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# Orthopaedic nurses' attitudes towards clinical nursing research - A cross-sectional survey

## SUMMARY

The call for evidence-based knowledge in clinical nursing practice has increased during recent decades and research in orthopaedic nursing is needed to improve patients' conditions, care and treatment. A descriptive cross-sectional survey was conducted to determine the self-perceived theoretical knowledge and practical research competencies among orthopaedic nurses, and their interest and motivation to increase these in everyday practice. A newly developed questionnaire was given to a convenient sample of 87 orthopaedic nurses. 43 orthopaedic nurses (49.4%) completed the questionnaire. The results indicated that despite the majority of orthopaedic nurses having low self-perceived theoretical knowledge and practical research competencies, their interest and motivation to improve these were high especially their inner motivation. However, the nurses' inner motivation was inhibited by a lack of acceptance from colleagues and head section nurses and a shortage of time. This study forms a baseline study as a part of a larger study and contributes with knowledge useful to other orthopaedic departments with an interest in optimizing nursing research to improve the orthopaedic nursing care quality.

**Keywords:** Orthopaedic nurses; Nursing research; Cross-sectional survey; Research interest; Research knowledge; Research motivation.

## INTRODUCTION

During recent decades, awareness of evidence-based practice has increased in nursing and the need for practice-based research has been well documented (Higgins et al., 2010). Evidence-based practice was introduced and recommended in health policies in 1992 and derived through the basis of evidence-based medicine to increase the best practice for patient care and treatment (Carlson & Plonczynski, 2008). Evidence-based practice has been characterized through various discourses. However, there is general agreement that practitioners should ensure that people receive care based on the best possible evidence (Rycroft-Malone et al., 2004). In Denmark the majority of nursing research studies are performed by Researchers at Universities. However, the interest and motivation for conducting nursing research in the clinical areas of primary and secondary care has grown over the years. This raises a need for involving non-academic nurses in clinical research (Poulsen et al., 2013), since it is well known that the clinical nurses' involvement in developmental and research projects and implementation of results creates impact and clinical relevance (Granger, 2001; Gurzick & Kesten, 2010).

Evidence-based practise is needed to improve orthopaedic patients' care and treatment (Waters & Moran, 2006). To use and produce this evidence, orthopaedic nurses (hereafter: nurses) with research skills and interest are needed. Since 2000, Danish nurses have been specifically trained to utilize national and international research in nursing care and to conduct and participate in research within the context of health care during their undergraduate training (Poulsen et al., 2013). Despite some nurses having bachelor degrees and completing courses on nursing research, no studies were found regarding their interest in nursing research or their motivation to develop and conduct nursing research in orthopaedic departments (hereafter OD).

## BACKGROUND

The demand for research in clinical practice, including nursing research, is rising (Breimaier et al., 2011) and patients are entitled by law (The Danish Health Law, 2005) to receive evidence-based care and treatment (Carlson & Plonczynski, 2008). Studies show how clinical nurses, who tend to be very interested in conducting research (Akerjordet et al., 2012), are motivated to expand their knowledge (Tranmer et al., 2002; Higgins et al., 2010), and have positive attitudes towards research in general (Akerjordet et al., 2012; McMaster et al., 2013; Kajermo et al., 1998; Glacken & Chaney, 2004). Akerjordet and colleagues (2012) discovered in their cross-sectional survey of 364 clinical nurses from a Norwegian university hospital, that 40% had a positive attitude towards research and 56% wanted to increase their research competencies. In an Australian survey of 32 mental health consultation nurses, McMaster and colleagues (2013) found that 41% of the participants reported an interest in becoming involved in research, and 53% reported their current research competencies to be 'moderate' to 'good'. Results also showed that 53% reported having research goals over the next twelve months (McMaster et al., 2013).

Although clinical nurses' are predominantly portrayed as having a positive attitude to research, many studies conducted on clinical nurses' utilization and participation in nursing research focus on the nurses' self-perceived barriers and deficiencies with respect to pursuing research in the clinical area (McMaster et al., 2013; Akerjordet et al., 2012; Carlson & Plonczynski, 2008; Adamsen et al., 2003; Breimaier et al., 2011; Roxburgh, 2006; Brown et al., 2010; Chan et al., 2011; Higgins et al., 2010). Breimaier and colleagues (2011) conducted a self-report questionnaire study of 1,023 Austrian hospital nurses, and found three main barriers to research utilisation to be lack of time (70%), lack of information and/or knowledge (46%), and lack of interest (26%). Adamsen and colleagues (2003) also found lack of time for participation in research studies (37%) to be a barrier, along with insufficient time to read new research results or implement

new ideas (50%). In a qualitative, exploratory study, Roxburgh (2006) interviewed seven nurses about their views on factors which they perceived constrained them from research participation. The key themes of the analysis revealed that the nurses felt constrained about lack of time, lack of peer support, and limited skills and knowledge (Roxburgh, 2006). Roxburgh suggests that nurses should be given financial incentives to participate in research (Roxburgh, 2006).

The literature shows how clinical nurses' knowledge about the development and execution of nursing research has been varied and that not all nurses are able or willing to utilize, undertake or participate in research (Mulhall, 1997). Studies also show how nurses' lack of knowledge on research implementation limits their use of research findings in daily practice due to the influence of barriers to research use (Brown et al., 2010) and because the results are not easily transferable to clinical practice (McKenna et al. 2004). Findings in Rycroft-Malone and colleagues' study (2004) of exploring the factors that influence the implementation of evidence into practice showed, that implementing evidence and developing practice is challenging and involves many factors. In Danish clinical hospitals, very few academic nurses are employed to develop, conduct or implement nursing research (Poulsen et al., 2013). For Danish orthopaedic nursing the deficiencies are even more pronounced as hospital management requires nurses to demonstrate evidence to support practice. The hospital management requires that nurses are able to demonstrate evidence to support practice, in order to improve the quality of orthopaedic nursing care, since the patients are entitled to receive high quality care based on recently acquired research knowledge (Breimaier et al., 2011).

This paper reports from an ongoing research project, where the aim is to strengthen the focus on clinical nursing research and evidence-based practice in the OD. The project consists of a baseline study (presented here), an educational intervention based on the baseline study and a process evaluation of the intervention (to be documented in a forthcoming paper). The aim of this

paper is to determine the self-perceived knowledge, competencies, interest and motivation regarding research among orthopaedic nurses in an orthopaedic department at a Danish Regional Hospital.

## METHODS

### Design

A descriptive cross-sectional survey (Polit & Beck, 2008) was conducted in an orthopaedic department at a Danish Regional Hospital.

### Participants

All nurses employed at the OD (n=87) were invited to participate in the study. The nurses related to clinical practice through their positions as leading nurse (n=1), head section nurses (n=4), clinical nurses specializing in education, quality and development (n=3), and registered nurses (n=79). The department has room for 72 patients with acute and elective orthopaedic disabilities, fractures and infections, and consists of four sections, each specializing in different orthopaedic surgical procedures.

### Questionnaire

The questionnaire was developed based on the Akerjordet and colleagues (2012) questionnaire used to determine clinical nurses' interest and motivation for research in a Norwegian University Hospital. Their questionnaire was a Norwegian translation of the Research Needs Analysis Survey (Gething et al., 2001) and consisted of 59 questions covering the seven stages of the research process: exploratory, literature review, design, preparation for action, action, data analysis and the writing-up phase (Akerjordet et al., 2012). Items from the original Akerjordet-questionnaire were retained, such as: the participants' current skills and the areas of research skills they wanted to improve; their engagement in research and their desire to be more involved in research; the participants' perceived barriers from colleagues, management and their collaboration partners. Through a discussion among the authors, decisions were made to broaden the questions about the

participants' knowledge and competencies to fit our study aim. The questionnaire was finally reviewed by the co-author for face and content validity (Polit & Beck, 2008) and by two registered nurses from an OD in a Copenhagen University Hospital, for comprehension of questions. Reliability was explored in a discussion between the two registered nurses and the first author about the content of the questionnaire and the consistency of the questionnaires ability the measure the target attribute. Furthermore the questionnaire was based on Akerjordet and colleagues' (Akerjordet et al., 2012) version of the Research Needs Analysis Survey (Gething et al., 2001) which had a very high level of internal consistency with a Cronbach's alpha ranging from .90 to .97.

The final questionnaire included 24 questions in four main categories. The first category of questions included questions (n=9) about general information about the participants' characteristics. The second category included questions (n=3) about the participants' self-perceived theoretical knowledge of research in general and their practical research competencies (1 question about how they evaluate their knowledge of research design, methodology, qualitative and quantitative methods – to be scored on a 4-point Likert scale from 'excellent' (4) to 'poor' (1); 1 question about how they currently gain knowledge of research results assessed through multiple choices; 1 question about how they evaluate their competencies in different research areas – to be scored on a 4-point Likert scale from 'excellent' (4) to 'poor' (1)). The third category included questions (n=5) about the participants' interest in nursing research (1 question about their interest in nursing research – to be scored on a 4-point Likert scale from 'high' (4) to 'none' (1); 1 question about whether they had participated in a research study and, if so, what kind; 1 question about their current participation in research studies; 1 question about their interest in developing and improving their research knowledge and competencies – to be scored on a 4-point Likert scale from 'high' (4) to 'none' (1); 1 question about their opinion of research as being a part of their daily practice – to be scored on a 4-point Likert scale from 'high' (4) to 'none' (1)). The fourth and final category

included questions (n=7) about the participants' motivation to increase their knowledge of nursing research. The first question was about the nurses' motivation to increase their research knowledge and competencies, assessed through yes or no. This question was related to sub-questions about the nurses' motivational factors and barriers: Yes: multiple choice assessments of important motivational factors; no: multiple choice assessments of personal and contextual barriers. The six further questions of motivation concerned (1 question about the kind of knowledge they wished to improve, assessed through multiple choice; 1 question about which research competencies they wished to develop, assessed through multiple choice; 1 question about their wish to collaborate in areas related to management; 3 questions about their wish to participate in a research project, if they had an idea for a study or if they wanted to develop a study).

#### Data collection

Data was collected between February and March 2013 at the four sections in the OD. Paper versions of the questionnaire were delivered to the nurses for self-reporting by the first author or the head section nurses. The nurses were recruited during their breakfast meetings in the four sections by the first author through convenience sampling (Polit & Beck, 2008). Our aim with this method of recruitment was to approach as many nurses as possible. The nurses were informed about the study, ethical rights of anonymity and free participation, and about the content of the questionnaire. They were furthermore requested to returning the questionnaire in a sealed envelope, for anonymity, to the first authors' mailbox after replying. The questionnaires and envelopes were handed out to the nurses present at the meeting. The head section nurse agreed to deliver the questionnaires to the nurses who were absent. After three weeks the nurses were contacted the second time through their head section nurse, who encouraged them to participate in the study. Data

from the questionnaires was extracted by the first author in data sheets and afterwards entered into STATA's data editor for analysis.

#### Statistical analysis

Descriptive statistics were used on all variables and presented as numbers and percentage.

Statistical analysis was performed by the first author using STATA software (12.0).

#### Ethical considerations

The study was approved by the directory of the Regional Hospital of Køge, Region of Zealand. The National Committee on Health Research Ethics and the Danish Data Protection Agency was presented with the protocol, and found no need for a formal evaluation of the project, since no sensitive data were obtained from the nurses. During recruitment the nurses were informed about their ethical rights of anonymity and voluntary participation.

## RESULTS

### Sample characteristics

All nurses employed in the department (n=87) were invited to participate. Of these, 43 chose to participate in the survey and completed the questionnaire, giving a response rate of 49.4 %. As shown in Table 1, almost all participants were female (97.8%).

### PLEASE INSERT TABLE 1 ABOUT HERE

The age of the participants ranged from 18 to >60, and over half of the participants (62.7%) were over 40 years of age. One-third had been qualified as registered nurses for more than 25 years (34.9%). The majority were educated further after nursing school (65.1%) or currently enrolled as students (18.6%).

### Knowledge and competencies in nursing research

The participants were asked to rate their self-perceived theoretical knowledge of research in general (Table 2).

### PLEASE INSERT TABLE 2 ABOUT HERE

The topics most familiar to the participants were methodology, where 26 participants (60.4%) had a high degree of or some degree of self-perceived knowledge, and qualitative methods and analysis, where 23 participants (53.5%) had a high degree of or some degree of self-perceived knowledge. The participants felt less confident with their knowledge of research design (n=31; 72.1%), quantitative methods (n=24; 55.8%) and statistical analysis (n=33; 76.8%), and rated their degree of theoretical knowledge to be low or none.

On the question of their self-perceived practical research competencies (Table 3) the participants rated their top three competencies as: to develop a research question (n=29; 67.4%), to get an idea for a research project (n=28; 65.1%) and to appraise quality of papers in Danish (n=24; 55.8%) to a high or some degree. The three practical research competencies rated lowest by the participants were writing a scientific paper (n=36; 83.7%), writing a professional paper (n=32; 74.4%) and using statistical analysis (n=28; 65.1%).

PLEASE INSERT TABLE 3 ABOUT HERE

Interest in nursing research

Three-quarters of the participants were interested in nursing research on different levels, as listed in Table 4.

PLEASE INSERT TABLE 4 ABOUT HERE

35 participants (81.4%) expressed a high or medium interest in nursing research, 35 participants (81.4%) expressed a high or medium interest in improving their research knowledge and competencies, and 33 participants (76.8%) expressed the opinion that research should be a central part of their daily work.

The participants showed interest in participating in research studies in the department (n=31; 72.1%). 8 participants (18.6%) were currently involved in research projects related to decreasing waiting time in out-patient facilities, decreasing medication-related adverse events, increase understanding of compartment syndrome, and topics related to information and communication with patients. 19 participants (44.2%) were interested in kick-starting new nursing

research studies concerning, for example, patient empowerment in caring for leg wounds, amputees' experience with rehabilitation, testing the pre-operative nausea and pain medication, and improving care to orthopaedic trauma patients. The participants emphasized studies with relevance for improvement of patient care and treatment.

#### Motivation to increase research knowledge and competencies

32 participants (74%) indicated motivation to actively increase their theoretical knowledge and practical research competencies. The variables are listed in Tables 2 and 3 respectively.

The participants were mostly interested in increasing their knowledge on research design (n=26; 60.5%) and statistical analysis (n=26; 60.5). However, approximately half of the participants wanted to increase their knowledge on methodology (n=23, 53.5%), qualitative- (n=25, 58.1%), and quantitative (n=21; 48.8%) methods. In accordance with their motivation to improve their practical research competencies, over half of the participants wanted to learn how to design (n=28; 65.1%) and conduct a research project (n=28; 65.1%). The participants were also motivated to improve their competencies in using statistical analysis (n=24; 55.8%) and to develop research questions (n=24; 55.8%), even though they already perceived themselves as having a high degree of competence in the latter.

The three most important motivational factors to increase research knowledge and competencies were inner motivation (62.8%), support from the head section nurse (60.5%) and support from colleagues (53.5%). Clinical guidance (44.2%) and having a role model (37.2%) were still considered important. One participant reported the importance of the research topics' relevance in daily clinical practice as a motivational factor. The participants' motivational factors are depicted in Figure 1.

PLEASE INSERT FIGURE 1 ABOUT HERE

#### Personal and contextual barriers

The participants were asked about their personal and contextual barriers against their motivation to increase their knowledge and competencies. The personal barriers were defined as the limitations the participants experienced from within themselves (Figure 2).

PLEASE INSERT FIGURE 2 ABOUT HERE

The most important personal barrier was lack of time (23.3%) in prioritizing research in the working day, experienced by one-quarter of the participants. Second were lack of interest (16.3%) and self-perceived lack of abilities (13.9%). The ratings showed how the participants experienced a low level of personal barriers.

The contextual barriers were defined as the limitations experienced from others (Figure 3). Almost half of the participants (n=20; 46.5%) experienced a lack of acceptance from colleagues and their head section nurse to prioritize time for research, and one-quarter of the participants (n=11; 25.6%) rated a lack of teaching and guidance as a contextual barrier for increasing their knowledge and competencies.

PLEASE INSERT FIGURE 3 ABOUT HERE

## DISCUSSION

This study was carried out to determine the nurses' self-perceived theoretical knowledge and practical research competencies and their interest and motivation to increase these in everyday practice. The results indicated that despite the majority of the nurses having a low degree of self-perceived theoretical knowledge and practical research competencies, they still had a high interest in nursing research and a high motivation for improving their skills. However, the nurses' motivation was inhibited by barriers such as lack of time and lack of acceptance from colleagues and their head section nurse to prioritize time for research.

Results indicated that the nurses felt more knowledgeable about the initial phases of research, such as developing a research question, getting an idea for a research project and methodology. The areas where the nurses lacked practical competencies in the research process were performing statistical analysis, and appraising and writing scientific papers. The nurses' low degree of self-perceived competencies in practical research could be connected with their low degree of theoretical knowledge. However, this finding was unexpected since 19 nurses (44.1%) held Bachelor degrees, which should indicate a higher level of research knowledge. Other studies have found clinical nurses' research-related knowledge and education to be insufficient (Akerjordet et al., 2012; Brown et al., 2010; Breimaier et al., 2011). The literature shows that the clinical nurses' research-related knowledge is rarely sufficient for using research findings in daily practice (Breimeier et al., 2011) and that only a few clinical nurses obtain knowledge from research articles (Glacken & Chaney, 2004). An American survey of 760 registered nurses found that the nurses sought more information from their colleagues than from the literature and that they valued their own experience the highest (Pravikoff et al., 2005). A possible explanation for the nurses low degree of research knowledge in our survey could be that over half of the nurses (62.7%) were over 40 years of age and were educated before evidence-based education was a mandatory in Denmark.

However, in contrast, over half of the nurses who participated in our survey held Bachelor degrees in nursing. In Akerjordet and colleagues' (2012) survey of 364 clinical nurses 28.6% had a Masters degree. However, the mean of their current self-perceived research skill level was 1.87 on a 1-5 point scale, with 5 as the higher score. It could therefore be assumed that the clinical nurses lack confidence in their educational research skills and that we need to focus on supporting the clinical nurses' abilities to perform developmental, as well as research, projects under the supervision of a researcher educated to a higher level.

More than three-quarters of the nurses in our survey indicated an interest in nursing research and high motivation in improving their theoretical and practical knowledge. They were also convinced that research ought to be a central part of their daily practice. In an Australian survey of 32 mental health consultation nurses, McMaster and colleagues (2013) found that 41% of the participants reported an interest in becoming involved in research and 53% reported their current research skills to be 'moderate' or 'good'. Results also showed that 53% reported having research goals over the next twelve months (McMaster et al., 2013). This could suggest that nursing research is moving forward and is regarded as more relevant for clinical nurses. Through recent years a positive change has been seen in nurses' attitudes towards research (Higgins et al., 2010, Akerjordet et al., 2010) and there is a growing need for basic learning and an interest in increasing knowledge about research utilization (Chan et al., 2011). However, although the majority of the nurses participating in our survey stated an interest in nursing research, the general interest among the total number of nurses invited to participate from the orthopaedic department was disappointingly low, since only 43 out of 87 nurses participated. The reasons could be that the nurses were unable to see any benefits or purposes in responding or had no interest in research. Other studies investigating clinical nurses' interest, motivation and barriers for research have encountered similar problems with inclusion and lack of participation. Breimaier and colleagues

(2011) performed a survey of clinical nurses' wishes, knowledge, attitudes and perceived barriers on implementing research findings – here, the response rate was 56%. Akerjordet and colleagues (2012) described clinical nurses' attitudes towards research with a response rate of 61%; Chan and his colleagues (2011) obtained a response rate of a mere 3.6% in their survey exploring barriers and needs for understanding and using research among emergency nurses. We could therefore argue that the nurses' interest and motivation to participate in research was questionable and that only the motivated nurses participated in our survey. Previous studies have reported a multitude of barriers to nurses research utilization, such as lack of time (Breimaier et al., 2011, Roxburgh, 2006, Akerjordet et al., 2012), interest (Akerjordet et al., 2012, Breimaier et al., 2011), knowledge (Akerjordet et al., 2012, Breimaier et al., 2011), research supervision (Akerjordet et al., 2012), feeling unable to evaluate the quality of the research (Adamsen et al., 2003, Chan et al., 2011) and difficulties in influencing changes within care (McKenna et al., 2004). Even though we are still encouraged by the nurses who were motivated to increase their theoretical research knowledge and practical research competencies, we need to support the nurses' motivation at every level.

Although the majority of the participating nurses were motivated to learn about and to conduct research, they also drew attention to impediments to increasing their knowledge. The greatest motivational factor was inner motivation, then support from the nurses' colleagues and head section nurse. However, almost half of the participants felt that the main contextual barrier was a lack of acceptance from colleagues and nursing managers to prioritize time for research. These findings are interesting because they show contradictions that impede the nurses' participation. In a qualitative, exploratory study Roxburgh (2006) interviewed 14 practising nurses about factors that constrain their participation in research. Roxburgh found the factor related to peer and managerial support to have major importance for the nurses, who had experienced resentment and animosity from their co-workers when withdrawing from clinical practice to participate in

research. However, the practice nurses suggested that setting up teams of nurses could provide a group synergy that would minimize the negative attitudes among their peers (Roxburgh, 2006). Olsen and second author (forthcoming, under review) found in their action learning project that bringing a group of novice and experienced practitioners, clinical experts, leaders, and researchers together, worked as a multistage focus group (Hummelvoll, 2008), characterised by togetherness, synergy and elevation of the participants' knowledge. Almost 20 years ago Hicks (1995) suggested that nurse managers on all levels should show their support if they were serious about nurses conducting research, and Roxburgh consents that not much has changed (Roxburgh, 2006). Akerjordet and colleagues (2012) also mention the critical role of nursing managers as a strategic point in developing a research culture among clinical nurses. We adopt these statements and agree that the nursing managers play a vital role in developing new ways of working and in supporting the nurses' interest and motivation for research.

Another motivational factor was the nurses' need for clinical guidance and having a role model, which was further explained by one-quarter of the nurses experiencing the lack of teaching and guidance from research-active nurses as a contextual barrier to increasing their knowledge and competencies. Akerjordet and colleagues (2012) agree that research supervision is a pivotal factor in linking research to clinical practice. They also explain how a clinical nurse with an MSc or a PhD could serve as inspiration, as well as a role model, to facilitate processes of critical thinking and education in the core competencies of research (Akerjordet et al., 2012). In our survey, a third of the nurses indicated that having a role model was a motivational factor. However, it was the smallest factor of all. This could be because research is a new and underdeveloped part of the nurses' working day. It could also be that the current role model have not succeeded in establishing the necessary research environment in the department or a supporting collaboration between herself and the nurses, which could encourage a feeling of engagement and ownership by the nurses.

The most important personal barrier for almost one-quarter of the participating nurses was the lack of time to prioritize research activities during the working day. The phenomenon of lack of time is a general assumption among nurses as a barrier to conducting research in their clinical practice. The results of other studies also indicate the presence of this phenomenon (Breimaier et al., 2011; Brown et al., 2010; Roxburgh, 2006). Brown and colleagues (2010) found insufficient time to read research and to implement new ideas to be the top barriers among hospital nurses in four hospitals in southern California. Their explanations for these findings were that the hospital nurses were distanced from research in their busy working day (Brown et al., 2010). This could also apply to the nurses in our survey. Even though one-quarter responded to have been engaged or were currently engaged in research projects, there were no ongoing nursing projects, developmental or research, in the OD when the survey took place. In Roxburgh's (2006) qualitative study, the nurses mentioned the pressure of working full time and on different shifts, as well as spending their leisure time with their families, as time-consuming barriers for research participation. Even though time as a barrier is consistent with the international literature, Adamsen and colleagues (2003) questioned lack of time as a legitimate and acceptable reason for not participating in research-related work. They further explained that 'lack of time' is often a euphemism and a socially acceptable reason for avoiding research utilization because of a lack of interest and competencies (Adamsen et al., 2003).

## STUDY LIMITATIONS

This study has several limitations. Because of the low response rate (49.4%), the study results may not be related to the other nurses in the department setting or to other nursing settings. A possible cause of the low response rate could be the role of the head section nurses in the distribution of the questionnaire. This could be explained through the results of our survey. Convenient sampling was chosen instead of a power estimate of the sample participation, which provided a smaller sample for generalization. However, the findings provide an interesting baseline for further facilitation and education regarding evidence-based practice for the nurses in the selected department. 80 % (76.8% – 81.4%) of the participating nurses indicated a significant interest in nursing research and in improving their knowledge and competencies. The response rate of 43 nurses out of 87 invited nurses left us considering that only those nurses who were interested in research participated. This could be a major obstacle for further research; however, we will limit our focus to the nurses interested in the beginning of the educational intervention. The study is a part of an ongoing project where data will be further interrogated.

## CONCLUSION

Based on the results of this survey, the nurses had a low degree of theoretical research knowledge and practical research competencies, despite 44.1% of the nurses held a Bachelor degree. The results indicated that the nurses were very interested in improving their skills. The nurses' motivational factors depended on acceptance from their colleagues and head section nurse, as well as their need for teaching guidance and a research-active role model; however, it was an impediment when these factors were absent. The nurses' lack of time to utilize research in their daily work was also an impediment.

The knowledge derived from this survey will serve as a baseline to develop an educational intervention that focuses on supporting the orthopaedic nurses' request for more evidence-based knowledge as well as practical research competencies. The educational intervention will continuously include the head section nurses in the process of planning and coordinating teaching sessions, while providing teaching guidance from research-active role models.

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## CONFLICTS OF INTEREST STATEMENT

There are no conflicts of interest for the authors of this manuscript.

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Table 1: Demographic characteristics (n= 43)

<b>Variable</b>	<b>N</b>	<b>(%)</b>
<b>Sex</b>		
<b>Male</b>	1	(2.3)
<b>Female</b>	42	(97.8)
<b>Age (years)</b>		
<b>18 – 25</b>	1	(2.3)
<b>26 – 30</b>	5	(11.6)
<b>31 – 35</b>	7	(16.3)
<b>36 – 40</b>	3	(7.0)
<b>41 – 45</b>	5	(11.6)
<b>46 – 50</b>	5	(11.6)
<b>51 – 55</b>	8	(18.6)
<b>56 – 60</b>	8	(18.6)
<b>≥ 60</b>	1	(2.3)
<b>Education after RN</b>	28	(65.1)
<b>Orthopaedic nurse</b>	10	(23.3)
<b>Bachelor</b>	17	(39.5)
<b>Master</b>	1	(2.3)
<b>Master of Science</b>	1	(2.3)
<b>Currently enrolled as a student</b>	8	(18.6)
<b>Orthopaedic nurse</b>	0	(0)
<b>Bachelor student</b>	7	(16.3)
<b>Master student</b>	1	(2.3)
<b>Master of Science Student</b>	0	(0)

Table 2: The nurses' self-perceived degree of theoretical knowledge and motivation to increase their knowledge: n (%)

	Self-perceived theoretical knowledge: n (%)				Motivation to increase their knowledge: n (%)
	High degree	Some degree	Low degree	No degree	
<b>Research design</b>	1 (2.3)	10 (23.3)	18 (41.9)	13 (30.2)	26 (60.5)
<b>Methodology</b>	5 (11.6)	21 (48.8)	12 (27.9)	4 (9.3)	23 (53.5)
<b>Qualitative</b>	1 (2.3)	22 (51.2)	12 (27.9)	8 (18.6)	25 (58.1)
<b>Quantitative</b>	1 (2.3)	17 (39.5)	15 (34.9)	9 (20.9)	21 (48.8)
<b>Statistics</b>	1 (2.3)	8 (18.6)	19 (44.2)	14 (32.6)	26 (60.5)

Table 3: The nurses' self-perceived practical research competencies and motivation to improve these.

	Self-perceived practical research their competencies: n (%)				Motivation to improve competencies: n (%)
	High degree	Some degree	Low degree	No degree	
<b>Get an idea for a research project</b>	8 (18.6)	20 (46.5)	12 (27.9)	1 (2.3)	21 (48.8)
<b>Develop a research question</b>	6 (13.9)	23 (53.5)	9 (20.9)	2 (4.7)	24 (55.8)
<b>Design a research project</b>	2 (4.7)	13 (30.2)	14 (32.6)	12 (27.9)	28 (65.1)
<b>Conduct a research project</b>	2 (4.7)	16 (37.2)	12 (27.9)	10 (23.3)	28 (65.1)
<b>Use qualitative analysis</b>	0 (0.0)	17 (39.5)	12 (27.9)	11 (25.6)	20 (46.5)
<b>Use statistical analysis</b>	1 (2.3)	9 (20.9)	15 (34.9)	13 (30.2)	24 (55.8)
<b>Search for literature</b>	0 (0.0)	17 (39.5)	13 (30.2)	9 (20.9)	21 (48.8)
<b>Appraise quality of papers in Danish</b>	3 (7.0)	21 (48.8)	11 (25.6)	5 (11.6)	19 (44.2)
<b>Appraise quality of papers in English</b>	1 (2.3)	10 (23.3)	19 (44.2)	9 (20.9)	15 (34.9)
<b>Create a poster</b>	3 (7.0)	10 (23.3)	11 (25.6)	14 (32.6)	20 (46.5)
<b>Create a PowerPoint presentation</b>	9 (20.9)	12 (27.9)	9 (20.9)	10 (23.3)	15 (34.9)
<b>Present a project</b>	5 (11.6)	14 (32.6)	10 (23.3)	10 (23.3)	14 (32.6)
<b>Write a professional paper</b>	0 (0.0)	7 (16.3)	15 (34.9)	17 (39.5)	17 (39.5)
<b>Write a scientific paper</b>	0 (0.0)	1 (2.3)	11 (25.6)	25 (58.1)	12 (27.9)

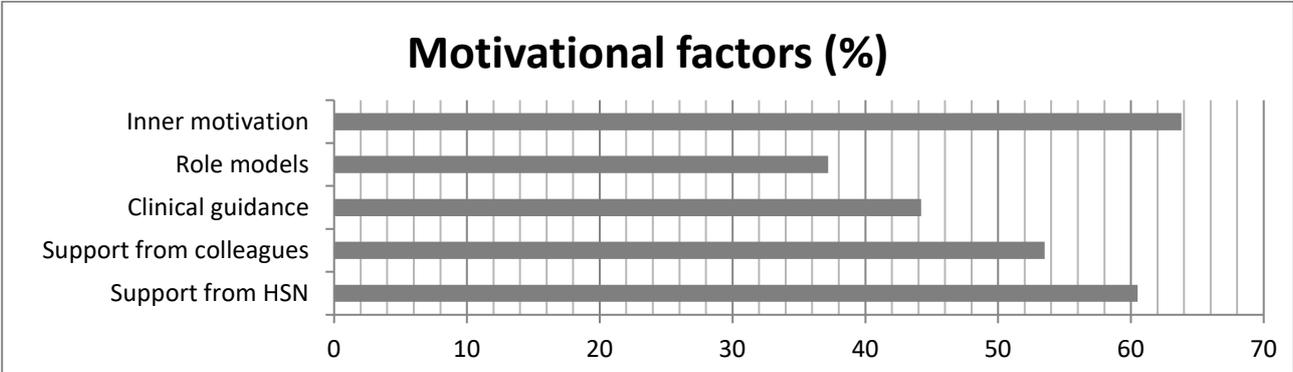
Table 4: The participants' interest in nursing research: n (%)

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<b>Interest in:</b>	
<b>Nursing research in general</b>	
<b>High</b>	13 (30.2)
<b>Medium</b>	22 (51.2)
<b>Small</b>	5 (11.6)
<b>None</b>	3 (7.0)
<b>Improve research knowledge and</b>	
<b>competencies</b>	
<b>High degree</b>	17 (39.5)
<b>Some degree</b>	18 (41.9)
<b>Less degree</b>	5 (11.6)
<b>No degree</b>	3 (7.0)
<b>Research as central part of daily</b>	
<b>workday</b>	
<b>High degree</b>	15 (34.9)
<b>Some degree</b>	18 (41.9)
<b>Less degree</b>	8 (18.6)
<b>No degree</b>	2 (4.7)

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Figure 1: The participants' perceived motivational factors (%)



(HSN: Head section nurse)

Figure 2: The participants' personal barriers against increasing knowledge and competencies (%)

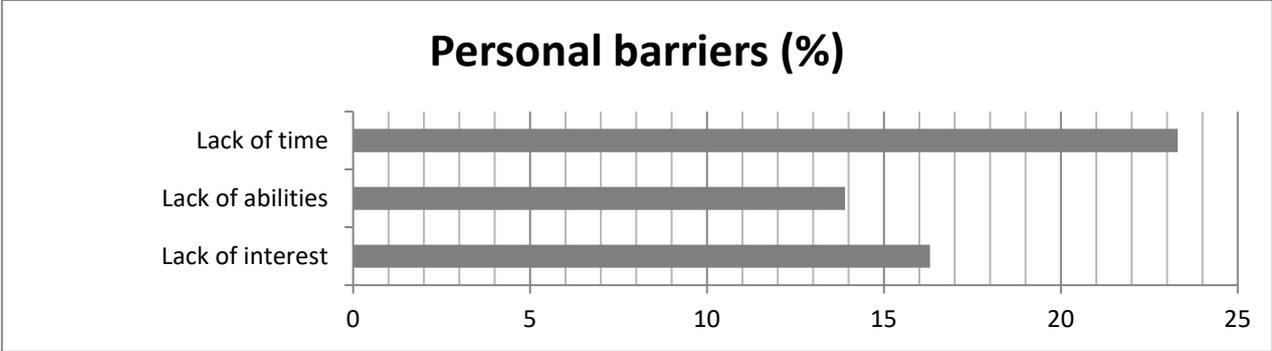


Figure 3: The participants' contextual barriers against increasing knowledge and competencies (%)

