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REGISTERED NURSES WITH A PhD – AN ASSET IN CLINICAL CARE

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Registered nurses with a PhD – an asset in clinical care

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By

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POPULÄRVETENSKAPLIG SAMMANFATTNING

DISPUTERADE SJUKSKÖTERSKOR – EN TILLGÅNG I KLINISK VÅRD

Bakgrund

Omvårdnad är sjuksköterskans professionella ansvarsområde och innefattar såväl klinisk omvårdnad av patienter som forskning och undervisning inom området. Sjuksköterskeutbildningen i Sverige var från starten en ren yrkesutbildning men övergick, genom en utbildningsreform under senare delen av 1900-talet, till att bli en akademisk utbildning. Ett viktigt motiv för reformen var att säkerställa kvaliteten på patienternas omvårdnad genom att integrera forskning och utveckling inom omvårdnad med den kliniska vården.

Brister i vården orsakar vårdskador med lidande för patienter och onödiga kostnader för samhället. Enligt tidigare forskning får cirka en tredjedel av alla patienter inte en vård som är evidensbaserad (dvs. som inte är grundad på vetenskap och beprövad erfarenhet) och ungefär en fjärdedel får vård som antingen är onödig eller förknippad med skaderisk.

Sjuksköterskans utbildningsnivå, erfarenhet och kompetens har betydelse för vårdens resultat. En högre formell utbildningsnivå påverkar vårdens resultat positivt och ger en säkrare vård för patienten. Dessutom finns ett samband mellan aktiv klinisk forskning och förbättrad vårdkvalitet.

Sedan den första sjuksköterskan i Sverige lade fram sin avhandling 1978 har drygt 1700 sjuksköterskor disputerat i Sverige. Trots att antalet stadigt ökar, är det fortfarande få som arbetar i den kliniska vården. Idag är kunskapen begränsad om vilken roll och funktion disputerade sjuksköterskor har i det kliniska vårdarbetet och vilka värden de kan tillföra vården.

Syfte, mål och vetenskaplig metodik

Det *övergripande syftet* med denna avhandling är att undersöka om, och hur, disputerade sjuksköterskor som arbetar på universitetssjukhus bidrar till förbättrad vård. Avhandlingen består av fyra delarbeten med *följande specifika mål*:

Studie I: att utforska publicerade vetenskapliga artiklar avseende om/hur disputerade sjuksköterskor som arbetar i klinisk vård inverkar på kvalitet och förbättring av omvårdnaden.

Studie II: att undersöka vad disputerade sjuksköterskor som arbetar i klinisk vård upplever gällande sin roll, funktion och arbetssituation.

Studie III: att undersöka vilka faktorer som påverkar disputerade sjuksköterskors och läkares möjligheter att kombinera kliniskt arbete med forskning efter avlagd doktorexamen.

Studie IV: att undersöka hur chefer uppfattar, och understödjer, användningen av disputerade sjuksköterskors kunskaper och kompetens som en resurs i klinisk vård.

De *metoder* som har använts är i *delstudie I* en systematisk litteraturöversikt, i *delstudie II och III* intervjuer analyserade med kvalitativ innehållsanalys och i *delstudie IV* intervjuer analyserade med tematisk analys.

Resultat

De disputerade sjuksköterskornas huvudsakliga arbetsområden är vårdutveckling och evidensbaserad omvårdnad. För dessa arbetsuppgifter ansågs de disputerade sjuksköterskornas ledarskap vara viktigt. Stöd från chefer upplevdes som avgörande för att disputerade sjuksköterskor ska kunna bidra med sina kunskaper och sin kompetens och stödja utvecklingen av evidensbaserad omvårdnad samt bidra till att främja kompetensutveckling bland kollegor. Ett problem i detta avseende är att deras chefer inte alltid är medvetna om vilka kunskaper och vilken kompetens de disputerade sjuksköterskorna besitter.

Att de disputerade sjuksköterskorna har en klinisk expertkunskap bedömdes också viktigt. Chefer beskrev att de disputerade sjuksköterskor som arbetade inom samma område där de genomförde sin forskning bidrog med värdefull kunskap inom området och i vården av patienterna. Det i sin tur bidrog till att utveckla vården och hjälpte till att identifiera områden i behov av ytterligare forskning och utveckling.

Att upprätthålla en koppling till den akademiska världen upplevdes av de disputerade sjuksköterskorna som viktigt. Möjligheten att kombinera de kliniska och akademiska aspekterna av omvårdnad ansågs nödvändig för att de disputerade sjuksköterskorna skulle kunna påverka och förbättra vården. Dock finns det få tjänster/anställningar som kombinerar kliniskt och akademiskt arbete för disputerade sjuksköterskor. Infrastruktur och forskningsfinansiering bedömdes som väsentliga faktorer för att möjliggöra forskning bland disputerade sjuksköterskor med tjänst i klinisk vård.

Slutsatser

- Chefers kunskap och engagemang är avgörande för hur de disputerade sjuksköterskornas kompetens tillvaratas för att främja vårdutveckling och evidensbaserad omvårdnad.
- Trots en positiv inställning bland chefer gentemot disputerade sjuksköterskor i klinisk vård saknas strategiska investeringar och lämpliga tjänster/anställningar
- Både chefer och de disputerade sjuksköterskorna behöver en organisatorisk infrastruktur som stödjer a) tjänster på avancerad nivå såväl som b) en kultur som värdesätter disputerade sjuksköterskors vetenskapliga kompetens i den kliniska vården
- Det finns ett behov av att understödja även sjuksköterskechefers vetenskapliga kunskaper och kompetens, för att de därigenom ska kunna tillvarata de disputerade sjuksköterskornas särskilda kompetens i omvårdnadsverksamheten

- Disputerade sjuksköterskor med tydliga arbetsbeskrivningar och klara mandat kan fungera som en stark kraft för att
 - underlätta evidensbaserad vård
 - bidra till snabbare överföring av vetenskaplig kunskap till klinisk praxis
 - identifiera relevanta forskningsfrågor som tar itu med utmaningar som uppstår i kliniskt vårdarbete
 - bedriva klinisk forskning
 - främja en akademisk nivå på klinisk utbildning för studenter
 - främja kompetensutveckling bland kollegor
- En ökning av antalet tjänster som kombinerar forskning med kliniskt arbete för disputerade sjuksköterskor kan ”bygga broar” mellan teori och praktik, till gagn för patienter, sjuksköterskor, studenter och chefer

ABSTRACT

Background

Shortcomings in providing health care may cause otherwise preventable patient harm and suffering, while also increasing the cost of healthcare delivery. Approximately one-third of all patients do not receive scientifically based care and about one-quarter receive care that is either unnecessary or associated with risk of injury.

Nursing is the professional domain of the registered nurse (RN), including both scientific knowledge and patient-related clinical practice. There is now scientific evidence that the educational level of RNs (bachelor's degree or higher), as well as professional skills, has a positive effect on patient outcome. Educational level (master's degree or higher) also has a positive impact on the application of research findings in the clinical setting. Furthermore, a relationship between clinical research and improved quality of care has been established.

The late twentieth century higher education reform saw nursing education in Sweden transition from a vocational education to an academic education. An important motive for this transition to a more academic emphasis in nursing education was to ensure quality of patient care for the future. To date, since the first RN thesis in 1978, there are about 1700 RNs with a PhD degree (RN/PhDs) in Sweden. Despite the steady increase in this number, few RN/PhDs are involved in clinical care. There is still limited knowledge concerning the role and function of RN/PhDs working in clinical care and the value their services can potentially bring to health care.

Aims

The overall aim of this thesis was to investigate whether and how RN/PhDs working at university hospitals contribute to improvement of care.

Four sub-studies were undertaken to meet the following specific objectives:

Study I: to explore published articles concerning clinical contributions from RN/PhDs regarding their impact on quality and improvement of nursing care.

Study II: to investigate what RNs with a PhD working in clinical practice experience in terms of their role, function and work context.

Study III: to explore what factors have a bearing on the ability of RNs and physicians to combine clinical work with research after earning a PhD.

Study IV: to investigate how managers perceive and apply the skills and expertise of RNs with a PhD as a resource in clinical practice.

Methods

Different methods were applied:

Study I is based on a systematic literature review.

Study II is based on data from individual interviews that were analyzed using inductive, qualitative content analysis.

Study III involved the analysis of data from individual interviews using conventional content analysis.

Study IV incorporated data from individual telephone interviews and subjected them to thematic analysis.

Results

The main areas of responsibility for RN/PhDs involved in clinical care relate to improvement of clinical care and implementation of research findings. In this context, the leadership role of the RN/PhD was considered to be essential. In order to contribute with their skills to support development of evidence-based practice (EBP) and the furthering of skills among colleagues, support from managers was essential to establish a conducive setting for the RN/PhDs. One problem in this regard is that managers are not always aware of what skills RN/PhDs are able to contribute. Maintaining a strong association with the academic world was perceived to be important. The opportunity to combine the clinical and academic aspects of nursing was considered essential in order for RN/PhDs to influence and improve care, yet few such combined positions are currently available. The opportunities for RN/PhDs to conduct research after earning their PhD are limited; one important reason is the challenge faced by inexperienced researchers in obtaining research funding. In addition, the infrastructure to help support research among RN/PhDs working in clinical care is limited.

Conclusions

- An informed approach among managers is key to safeguard the skills and expertise of RN/PhDs so as to promote good quality nursing care and EBP
- RN/PhDs with a clear job description can serve as a potent force to
 - facilitate EBP
 - improve the transfer of scientific knowledge into clinical practice
 - point out relevant research questions that address challenges emerging from clinical practice
 - conduct clinical research
 - provide clinical training and competence development among colleagues
- An increase in the number of combined academic/clinical employment opportunities for RN/PhDs can help bridge theory and practice, for the benefit of patients, nurses, students and managers

LIST OF SCIENTIFIC PAPERS

- I. **Orton, M. L.**, Nelson Follin, N., Dannapfel, P., Wengström, Y., (2021). Roles and functions in clinical care for registered nurses with a PhD – A systematic literature review. *Scandinavian journal of caring sciences*, 10.1111/scs.12979. Advance online publication. <https://doi-org.proxy.kib.ki.se/10.1111/scs.12979>
- II. **Orton, M.L.**, Andersson, A., Wallin, L., Forsman, H., & Eldh, A.C. (2019). Nursing management matters for registered nurses with a PhD working in clinical practice. *Journal of Nursing Management*. 2019 Jul;27(5):955-962. doi: 10.1111/jonm.12750. Epub 2019 May 15. PMID: 30656787.
- III. **Orton, M. L.**, Nilsen, P., Nelson Follin, N., Dannapfel, P. (2020). Is it possible for registered nurses and physicians to combine research and clinical work to facilitate evidence-based practice? *Worldviews on Evidence Based Nursing*. 2021 Feb;18(1):15-22. doi: 10.1111/wvn.12481. Epub 2020 Dec 8. PMID: 33290642.
- IV. **Orton, M. L.**, Wengström, Y., Smeds Alenius, L., Andersson, Å., Nelson Follin, N., Dannapfel, P., (2021). How registered nurses with PhDs are currently used in clinical care: managerial views. *Submitted*.

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LIST OF ABBREVIATIONS

AACN	The American Association of Colleges of Nursing
ANA	American Nurses Association
APN	Advanced Practice Nurse
ALF	Agreement between the Swedish state and the regions on co-operation on basic education of physicians, medical research and healthcare development. The national level agreement is supplemented by regional agreements between the involved regions and universities.
DNP	Doctor of Nursing Practice
EBP	Evidence-based practice
EU	European union
HSL	Health and Medical Services Act (Hälso- och sjukvårdslag, HSL 2017:30)
ICN	International Council of Nurses
IOM	Institute of Medicine
IVO	The Health and Social Care Inspectorate (Inspektionen för vård och omsorg)
MD/PhD	Physician (medical doctor) with a PhD degree
PhD	Doctor of Philosophy
RN	Registered nurse
RN/PhD	Registered nurse with a PhD degree
R&D	Research and development
RNM	Registered nurse midwife
SBU	Swedish Council on Health Technology Assessment (Statens beredning för medicinsk och social utvärdering)
SOU	Official Reports of the Swedish Government (Statens offentliga utredningar)
UK	Great Britain
UN	United Nations
US or USA	United States of America
WHO	World Health Organization

1 INTRODUCTION

The focus of this doctoral thesis was to investigate whether registered nurses with a PhD degree (RN/PhDs) working at university hospitals contribute to improvement of care. The idea of investigating this question gradually evolved while I was working in various positions as a registered nurse (RN)/registered nurse midwife (RNM), and later as a manager at different levels and with a variety of responsibilities within the healthcare organization.

Concerning issues related to quality of care and patient safety, level of expertise is extremely important. Extensive research now shows that the level of nursing expertise as well as academic degrees is crucial to patient outcome. However, few studies address the clinical importance of the specific expertise acquired through earning a PhD.

Throughout my professional career, quality of care and patient safety have held a position of paramount importance in my daily work. Over the years, I have been engaged in a wide variety of development projects, as both project manager and team member, and have also helped support initiatives by colleagues to improve patient care. Thus, I have first-hand experience on the difficulties involved with completing projects, implementing research findings, and creating a sustainable climate for the agreed improvements. In some situations, this was due to a lack of knowledge among those responsible for implementing the change, while in others, problems arose due to lack of manager support and/or knowledge.

I hope the findings of my thesis will have a positive impact on quality of care and patient safety, facilitate professional development for RNs, and provide organizational support for evidence-based nursing, while helping to utilize the full potential of RN expertise, from “novice to expert,” at all levels in health care. I also hope that these aspirations will become self-evident in the future and result in clearly defined clinical positions for RN/PhDs, where their skills and expertise will be fully utilized both in clinical patient care and as a bridge between theory and practice through combined academic/clinical positions.

2 RESEARCH AIMS

The overall aim of this thesis was to investigate whether and how RN/PhDs working at university hospitals contribute to improvement of care.

Four sub-studies were undertaken to meet the following specific objectives:

Study I

- to explore published articles concerning clinical contributions from RN/PhDs regarding their impact on quality and improvement of nursing care.

Study II

- to investigate what RNs with a PhD working in clinical practice experience in terms of their role, function and work context.

Study III

- to explore what factors have a bearing on the ability of RNs and physicians to combine clinical work with research after earning a PhD.

Study IV

- to investigate how managers perceive and apply the skills and expertise of RNs with a PhD as a resource in clinical practice.

3 BACKGROUND

3.1 NURSING DOMAINS

Nursing is an integral part of patient care, and is under the professional auspices of the RN, and encompasses both scientific knowledge and patient-related clinical responsibilities. Important nursing domains include providing direct patient care, support for and supervision of colleagues, support and guidance for managers, striving for quality improvement and organizational development, as well as advocating for evidence-based practice, nursing research and nursing education.

3.1.1 Definition and description of nursing

There is no current consensus concerning a universal definition of nursing. For example; many different nursing theorists have put forth definitions based on their own theories (Alligood, 2018). The American Nurses Association (ANA, 2021) describes nursing as

“... both an art and a science; a heart and a mind. At its heart, lies a fundamental respect for human dignity and an intuition for a patient’s needs. This is supported by the mind, in the form of rigorous core learning. Due to the vast range of specialisms and complex skills in the nursing profession, each nurse will have specific strengths, passions, and expertise ... In assessing a patient, nurses do not just consider test results. Through critical thinking nurses use their judgment to integrate objective data with subjective experience of a patient’s biological, physical and behavioral needs ...”

This thesis uses the term “nursing” to refer to the professional realm of knowledge under the domain of the RN, including profession-specific acts of care and specialized knowledge of care practices. Given this context, I agree with the ANA *description* of nursing. And when consideration is given to the constant evolution of knowledge and society, it begs the question of continually readdressing the issue: what is nursing?

The scientific discipline of nursing is the basis of the nursing profession as well as an independent field of scientific inquiry.

3.1.2 Nursing education

Florence Nightingale is credited with starting modern nursing education in mid-nineteenth century England. This movement resulted in the launch in Sweden of several similar programs in the late nineteenth century. In 1920, a decision was taken mandating state approval of nursing schools in Sweden, which included an initiative to reform the education provided at the various schools; however, not until 1958 were Swedish nurses required to become licensed as registered nurses (Erlöv & Pettersson, 1998).

Many countries offer different levels of training for nurses, from the undergraduate to the postgraduate. RNs must complete an established nursing education program and become authorized by the appropriate regulatory authority in order to practice nursing in their country (International Council of Nurses [ICN], 1987). A license from the National Board of Health and Welfare is mandatory to work as an RN in Sweden.

Within the European Union (EU), the Bologna Process was an important reform that created an EU-wide comparable education system among participating countries. This collaboration was also intended to facilitate cross-border work and study. Today, the Bologna Process defines three cycles pertaining to nurse training programs within EU: first cycle (usually bachelor's degree), second cycle (usually master's degree) and third cycle (doctoral degree) (Davies, 2008, Collins & Hewer, 2014)

3.1.3 Nursing science

Today, many countries recognize nursing as an academic profession and as such, higher quality patient care, based on scientific evidence, is expected. Although the first doctoral program in nursing was established in 1924 in the US (Robb, 2005), nursing research remains a relatively young scientific discipline in many countries, including Sweden. In Europe, the UK lead the charge in 1971 by establishing the first nursing research unit at the University of Edinburgh (Hamrin, 2014), while globally, the academic trend in nursing is still evolving (Alghamdi & Urden, 2015; Sun & Larson, 2015).

Although the first nursing programs in Sweden to include both theoretical and practical elements began in the late nineteenth century, not until nurse training moved into the sphere of higher education did the profession achieve a more academic standing. In connection with the 1977 higher education reform, nursing education transitioned from being vocational to academic. This entailed creating a scientific basis for the education and securing an association between education, research and development (R&D). Nursing education was further reformed in 1993, which included the introduction of a bachelor's degree at the undergraduate level and a master's degree at the specialist level (Hamrin, 2014).

This reform put pressure on universities to hire teachers with a doctoral degree, which also entailed an increase in the knowledge base underlying practical nursing care. Meanwhile, RNs earning doctoral degrees paved the way for future developments. The 1993 higher education reform in Sweden stipulated that all higher education should provide both vocational and academic expertise, thereby further consolidating the research connection in the field (Swedish Research Council, 2006). Over time, pointed efforts were made to promote healthcare research and to increase both the number of RN/PhDs and the number of RN/PhDs with higher academic credentials (“professor incubators”) (Swedish Research Council, 2006).

The motivation to support and invest in healthcare research included the expectation that it would lead to safer patient care and meet the need for postgraduate teachers. Since PhDs

were first offered almost 40 years ago, there are now around 1700 RN/PhDs in Sweden, of whom at least 98 (including 40 emeritus) are professors (Swedish Society of Nursing, 2018). As a comparison, it can be mentioned that the number (2017) in Denmark is 210 and in Finland 430 (Elgaard Sørensen et al., 2019). Of the approximately 125,000 RNs in Sweden currently estimated to be professionally active in 2020, just under 1.5% hold a PhD (Swedish Society of Nursing, 2018).

Currently, RNs write their theses in a variety of fields, but there is no current database of the fields to which these dissertations belong, for which reason it is not possible to determine how many of them fall within the purview of nursing science.

Despite the steady increase in the number of RN/PhDs, many of whom write dissertations with a clear clinical orientation, few RN/PhDs work clinically in the inpatient setting (study II; van Oostveen et al., 2017). Although, as mentioned above, support for healthcare research is motivated by expectations of better healthcare and the need for postgraduate teachers, investments in this area have mainly focused on increasing the number of RN postgraduates, RNs conducting research and the number of academically qualified teachers. This may be a significant reason why the Swedish Research Council in its report *Vårdvetenskap i tiden* (*Caring Science at this point in time*) (Swedish Research Council, 2006) stated that there is

“... in some respects, a lack of connection between research and practical use of research findings. This is a significant challenge for the care sciences since the primary goal of much of the research is that it be used for practical applications and nursing work.”

3.2 QUALITY OF PATIENT CARE

Under Swedish law (Health and Medical Services Act, HSL 2017:30) all patients have the right to receive safe high-quality care, which means that such care should be both medically justified and evidence-based. The World Health Organization (WHO, 2020) defines patient safety as

“... the absence of preventable harm to a patient during the process of health care and reduction of risk of unnecessary harm associated with health care to an acceptable minimum.”

Improving quality of care has a long tradition. In nursing, Florence Nightingale was a pioneer in the field by measuring mortality and developing hygiene procedures (Kudzma, 2006). RNs are responsible for monitoring and assessing patients, and for performing interventions to prevent risk or harm to the patient. Another responsibility involves coordinating patient care. Today, safety and quality of nursing care are often measured by indicators such as the prevalence of malnutrition, falls and pressure ulcers. There are also other important aspects; for example, nursing should be performed with respect for patient dignity and integrity. Since nursing generally entails direct encounters with patients, an ethical approach to patients and

their relatives is required. In Sweden, patient complaints are increasing regarding shortcomings in communication, information and treatment (Health and social Care Inspectorate [IVO], 2017). Another concern involves flawed coordination of patient care.

The Institute of Medicine (IOM, 2001) defines health care quality as

"the degree to which health care services for individuals and populations increase the likelihood of desired health outcomes and are consistent with current professional knowledge."

The IOM defines quality in six dimensions: high quality care should be safe, effective, efficient, patient-centered, timely and equitable (IOM, 2001).

Quality of care is influenced by how it is organized, availability of resources and expertise of individual caregivers. Consequently, the professional competence of the RN is important to quality of nursing care. Competence relates to the ability of the individual to perform a task through application of knowledge and skills. Professional competence pertains to how the individual utilizes knowledge, skills, and judgment when carrying out professional duties. Professional competence encompasses both experience-based and evidence-based knowledge. Experience-based knowledge is gained over time by means of practice, while evidenced-based knowledge is generated from scientific research.

Regarding important aspects of quality in patient care, studies have demonstrated an association between nurse staffing levels and RN competence on the one hand and patient care outcome on the other (Ball et al., 2018). Safe nurse staffing, as defined by the International Council of Nurses (ICN), means

"... that an appropriate number of nurses is available at all times across the continuum of care, with a suitable mix of education, skills and experience to ensure that patient care needs are met and that the working environment and conditions support staff to deliver quality care." (Aiken & Fagin, 2018)

Thus not only is appropriate base staffing required, but also the right mix of expertise to meet patient care needs. Organizations with a high proportion of RNs with formal qualifications corresponding to a bachelor's degree or higher report better qualitative patient care outcomes (Aiken et al., 2017). The level of clinical expertise among RNs is important for patient care outcome (Yakusheva et al., 2014) as well as the educational level of the RN has been shown to be important in regard to research use. RNs with a graduate degree (masters/PhD) apply research findings in clinical practice to a greater extent than RNs with undergraduate (bachelor) degrees (Squires et al., 2011). Therefore one may conclude that an increase in the number of RN/PhDs possessing high scientific expertise may help to improve quality of care.

3.3 EVIDENCE-BASED PRACTICE (EBP)

Thus in health care today, the mass of knowledge is increasing at an enormous rate. No one knows exactly how many scientific journals are published, but estimates point to around 30,000, with almost two million articles annually and a 4-6% increase per year (Altbach PG & de Wit H, 2018). This places great demands on all healthcare professionals both to stay up to date with and to be able to evaluate new findings.

Evidence-based practice (EBP) describes a deliberate, problem-solving approach to clinical practice that incorporates the best evidence from well-designed studies, patient values and preferences, and clinical expertise when making patient care decisions (Melnik et al., 2014, Dawes et al., 2005).

Many definitions of EBP describe three knowledge sources: research-based knowledge, professional expertise (the practitioner's experienced-based knowledge) and the preferences, values and priorities of the patient. The term was originally applied to define actions concerning how practitioners critically appraise research and subsequently incorporate research knowledge into their clinical decision-making. Sackett et al. (2000) describe EBP as a five-step decision-making process:

1. Formulate answerable questions based on patient/client problems
2. Find the best relevant evidence
3. Critically appraise its validity and usefulness
4. Integrate this appraisal with clinical practice and patient/client values
5. Assess performance

The decision-making process involved in achieving EBP requires specific "EBP skills" or "research literacy" in order to consume, interpret and apply evidence from research and combine it with professional expertise and patient factors. An array of strategies have been adopted to ease the transition into EBP, including educational efforts, systematic reviews and guidelines that promote EBP. However, prior research has revealed multiple barriers at both the individual and the organizational levels to the full implementation of a decision-making approach to EBP (Straus et al., 2009).

3.4 STRUCTURE - CORNERSTONES OF THE SWEDISH RESEARCH AND DEVELOPMENT SYSTEM

According to the official Swedish Government report (SOU) *Klinisk forskning – Ett lyft för sjukvården (Clinical research - a boost for healthcare)*, good clinical research should answer the questions what is the right treatment for the right patient and the right way to administer it (SOU 2009:43). Meeting this challenge puts demands on both interprofessional research and care improvement, which requires involvement of RNs with a scientific education. It is therefore important that experienced RNs with high academic qualifications work in clinical care.

To incorporate new knowledge into clinical care, interactions between care, research and education are essential. The function of the RN/PhD to serve as a role model, support colleagues and facilitate implementation of new knowledge is important (Dogherty et al., 2013; Staffileno et al., 2013).

In Sweden, medical research (including nursing research), healthcare development and educational activities, as well as research and development (R&D) are financed through special funding from the local regions and the state. This funding process is described in the national ALF agreement between the Swedish state and the local regions, which addresses regulation of state reimbursement to local regions for specific costs related to education and medical research. This national level agreement is supplemented by regional agreements between the involved regions and universities.

Under this agreement, the university hospitals play a central role with their threefold mission: health care, R&D and education.

“In addition to health care, the core healthcare activities of universities must include clinical research and education, as well as application and dissemination of knowledge for healthcare development.” (ALF agreement, 2015)

Under the Alf agreement, university health care must:

- continuously conduct research of high national and international quality
- follow international developments in medical research, education and health care
- contribute to evidence-based health care by incorporating research findings of their own and from others into clinical practice and by continuously evaluating new and established methods
- share the results of their activities with other parts of the healthcare system and
- collaborate with the business community and patient organizations

The university hospital mandate thereby places special demands on organizational design and scientific leadership, as well as on funding and infrastructure.

3.5 THEORETICAL FRAMEWORK

Health care today faces many challenges. Due to finite resources, prudent use is important. Because of the aging population and rapid changes within the healthcare system, delivery of safe high-quality care becomes a challenge. Part of the solution may be the concept and theory of capacity building, which aims to further the ability of entities within the healthcare system to improve their performance in both established areas and new frontiers. The World Health Organization (WHO) define capacity building as

“... the process by which individuals and organizations obtain, improve, and retain the skills, knowledge, tools, equipment, and other resources needed to do their jobs competently”
(Smith et al., 2006).

A variety of distinct characteristics have been identified pertaining to the multifaceted concept of capacity building (Goldberg & Bryant, 2012, Leeman et al., 2015). Capacity building must be viewed and understood from a number of levels (McCane et al., 2007), since a hierarchy of needs must be considered to ensure that investments in development are well spent (Potter & Brough, 2004). Earlier research highlights several core elements at different levels that are of importance for capacity building:

- micro (unit/individual) level: training, skills, application and dissemination of research knowledge, commitment
- meso (hospital/organizational) level: job opportunities, leadership, resources, learning environment, leadership, organizational climate and culture, partnership, workforce development and financial processes
- macro (regional and national) level: engaging with others outside the organization to cooperate and build knowledge and skills, decide on policies and create opportunities for funding

(Brownson et al., 2018, McCance, et al., 2007, Jacob et al., 2017). Further, McCane et al. (2007) highlight three hierarchal levels that need to be addressed to help build capacity for nurses and midwives to conduct and apply research to participate in R&D

1. educate and train practitioners in research methodology to help them understand the relevance and benefits of research to their practice
2. direct research training through personal involvement
3. continuing career development for specialized researchers to promote future research leaders

Capacity building is one of the United Nations (UN) Agenda 2030 sustainability goals, which promote change toward a sustainable society (UN General Assembly, 2015). National action plans have been drawn up to achieve the Agenda 2030 goals. The Swedish action plan (2018) includes goals for health care (goal 3) and goals to ensure inclusive, high-quality equitable education and lifelong learning for all (goal 4), including specific goals to be met by the university in an effort to promote Sweden as a leading knowledge nation. To achieve these goals, proper expertise and competence are essential.

4 MATERIALS AND METHODS

This chapter presents an overview of the methods used in the four studies of this thesis. Table 1 gives an overview of the methodological approaches of all studies.

4.1 OVERVIEW OF THE METHODS

Different approaches concerning qualitative data collections and data analysis were used to address the research questions. An array of approaches was developed based on purposeful methodology for data collection and analysis in order to achieve the overall aim and answer the specific research questions. Table 1 presents a summary of the characteristics of the four studies.

Study I aims to investigate what is already known from prior research concerning the impact of RN/PhDs on clinical care. Data were obtained by performing a systematic literature review; the data were analyzed using qualitative content analysis according to Elo & Kyngäs (2008).

Study II investigates the experiences of RN/PhDs in terms of their clinical role and function at work. Individual interviews were performed in various settings in Sweden, from which the data were analyzed using qualitative content analysis (Elo & Kyngäs, 2008). This study provides an understanding of the various roles and functions that RN/PhDs experience at work, as well as the different work environments they encounter in terms of using their expertise in the clinical setting.

Study III explores the factors that RNs and physicians encounter that have an impact on their opportunities to combine clinical practice with continuing active research after obtaining their PhDs. Qualitative in-depth interviews with an open-ended structure were conducted with informants from two different settings, after which the data were analyzed using conventional content analysis according to Hsieh and Shannon (2005).

Study IV, a qualitative in-depth study, involves interviews with managers concerning how they perceive and facilitate the use of skills and expertise among RN/PhDs and apply them in clinical care. The study investigates how the leadership role of managers impacts conditions that affect how RN/PhDs are able to work and apply their PhD skills and competence. The data were subjected to thematic analysis (Braun & Clarke, 2006).

Table 1 presents the methodological approaches of the four studies.

Table 1. Methodological approaches of the four studies in this thesis.

Study	I	II	III	IV
Aim	To explore published articles concerning clinical contributions from RN/PhDs regarding their impact on quality and improvement of nursing care.	To investigate what RNs with a PhD working in clinical practice experience in terms of their role, function and work context.	To explore what factors, have a bearing on the ability of RNs and physicians to combine clinical work with research after earning a PhD.	To investigate how managers perceive and apply the skills and expertise of RNs with a PhD as a resource in clinical practice.
Design	Systematic literature review	Qualitative design	Qualitative design	Qualitative design
Setting	---	Three university hospitals	Two university hospitals	One university hospital
Study participants	Published scientific studies describing the tasks and working conditions of RN/PhDs employed in clinical care. Studies published in English with abstracts available.	RN/PhDs employed in clinical positions.	RNs and physicians with a PhD working in clinical care.	Department heads and ward managers, including both those who did and did not have RN/PhDs on staff in clinical care.
Data collection	Searches, limited to title and abstract, were conducted in two different databases, PubMed and Cinahl.	Individual interviews Snowball sampling	Individual interviews Purposive sampling	Individual telephone interviews Purposive sampling
Data analysis	Analysis of data from the included studies was conducted using inductive, qualitative content analysis (Elo & Kyngäs, 2008).	Induction; qualitative content analysis (Elo & Kyngäs, 2008).	Induction; conventional content analysis (Hsieh & Shannon, 2005).	Thematic analysis (Braun & Clarke, 2006).

4.2 STUDY SETTINGS, STUDIES II-IV

Studies II-IV were conducted at university hospitals in Sweden. The term university hospital has no legal or regulatory definition in Sweden. We have chosen to define a university hospital as “a hospital where the primary mission, in addition to health care, is to conduct research and provide education for various professional groups in health care.” This definition of university hospitals is consistent with the concept of university health care as cited in the national ALF agreement (2015). In Sweden, seven hospitals meet these criteria: Karolinska University Hospital, Skåne University Hospital, University Hospital of Umeå, Linköping University Hospital, Örebro University Hospital, Uppsala University Hospital and Sahlgrenska University Hospital.

Currently, few RN/PhDs are employed at university hospitals. Among these, some are employed by the university and, by agreement between the university and university hospital, they hold a part-time position at the hospital. Our studies aimed to investigate the working conditions of RN/PhDs who work in clinical care and are employed by university hospitals. This proved to be a challenging task owing to a lack of both local and national records concerning RN/PhDs. For the purposes of study II and study III, we enrolled RN/PhDs from different university hospitals. Although all data were collected at university hospitals, context and circumstances differ since the hospitals are located in different regions, all of which have their own particular organizational structure, political governance, career pathways, and work culture; they also differ in size. To recruit managers for study IV, we focused on just one university hospital because the others had so few RN/PhDs employed in clinical care that we were unable to guarantee the confidentiality of participants.

4.3 STUDY PARTICIPANTS, STUDIES II-IV

Study II participants were RN/PhDs working in clinical care, study III participants were RN/PhDs and physicians with a PhD degree (MD/PhDs) working in clinical care, while study IV considered both RN and physician department heads and ward managers.

The objective for studies II and III was to enroll RN clinicians with PhDs in different fields at different clinics and in different contexts, while study III focused on the same group, both with and without ongoing research duties, in order to strengthen the validity of the study. The objective for study IV was to enroll heads of departments, clinics or units within different medical fields and in different contexts, with or without RN/PhDs employed on staff.

Due to the lack of national and local records identifying RN/PhDs, we chose to use snowball sampling to identify participants for study II. Snowball sampling is a recruitment technique in which participants are asked to assist the researcher in identifying other potential participants (Polit & Beck, 2016). Initially, we contacted nurse managers at the three university hospitals and inquired whether they knew of RN/PhDs within the organization. Next, the newly identified RN/PhDs were asked whether they knew of other RN/PhDs at the hospital and so on until we had obtained a sufficient number of participants. For the purposes of this study, 13 RN/PhDs were interviewed.

Participants for studies III and IV were selected using purposive sampling, a technique in which researchers identify and select individuals who are especially knowledgeable about the phenomenon of interest (Patton, 2014). In study III we contacted managers at an overarching level within the organization who knew where to find the RN/PhDs and MD/PhDs. Eight RN/PhDs and six MD/PhDs working in different fields, clinics and contexts, some with and some without current research involvement, were interviewed to strengthen the validity of the study. An e-mail describing the study was sent to 25 eligible individuals and after one reminder, 14 respondents agreed to participate in the study. All study participants worked at one of the two university hospitals in Sweden that were included in the study. Again, for

study IV we contacted one manager at an overarching level within the organization who knew where to find managers who met the inclusion criteria of the study. Participants in this study included managers both with and without RN/PhDs employed at their unit. Prospective participants were sent an e-mail invitation describing the study, and of the 24 managers approached, 14 respondents agreed to be interviewed. The study sample included both nurse and physician managers, with a broad range of experience regarding years in practice and clinical contexts within the hospital, as well as differences in age and sex, in order to strengthen the validity of the study by including a diverse spectrum of experiences and contexts (Patton, 2014).

An overview of the background characteristics of the participants in studies II-IV is presented in Table 2

Table 2. Overview of participants in studies II-IV.

	Study II <i>(RNs)</i>	Study III <i>(RN/PhDs and MD/PhDs)</i>	Study IV <i>(RN and physician managers)</i>
Number of participants	13	14	14
Age years – mean (RN/physician)	54	50 (55/44)	51 (48/53)
Age years – range (RN/physician)	39-63	40-66 (43-66/40-47)	31-62 (31-62/45-61)
Gender, numbers (female/male)	13/0	9/5	10/4
Profession (RN/physician)	13/0	8/6	6/8
Professional experience – Years (mean/range)	28 (17-38)	24 (14-44)	----
Managerial experience years – mean/range	----	----	10/2-25
Managerial level - unit/section/department/R&D			3/2/8/1
Academic degree - PhD (RN/physician)	13	14	8 (0/8)
Academic degree - Master’s (RN/physician)	----	----	4 (4/0)
Academic degree - Bachelor’s (RN/physician)	----	----	1 (1/0)
Academic degree - No academic (RN/physician)	----	----	1 (1/0)
Years since PhD - mean (RN/physician)	7	8 (7/8)	----
Years since PhD - range (RN/physician)	1-15	1-16 (2-12/1-16)	----

4.4 DATA COLLECTION

4.4.1 Study I

Data for study I, the systematic literature review, were collected through database searches in PubMed and Cinahl. Following a systematic search of the literature (Gough et al., 2019, SBU, 2016), data were compiled from scientific studies published between 1986 and 2020 that related to our research questions. Preparatory database searches were initially conducted to identify relevant search terms. In addition to "MeSH terms" (PubMed) and "subject terms" (Cinahl), terms that appeared in titles and abstracts were examined for relevant studies and as to how they were indexed. The searches, which were designed with assistance from a Karolinska Institutet librarian, also explored selected issues and different databases (SBU, 2016).

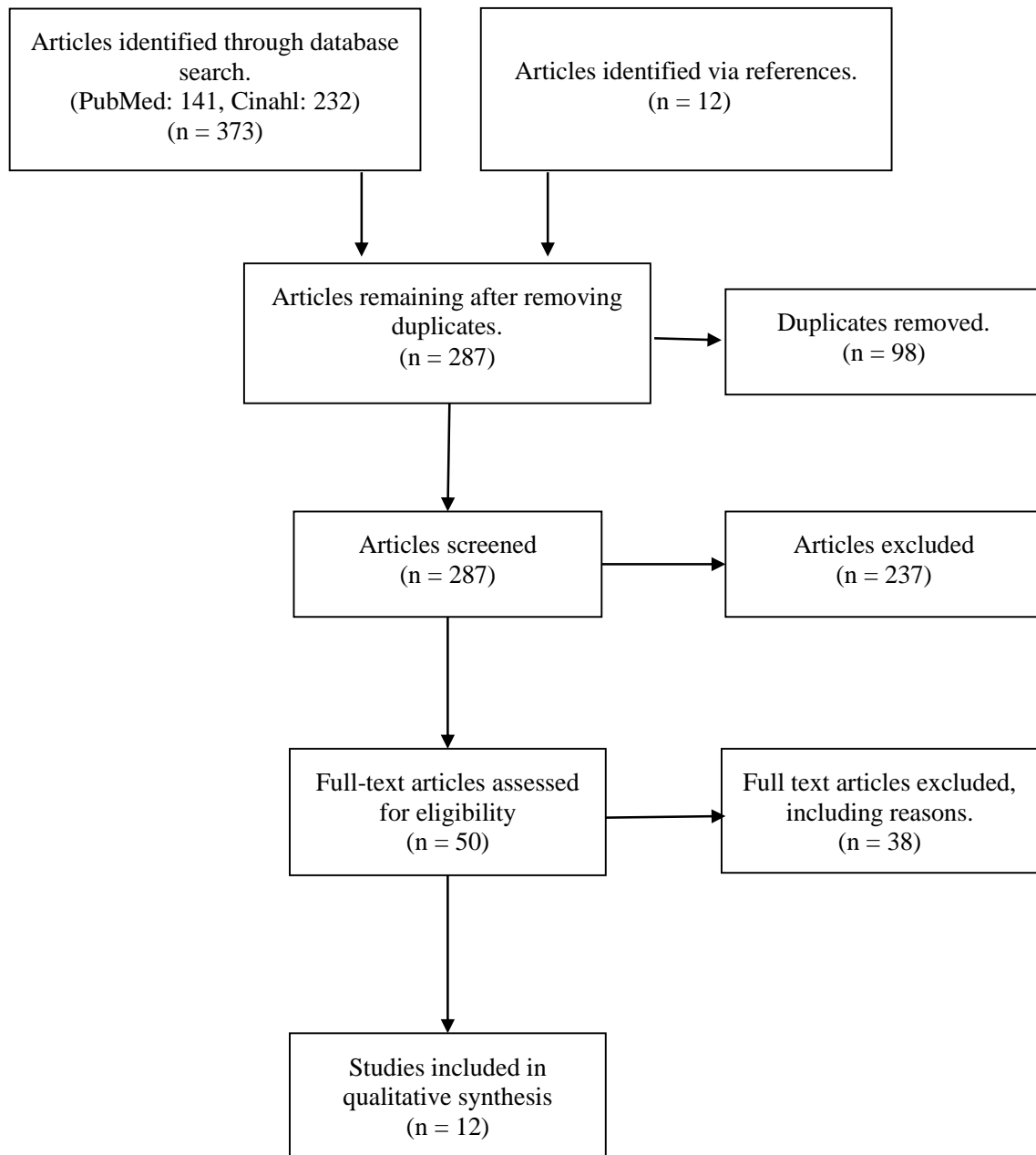
The Boolean operators AND and OR were used to identify and combine relevant keywords. Searches, which were filtered by title, abstract and studies published in English, were adapted to the requirements of the two databases, PubMed and Cinahl. Table 3 documents the search strategies.

Table 3. Search strategies

Database	Search strategy
PubMed	<p>((nurse*[Title/Abstract] OR registered nurse[Title/Abstract])) AND (doctoral degree[Title/Abstract] OR doctorate[Title/Abstract] OR PhD[Title/Abstract]) AND (clinical practice[Title/Abstract] OR clinical setting[Title/Abstract] OR clinical[Title/Abstract])</p> <p><i>Filter: abstract and English</i></p>
Cinahl	<p>AB (nurse* OR registered nurse) AND AB (doctoral degree OR doctorate OR PhD) AND (clinical practice or clinical setting or clinical)</p> <p><i>Filter: abstract and English</i></p>

A manual search was also conducted by examining the reference lists of all selected publications. The number of identified articles which were considered relevant are documented in a flow chart diagram, see Figure 1.

Figure 1. Flow chart diagram: Number of articles found and number of included articles



4.4.2 Studies II-IV

Due to a lack of both local and national records concerning RN/PhDs, we used snowball sampling in study II, while we used purposive sampling to select the informants for studies III and IV (Polit & Beck, 2016).

Data for studies II-IV were collected through individual interviews based on semi-structured interview guides developed for the studies. Interviews for studies II and III took place at the university hospitals, while study IV interviews were conducted by telephone.

4.5 DATA ANALYSIS

The focus of the studies was to elucidate participant experiences, rather than to investigate any deeper meaning of the phenomenon in question (Patton, 2014).

In studies I, II and III the data were subjected to qualitative content analysis (in studies I and II according to Elo & Kyngäs (2008), in study III according to Hsieh and Shannon (2005). These two types of qualitative content analysis are equally suited to this type of data. The content analysis technique is intended to analyze texts based on empirical data that is explorative and descriptive in nature, where a structured process is applied to code and categorize the data (Hsieh & Shannon, 2005). Content analysis, which generates knowledge based on participant perspectives, is used to elucidate how participant narratives reflect their experiences.

The study IV data were subjected to thematic analysis in accordance with Braun and Clarke (2006). The thematic analysis technique is intended to analyze texts based on empirical data in order to find repeated patterns of meaning and is useful for reporting participant experiences (Braun & Clarke, 2006). Thematic analysis entails a structured process of coding and categorizing data from which themes and patterns are identified, using an inductive data-driven approach.

4.6 ETHICAL CONSIDERATIONS

This doctoral thesis addresses issues relating to how RN/PhDs can be of benefit when working in clinical care. The interview process is intended to reveal how, in their professional experience, RN/PhD expertise is utilized and may become a sensitive issue for respondents who find that their PhD skills are ignored or undervalued at work. The interview may also be perceived as an invasion of privacy. However, considering the nature of the questions and that participation is voluntary, and given that most of the informants had a postgraduate degree, we assessed this risk to be small. The potential for privacy infringement is limited to some possible discomfort relating to reflections resulting from questions about the work situation.

Some participants in the various studies may also have found the experience to be positive, and appreciated being asked about their views and experiences. Moreover, the interview may also have a beneficial effect on participants if the study leads to improvements in the work organization and environment. Nevertheless, failure to meet potential positive expectations may culminate in individual disappointments, thereby posing an ethical dilemma.

We believe any potential ethical risk that may result from the studies is small and outweighed by the benefits of the new knowledge that may be gained. Today, there is little, if any, collective knowledge concerning the work tasks performed by RN/PhDs in clinical care and what value they contribute to such care. Scarcely any documented knowledge is available concerning the opportunities for RN/PhDs (and MDs – included in study two) to conduct personal research. The same applies to potential implementation of new research findings, whether their own or those of others, into everyday clinical practice. It is therefore difficult to assess the impact that the results of the study may have on the study groups.

In sub-studies II-IV, prior to data collection, all participants were provided with verbal and written information about the study, after which informed consent was obtained. Participants were also informed that they could withdraw from the study at any time. They were assured of confidentiality in relation to their participation, which was guaranteed through interview transcript coding and representation of findings at the group level. Since the collected material is deidentified, the risk of invasion of privacy is minimized.

4.6.1 Ethical approval:

Study I: The study was a systematic literature review for which reason ethical approval was not required.

Study II: Ethical approval was obtained from the Regional Ethical Review Board, Stockholm, Sweden (Dnr. 2013/283-31/5).

Study III: Ethical approval was obtained from the Regional Ethical Review Board, Linköping, Sweden (Dnr. 2017/50-31).

Study IV: Ethical approval was obtained from the Regional Ethical Review Board, Stockholm, Sweden (Dnr. 2018/2319-31/5).

5 RESULTS

This chapter contains a summary of results from all four studies. The complete results in detail for all studies are presented in the papers appended in the last section of the thesis.

Table 4. The results of the four studies at a glance

Study	I	II	III	IV
Findings	<p>Two different roles/ types of employment were found: nurse researchers and specialist RNs (e.g. APN).</p> <p>The leadership and support roles regarding EBP and implementation of scientific knowledge were emphasized as important, as was research.</p> <p>The role of RN/PhDs in clinical care is not yet clearly defined</p>	<p>The main areas of responsibilities were related to practice development and EBP.</p> <p>Teaching and clinical training of nursing students were important duties.</p> <p>The RNs found it difficult to pursue their own research due to lack of time.</p> <p>Their role was unclear, and the expectations and requirements of the organization were not clearly defined.</p>	<p>A broad range of factors either facilitated or hindered continued research combined with clinical work.</p> <p>Personal factors, such as individual motivation, were influential.</p> <p>Important factors for continued research were financial support and allocated time, good academic relationships and support from management.</p> <p>Differences in professional culture and tradition between physicians and RNs regarding clinical research and research education.</p>	<p>All managers were supportive of having RN/PhDs among their employees.</p> <p>Important areas of focus:</p> <ul style="list-style-type: none"> • EBP • clinical nursing research • clinical education and training <p>Structural factors, including financial resources, influence the ability of managers to expand and develop nursing responsibilities.</p>
Conclusions	<p>Advancing development of nursing practices requires:</p> <ul style="list-style-type: none"> • clearly defined clinical positions • sufficient time for teaching and conducting research • management support 	<p>RN/PhDs can contribute to EBP, clinical training and development of clinical research</p> <p>Their roles and responsibilities need to be clarified</p> <p>Support from managers is needed</p>	<p>Continued research, combined with clinical work, is influenced by:</p> <ul style="list-style-type: none"> • structural factors • professional culture • leadership • individual factors <p>Support for the clinician-scientist role may:</p> <ul style="list-style-type: none"> • improve transfer of scientific knowledge into clinical practice • yield research questions relevant for clinical practice 	<p>Despite a favorable attitude from managers, strategic investments and job openings are often in short supply.</p> <p>Manager support is necessary for utilization of RN/PhD expertise in clinical care.</p> <p>Both job descriptions and terms of employment require clarification to create an environment in which RN/PhDs can meet set goals in clinical work.</p>

5.1 STUDIES I AND II: RN/PhDs: ROLE, FUNCTION AND WORK CONTEXT

The *study I* results show that spearheading and supporting evidence-based practice (EBP) was considered to be extremely important, as was a presence through participation in clinical nursing. RN/PhDs were considered to be a resource for other nurses, other professions, patients and relatives. Nurse managers often showed a lack of understanding concerning how RN/PhDs can contribute to patient care. The study also found that splitting positions between academic and clinical duties is not yet an established practice for RN/PhDs in clinical care, a situation that requires further elucidation. There was also a lack of job opportunities for RN/PhDs working in clinical care. Many of these findings are similar to the results seen in study II.

Study II showed that the main areas of responsibility held by RN/PhDs related to developing care practices and EBP. RN/PhDs felt that their presence in clinical care, with their high level of competence, added value to the organization, both among colleagues and in relation to direct patient care. Teaching and clinical training of nursing students were deemed important, as were contributions to furthering skills among colleagues, which included a variety of duties ranging from orientation of recent nursing graduates to supervision of PhD students. They also functioned as consultants to other nurses.

The RN/PhDs also experienced obstacles to using their full array of expertise. The expectations and conditions of employment were not always clearly defined, and a mandate to implement improvements was often absent. Even if the RNs perceived that many managers and co-workers considered their high level of competence to be an asset, some experienced a lack of support from managers which, in the case of nurse managers, was perceived to reflect deficiencies in their own scientific knowledge. This contributed to suboptimal use of their skills.

5.2 STUDY III: FACTORS THAT INFLUENCE COMBINING CLINICAL WORK WITH RESEARCH

Study III showed that inadequate planning for both RN/PhDs and MD/PhDs had been undertaken to enable further research post-PhD. Cooperation with a university having an established collaborative infrastructure was emphasized as fundamental for continuing with research.

When it comes to working at university hospitals, the norms and requirements that apply to MD/PhDs differ from those that apply to RN/PhDs. While MD/PhDs are given

opportunities for advancement, RN/PhDs work under less favorable circumstances in the clinical setting, with undefined roles as clinical scientists and no obvious career pathway.

All participants were under pressure to apply for grants to fund their research. Because of their novice status in the research world, funding was often difficult to obtain, for which reason many conducted research in their spare time. Time constraints posed a problem for many participants since the expectations of the job prioritized patient care.

According to the participants, the area/nature of their research was important both to obtain research funding and to implement research into clinical practice. Both RNs and MDs believed it was easier to obtain funding and support for medical or technical projects than for nursing care or quality improvement projects.

RNs and MDs both made it clear that individual managers played an important role in creating a climate in which a combination of research and clinical work can thrive. RNs and MDs with department level managers who respected research reported that their managers proactively promoted a climate conducive to research in the clinic.

5.3 STUDY IV: MANAGERS' VIEWS ON HAVING RN/PhDs ON STAFF

One important aspect that recurred in all interviews with the managers in *study IV* was to use new knowledge to develop procedures and guidelines based on EBP. Managers also felt that the presence of RNs on staff shortened the pathway to implementation of new knowledge and bring it closer to the patient.

Having a specialized area of clinical competence was also considered important.

Managers found that RN/PhDs working in the same area in which they conducted their research were able to contribute deeper and more valuable knowledge within that specialized area, which also helped to identify areas in need of further research and development.

Furthermore, managers found that when RN/PhDs were on staff, they contributed to development of scientific knowledge in a larger sense among colleagues.

Managers also recognized the inherent value of clinical nursing research since RN/PhDs are able to identify relevant research questions and inspire enthusiasm for research among colleagues. Moreover, they help strengthen interprofessional research collaboration in clinical care, especially between RNs and MDs, and are also instrumental for supervision of doctoral students. They also lend support to clinical education and training, supervise

students and colleagues (“supervising the supervisors”) and foster competence development among colleagues.

6 DISCUSSION

6.1 RN/PhDs: ROLE AND FUNCTION

Findings of studies I, II and IV of this thesis show that RN/PhDs are basically tasked with fulfilling two different kinds of roles: that of the specialist RN (e.g. APNs) working in the clinical care setting and that of nurse researcher. Just one ubiquitous problem: there is still no uniformity in professional title or job descriptions for these roles. Previous research has also highlighted these issues; Elgaard Sørensen et al. (2019) state that such a lack of clear definitions may affect capacity building at this level of nursing. The RN/PhDs in this study agree that their role is often unclear and expectations from the hospital organization are not clearly defined (study II), which entails a risk that their performance and further development will be impeded, and their skills not fully utilized. Chan et al. (2010) suggest an organizational model in order to succeed with research capacity building among the nursing workforce. The model suggests a clear design and definition of the role, a support system and thorough assessment of outcomes.

Nursing is a vital aspect of patient care and must strive to be evidence-based. Both the RN/PhDs and managers in studies I, II and IV see quality improvement and EBP as primary areas of responsibilities, which is also in line with other research (McNett, 2006; Sterling & McNally, 1999; Wilkes & Mohan, 2008; Andreassen & Christensen, 2018, Elgaard Sørensen et al., 2019, van Oostveen et al., 2017). The achievement of sustainable quality improvement requires mentoring and education of frontline staff. Therefore facilitators sufficiently versed in quality improvement and EBP are needed for successful implementation (Dogherty et al., 2013). RN/PhDs have a significant role to play in this process, and our results show that both managers and RN/PhDs felt that supervising and supporting professional development among colleagues is paramount (studies II and IV). The feeling among managers is that the presence of RN/PhDs in clinical care shortens the process of implementing new knowledge and thereby brings it closer to the patient (Study IV). The results indicate that, given the opportunity, RN/PhDs will have a significant impact on clinical care. Today, patients do not always receive care in line with the best available knowledge (Grimshaw et al., 2012, Grol & Grimshaw, 2003), thereby exposing them to avoidable risk. Improvement of patient care serves as a strong motivator to introduce greater academic influence into the nursing profession and to promote nursing research (Swedish Research Council, 2006). The knowledge and scientific competence of the RN/PhD must be both recognized and utilized in order to achieve the ultimate goal of improving clinical care.

The advancement of nursing as a practical discipline requires RNs with expertise in both clinical practice and scientific research (Kitson et al., 2013, Meleis, & Dracup, 2005). Currently, the limited number of RN/PhDs is likely insufficient to meet the growing needs for development of evidence-based care and to carry out competent academic clinical nursing research. Florczak et al. (2014) highlight the importance of a scientific foundation to creation of evidence. The PhD degree is research-focused aiming at advanced nursing science and

patient care. The US and some other countries have also developed a different type of doctoral degree, the Doctor of Nursing Practice (DNP), which focuses on evidence-based practice, quality improvement and systems leadership (AACN, 2006). The DNP degree in the US is gaining momentum in clinical practice compared with the conventional PhD degree; the total number of doctorate degrees in nursing awarded in 2010 was 1814 (DNP 71%, PhD 29%) and by 2019 that number was 8745 (DNP 91% and PhD 9%) (Campaign for Action, 2020). This development (DNP vs PhD) has raised concerns as to whether implementation of EBP can or should be distinguished from research (Meleis, & Dracup, 2005). One suggestion addressing this question is to form partnerships between RNs with DNPs and those with PhDs, for the purpose of both generating and implementing evidence-based findings in nursing care (Florczak et al., 2014). Another solution is that some universities now also offer a dual DNP/PhD degree.

To meet the challenges of quality care improvement and to create a learning organization, capacity building concerning nursing competence at the RN/PhD level is vital. Bedside clinicians, who continue to do active research, have also been found to improve quality of care and patient safety (Ozdemir et al., 2015). Therefore, as in the US (IOM, 2011, p. 13), the goal in Sweden must be to sharply increase the number of RN/PhDs in clinical care, which will require efforts at all levels from micro (individual/unit level) to macro (national level).

6.2 MANAGER SUPPORT

The results (study I - IV) show that manager support is crucial for RN/PhDs to have the opportunity to use their dual skill set of combining clinical practice with research. Because few RN managers have an academic scientific education (Gunningberg et al., 2010, Udod & Care, 2004, Bianchi et al., 2018), it would be a reasonable assumption that RN managers do not always recognize or understand the added value of RN/PhDs in clinical care (van Oostveen et al., 2017). Studies II and III showed that the participants did not always feel that their managers were supportive of their situation. Although some RNs perceived that many managers and co-workers considered their expertise to be an asset, others experienced a lack of support from managers at all levels (study II). Specifically, it was felt that such RN managers lacked scientific knowledge in their background (study II). Moreover, prior research has found that nurse managers do not always value the scientific expertise of the RN/PhD in contributing to improvement and clinical outcomes (Wilkes & Mohan, 2008; van Oostveen et al., 2017).

The RNs and MDs in study III made it clear that individual managers play a critical role in creating a climate where the combination of research and clinical work can thrive. The RN/PhDs and MD/PhDs working under clinic managers who respected research reported that they proactively promoted a climate conducive to research in the clinic.

All of the managers interviewed for study IV had a positive attitude toward the presence of RN/PhDs in clinical care. All of our informant physician managers held a PhD degree. Likely

for this reason, the physician managers appeared able to more clearly express the value of employing RN/PhDs. In contrast, none of the RN managers held a PhD degree; they seemed less likely to specify the value of scientific knowledge in clinical practice, thereby suggesting the value of increasing scientific expertise among managers to enable them to recognize, support and utilize the scientific expertise of their employees. The lack of scientific expertise among RN managers may also have a negative impact on the ability to verbalize strategies and actions to build capacity, capability and a culture promoting full use of research knowledge and expertise among RN/PhDs. Consequently, capacity building is fundamental to enabling RN/PhDs to use their skills and expertise and thereby further advance nursing research and development in the clinical setting (McCance et al., 2007).

6.3 BRIDGING THE THEORY – PRACTICE GAP

The RN/PhD, serving as a bridge between theory and practice, contributes scientific knowledge to clinical care and brings up-to-date clinical expertise to the academic setting. RN/PhDs with combined positions have the opportunity to influence relevant issues in both clinical care and the university academic setting by linking theory and practice in nursing (study II). Maintaining an active working relationship with academia was considered important by the participants in all of our studies, and was also in line with opinions expressed in other studies (Weggemans et al., 2019; Bookey-Bassett et al., 2019; Strickland, 2017; Morel & Ross, 2014). The opportunity to affiliate with a university with access to databases, along with the ability to network with other researchers, were considered important.

Clinical nursing research is integral to the overall mission of the RN/PhD; building new knowledge requires both clinical and scientific knowledge (Kitson et al, 2013). Bedside clinicians who actively pursue research improve quality of care and patient safety (Ozdemir et al., 2015). The RN/PhDs in our studies (studies I, III and IV) also held the opinion that clinical nursing research was valuable. Nevertheless, few nurses have the opportunity to combine research and clinical work after earning their PhD. Financial support and time allocation were cited as fundamental to continuing research. Most funding comes from grants, which creates problems for junior clinical researchers who have not yet had the opportunity to produce much research. Experienced productive researchers are usually prioritized when grants are allocated. Prior research has repeatedly pointed to this same problem for both RN/PhDs and MD/PhDs (Van Oostveen et al., 2017, Strong et al., 2018). Even managers with a favorable attitude in this regard frequently cite a lack of sufficient resources such as funding, time and infrastructure to support clinical research (study IV). To rectify this situation and foster capacity building in clinical nursing research, new policy decisions at the hospital, regional and national levels regarding clinical research funding will be required.

One important finding in study IV was that, likely due to their specialist knowledge, RN/PhDs working within their field of research can help identify clinical areas in need of further research and development. This interdependency strongly contributes to the potential to reach the goal of infusing the nursing profession with a more academic orientation, thereby strengthening nursing research and improving patient care (Swedish Research Council, 2006). Accordingly, this finding highlights the need for clinical positions with clearly defined roles for RN/PhDs in direct patient care as well as for combined employment opportunities between academia and clinical care for RN/PhDs to support a merge between theory and clinical practice.

Studies II and IV show that support for clinical education and training were considered to be important, as were teaching and clinical training of nursing students and staff. An academic education in nursing requires teachers with high academic competence to supervise clinical education. Thus RN/PhDs fulfill an important role, serving both as supervisors and role models for students, as well as supervisors for the nurses supervising students (studies II and IV). They are then able to convey their up-to-date knowledge of clinical care to their students. The RN/PhD can also suggest appropriate clinical topics for diploma theses and involve students in ongoing nursing care research and development projects (study II). Previous RN/PhD research has not focused on the clinical education aspect, although it has received mention in a couple of studies (ref). Therefore comparisons become difficult.

Another relevant contribution can be made by raising competence among colleagues, which entails a number of tasks, ranging from being available to answer questions and providing an orientation for new colleagues, to supervision of PhD students. The RN/PhDs also expressed the desire to inspire other RNs to pursue postgraduate studies (study II).

6.4 FACTORS PERCEIVED AS OBSTACLES

Participants in studies II and III described an array of factors posing obstacles for RN/PhDs who wish to work in and contribute to clinical care. Many such factors were structural in nature. Financial resources were cited as one obstacle that prevented managers from hiring RN/PhDs (study IV), since budgets were often insufficient to recruit and retain RN/PhDs at competitive salaries.

In addition, clinical practice and scientific research compete for time, creating an atmosphere in which the RN/PhD feels less expert in either arena than colleagues with a dedicated focus on one or the other (Study II and III), as also mentioned in other studies (Kluijtmans et al., 2017, Morel & Ross, 2014). Another issue was the lack of suitable post-PhD positions and career pathways, including the lack of a defined and specified role for RN/PhDs in clinical care. As yet, Sweden has no established tradition of RN/PhDs working in clinical care. The type of employment and specific job descriptions for RN/PhDs are both important factors when considering the potential for impact on improvement of nursing care and conducting further research. Earlier research has also addressed these same problems (Wilkes & Mohan,

2008; van Oostveen et al., 2017). At this point, there are still very few RN/PhD positions available in clinical care, with no consensus in job descriptions as to how to best use their professional competence. This situation likely has a negative impact on capacity building for educational programs, job opportunities and active participation in research and development at different levels. Other researchers have also pointed to the need for a supportive infrastructure to enable a clinical-academic pathway (Bookey-Bassett et al., 2019; Morel & Ross, 2014; Strickland, 2017; Weggemans et al., 2019).

6.5 CULTURE AND TRADITION

In all of our studies (I, II, III and IV), participants describe differences between medicine (physicians) and nursing (RNs) relating to professional culture and tradition. Culture refers to values that guide groups of people. Professional culture refers to a set of cultural values and practices incorporated into the culture of organizations, thereby differentiating the characteristics and the value systems of different professional groups. Professional tradition is a belief or behavior, originating in the past, which is shared within a group, where it has a special meaning (Bloor & Dawson, 1994).

The participants in study III point to a hierarchy between quantitative and qualitative research, in which the higher value is placed on “numbers and figures,” thereby making it easier to obtain funding for quantitative research. Both RNs and physicians believed it was easier to obtain funding and support for medical or technical projects than for nursing care or quality improvement projects. Participants in all studies (I - IV) noted group differences relating to areas of research, research methodology and knowledge concerning research, as well as conditions conducive to research. While medicine has been an established focus of research for decades, nursing is still a young research discipline. Among physicians, a PhD degree may help advance their career and may be a requirement for attaining a high-status position (Study III and IV). In contrast, the RN/PhD may have difficulty finding suitable employment in clinical practice that also takes advantage of their advanced degree (Study I, II, III and IV, Wilkes & Mohan, 2008).

Study III also showed that the pathway for RNs who wish to start a research career is longer. Whereas physicians are often able to get involved with research early in their career, RNs do not benefit from such an established tradition of continuing with postgraduate education or performing research. Many RNs began as research nurses, before finally obtaining support from a physician researcher to become a doctoral student. Consequently, RNs are usually significantly older upon finishing their PhD degree, which has implications concerning opportunities to build a research career and to become a principal researcher with opportunities to apply for and receive grants. The above observations illustrate the need for a supportive infrastructure allowing RN/PhDs to pursue a clinical academic pathway.

6.6 IMPORTANCE FOR QUALITY OF CARE

When I began my thesis work, my aspiration was to evaluate the specific contributions of RN/PhDs to quality of patient care. To correctly assess the impact of employing RN/PhDs in clinical care, their efforts need to be systematically evaluated. Today, since so few RN/PhDs are employed in clinical care, conclusive results concerning their impact are difficult to ascertain. Nevertheless, our findings suggest that the presence of RN/PhDs in clinical care may have a positive impact on both development and quality of patient care. The results from studies I, II and IV show a perception of the RN/PhD as an important resource in leading and developing EBP, in addition to providing support to other employees with their scientific knowledge. Study II indicates that RN/PhDs felt that earning their PhD degree helped them to care for patients more systematically and with a more EBP-based approach. The study IV managers felt that RN/PhDs working in a clinical field relating to their research were able to apply their specialist knowledge directly to patient care and to identify areas in need of further research and development. Their presence was felt to shorten the pathway toward implementation of new knowledge and integration into patient care.

Some prior studies also found that level of RN education (bachelor's degree or higher) (Aiken et al., 2017) as well as clinical expertise (Yakusheva, Lindrooth, & Weiss, 2014) affect patient outcome. To achieve the level of clinical expert as defined by Benner (2009), clinical experience, in addition to formal education, is necessary (Benner et al., 2009). Furthermore, RN educational level (masters/PhD) matters in terms of using research findings (Squires et al., 2011). A positive association is stated between the presence of clinicians actively involved in research and quality of care has been established (Ozdemir et al., 2015).

The presence of RN/PhDs in the clinical care setting may help to identify questions appropriate for further scientific study that emerge from that setting. The managers in study IV expressed the opinion that RN/PhDs involved in clinical care could assist in the decision-making process concerning appropriate areas of research to improve care. Overall, the study findings highlight the role of RN/PhDs as clinical specialists who promote improvement of care in the patient care setting.

6.7 METHODOLOGICAL CONSIDERATIONS AND LIMITATIONS

6.7.1 Study I

We conducted a systematic literature review. The search strategy was based on the research questions. In addition to "MeSH terms" (PubMed) and "subject terms" (Cinahl), the terms that appeared in titles and abstracts were examined to identify relevant studies. Due to lack of indexing in databases and article abstracts, it was harder to identify relevant keywords in qualitative articles (SBU, 2016), which can explain the difficulty in finding relevant hits when using MeSH terms and subject terms alone. In addition, free text searches were also

used. It may take considerable time for articles to be indexed in a database, which may be another limitation in obtaining relevant hits.

The searches resulted in only a limited number of studies for inclusion; moreover, some of the studies included relatively few informants. This can likely be attributed to the limited number of RN/PhDs working in clinical care. Because search criteria were restricted to studies published in English, cultural bias could result. In addition, no search for gray literature was conducted, which may have eliminated unpublished research.

6.7.2 Studies II-IV

Different qualitative methods were applied in the treatment of different aspects of the research questions. Studies II-IV, which are based on data from individual interviews, were conducted at university hospitals in Sweden. Participants in the three studies were as follows: study II, RN/PhDs working in clinical care; study III, both RN/PhDs and MD/PhDs working in clinical care; and study IV, RN and physician heads of wards and departments working at a university hospital. Our study focused on ascertaining how informants experienced their situation, as described in their own words, for which reason interviews were considered the most appropriate approach. Our studies aimed to elucidate participant experiences, rather than to investigate any deeper meaning of the phenomena in question (Patton, 2014).

Snowball sampling was used to recruit participants for study II, while purposive sampling was used for studies III and IV (Polit & Beck, 2016). These methods are associated with potential risk for recruitment bias (Polit & Beck, 2016), but we sought to minimize this risk by recruiting participants in studies II and III from different hospitals. In all three studies we strived to find informants with a range of experience in terms of years of practice, differences in age and sex, and coming from different clinical contexts within the hospital. Validity of findings was strengthened by involving all authors in the interview data analysis process (Elo & Kyngäs, 2008).

The concept of trustworthiness is often relevant when considering validity of knowledge in qualitative research. Trustworthiness encompasses four criteria that also have equivalents in quantitative research: transferability (external validity); confirmability (objectivity); dependability (reliability); and credibility (internal validity) (Lincoln and Guba, 1985; Nowell et al., 2017).

Transferability refers to the ability to generalize results to other contexts and settings and whether other individuals belonging to the same groups as those included in the studies might share the same experiences. Qualitative research often entails the study of small groups in which individuals share their experiences of the phenomenon under investigation. By design, the respondents in our studies differ in terms of setting, geographic location, age, sex and experience in order to include a wide range of backgrounds, views and experiences. There is

no reason to assume that the experiences of the respondents in these studies are in any way unique, for which reason they should be transferable to other Swedish contexts.

Confirmability refers to the degree to which the results are supported by the gathered data, with the understanding that the researcher has been reflective regarding his or her own values when interpreting the data. All study results were discussed within the research groups in an effort to assure confirmability of the findings. According to Lincoln and Guba (1985), confirmability is established when credibility, transferability and dependability are all achieved.

Dependability refers to the quality of the research process as a whole and to the use of appropriate research methods. Lincoln and Guba (1985) argue that the researcher should take an auditing approach to each step in the study.

Credibility concerns whether the research findings represent a credible analysis of the material and also that good research practices were employed. These two criteria are strengthened if all planning and methodological considerations in the studies have been discussed and scrutinized by researchers from different disciplines. Concerning our studies, the authors of the papers have continually discussed and audited the research process to ensure quality and transparency. Researcher triangulation was used, which means that two or more researchers independently analyze the same qualitative data set and then compare findings, a process that serves as an important check on selective perception and blind interpretive bias (Patton, 1999).

All studies are associated with shortcomings that must be taken into consideration when interpreting the specific and overall findings. Because the studies were set in Sweden, transferability of findings beyond the context of the Swedish healthcare system might be limited.

In our studies, we sought to investigate the situation for RN/PhDs who work in clinical care and are employed at university hospitals. This proved to be a challenge due to the lack of local and national records pertaining to RNs with PhD degrees. For study II and study III, we recruited RN/PhDs from several different university hospitals. Despite our efforts to identify hospitals that were as similar as possible, they did still differ in terms of parameters such as size. In study IV, we limited recruitment of managers to just one university hospital because the other hospitals had too few RN/PhDs employed in clinical care, for which reason we could not guarantee their confidentiality.

We considered interviews with RNs and physicians to be the most relevant approach, a recruitment strategy that may have resulted in bias toward RNs and physicians with a strong interest in research. Sample size for study II was 13 participants, study III 14 participants and study IV 14 participants, which may be viewed as scant. However, Malterud et al., (2016) emphasize that the strength of the information received (i.e., information power) is more important than sample size. The multidisciplinary research teams involved in the different

studies represent a strength because they bring different perspectives to the table. The study II research team consisted of registered nurses; the study III team included a registered nurse, physician, sociologist and behavioral economist.

7 IMPLICATIONS FOR CLINICAL PRACTICE

Based on the findings from studies I-IV, I suggest the following actions:

7.1 NATIONAL LEVEL

- The systems for distribution of research grants and funding should be reviewed at the national level to improve opportunities for researchers who split their time between clinical care and research.
- A national standard should be created to ensure uniformity of professional competence, job descriptions and titles for RN/PhDs who work in clinical care
- Nationally, there is a need to set targets to increase the number of RN/PhDs in clinical care (cf. USA)

7.2 REGIONAL LEVEL

- The systems for distribution of research grants and funding need to be reviewed also at the regional level to improve opportunities for researchers to divide their time between clinical care and research
- Support is needed to increase the number of combined academic/clinical positions

7.3 HOSPITAL LEVEL

- A supportive infrastructure to facilitate combining clinical care with academic duties is needed to enable clinician-scientists to pursue research
- More combined academic/clinical positions are needed for RN/PhDs to promote the exchange of knowledge between clinical practice and academia
- Good career and competence development opportunities in clinical care, encompassing the range from “novice to expert at the RN/PhD level” (career ladders), will foster opportunities to recruit and retain highly skilled RNs in the organization

7.4 CLINIC AND WARD LEVEL

- Management support relating to the workplace and organizational factors is crucial when combining research and clinical work
- There is a need for clearly defined clinical positions for RN/PhDs at clinic and ward levels, allowing full advantage to be taken of their professional competence with sufficient time also allocated for both teaching and research
- Close cooperation between managers and RN/PhDs fosters the development of EBP and clinical nursing research

7.5 ASPECTS RELEVANT FOR THE UNIVERSITY

- More combined academic/clinical positions for RN/PhDs need to be created to facilitate exchange of knowledge between academia and clinical practice and to support clinical nursing research
- More combined academic/clinical positions for RN/PhDs is needed to support and develop clinical education
- A supportive infrastructure between university and clinical care is needed to enable clinician-scientists to pursue research

8 CONCLUSIONS

- An informed approach among managers is key to safeguard the skills and expertise of RN/PhDs so as to promote good quality nursing care and EBP
- Despite a favorable attitude among managers toward RN/PhDs in clinical care, there is a lack of strategic investments and suitable positions
- There is a need for an organizational infrastructure that supports a) positions on an advanced level of nursing practice and b) a research culture that incorporates the scientific expertise of RN/PhDs
- Promote a higher level of scientific competence among RN managers to enable them to recognize and support the scientific expertise of their RN/PhD employees
- RN/PhDs with a clear job description can serve as a potent force to
 - facilitate EBP
 - improve the transfer of scientific knowledge into clinical practice
 - point out relevant research questions that address challenges emerging from clinical practice
 - conduct clinical research
 - provide clinical training and competence development among colleagues
- An increase in the number of combined academic/clinical employment opportunities for RN/PhDs can help bridge theory and practice, for the benefit of patients, nurses, students and managers

9 FUTURE PERSPECTIVE

The issues highlighted in the studies in this thesis provide information that can be used to further research aimed at advancing the role and function of RN/PhDs for the purpose of improving the quality and safety of clinical nursing care.

Given the paucity of research concerning RN/PhDs who work in clinical care, further studies are warranted. Important topics for future research regarding the influence of RN/PhDs include:

- patient safety
- quality of patient care
- implementation of EBP
- clinical nursing research
- clinical nursing education
- leadership and culture
- psychosocial work conditions
- adoption of new techniques or routines

Further investigation concerning the various aspects of combining research with clinical work is also recommended.

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