ORIGINAL RESEARCH

Research use in clinical practice – extent and patterns among nurses one and three years postgraduation

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Abstract

Title. Research use in clinical practice – extent and patterns among nurses one and three years postgraduation.

Aim. This paper is a report of a study of nurses’ research use in clinical practice one and three years postgraduation in Sweden.

Background. Internationally, learning to critically appraise and use research is an educational objective within nursing training, with the aim of promoting research use in nursing practice. The extent to which these skills is acquired and used among relatively newly graduated nurses is largely unexplored, however.

Method. A descriptive study was conducted in 2006 using a national longitudinal survey of two nursing cohorts one \( n = 1,365 \) and three \( n = 933 \) years postgraduation. The self-reported extent of instrumental, conceptual and persuasive research use was measured. Data were analysed using both variable- and pattern-oriented approaches based on cluster analysis.

Results. Research use was reported to occur in about half or fewer of the working shifts. In both samples, seven clusters of nurses with different research use profiles were identified. Clusters representing overall low and very low users in all three types of research use were predominant both at one (45.6%) and three (51.6%) years postgraduation, whereas clusters of nurses reporting overall high research use were uncommon. The proportion of very low users was larger 3 years after graduation than 1 year after graduation.

Conclusions. The low extent of reported research use, raises the question of whether scientific perspectives included in nursing education are translated into clinical application. The pattern-oriented approach illustrates the complexity of research use and identification of typical research use profiles in specific contexts may have potential to guide interventions aimed at supporting evidence-based practice.

Keywords: clinical practice, cluster analysis, evidence-based practice, nurses, postgraduation, questionnaire, research use

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Introduction

The use of best available knowledge in nursing care can substantially enhance care quality and alleviate the pain and suffering of patients. For example, studies have shown that the implementation of evidence-based clinical guidelines has the potential to decrease pressure ulcer incidence in intensive and long-term care and to improve urinary continence among long-term care residents (Frantz et al. 2003, de Laat et al. 2007, Timmerman et al. 2007). Translating research findings into clinical use is of considerable importance for the health of the population worldwide (Sanders & Haines 2006, Madon et al. 2007) and is prominent among WHO research priorities (World Health Organization 2004, 2006). It is, however, a complex undertaking (Bero et al. 1998, Grol & Grimshaw 2003) because current knowledge on how to increase research use (RU) remains incompletely understood (Thompson et al. 2007). Internationally, there is a strong desire for evidence-based nursing, including research-based nursing practice (Bucknall 2004, Estabrooks 2004, Kitson 2004, McNerney 2004, Stetler 2004, Thompson 2004, Wallin & Ehrenberg 2004). To meet this call, learning to critically appraise and use research evidence has developed into an important educational objective within nursing education. However, the extent to which these skills are acquired and subsequently used in working life is largely unexplored. Therefore, the overall aim of this study was to investigate relatively newly-graduated nurses’ use of research knowledge in clinical practice.

Background

Studies have identified a gap between theory and clinical practice in both nursing students (Corlett 2000) and newly-graduated nurses (Maben et al. 2006). This gap appears to persist despite the fact that nursing education has witnessed a transformation from vocational training to academic education in recent decades. This change is an international movement; in the United Kingdom, for example, an educational reform, ‘Project 2000’, was introduced by the United Kingdom Central Council (UKCC 1986), moving nursing education into higher education. In the United States of America, applying evidence-based knowledge as the basis for clinical practice is stated as one of the hallmarks of quality and patient safety in baccalaureate nursing education by the American Association of Colleges of Nursing (AACN: American Association of Colleges of Nursing 2006). In Sweden, nursing education has shifted from an apprentice-training programme to an academic education, which results in both a professional and an academic degree. Scientific perspectives and the ability to search, critically appraise and use scientific knowledge are emphasized in laws and regulations on educational objectives and nurses’ professional ability (The Swedish Code of Statutes 1992, 1993, The National Board of Health and Welfare 2005). However, studies show that Swedish nursing students experience the clinical and academic elements of their education and the nursing profession as poorly integrated (Holmström & Larsson 2005, Lilja Andersson 2007). A recent national review of nursing education by the Swedish National Agency for Higher Education (2007) confirms this view of nursing students.

Nurses’ RU has been extensively investigated in diverse nursing samples, in various contexts and using different measurement instruments. Little is known, however, about the use of research findings among newly-graduated nurses, despite the increased academic focus of nursing education. A study of newly-graduated nurses and midwives in England revealed a relatively high extent of RU (Veeramah 2004), but the use of a project-specific instrument makes it difficult to interpret and compare these findings with those from studies based on more commonly-used instruments. Although the field lacks standardized measures of RU, three commonly-used multi-item instruments are the Nurse Practice Questionnaire (NPQ), Research Use Questionnaire (RUQ) and Edmonton Research Orientation Survey (EROS) (Estabrooks et al. 2003). The RUQ and EROS measure RU in a general sense, whereas the NPQ measures nurses’ adoption of specific nursing practices (Brett 1987). Nurses’ use of research findings in studies using these instruments is commonly considered as moderate or low. All three instruments lack an operational definition of RU and the unclear conceptualization of RU is a major shortcoming in the area of implementation research (Estabrooks et al. 2003).

In social science research, Rich (1975, 1977) and Weiss (1979) have discussed instrumental and conceptual use as two distinct and different forms of information utilization. In addition, Pelz (1978) and Beyer and Trice (1982) have examined symbolic utilization of social science knowledge. These three concepts (instrumental, conceptual and symbolic utilization) of RU were brought into nursing through the work of Stetler (1994a,b). In an attempt to develop measures for these concepts, Estabrooks (1997, 1999a) defined and operationalized measures of instrumental (direct), conceptual (indirect) and symbolic (persuasive) RU and was the first to conceptually model and empirically assess these concepts in nursing. In the work by Estabrooks (1997, 1999a), instrumental utilization was theoretically-defined as a concrete application of research, resulting in, for example, clinical practice guidelines (at the level of an organization or nursing
unit) or, at the individual level, ‘direct’ application in making specific decisions/interventions. Conceptual use pertained to RU that resulted in changes in thinking, but not necessarily changes in action. This meant that research knowledge enlightened and informed the nurse. Symbolic use (persuasive in this current study) referred to research that is used as a political or persuasive tool to influence colleagues or decision makers. By using the techniques of structural equation modelling, Estabrooks provided evidence of the existence of instrumental, conceptual and persuasive RU. These types of RU were also found to influence an underlying latent concept, ‘overall RU’. The findings by Estabrooks implied that, despite its complexity, might be measurable with relatively simple questions that are not nursing intervention-specific, capturing more than the instrumental use of research. Several subsequent empirical studies have been published using these RU measures (Estabrooks 1999b, Profetto-McGrath et al. 2003, Kenny 2005, Milner et al. 2005, Estabrooks et al. 2007).

In Estabrooks’ study (Estabrooks 1999a) of the conceptual structure of RU of Canadian staff nurses, scores were highest for conceptual RU, followed by instrumental and persuasive use. The same distribution was found by Profetto-McGrath et al. (2003) in a study of RU among nurses in adult surgical and paediatric units. In yet another study, Milner et al. (2005), who studied RU among staff nurses, educators and managers, found that educators reported statistically significantly higher levels of RU than staff nurses and managers and conceptual RU was again most frequent, while persuasive use was least common. The same distribution was found by Kenny (2005), who investigated nurses’ RU in practice in US army hospitals.

In summary, increased emphasis has been placed on the use of research within nursing education and nursing practice. Knowledge about nurses’ RU shortly after graduation, i.e. how the scientific perspectives included in nursing education are put into clinical practice for the benefit of patients, is limited, however. Different types of RU (instrumental, conceptual and persuasive) exist and nurses apply these to different extents. Investigating these three types of RU simultaneously might facilitate understanding of how RU is carried out in clinical practice by disclosing potential user profiles.

The study

Aim

The aim of this study was to describe nurses’ research use in clinical practice one and three years postgraduation. Specifically, we wished to:

- describe and compare the extent of RU in two samples of nurses one and three years postgraduation.
- identify and describe clusters of nurses having similar RU profiles and to compare profiles and their prevalence between samples one and three years postgraduation.

Design

The study was a cross-sectional survey among Swedish nurses one and three years postgraduation. The data presented here are part of a larger study: the Swedish LANE project (Longitudinal Analyses of Nurse(s) Education/Entry in working life) (Gustavsson et al. 2007), a prospective, longitudinal and national survey. The original aim of the LANE project was to study health-related issues among nursing students and nurses shortly after graduation. Data collection for this study was carried out from 2002 to 2006. Questions about nurses’ RU were added in the 2006 (the fourth) data collection phase, from which the data reported here are derived.

Participants

The target population in the LANE study was all nursing students enrolled in 2002 in the first and third years at any of the 26 universities and university colleges in Sweden having nursing programmes. Of these institutions, 24 agreed to provide student registers, making their students available for recruitment. Students who agreed to participate and returned the questionnaires formed the two cohorts of the LANE study. One cohort consisted of students who graduated in the end of 2002 (the ‘EX2002’ cohort, EX = examination year) and entered working life as nurses in 2003. The other cohort included students expecting to graduate in the end of 2004 (the ‘EX2004’ cohort) and entering working life in 2005. Consequently, at data collection in 2006, ‘EX2004’ nurses formed a sample who had completed their first year working as a nurse, the year one (Y1) sample. Similarly, the ‘EX2002’ nurses had been working for 3 years, the year three (Y3) sample. In comparison with the students available for recruitment in 2002, men were somewhat underrepresented (1–1.5% fewer) in the Y3 sample from 2006. From the total number of respondents available at the 2006 data collection, 201 from the Y1 sample and 135 from the Y3 sample were not currently working as a nurse and thus were not eligible to answer the RU items. The analyses of RU patterns included only nurses with responses on all three items measuring RU (‘don’t know’ responses were excluded). See Figure 1 for sample sizes over time and for the different analyses.

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Data collection

Data collection was performed by Statistics Sweden (SCB). Questionnaires were mailed and followed by two postal reminders and one reminder by phone for non-responders.

Participant demographics
Age, gender, previous college experience (before the nursing programme), previous work experience in health care and present employment (type of organization) were used in describing the two samples (Table 1).

Research use variables
The questionnaire included three items measuring instrumental, conceptual and persuasive RU, originally developed by Estabrooks (1997, 1999a). The Swedish translation and adaptation of the items, performed by the present research group, were based on a Canadian version of the items (Estabrooks et al. 2004). Each RU item included a definition of the concept, followed by three examples of application (see Figure 2).

Validity
Estabrooks (1997, 1999a) reported on construct validity in her examination of the conceptual structure of RU. She detected an explained variance in the latent concept of 70% and that the latent concept was causally influenced by each type of utilization (i.e. instrumental, conceptual and persuasive). As noted earlier, a number of studies (Estabrooks 1999b, Profetto-McGrath et al. 2003, Kenny 2005, Milner et al. 2005, Estabrooks et al. 2007) using these measures have reported credible findings from regression models and
correlation analyses on RU and its predictors. This previous work can be said to constitute a promising body of evidence for the validity of these measures (Goodwin 2002). To test the feasibility of the Swedish items and to ensure face validity, they were reviewed by clinical nurses and also examined by the workers at the technical and language laboratory at Statistics Sweden (SCB).

Ethical considerations
The study was approved by the appropriate ethics and informed consent was gained from all respondents. The nurses received written information about the study, including a statement that participation was voluntary and could be terminated at any time. Confidentiality was guaranteed.

Data analysis
Descriptive and comparative analyses
Descriptive statistics were used to describe participant demographics and the extent of RU. RU data were treated as interval data. Differences in RU between the Y1 and Y3 samples were analysed using $t$-test statistics (for responses 1 to 5) and chi-square tests (for ‘don’t know’ proportions). All analyses were performed using SPSS, version 14.0 (SPSS Inc, Chicago, IL, USA), with the level of statistical significance set at $P < 0.05$ (two-tailed).

Cluster analyses
A pattern-oriented approach was applied by using cluster analysis to identify homogeneous clusters of nurses presenting similar RU profiles (Bergman et al. 2003). All three RU variables were used for the cluster analyses. Individuals with non-complete responses on RU, i.e. responses including ‘don’t know’ or missing values on some or all of the three RU items, were not included in the cluster analyses (Y1: $n = 286$, Y3: $n = 173$) (Figure 1). Ward’s hierarchical agglomerative method as implemented in SLEIPNER, version 2.1 (Bergman & El-Khoury 2002) was used, with the squared Euclidian distance chosen as a measure of similarity. The SLEIPNER package comprises 16 modules addressing data analysis from a pattern-oriented perspective (Bergman & El-Khoury 2002, Bergman et al. 2003). For the present paper, modules dealing with data preparation and analyses of possible classification patterns were used. For a more detailed description of the theoretical and operational perspectives, see Bergman et al. (2003). The quality of the cluster solutions was evaluated by following a rationale for obtaining a well-functioning and trustworthy classification. For example, high levels of ‘explained error sum of squares’ (EES) were interpreted as indicators of quality. The final number of clusters was also decided based on judgement of the theoretically-reasonable profiles. A relocation procedure (using the RELOCATE module in SLEIPNER) was used to optimize the cluster solution, allowing ill-fitting objects to move to the most appropriate cluster and resulting in more homogeneous clusters. To study the differences in cluster prevalence between the Y1 and Y3 samples, the K-means cluster analysis in SPSS was used, where the Y3 cluster sample was clustered using the Y1 centroids (mean values) as seed points. $Z$-values were used as a measure of effect size, i.e. the deviance of cluster centroids from the mean value of the total sample. For each sample, individuals with non-complete RU responses were compared with those included in the cluster analysis in the corresponding sample regarding participant demographics [$t$-test (age) and chi-square tests].

Results
Extent of research use in clinical practice
Frequency distributions, mean values and standard deviations (SD) for RU responses are presented in Table 2. Instrumental RU was most prevalent both at one and three years postgraduation, followed by conceptual use; persuasive RU was least prevalent. The proportions of nurses reporting instrumental use of research on more than half of their working shifts during the four latest working weeks (alternatives 4 and 5 on the response scale) were 33.6% (Y1) and 35.8% (Y3). The

Figure 2 Wording of the item for instrumental (direct) research use (RU) in the present study (translated into English).

Respondents were asked to estimate their extent of RU during their past four working weeks. Response alternatives: 1 = ‘never’, 2 = ‘on some shifts’, 3 = ‘on about half of the working shifts’, 4 = ‘on more than half of the working shifts’, 5 = ‘on almost every shift’, 6 = ‘don’t know’.

It means that you use research findings (nursing or other kinds of research) in a concrete way in providing patient care. Instrumental RU can be based on scientific articles or recommendations in systematic literature reviews, clinical guidelines, protocols or other documents based on research findings. For example:
- Assess the risk of pressure ulcers by using e.g. the modified Norton Scale.
- Use of physiological saline instead of heparin to keep a peripheral vein catheter open.
- Use of compression treatment in the treatment of venous leg ulcers.
corresponding proportions for conceptual RU were 22·1% (Y1) and 24·3% (Y3) and for persuasive use 6% (Y1) and 6·5% (Y3). ‘Don’t know’ answers ranged between 8·8% and 13·2%, with the highest proportions for persuasive RU.

No statistically significant differences in the extent of RU or ‘don’t know’ proportions could be identified between the samples on the three RU variables. Furthermore, no statistically significant differences were found on demographics between individuals with non-complete RU responses and those included in the cluster analysis for each sample.

Patterns of research use

Seven patterns of RU were found, which were similar across the two samples (Table 3, Figure 3). The patterns were named based on the occurrence of high RU scorings, except for the two low RU clusters that represented low and very low use in all three variables. The identified clusters were labelled as follows:

‘Overall high users’, ‘Instrumental and conceptual users’, ‘Instrumental and persuasive users’, ‘Instrumental users’, ‘Conceptual users’, ‘Low users’ and ‘Very low users’. High RU represented mean values of 3·7 to 4·8 on the response scale, equivalent to a salient deviance in effect size (+0·9 to +2·9 sds) as compared with mean values for the total cluster samples on each RU variable. The remaining cluster mean values varied between 1·0 and 2·4 on the scale and were thus considered as low (presenting a deviance in effect size varying between +0·2 and −1·2 as compared with mean values for the total cluster samples). EESS for the cluster solutions were 80% (Y1) and 83% (Y3), which indicated a well-functioning classification [ESS should exceed 67% for a satisfactory solution (Bergman et al. 2003)]. The relocation procedure needed three iterations for the Y1 sample and two iterations for the Y3 sample (number of relocated objects: Y1 = 149, Y3 = 82).

Being in the two low-using clusters was common for nurses both one and three years after graduation [including

Table 2 Frequency distributions and mean values for use of research findings 1 (Y1) and 3 (Y3) years after graduation. Percent of respondents currently working as nurses, n = 1,164 (Y1) n = 798 (Y3)

<table>
<thead>
<tr>
<th>Pattern</th>
<th>Instrumental</th>
<th>Conceptual</th>
<th>Persuasive</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Y1</td>
<td>Y3</td>
<td>Y1</td>
</tr>
<tr>
<td></td>
<td>n (%)</td>
<td>n (%)</td>
<td>n (%)</td>
</tr>
<tr>
<td>Never</td>
<td>197 (16·9)</td>
<td>138 (17·3)</td>
<td>163 (14·0)</td>
</tr>
<tr>
<td>On some shifts</td>
<td>310 (26·6)</td>
<td>209 (26·2)</td>
<td>425 (36·5)</td>
</tr>
<tr>
<td>On about half of the working shifts</td>
<td>124 (10·7)</td>
<td>86 (10·8)</td>
<td>142 (12·2)</td>
</tr>
<tr>
<td>On more than half of the working shifts</td>
<td>135 (11·6)</td>
<td>76 (9·5)</td>
<td>102 (8·8)</td>
</tr>
<tr>
<td>On almost every shift</td>
<td>256 (22·0)</td>
<td>210 (26·3)</td>
<td>155 (13·3)</td>
</tr>
<tr>
<td>Don’t know</td>
<td>123 (10·6)</td>
<td>70 (8·8)</td>
<td>148 (12·7)</td>
</tr>
<tr>
<td>Missing</td>
<td>19 (1·6)</td>
<td>9 (1·1)</td>
<td>29 (2·5)</td>
</tr>
<tr>
<td>Mean (SD)*</td>
<td>2·9 (1·5)</td>
<td>3·0 (1·5)</td>
<td>2·7 (1·3)</td>
</tr>
</tbody>
</table>

*‘Don’t know’ responses excluded.

Table 3 Naturally-occurring clusters of individual research use (RU) profiles one and three years after graduation

<table>
<thead>
<tr>
<th>Cluster</th>
<th>Instrumental</th>
<th>Conceptual</th>
<th>Persuasive</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Y1</td>
<td>Y3</td>
<td>Y1</td>
</tr>
<tr>
<td></td>
<td>M  sd ES</td>
<td>M  sd ES</td>
<td>M  sd ES</td>
</tr>
<tr>
<td>Overall high users</td>
<td>4·2 1·1 0·9</td>
<td>4·8 0·6 1·2</td>
<td>4·7 0·5 1·5</td>
</tr>
<tr>
<td>Instrumental and conceptual users</td>
<td>4·7 0·5 1·2</td>
<td>4·8 0·4 1·2</td>
<td>4·6 0·5 1·5</td>
</tr>
<tr>
<td>Instrumental and persuasive users</td>
<td>4·3 0·9 1·9</td>
<td>4·6 0·7 1·1</td>
<td>2·4 0·7 0·2</td>
</tr>
<tr>
<td>Instrumental users</td>
<td>4·3 0·8 0·9</td>
<td>4·6 0·5 1·1</td>
<td>2·0 0·6 0·5</td>
</tr>
<tr>
<td>Conceptual users</td>
<td>2·3 0·7 0·4</td>
<td>2·1 0·8 0·5</td>
<td>4·3 0·8 1·3</td>
</tr>
<tr>
<td>Low users</td>
<td>1·7 0·5 0·8</td>
<td>2·3 0·5 0·4</td>
<td>2·2 0·4 0·3</td>
</tr>
<tr>
<td>Very low users</td>
<td>1·4 0·6 1·0</td>
<td>1·4 0·5 1·0</td>
<td>1·0 0·0 1·2</td>
</tr>
<tr>
<td>Total in cluster samples</td>
<td>2·9 1·5 0·0</td>
<td>2·9 1·5 0·0</td>
<td>2·6 1·3 0·0</td>
</tr>
</tbody>
</table>

Cluster names, cluster centroids/mean values (M), standard deviations (SD), effect size (ES, deviance of cluster centroids from the general trend in the cluster sample).
These two clusters represented low RU in all three items, but differed somewhat in magnitudes from each other within each sample (Table 3). Being in the overall high user cluster or in the cluster representing high instrumental and persuasive use was most uncommon in both the Y1 and Y3 samples.

When comparing the clusters, ‘Instrumental and conceptual users’ and ‘Conceptual users’ were equal in size in each sample. In contrast to the variable-oriented analyses, which did not detect any differences in RU between the samples, the cluster analyses detected a dissimilarity in that the proportion of ‘Very low users’ was larger in the Y3 (29.4%) than in the Y1 (13.7%) sample. To determine whether this difference reflected real differences in proportions or was a result of somewhat different cluster centroids, a new analysis was performed in which all Y3 individuals were clustered using the Y1 centroids. The result of this K-means cluster analysis showed that 95% of the Y3 individuals were correctly classified and that all of the ‘Very low users’ in the Y3 sample remained in that cluster after the re-clustering procedure, indicating that the prevalence of low users was more common in the Y3 sample.

Discussion

The extent of nurses’ self-reported RU was low in relation to the current emphasis on evidence-based health care. Instrumental use was most prevalent, taking place on about half of the working shifts, whereas persuasive use was occasional and least prevalent. These results are fairly comparable with findings from other studies. This was a little surprising because the current sample differed from previous mixed nurse samples in that it only included nurses recently-graduated from an academic educational programme. The cluster analyses resulted in seven clusters of RU in both samples, representing seven profiles pertaining to how the nurses used research in their nursing practice. The cluster analysis represents a new and illustrative approach in showing how RU appears in clinical practice.

Study limitations

The nurses’ self-reported RU was based on their own awareness of what kind of knowledge their actions were actually based on. Therefore, the self-reported RU may differ
from their actual use of research, which may be the major threat to validity in studies of RU (Estabrooks et al. 2005a). However, it is reasonable to argue that it is the RU that the nurses are aware of themselves that is the RU of interest, in that it represents the deliberate and reflective use of research findings. Because of the national sample and the relatively high response rates, we are confident that the findings are generalizable for the whole group of relatively newly-graduated and presently working nurses in Sweden.

In the present study, the designation of RU as 'high' or 'low' in naming the cluster profiles was based on the mean values of the scorings and on effect size values. A mean value of about 3 (as found in the variable-oriented analyses) on the response scale from 1 to 5 may not be regarded numerically as a low value, but in this study, it is considered as such because 3 corresponds to RU on only about half of the working shifts. Cluster centroids ranging from 1.0 to 2.4 were regarded as low, although some of these values did not deviate or deviated only marginally, from mean values for the total cluster samples. They did, however, deviate considerably from the 'high' clusters. Effect sizes for high RU exceeded 0.8, which is an accepted standard for large effects (Cohen 1988). However, the designation of RU as high or low is to some extent always arbitrary as the denominator of RU is unknown, i.e. the 'appropriate' extent of RU cannot be established. Because the expected use of instrumental, conceptual and persuasive types of RU might differ, it could also be the case that this unknown denominator differs between the three types of RU. Perhaps persuasive use could be expected to be less frequent than instrumental use. We believe, however, that our use of 'high' and 'low' labels is appropriate according to our findings and the current understanding of this issue.

The fact that the cluster analyses were successful, i.e. that clusters of nurses with similar scorings were identified, indicated that scoring was consistent. This finding firmly confirms the existence of the three types of RU and the validity and reliability of the measures used. Similar cluster profiles appeared in both samples, indicating strong support for the validity of the cluster solution. The existence of these cluster configurations is new and important knowledge in the RU research field.

Extent and patterns of research use

Comparing the results of RU in the current study with those previously published when the same measures of RU are employed is not a straightforward task, mainly because of different response scale formats and time frames. Generally speaking, there were no major differences in the levels of RU between our data and the existing literature (Estabrooks 1999a, Profetto-McGrath et al. 2003, Kenny 2005, Milner et al. 2005). Among the clusters, 'low' and 'very low' users were predominant, reflecting the low extent of RU found in the variable-oriented analyses in the current study. Although the low level of reported RU is in line with previous findings, it is nevertheless striking. Unlike in earlier studies, our sample comprised relatively newly-graduated nurses only. All these nurses had undergone an academic nursing education intended to promote critical thinking and RU. Because social desirability bias is a common problem in this research area (Estabrooks et al. 2003), the 'actual' extent of RU is likely to be even lower than reported here. Indeed, these results and others (e.g., Maben et al. 2006, 2007) call into question how well the scientific perspectives presented during nursing education are translated into clinical practice. Supporting new nurses in evidence-based practice is important and has proven to be an educational as well as an organizational and managerial challenge (Landers 2000, Andersson et al. 2007, Ferguson & Day 2007, Gerrish et al. 2008). Regardless of whether organizational support is present or lacking, knowledge and skills in evidence-based practice acquired from undergraduate education should be of great importance. Our findings give rise to several important questions: Should this low utilization of research be considered a failure of the educational system's ability to prepare the students for evidence-based nursing practice? Alternatively, is it that the healthcare organization is unprepared to take advantage of modern nurses’ academic capacity? We have no clear answers, but believe that these questions require further inquiry.

A broader definition of evidence includes, in addition to research findings, clinical experience, patient experience and preferences and information derived from the local context (Rycroft-Malone et al. 2004). It is also well-known that nurses report various sources of information and not primarily research, as the basis for their work. These sources include, for example, social interaction and experiential knowledge (Estabrooks et al. 2005a,b, Secco et al. 2006). The existence of these various sources of knowledge requires that nurses are critically reflective and aware of which knowledge they use, to be able to make proper clinical decisions, avoid a mechanistic, unreflective application of research and ensure that the different types of evidence are as robust as possible (Stetler 2001, Rycroft-Malone et al. 2004). Appropriate use of research findings may require “reasoned individualisation” (Stetler 2001, p 275) – otherwise, there is a risk that research findings are not applied according to patient needs, which may lead to inappropriate care (Stetler 2001). In our cluster analyses, two clusters were found, representing high RU in
only one aspect, namely ‘Instrumental users’ and ‘Conceptual users’. The clinical consequences of such RU patterns are unclear: What if instrumental users are ‘doers’ who use guidelines and protocols in an unreflective manner, as described above? And what are the consequences of solely conceptual use? Such use implies enlightenment and increased understanding, but is it manifested in patient care?

Although the levels of reported RU were approximately similar to those found in other studies, there was a difference in the ‘order’ of prevalence of the three types of RU. Earlier research including the measures of the same three types of RU have reported conceptual use as most frequent, followed by instrumental and persuasive use (Estabrooks 1999a, Profetto-McGrath et al. 2003, Kenny 2005, Milner et al. 2005). These disparities may be explained by the differences in how the question was presented in our study and in the questionnaires used in the Canadian and US studies. In the description of the concept in previous studies, instrumental RU was also said to result often in protocol, procedure, routine or policy development. Such a definition corresponds to RU on a policy level rather than at the level of the individual nurse and was therefore not used in the present study. Another important difference between this Swedish and previous studies was that our study included only relatively ‘novice’ nurses. One hypothesis could be that novice nurses use research instrumentally to a greater extent than their more experienced colleagues. However, such a trend, with instrumental use decreasing over time to the benefit of conceptual use, could not be verified in our data.

No differences in RU were found between the Y1 and Y3 samples in the variable-oriented analyses, suggesting that the nurses’ RU remains pretty much unchanged during the first 3 years of their professional careers. However, although the same cluster profiles were found one and three years after graduation, the samples did differ somewhat in cluster prevalence. Very low users were more common in the Y3 sample than in the Y1 sample. Further analyses indicated that there was a real difference between these cluster proportions, even when differences in cluster centroids had been ruled out. In a study of RU among nurses at US army hospitals (Kenny 2005), the number of years worked in nursing or in hospital correlated negatively with RU. Because the two groups in our study represented separate samples, no such longitudinal conclusions can be drawn. However, the difference in prevalence of very low users generates a hypothesis that would be the task of further research, i.e. does the cluster comprising very low users increase over time and, if so, why? Furthermore, although RU was regarded as low when viewing each variable separately, the cluster analysis revealed small groups of individuals in both samples who were high on all three RU variables (‘overall high users’). This finding raises questions about whether these nurses have specific individual, educational and organizational characteristics in common. In forthcoming studies, we will investigate potential predictors of the RU profiles.

Contributions of the pattern-oriented approach

By using the pattern-oriented approach, the three types of RU could be analysed simultaneously. These analyses revealed separate RU profiles, illustrating to what extent the individual nurses applied the three types of RU in their daily work. Profiles that did not appear in the analyses were not naturally-occurring. For example, there was no cluster representing solely high persuasive RU. Nor did low instrumental use, together with high conceptual and persuasive use, occur.

The pattern-oriented approach advances existing knowledge about the concepts and measures of instrumental, conceptual and persuasive RU by bringing a new perspective to this field of research. It adds a multidimensional and more nuanced picture of RU than analyses of each type of RU alone. The cluster analysis makes it possible to turn attention towards research users as individuals in addition to RU as a variable. It illustrates that RU is more than just use or non-use of research findings: it is more likely to concern various types of use in different combinations, resulting in different RU behaviours. Thus, our findings also show the complexity of RU in practice and of the concept of RU. The fact that different RU profiles appeared in the analyses indicates that RU is a complex and multidimensional phenomenon and should be measured as such, a view also asserted by Estabrooks (1997, 1999a). In addition, Estabrooks measured a latent variable, ‘overall RU’. We believe that the clusters presented here may be an additional and perhaps more informative way to illustrate nurses’ overall RU because the analysis reveals the simultaneous extent of the three types of RU that have been shown to influence that latent concept causally.

Conclusion

This study adds unique findings on nurses’ use of research in that the sample consisted of homogeneous samples of nurses one and three years after graduation. Bearing in mind, the focus on evidence-based nursing and use of research in today’s nursing education, the reported use of research evidence was quite low. More research is needed to understand how best to support the transition from nursing education to clinical practice and also to explore the role of
the organizational context for new nurses’ RU. Clearly, these issues are important for the educational system, nursing practice leaders and nursing researchers.

The cluster approach adds credibility to the RU measures used and offers additional ways of viewing and interpreting data. The approach also addresses the complexity of RU. We hope that it can bring new insights to both nursing education and clinical nursing practice by broadening discussions about different ways of using research.

Further research is needed to understand how best to support nurses’ research use in the transition from nursing education into clinical practice.

What is already known about this topic

- There is a strong call internationally for evidence-based nursing, including the use of research-based knowledge with a clear potential to improve care quality.
- Measures of instrumental, conceptual and persuasive research use have been developed and used in studies with different groups of nurses, but not in relatively newly-graduated nurses.

What this paper adds

- The extent of nurses’ research use one and three years postgraduation was relatively low, which is an important information both for nursing education and for healthcare organizations.
- Cluster analyses revealed seven profiles of research use, which underscores the complexity of research use as a concept as well as its manifestation in clinical practice.
- The identification of nurses’ profiles of research use has the potential to act as a basis for tailoring interventions aimed at supporting evidence-based practice.

Implications for practice and/or policy

- The complexity of research use should be addressed both in nursing education and clinical nursing practice to broaden discussions about different ways of using research.
- Further research is needed to understand how best to support nurses’ research use in the transition from nursing education into clinical practice.

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Conflict of interest statement

No conflict of interest has been declared by the authors.

Author contributions

HF, PG, AE and LW were responsible for the study conception and design. PG, AE and LW performed the data collection; obtained funding and supervised the study. HF, PG and AR performed the data analysis. HF was responsible for the drafting of the manuscript. HF, PG, AE, AR and LW made critical revisions to the paper for important intellectual content.

References


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