weakest on English research terminology and information sources, (only 14.8% and 15%, respectively, answered correctly) (Table 1). Students knew more about assessment criteria for research than about the acquisition of research knowledge (p = 0.015) or the process of producing research (p < 0.003).

RU skills were above moderate (mean = 3.7; SD = 0.57). The students assessed their skills to be best in the acquisition of research knowledge (mean = 3.8; SD = 0.62), and lowest in critical reading of research (mean = 3.6; SD = 0.62) (Table 1). Students assessed their skills in acquisition of research knowledge to be better than their skills in critical reading of research (p < 0.001) and application of research (p = 0.045), while their skills in application of research were, in turn, better than their skills in critical reading of research (p < 0.001).

Support received by students in learning research utilization during clinical practice

The support students received regarding the learning of RU during their most recent clinical practice was measured with ten items. The total mean was 3.6

(SD = 1.05). In all items, the majority (51.8–71.3%) agreed partially or completely with the statements.

According to the students (71.3%), guided discussions with supervisors supported the learning of RU in a concrete way, and the supervisor was regarded as a model for how research knowledge could be used in the nursing care of patients or clients (Table 3).

Several moderate to strong (r ≥ 0.30) positive correlations were found between the categories within the attitudes, knowledge, and skills sections. Support received in learning RU during clinical practice also correlated positively with attitudes to RU (r = 0.30; p < 0.001) and RU skills (r = 0.30; p < 0.001) and their sub-categories (Table 4).

Table 3 Support received in learning research utilization during clinical practice (n = 216–219)

Section	mean	SD
Support received in learning research utilization during clinical practice (10 items)[a]	3.69	1.05
Items		
1. The supervisor of the clinical practice knew about the learning goals concerning the research utilization included in the practice period.	3.87	1.05
2. The guided discussions with the supervisor supported my learning of research utilization in a concrete way.	3.86	1.04
3. The supervisor was an example of how research knowledge can be used in the nursing of patients / clients.	3.87	1.07
4. The head nurse promoted research utilization by setting a good example and creating a positive atmosphere for learning to use research knowledge.	3.57	1.14
5. In the assessment discussion, the supervisor gave me supportive feedback concerning research utilization.	3.74	1.09
6. In learning assignments during my practice period, I made good use of systematic reviews and / or nursing guidelines.	3.85	0.93
7. Together with my supervisor, I critically assessed the applicability of research knowledge in the nursing of patients / clients.	3.62	1.15
8. In addition to discussions with the supervisor, I also discussed the use of research knowledge in the nursing of patients / clients with the other staff.	3.56	1.17
9. I actively informed the staff of my clinical practice organization on the latest research knowledge.	3.43	1.16
10. The practical period deepened my know-how of research utilization as part of evidence-based nursing.	3.55	1.06

© Heikkilä 2012. [a]*Five-point Likert scale: 1 – disagree completely; 2 – disagree partially; 3 – neither agree or disagree; 4 – agree partially; 5 – agree completely; SD – standard deviation*

Relationship of demographic variables to students' competence in research utilization

Students with prior vocational qualifications scored lower (21.8% gave correct answers) in the knowledge test than students with no prior vocational education (29.2%; p = 0.001). Educational institution was related to RU skills, e.g., students in institute I (mean = 3.95) assessed their skills more highly than students in institute H did (3.46; p = 0.008) and J (3.57; p = 0.006).

Discussion

The results indicated positive attitudes to RU among nursing students, a finding congruent with other studies (Heikkilä et al., 2018, 2019; Leach et al., 2016; Ross & Burrell, 2019; Ryan, 2016). This result is heartening, as the more positive the nursing students' attitudes to using research throughout their studies, the higher their intention to use research in nursing care after graduation (Blackman & Giles, 2017; Ramis et al., 2018). However, the students' willingness to commit themselves to RU was not as high as their appreciation of RU. Other studies have reported corresponding findings (Heikkilä et al., 2018, 2019). This may partly reflect the fact that

nursing students are not comfortable with research and find it intimidating, as in the study by Brooke et al. (2015).

The knowledge test, which contained items essential for the acquisition of research knowledge, critical reading, and application of research (Heikkilä, 2005), indicated poor knowledge of RU among nursing students, mirroring results in other countries, such as Finland and Poland (Heikkilä et al., 2018, 2019). The data does not provide an explanation. However, it might be that the teaching of RU is not yet sufficiently integrated into nursing curricula, as Skela-Savič et al. (2020) have stated. If this is true, it might be useful to consider strengthening the RU and EBP content of curricula in undergraduate nursing education, and possibly also to look for more effective teaching and learning methods and combinations of learning strategies, as suggested by Fiset et al. (2017). Certain innovative approaches seem to be effective (Patelarou et al., 2020).

Nursing students were fairly familiar with the structure of research articles, which is likely to be associated with their ability to read research. However, students' knowledge of English research terms was limited. The results are in line with other studies (Heikkilä et al., 2018, 2019; Smith-Strøm

Table 4 Spearman correlations[a] between competence in research utilization and support received during clinical practice (n = 219)

Sections categories	Attitudes			Knowledge				Skills				Support received
	1	1A	1B	2	2A	2B	2C	3	3A	3B	3C	4
1 Attitudes	1.00											
1A appreciation	0.87***	1.00										
1B commitment	0.90***	0.60***	1.00									
2 Knowledge				1.00								
2A acquisition				0.40***	1.00							
2B producing process				0.98***	0.32***	1.00						
2C assessment criteria				0.58***		0.46***	1.00					
3 Skills	0.46***	0.34***	0.41***					1.00				
3A acquisition	0.33***		0.32***					0.82***	1.00			
3B critical reading	0.43***	0.34***	0.41***					0.94***	0.69***	1.00		
3C application	0.34***		0.32***					0.84***	0.57***	0.67***	1.00	
4 Support received	0.33***		0.32***					0.53***	0.36***	0.53***	0.47***	1.00

[a]Spearman correlation which are moderate to strong (r ± ≥ 0.30) are reported; ***p < 0.001

et al., 2012). Since English is considered difficult in non-English speaking countries, potentially hindering RU (Smith-Strøm et al., 2012), actions that promote the availability of research in local languages, such as evidence-based guidelines and systematic reviews, are recommended.

The findings show that the better the students' grasp of how to acquire research knowledge, the better their knowledge of the process of producing and assessing research. Research articles are mainly stored electronically, and access to the sources of scientific literature via the Internet predicts students' competence in RU (Labrague et al., 2019). However, in this study, relatively few students were familiar with information sources. While this study provides no explanation for this, a study by Heikkilä et al. (2018), conducted in Finland, showed progress in students' familiarity with information sources over a ten-year period, which was presumed to be due to increased co-operation with librarians. It might, therefore, be useful for higher educators in Slovenia to discuss how students can become more familiar with, and have easier access to electronic databases.

In this study, students assessed their RU skills as above moderate, indicating relatively high self-confidence. In Slovenia, there are no other findings with which to compare these results, but other studies indicate that nursing students' RU skills often range from low to moderate (Al Qadire, 2019; Labrague et al., 2019). The results demonstrated that students' skills in the acquisition of research knowledge associated positively with skills in critical reading, and application of research. This finding is congruent with the results regarding the knowledge of RU described above. Both findings indicate that during education, it is essential to emphasize the learning of acquisition of research knowledge, since it creates a central starting point for learning the other parts of the RU process (Florczak, 2016; Heikkilä, 2005).

In this study, students received support from their supervisors in learning RU during clinical practice. This is contrary to previous findings (Fiset et al., 2017; Lam & Schubert, 2019; Ryan, 2016). More specifically, the majority of students thought that their guided discussions with supervisors supported their learning of RU in a concrete way, and that the

supervisors were a supportive example of how research knowledge can be used in nursing care. This finding is encouraging and confirms other research results (Adamson et al., 2018; Jansson & Ene, 2016; Kajander-Unkuri et al., 2014; Ryan, 2016; Smith-Strøm et al., 2012). The results of this study demonstrate that support and supervision received during clinical practice correlated with students' RU attitudes and skills. The finding is heartening since building confidence in RU skills during clinical practice encourages students to implement research evidence into clinical care after graduation (Smith-Strøm et al., 2012). According to the findings of this study, there were differences between the educational institutions regarding students' RU skills. As we cannot identify the reason for these differences based on this data, further research is needed. However, this finding is supported by the study of Skela-Savič et al. (2020) on six European countries, including Slovenia, indicating variability in EBP teaching across universities and educators.

The findings of this study are parallel to other research findings related to nursing students' competence in RU and EBP. In Europe, the goal of nursing education is to ensure equal competence in all students, and good quality of nursing care. Equal competence of nurses is also important as it enables free movement of nurses across Europe. (European Union, 2005, 2013) It is, thus, suggested that shared planning, implementation, and assessment of teaching and curricula should be developed and disseminated nationally and internationally in nursing education to harmonize RU and EBP education across Europe. There are already initiatives in this direction (Ruzafa-Martínez, 2019).

Limitation of study

There are limitations to this study. First, only five of the eight educational institutions invited consented to the study. In addition, the sample size remained 10% lower than the ideal amount according to power analysis. Therefore, the results can only be generalized with caution. Second, the CompRU instrument is a questionnaire aimed at measuring RU competence extensively, including attitudes, knowledge, and skills (Heikkilä, 2005; Heikkilä et al., 2018). A knowledge test was used alongside the more subjective self-assessment questionnaire (Kajander-Unkuri et al., 2014) to obtain a more comprehensive view of students' RU competence. Some responses were incomplete (n = 0–33) in the knowledge test, which might indicate that the participants found the test too long, or too demanding. Nevertheless, the knowledge test was composed of items essential for RU. Third, the study

focused only on how the most recent period of clinical practice supported students' learning of RU, which does not give a detailed picture of the learning of RU throughout nurses' theoretical and clinical practice education. However, the findings do illustrate how students are supported in the learning of RU during clinical practice in Slovenia. Fourth, although the CompRU instrument's construct validity was supported statistically and the internal consistency was satisfactory, the psychometric aspects of the CompRU instrument should be tested further.

Conclusion

The results indicate that graduating Slovenian nursing students' attitudes to RU are positive and that their RU skills are above moderate average, according to (subjective) self-assessment. However, results of the knowledge test suggest that students have limited knowledge of RU. The results parallel other findings internationally. In this study, students received support from their supervisors in learning RU during clinical practice, and the support they received correlated with their RU attitudes and skills. It is recommended that educational institutes should pay attention to improving nursing students' competence in RU, especially regarding knowledge. Further research is needed to explore the most effective pedagogical strategies, including clinical practice, to improve students' competence in RU, and to gain a better understanding of multidimensional RU competence assessment.

Ethical aspects and conflict of interest

The ethical principles were followed according to the Helsinki Declaration. The Ethical Committee of the University of Turku (10/2012, 28/2014) approved the study protocol before the research started. Written permissions were obtained from the institutes where the data collection was performed. Students were informed with written study announcement, and written informed consent was obtained from the students on the first page of the questionnaire. Students could participate voluntarily and anonymously. Students could discontinue participation from the study at any time. The authors declare that there is no conflict of interest.

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Author contributions

Concept and design (AH, MK, BF, HLK), data collection (MK, BF), data analysis and interpretation (JK, AH), manuscript draft (AH, LS, JK), critical revision of the manuscript (AH, MK, BF, LS, HLK), final approval of the manuscript (all authors).

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