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Postgraduate nurse education and the implications for nurse and patient outcomes: A systematic review

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TITLE: Postgraduate nurse education and the implications for nurse and patient outcomes: A systematic review

ABSTRACT

Objectives: To synthesise the current evidence of the implications of postgraduate nursing qualifications on patient and nurse outcomes.

Design: A systematic review

Data Sources: Primary research findings

Review Methods: A systematic search following PRISMA guidelines and the Joanna Briggs Institute's framework was conducted. A structured and comprehensive search of three electronic databases CINAHL, MEDLINE, PsychINFO, search engine Google Scholar, and a manual-search of reference lists was undertaken. The search was limited to articles in English between 2000 and 2019. The combined search yielded 3710 records. Search records were exported to EndNote X8 and duplicates were removed. Inclusion eligibility was assessed by title, abstract and full text. All team members were involved in selecting the studies and assessing methodical quality. Discrepancies were resolved through rigorous discussion between the reviewers. Twenty studies (quantitative and qualitative) were finally selected as suitable for inclusion in the review. A qualitative descriptive synthesis was undertaken to summarise and report the findings.

Results: This systematic review has shown that the empirical evidence to date does not support nurses' perceptions of the implications of postgraduate education. The findings from this review fell into three major themes: perceived implications of postgraduate study, clinical outcomes and patient satisfaction. Nurses perceived that postgraduate qualifications had improved their knowledge and skills and thus clinical practice, patient outcomes and health services. This perception has not been borne out by measurable outcomes as yet. The literature also suggests that postgraduate education should improve career opportunities and progression for nurses. This is not supported by the nurses' perceptions in the research available to date. It should be noted that these findings predominantly came from qualitative data. A few studies did report descriptive statistical analysis: demographics, knowledge levels, qualifications etc. None conducted any inferential statistical analysis.

Conclusion: Although the literature suggests that postgraduate nursing qualifications improve outcomes for patients, the level of evidence is weak. Exploration methods are suggested to move beyond examining nurses' perceptions, to empirical measures of the value of postgraduate education on nurse and patient outcomes.

Keywords: Postgraduate nursing, master's-prepared nurse, advanced nursing practice, patient care, clinical practice, patient satisfaction, patient outcomes.

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BACKGROUND

Providing quality care is a target that healthcare organisations aim to achieve regardless of their focus and/or available resources. The World Health Organisation [WHO] (2018) considers that quality health care should be safe, effective, efficient and person-centred. Achieving such a target requires contributions from all health care professionals (Schrimmer et al., 2019) especially nurses as this cohort of clinicians represents most of the workforce (Australian Commission on Safety and Quality in Healthcare, 2010; Smiley et al., 2018). Nurses are the common link between different members of the health care team, and are subsequently responsible for the delivery and coordination of the majority of patient care (Joseph and Huber, 2015). Equipping nurses with advanced knowledge and skills will therefore enable them to effectively contribute to the patient journey and to ensure quality care is provided. Nurses' knowledge and skills can be enhanced through further education and training. A formal structured program of education can equip nurses with the skills required to provide evidence-based care that is safe, efficacious, cost effective and person-centred.

Health care organisations require evidence that postgraduate education has the potential to enhance staff satisfaction and the efficient use of organisational resources. Staff who are supported in their educational endeavours may be more likely to demonstrate long-term commitment towards their employers, thereby reducing costs of recruiting and training new staff. Retaining staff with postgraduate qualifications is more likely to result in efficient and effective day-to-day practice because of their advanced knowledge and skills (Holloway, 2017; Wong et al., 2017). An added benefit of staff retention is a more stable workforce with reduced staff turnover, enhanced mentorship opportunities and adds value in relation to familiarity and consistency of context related clinical practice, as well as an increased awareness of the organisational culture. Postgraduate education can enhance critical thinking capabilities, enabling the linking of day-to-day practice with policy development. Therefore, nurses with postgraduate qualifications have the ability to influence systems and processes, thereby improving patient outcomes (Wong et al., 2017).

A thorough search of the literature was unable to identify any systematic reviews examining the implications of nurses with postgraduate education on patient outcomes. Therefore, this systematic review addressed this gap in the literature. This systematic review examined research publications reporting the impact of postgraduate nursing qualifications on patient outcomes, as well as the benefits to organisations and advantages to the nurses themselves.

METHODS

Design

A systematic review of primary research was undertaken guided by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (Moher et al., 2009), as well as the Joanna Briggs Institute's (JBI) recommendations (Aromataris and Riitano, 2014; Peters et al., 2015).

Search Strategy

Three electronic databases CINAHL Plus with full text, MEDLINE and PsychINFO were searched for research evidence. Boolean combinations of the principle terms and keywords were applied to the search: Advanced Nursing Practice, Patient Outcomes, Nurse Outcomes and Organisational Outcomes (Table 1). Electronic search engine Google Scholar was also explored. The reference lists of the identified articles were screened for relevant references not otherwise found in the search. The search was limited to articles in English and conducted between 2000 and 2019 to reflect the advancement of postgraduate education globally from 2000.

Study selection

The selection process was divided into four stages according to Moher et al. (2009) guidelines (Figure 1). The first stage identified articles through database searching and manual searching, and relevant articles were exported to the reference manager software EndNote X8. In the second stage, all duplicated articles were removed using EndNote. Titles and abstracts of the articles were screened for eligibility. If the eligibility of any article was in doubt, it was included for full text review. In the third stage, full text assessment of each article was conducted by two reviewers independently with a third or fourth researcher to review any discrepancies. Only primary research studies including unpublished theses and government reports were considered for inclusion in this review. Studies were excluded if they did not include postgraduate prepared nurses providing patient care or included both undergraduate and postgraduate nurses without segregating the findings by type of qualification. Studies including nurse practitioners were also excluded because nurse practitioners are required to have many years of experience and extensive training as well as a master's qualification to maintain endorsement (Middleton et al., 2016). Advanced practice nurses (APN) including nurse consultants and nurse specialists, are in many countries, positions that do not necessarily stipulate a master's qualification, extensive training or credentialing. Therefore, studies which clearly identified postgraduate prepared nurse consultants or nurse specialists were included.

Quality appraisal and Data extraction

Through random allocation of articles, each team member was assigned an equal number of articles to review. The articles were reviewed using the JBI Quality Appraisal checklists for all types of research methods to assess internal and external reliability and validity (Hannes et al., 2010; Pearson et al., 2005). The JBI data extraction tool was used to extract key features and findings, including research study design, interventions, geographical and cultural setting, participants, data analysis, study results, and authors' and reviewers' conclusions. Both quality appraisal and data extraction were conducted by the review team independently and were validated by one other team member. Discrepancies were resolved through rigorous discussion between the members.

Data synthesis

Data extracted from the included articles were assembled in a spreadsheet. Meta-analysis of the data extraction could not be performed due to the heterogeneity of study designs and outcomes measured; a qualitative descriptive synthesis was undertaken to summarise and report the findings. The qualitative descriptive synthesis is an approach of handling results of different research methodologies where both qualitative and quantitative data are managed collectively (Bearman and Dawson, 2013). The review team read the extracted data independently and similar data were aggregated and coded to form themes. Several meetings were held to discuss the process of data synthesis and the identified themes.

RESULTS

Included studies

A total of 3710 records were identified from the databases and manual searches. After the removal of duplicates, title and abstract screening, 147 full text articles were assessed for eligibility. Quality assessment review resulted in the inclusion of 20 articles in the final review (Figure 1). Table 2 represents the characteristics of the 20 included studies. All included studies were conducted between 2000 and 2017. Of those 20 studies, four were conducted in the United States of America (USA), three in Australia, three in New Zealand, three in the United Kingdom (UK), and one in each of the following countries: Canada, Finland, Hong Kong, Ireland, Jordan, Scotland and Sweden. A total of 18 studies were published in academic journals, one was a government report published online (Darcy Associates, 2015), and one was an unpublished doctoral thesis (Chari, 2017). There were 12 quantitative studies which mostly involved survey questionnaires (n=10), one was a randomised controlled trial (RCT), and one

was a retrospective cohort study. The other five studies were of a qualitative design with a further three mixed-method.

Most studies had surveyed nurses who had completed master's degrees. The outcomes of studies were predominantly self-reported improvements in nursing knowledge and practice, followed by the perceived implications for clinical outcomes, patient satisfaction and health service provision. Only a few studies used validated tools to measure nurses' knowledge and quality of care, and most studies conducted applied descriptive statistics of participants' responses and thematic analysis. The summary of the findings from the individual studies are presented in Table 3. The findings identified three major outcomes: perceived implications of postgraduate study, clinical outcomes and patient satisfaction.

Theme 1:- Perceived implications of postgraduate study

This theme comprises three subthemes: 1- Knowledge and skills, 2- Employment opportunities and job satisfaction and 3- Patient care. These three subthemes were developed from evidence reported in 16 of the 20 studies which examined the impact of postgraduate degrees on the nursing profession from postgraduate nurses and/or their employer's perspective. Eight studies used survey questionnaires (Barnhill et al., 2012; Chari, 2017; Drennan, 2012; Hardwick and Jordan, 2002; Holloway, 2017; Pelletier et al., 2003; Whyte et al., 2000; Wilson and Johnson, 2015), and five used qualitative interviews (Armstrong and Adam, 2002; Cragg and Andrusyszyn, 2004; Spence, 2004; Wisur-Hokkanen et al., 2015; Zahran, 2013). Three studies employed a mixed-method design using surveys, interviews and/or focus groups, and case-studies (Darcy Associates, 2015; Wilkes and Mohan, 2008; Wong et al., 2017).

Knowledge and skills

In most of the studies participants agreed that postgraduate education improved their knowledge and skills, including the quality of nursing care they delivered (Wilson and Johnson, 2015). Participants also reported improvements in their ability to undertake technical procedures as well as the interpretation and application of results from diagnostic tests (Barnhill et al., 2012). Also reported were improvements in their ability to change practice, in communication/teamwork and problem-solving (Drennan, 2012) and research skills (Hardwick and Jordan, 2002). An increase was also noted in confidence in clinical practice, leadership, management (Holloway, 2017) and professional credibility (Whyte et al., 2000). In an Australian mixed-method study, Darcy Associates (2015) reported that both nursing staff (n= 452) and managers (n= 346) [80%-90%] held similar views of the impact of postgraduate qualifications on their own development as a practitioner including greater knowledge and skills thereby

improving their critical thinking abilities. Wong et al. (2017) reported that master's educated nurse consultants were performing at the highest level of clinical practice and were involved in complex care delivery and management processes. The findings from these surveys echoed the qualitative views where the participants reported a broader understanding of health care practice and policy issues which led to an increase in their self-confidence and professional pride (Cragg and Andrusyszyn, 2004). Postgraduate nursing students (n=12) in a qualitative study by Armstrong and Adam (2002), identified that they reflected a changed attitude to nursing with a "much wider view" of the "whole picture" (p.173) following their postgraduate education. It was also reported in this study that participants identified a gap between theoretical knowledge and clinical practice and expressed frustration in the relevance of their qualification. In contrast, master's level nurses in Zahran (2013) considered that they had a positive impact on clinical practice through the application of enhanced skills. Non-master's level nurses believed that their qualified master's-level colleagues were able to improve practice and transfer knowledge to other nurses through teaching and in-service training. Spence (2004) also reported that the nurses had a "ripple out" or "filter down" effect of their postgraduate education in workplaces which in turn contributed to the professional development of junior nurses (p.52).

In a study by Chari (2017), no significant difference in perceptions of professional practice, teamwork, communication, or problem-solving skills between master's (n=24) and non-master's (n=24) educated nurse leaders were identified. In a 10 year longitudinal study (Pelletier et al., 2003), half (n=236) of the study sample, surveyed two years after graduation, considered that postgraduate education had impacted on their professional abilities. However, 20-30% of the sample reported no impact on professional abilities, decision-making processes, communication skills or their ability to motivate patients. Two of the 13 doctoral prepared nurses in the Wilkes and Mohan (2008) study considered that having postgraduate qualifications did not make a difference to their career paths as they continued as they were prior to entering their doctoral programs.

Employment opportunities and job satisfaction

To explore areas of career opportunity, satisfaction and relevance of study to practice, Whyte et al. (2000) conducted a ten-year longitudinal investigation of local and overseas nurses (n=109) who graduated with a master's degree from the University of Edinburgh from 1986 to 1996. Fifty percent reported that they had been promoted since gaining their degree, and 96% of those stated that the postgraduate degree had been a significant factor in their promotion. It was noted in this study that the positions were mostly within the education sector.

Wilkes and Mohan (2008) indicated that employment type changed after completion of a PhD, with associated increased involvement in management and research roles. The majority (52.6% and 78.9%, n=19) of participants in the Wilkes and Mohan (2008) study reported that a PhD enhanced employment prospects and was valuable for career development, respectively. Holloway (2017) reported that most of the study participants agreed about the impact of a postgraduate degree on employability, and Wong et al. (2017) reported job satisfaction among the master's-educated nurse consultants but did not explore why this was the case.

Darcy Associates (2015) [n=798] through surveys and focus groups identified a link between staff satisfaction and benefits to health care services. Examples of these benefits included improved staff recruitment, retention, succession planning, an efficient and productive workforce, increased staff satisfaction and morale, better organisational culture and an ability to offer a broader range of services to patients. However, Darcy Associates (2015) added none of the participants were able to confirm whether health services measured the benefits gained from employing postgraduate qualified nurses. Within the context of potential benefits, Naylor et al. (2004) estimated a cost saving per patient of US\$4,845, who received APN directed transitional care compared with those who received standard care over a period of 52 weeks. Naylor et al. (2004) considered the reductions in re-hospitalisation within the first six months post discharge, a reason to accept the higher cost of home visits of the group who received APN directed transitional care.

In Hardwick and Jordan (2002), many of the participants felt that their graduate status was not valued by their employers. Darcy Associates (2015) also found that nursing staff, compared to their managers were less likely to perceive that their postgraduate qualifications were valued by their employers. Chari (2017) found no significant difference in turnover and job satisfaction amongst master's and non- master's prepared nurse leaders.

Patient care

In terms of patient care, the perception from the studies included in this review, were that postgraduate qualified nurses with enhanced knowledge and skills provide better patient care. In Wong et al. (2017) when master's-educated nurse consultants were asked to select the key indicators, which could best reflect their service outcomes, most of them selected a range of indicators. These included "client satisfaction", "symptom management", "reduced re-admission rate", "complication preventions", "breastfeeding rates", "emergency room attendance rate", "care for family caregivers", "nurse clinic attendance rate" and "waiting time

for first attendance” (p. 551). Wisur-Hokkanen et al. (2015) reported that postgraduate education encouraged the study participants to deliver deeper holistic care and took their own clinical responsibility for patients, for instance by offering patients an urgent APN consultation to prevent further deterioration whilst they were waiting for their general practitioner (GP). Elsewhere it was reported that over 95% of the nurses (n=57) agreed that postgraduate education influenced patient care, and enhanced their ability to detect changes in the patient’s condition (Barnhill et al., 2012). Whilst perceived increases in quality of care was evident, no difference in self-reported patient outcomes in terms of hospital-acquired infections and hospital re-admission rates were found between master’s and non-master’s prepared nurse leaders (Chari, 2017). The majority of the respondents (88%-94.5%, n=798) in the survey by Darcy Associates (2015) perceived that there were direct benefits for patients from having care provided by postgraduate prepared nurses. Their perceptions were revealed from the focus group participants, although they could not identify if there was any system in place by the health service to monitor the impact of a postgraduate-educated nursing workforce on patient outcomes.

Theme 2:- Clinical outcomes

Two studies reported clinical outcomes involving master’s-educated nurses in advanced care practice. In an RCT, Naylor et al. (2004) examined the effect of three-months of APN directed care (discharged management and home follow-up) for 118 older adults hospitalised with heart failure. In this intervention, an APN visited the patient within 24 hours of hospital admission, then daily during hospitalisation, followed by weekly and bimonthly visits after discharge. Additional APN visits based on patients’ needs and a seven days a week telephone service were also offered. The control group received site-specific standard care including home agency care consisting of comprehensive skilled home services seven days a week. Outcome data were collected through patient telephone interviews at up to 52 weeks after hospital discharge using standardised tools. The authors found that at 52 weeks the intervention group (n= 118) had significantly lower re-hospitalisations or deaths (47.5% vs 61.2%) and fewer re-admissions (104 vs 162) than in the control group (n= 121).

While a statistically significant greater quality of life at 12 weeks was found in the intervention group, there were no statistically significant group differences observed in the functional status scores in terms of personal and/or social dependency. The authors concluded that this APN directed transitional care was effective for improving outcomes of older adults hospitalised with heart failure. It is worth noting that the APNs in this intervention received a two-month specialised training program focusing on developing skills related to the recognition and

management of heart failure, complications and comorbid conditions with ongoing support from multidisciplinary team members. It is therefore, yet to be concluded if the master's qualification only and/or the years of experience and special training resulted in better clinical outcomes.

Wheeler (2000) examined the differences in length of hospital and rehabilitation stay and complications among patients with total knee replacement in four orthopaedic hospital units with or without clinical nurse specialists. The patients on units with clinical nurse specialists had significantly shorter total length of stay and a lower percentage of preventable complications than the patients on units without clinical nurse specialists. The authors also found that patients with clinical nurse specialists received more nursing care interventions than patients without. These frequent nursing care interventions resulted in a significantly decreased total length of stay and lower preventable complications for the first 24 hours ($r = -0.46, p < 0.001$). The clinical nurse specialists in this study were specialised in orthopaedic care and had more than ten years of work experiences as clinical nurse specialists in addition to a master's degree.

Theme 3:- Patient satisfaction

There were four studies that examined patient satisfaction with the care provided by master's educated nurses. Bergman et al. (2013) surveyed patients and legal guardians [$n=223$] (in the case of patients aged 18 or younger). The authors targeted those who received care by any of four APNs during a one-year period in comparison to GPs at five primary health clinics. Satisfaction was measured by collecting data on nine concepts including "respect, commitment, empathy, information, communication, and overall satisfaction, aspects of time, confidence, and expectations" (p. 328). Bergman et al. (2013) reported that 86.6% of the respondents were very satisfied with the APN care. This high rate of satisfaction was confirmed in the narrative feedback from respondents commenting that they felt APNs had the skills required to provide "quality care" and "felt as secure as if they had consulted a GP" (p. 330). The authors did report a statistically significant increased satisfaction ($p=0.022$) amongst those who were made aware of the involvement of APNs in care provision. This is in addition to the fact that the reliability and validity of the survey tool was unknown. This introduces an element of bias to the study due to participants' awareness of the role and the lack of reliability and validity of the survey, issues which were not addressed during data analysis. The authors admitted that due to the small number of APNs in the study, the outcomes might reflect individual differences further restricting the generalisability of results.

In a post-intervention survey of patients with depression aged 60 years or older, Saur et al. (2007) sought to evaluate patients' experiences with the care provided by a psychiatric clinical nurse specialist (PCNS) and to compare high versus low levels of satisfaction with clinical outcomes. They reported that 85%-88% (105) of the patients were highly satisfied with the care of a PCNS. Seeking future treatment with the PCNS would be a strong possibility for them as the patients considered the PCNS a "good professional nurse," "excellent therapist," and "genuinely interested and involved in my care and health improvement" (p.67). The authors identified that patients who were very satisfied with PCNS care, had significantly lower level of PHQ (Patient Health Questionnaire) scores, "greater clinical improvement" and a "greater reduction in depressive symptoms" (p.67).

An RCT compared the effectiveness of transitional care delivered by APNs to usual care in older hospitalised patients with heart failure (Naylor et al., 2004). Outcome measures included patient satisfaction, time to first re-hospitalisation, quality of life, functional status, and costs. The study identified a reduction in re-admission rates related to comorbid conditions, reduction in costs and significantly enhanced patient satisfaction with care at six-weeks with APN directed transitional care (to home) compared with patients who received usual care and standard discharge planning. The authors reported that prior testing of the survey tool for the control group determined that the "hospital experience was too far removed for accurate recall and the generation of reliable data" (p. 678). Gathering data from focus groups and interviews, Wisur-Hokkanen et al. (2015) described patient satisfaction from the APNs' perspective. Participants perceived that their patients were very satisfied with the new APN models due to improved accessibility to flexible care. The APNs also mentioned that children were less afraid of them than GPs. The APNs explained that patients (young parents with children and elders) preferred them to the GPs because of the extended time they devoted to patients, providing individualised self-care advice, in greater depth.

DISCUSSION

Nursing is an ever-evolving profession in response to the changing health care needs of the population. Nurses are required to consistently strive to maintain their currency of knowledge and practice to optimise patient outcomes (Salmond and Echevarria, 2017). Nurses and nurse managers reported improvements in knowledge and skills following postgraduate education. Importantly, the skills included higher order skills such as problem solving and critical thinking. The development of higher order skills including leadership, personal and professional growth has been supported elsewhere within master's level of education (Cotterill-Walker, 2012) and

within postgraduate education overall within Australia (Ng et al., 2016). However, these studies as well as studies included in this systematic review, were reliant on subjective self-reporting. For example, Cotterill-Walker (2012) reviewed studies based on opinions of educators who may have been biased towards the outcomes of their students. The impact of postgraduate programs has also been evaluated in other healthcare professions. In a Japanese study, improvements were reported in care delivered by physicians who had completed a recently updated postgraduate emergency course (Tokuda et al., 2012). This Japanese study was also based on a self-assessed rating and reliant on perception of clinical outcomes and not rigorously measured.

This systematic review has indicated that nurses perceived that postgraduate qualifications impacted positively on clinical outcomes although there is limited evidence to support this. Specifically, little evidence was found of tangible impacts on specific nurse sensitive outcomes including cross infection rates and hence health care costs. It has been acknowledged for some time that there is a positive impact of baccalaureate education on nurse sensitive outcomes but the evidence which supports postgraduate education in this context is sparse. For example, in a multicenter (n=21) American cross-sectional study, hospitals with a higher percentage of baccalaureate prepared registered nurses had lower rates of heart failure, mortality, pressure ulcers, failure to rescue, thromboembolic events and reduced hospital length of stay (Blegen et al., 2013). In the absence of objective measures, the impact of postgraduate qualification on skills, clinical practices, job prospects, patient care and/or health services cannot be quantified. Perceived enhancement of knowledge, and skills, or benefit to patient care and/or health services are subjective and thus do not provide evidence of the effect of postgraduate education. Recommendations for empirical studies has been made to capture tangible outcomes relating to the impact of postgraduate education on clinical outcomes (Cotterill-Walker, 2012). Given that postgraduate nurse education is undertaken globally, it is important to consider conducting inter-country studies examining the benefits of these qualifications on patient outcomes. This may pose challenges because of variations in education and healthcare systems, as well as the different pace at which postgraduate education has developed in different contexts globally. It is recommended that methods utilized in the evaluation of baccalaureate education on patient outcomes, including longitudinal and retrospective methods, should be applied to the postgraduate field. This would provide evidence of tangible outcomes rather than perception-based reports which can be subject to bias. If nurses are aware of the impact that postgraduate education has on patient outcomes, arguably this will promote the uptake of tertiary led postgraduate education programs. There is an opportunity for increased collaboration with industry and universities in

course development and delivery, to encourage nurses who may have not undertaken university education before or who were educated in a different system overseas.

This systematic review has revealed that nurses with postgraduate qualifications have better career opportunities, and therefore greater job satisfaction. Yet studies included in this review reported that nurses had an impression that their employers/ managers do not value postgraduate qualifications (Darcy Associates, 2015; Hardwick and Jordan, 2002). This impression could be due to the challenges of balancing responsibilities (work and study) as the reported impressions were about clinical manager/ employer who might have challenges in providing adequate staffing in the workplace. The reported career opportunities were mainly in the education sector where nurses were employed as researchers and nurse educators, as postgraduate education equips nurses with skills in research, problem solving and communication. The need for postgraduate education would raise a question from two perspectives; firstly, whether the clinical managers acknowledge the value of research in improving practice, and secondly, whether academic institutions equip postgraduate nurses with knowledge and skills that the clinical settings require. In addition to considering these two points, it is necessary to reiterate that evidence generated in this review relied mainly on individual perceptions. Empirical evidence is required to examine the extent to which postgraduate qualifications enhance career opportunities and job satisfaction. Generating such empirical evidence is important as postgraduate studies are currently perceived to be driving factors in developing one's career, including the ability to influence clinical outcomes (Zamanzadeh et al., 2019). Future studies will be able to verify whether improved opportunities for nurses with postgraduate qualifications is a global phenomenon. Large national cohort studies will be able to identify professional/ career changes associated with postgraduate education.

Limitations

The findings of this systematic review of the implications of postgraduate nursing qualification for nursing care and patient outcomes are important, however, there are limitations which need to be considered. A meta-analysis would have been valuable to present the combined impact of postgraduate qualifications on nursing practice, and patient outcomes. However, conducting a meta-analysis was not possible due to the fact the included studies were heterogeneous in terms of study designs, interventions, outcomes measured and data analysis. The studies also recruited postgraduate nurses at a different level of experiences

and qualifications. It would also have been useful to be able to clearly identify roles and titles internationally as title does not always indicate qualifications.

CONCLUSION

Findings of this systemic review confirm results of research in other disciplines that postgraduate education improves knowledge and skills and may improve patient outcomes. Postgraduate education programs can be considered an appropriate approach for enhancing nurses' knowledge and skills. Postgraduate education could impact on the nurses' role across the spectrum, from providing bedside care to the capacity to influence healthcare policy at the macro level. The development of higher order skills, which postgraduate education provides, can enable nurses to achieve senior positions where nurses' experiences and opinions will be taken into consideration at a policy level. Studies included in this systematic review reported personal views of benefits of postgraduate education. Therefore, perceived enhancement of knowledge, and skills, or benefit to patient care or health services are subjective and thus do not provide evidence of the effect of postgraduate education. Empirical studies are recommended to verify results of this systematic review.

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Figure 1. Study selection and search results

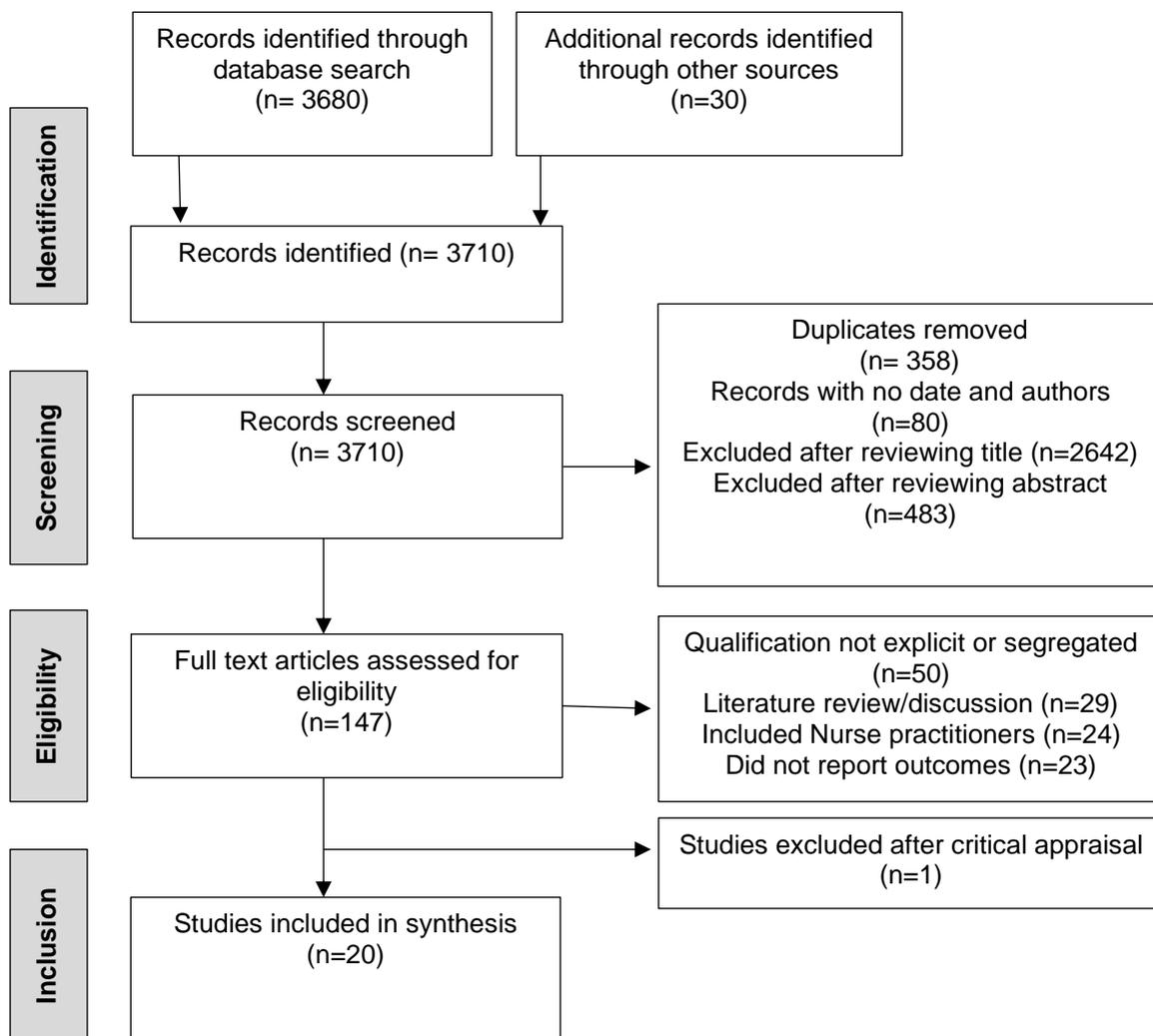


Table 1. Example of search strategy in CINAHL

- (((MH "Advanced Nursing Practice") OR (MH "Advanced Practice Nurses")) OR ("Advanced Nursing Practice") OR (Clinical Nurse)) OR (MH "Masters-Prepared Nurses") OR (MH "Doctorally Prepared Nurses") OR (MH "Education, Nursing, Masters")) OR (postgraduate nursing) OR (tertiary nurse education) OR ((MH "Education, Nursing, Doctoral")) OR ((MH "Education, Nursing, Graduate")) OR (masters prepared nurses) OR (doctorally prepared nurses) OR (post graduate nurse) AND (((MH "Hand Off (Patient Safety)") OR (MH "Patient-Reported Outcomes")) OR ((MH "Iowa Nursing Outcomes Classification") OR (MH "Nursing Outcomes")) OR ((MH "Patient Care")) OR ((MH "Patient Safety")) OR ((MH "Hospital Mortality")) OR ((MH "Adverse Health Care Event")) OR ((MH "Treatment Outcomes")) OR ((MH "Cross Infection")) OR (hospital acquired infections) OR ((MH "Accidental Falls")) OR (patient falls "in" hospital) OR (patient mortality) OR ((MH "Length of Stay")) OR (hospital acquired pneumonia) OR (average hospital length of stay) OR ((MH "Patient Satisfaction")) OR (Nurse Satisfaction) OR (Patient Satisfaction))
- Narrow by Publication Year: 1 Jan 2000- 31 Dec 2018
- Narrow by Language: English
- Search modes: Boolean/Phrase

Table 2: Characteristics of included studies

Reference, Country	Study objectives	Study design	Participants and settings	Intervention and Outcomes Measured
Armstrong and Adam (2002), UK	to explore the impact of postgraduate education on clinical nursing practice	Qualitative study using focus group	12 post graduate nursing student. In a non-threatening environment away from the clinical areas	Postgraduate critical care course. Perception on knowledge and practice.
Barnhill et al. (2012), New Zealand	to explore the impact of postgraduate education on nursing practice	Cross-sectional study using survey	82 nurses including registered nurse (n=57) who had obtained a postgraduate certificate in nursing or health science, and senior nurses (16 Nurse managers, and 9 nurse educators) working in acute medical and surgical areas.	Postgraduate qualification. Perception on their knowledge and understanding, application of knowledge, critical thinking, patient care, sharing knowledge in workplace, measured by a five-point Likert scale with 48 statements.
Bergman et al. (2013), Sweden	to explore patients' satisfaction with master educated advanced practice nurses	Cross-sectional study using survey	223 patients (age between <1 and 97) and legal guardians (in the case of patients aged 18 or younger) in five primary healthcare centres.	Master educated Advanced practice nurse-led care. Patient's perception on the concepts of respect, commitment, empathy, information, communication, overall satisfaction, aspects of time, confidence and expectations.

Table 3: Findings of studies

Outcome measured	Results	Interpretation
Theme 1:- Perceived implications of postgraduate study		
Armstrong and Adam (2002)	<p>An overarching theme emerged to describe lived experiences of the postgraduate students is becoming a specialist practitioner.</p> <ul style="list-style-type: none"> A. Becoming more expert B. Having your wings clipped C. Changing the goal posts D. Slotting back in 	<p>The results is individuals' perception, hence the impact on personal and professional benefit were not possible to measure.</p> <p>A Scotland study conducted at a single site with one group of students in a single postgraduate program, as such the results cannot be generalised across different settings.</p> <p>The data was the results of one-hour session are not compared between groups, thus results cannot guarantee external validity.</p> <p>The nurse students reported themselves, and the course teacher was one of the researchers, therefore subject to responses biased.</p>
Barnhill et al. (2012)	<p>The majority (92.6% and 80%) agreed or strongly agreed that their knowledge and understanding in nursing care had increased, and that their ability to undertake technical procedures, interpret and use results from diagnostic tests had enhanced.</p> <p>Over 90% registered and senior nurses agreed that postgraduate education impacted on patient care, and on detecting changes in patient condition.</p>	<p>A New Zealand study conducted at a single hospital between two groups: postgraduate-educated registered nurses, and senior nurses including nurse managers and educators working in medical and surgical wards.</p> <p>The sample size was small to establish generalisability.</p> <p>The registered nurses reported their own behaviour, while senior nurses reported their observations of the behaviour of the registered nurses to validate the perceptions. However, all perceptions are subjective.</p>

<p>Chari (2017)</p>	<p>No significant difference in nurse satisfaction between nurse leaders with and without postgraduate degrees.</p> <p>No significant difference in perceptions of unit efficiency between units managed by a masters-prepared nurse leader compared to a non-masters-prepared nurse leader.</p> <p>While there was no significant difference in total scores on the survey results between nurse leaders with and without graduate education ($t = -.178$, $p = NS$), nurse leaders with a graduate degree had a significantly higher score on perceived professional practice ($t = -4.07$, $df = 2$, $p = .001$), communication/teamwork ($t = -2.73$, $df = 20$, $p = .013$), and problem solving ($t = -4.93$, $df = 20$, $p = .000$) subscales than nurse leaders without a graduate degree (p.40).</p>	<p>The authors mentioned that there was a large amount of missing data for National Database of Nursing Quality Indicators, and Hospital Consumer Assessment of Healthcare Providers and Systems). Further, some of the outpatient units' data were missing while data from some of the units' data were combined with similar acute care units under one leader. These could potentially have an impact on the results.</p>
<p>Cragg and Andruszyn (2004)</p>	<p>Four main themes identified: greater breadth and depth of understanding of the health care system; higher order skills in recognition, professional relationships and research; greater self-confidence and increased pride in the nursing profession.</p>	<p>Before returning to postgraduate education respondents had worked in a wide variety of nursing positions, including critical care, community, education, and administration.</p> <p>Fifteen were employed in positions for which Masters preparation was required, and four had positions for which a Masters was preferred. Most had been hired into these positions after completing their graduate programs.</p>
<p>Darcy Associates (2015)</p>	<p>About 80%-90% nursing staff and managers had similar perceptions of the impact of postgraduate study on their own development in terms of greater knowledge and skills, improved critical thinking skills.</p> <p>About 88%-94.5% perceived that there were direct benefits for patients.</p> <p>Most health services have an ad hoc approach to realising the benefits of having a postgraduate-trained nursing and midwifery workforce.</p>	<p>The postgraduate nursing and midwifery education was a Training and development initiatives by the department of Health and Human Services, Victorian Government, Australia.</p> <p>Benefits were identified for the individual practitioner, for patients and for the health services. However, there were no examples identified of health services actively monitoring or measuring the perceived benefits to patients or health services.</p>

Drennan (2012)	<p>Overall graduates identified that they gained significantly higher scores on all three outcomes: ability to change practice ($F_{1, 124} = 25.89, P = 0.001, \eta^2 = 0.17$), communication/teamwork ability ($F_{1, 124} = 77.77, P = 0.001, g^2 = 0.39$) and problem-solving ability ($F_{1, 124} = 73.05, P = 0.001, g^2 = 0.34$.) in each strand as a consequence of their master's programme.</p> <p>The most substantial gains were made in the area of communication and teamwork and problem-solving abilities.</p>	<p>Data collection relied on student self-reports of outcomes and change.</p> <p>In this study the graduates answered the same questions on their leadership and management skills twice on post-master-qualification and pre-master-qualification in a single occasion.</p> <p>As the authors found that this method could affect the validity of the findings including: social desirable responding and respondents difficulty in recalling their skills at the beginning of their master program.</p>
Hardwick and Jordan (2002)	<p>Eleven master-educated respondents were nurse lecturers. They reported using their new knowledge in the workplace.</p> <p>The most commonly cited example of skills used in practice was 'research skills'.</p> <p>One felt that, although she had not personally encountered resentment, some colleagues in the clinical area thought that undertaking a degree was a 'waste of time'.</p> <p>Lecturers were uncertain as to the value placed on their degree by managers, and commented that, apart from the fact that a degree was a requirement for working in higher education, they were unsure whether their graduate status was valued in any other way. Clinicians were ambivalent regarding managerial support.</p>	<p>The results from descriptive statistics were mostly aggregated for both master and bachelor educated participants.</p> <p>In the absence of any clinical cases, it was hard to elicit clinical instances of application of Master's course knowledge in clinical practice.</p>
Holloway (2017)	<p>The majority of the respondents ($n=17$) reported improved skills, improved knowledge and employability ($n=18$), adaptability and leadership and management ($n=16$).</p> <p>They also thought their postgraduate studies impacted on increasing confidence in their personal practice, clinical practice; and developing their care pathways and implementation of clinical guidelines and therefore cost savings.</p>	<p>The findings are from a small sample of self-selected respondents.</p>

Pelletier et al. (2003)	<p>Over 20% reported that postgraduate education had had a significant impact on all of the items in the questionnaire, and 50% had increased professional behaviour/abilities while about 20% had no impact on their abilities/skills.</p> <p>Twenty-eight percent had improved communication with patients and families and capacity to support patients in the decision making process, while 20% had no effect on communication and decision making process.</p> <p>Thirty-three percent reported that postgraduate education had no effect on motivating patient, while 57% reported having an increased effect.</p>	<p>The survey questionnaire had not been validated.</p> <p>All of the items in the questionnaire were skills or behaviours related rather than quality of care.</p> <p>The graduates completed questionnaire A upon graduation, and then completed a different questionnaire B two years thereafter.</p> <p>The findings are the opinion of reflective practitioners.</p> <p>Many respondents did not remain in the nursing workforce, and were working in roles such as management, educational and computing graduates.</p>
Spence (2004)	<p>Themes identified: 'enhancing clinical practice', 'thinking differently', 'advancing the profession and 'getting to the next notch'.</p> <p>The nurses perceived that the postgraduate education helped to promote and advance their profession, as well as had a "ripple out" or "filter down" effect of their postgraduate education in workplaces in terms of contributing to the development of those nurses with less experience (p.52).</p>	<p>Small sample size (n=12).</p> <p>Findings are self-reported.</p>
Whyte et al. (2000)	<p>Ninety-two percent had returned to posts in nursing on completion of their MSc degrees. Fifty percent had been promoted since gaining the MSc. Ninety-six percent of those in promoted posts stated that the possession of an MSc had been a significant factor in their promotion.</p> <p>Seventeen percent indicated that the degree had improved credibility and professional standing within nursing and among other health care professionals.</p>	<p>Ten-year follow-up of students on a Master programme in a single university in Scotland.</p> <p>Self-reported questionnaire was peer reviewed but not tested for validity and reliability.</p> <p>Nurses' previous skills and experiences were not identified.</p> <p>Nurses' skill gained in ten years were not considered.</p>
Wilkes et al. (2008)	<p>A slight change after graduation with some increased involvement in management (10.5% vs 26.3%) and research roles (15.8% vs 31.5%).</p> <p>The majority of the respondents however had maintained their clinical positions (26.3% vs 21.1%).</p> <p>PhD helped in improving employment aspects (n=52.6%) and was valuable for their career (n=78.9%).</p> <p>About 84% thought that PhD valued to</p>	<p>PhD nurses were identified through student databases from Australian universities.</p> <p>The validity and reliability of the questionnaire was unknown.</p>

	<p>improve patient management and care. Two participants did not experience personal growth during their degree and remained the same as when they entered the program. Some nurses reported that the topic of their PhD was not directly relevant to their clinical area.</p>	
Wilson and Johnson (2015)	<p>Nearly 53% reported positive gains in confidence and self-efficacy. About 66% rated application of evidence-based practice and quality of nursing care as the two factors most greatly influenced on their service. About 76% reported improvements in team role and communication and collegial support and teaching.</p>	<p>A longitudinal survey was conducted over 5 years from 2005 to 2009 in New Zealand. The selection criteria of the survey respondents were unknown. It was unknown when the respondents were enrolled in the programme, when they obtained the postgraduate qualifications and what they were basing their comments on.</p>
Wisur-Hokkanen et al. (2015)	<p>Three major categories identified. Promoting factors in the development of APN practice: an identity as a nurse with advanced competency; feedback from satisfied patients; fruitful teamwork is a necessity. The substance of APN: a broader and deeper holistic view of patients' state of health; an independent and responsible manner of working; knowing my own limits. Inhibitive factors in the development of APN practice: lack of understanding for APN practice; poor planning leads to unsatisfactory APN models; lack of courage in adopting the new APN role.</p>	<p>Eight focus group interviews with 22 APN and interviews with another two APNs in Finland. Findings are self-reported.</p>
Wong et. al. (2017)	<p>Three areas identified: impact on patients, impact on the organization and impact on the nursing profession. When asked which measures could best reflect their service outcomes the Nurse Consultants indicated client satisfaction, symptom management, reduced readmission rates, prevention of complications, specialty-specific indicators (e.g., breastfeeding rates), emergency room attendance, care for family caregivers, and level of activities of daily living as key indicators.</p>	<p>Small sample size (n=7). The respondents had an average of 21 years of specialty experience and had been Nurse Consultants for an average of 1.6 years. The connection between the respondents' postgraduate education and their expected role competencies is unclear.</p>

Zahran (2013)	<p>Four main themes: self-development; broadening career opportunities; developing practice; and the perceived impact of Master's level nurses on practice.</p> <p>The majority stated that a Master qualification equipped them with specialised skills and knowledge, fostered personal change and the development of certain positive characteristics, ability to work independently and establish collaborative relationships,</p> <p>One physician considered that the clinical knowledge of M-level nurses, their knowledge of diseases, and their knowledge of patient care enabled them to assess different clinical situations and arrive at an appropriate therapeutic decision.</p> <p>Some thought that a Master degree had no practice value as they perceived that all nurses performed the same tasks regardless of their qualifications.</p>	<p>A qualitative study in Jordan. Perceived impact on clinical practice could not be quantified.</p> <p>The findings did not identify the potential impact of postgraduate level nurses on clinical practice.</p>
Naylor et al. (2004)	<p>Mean 52-week total costs adjusted for unequal follow-up were \$7,636 for the intervention group, compared with \$12,481 for the control group.</p> <p>Estimated mean cost savings of \$4,845 per patient (nonparametric bootstrapped 95% CI of true difference in mean lower mean total costs (\$7,636 vs \$12,481, P=.002).</p>	<p>The master prepared nurses had general expertise in the management of heart failure conditions.</p> <p>The nurses further received 2 month training focusing on developing their competencies in early recognition and treatment of acute episodes of heart failure in this population.</p> <p>Intervention group had more home visit after hospital discharge.</p>
Theme 2:- Clinical outcomes		
Naylor et al. (2004)	<p>Rehospitalisation or deaths at 52 weeks were lower in the intervention group (56/118 (47.5%) vs 74/121 (61.2%), adjusted P =.01).</p> <p>Time to first readmission or death was longer in intervention patients (log rank $\chi^2=5.0$, P=.026).</p> <p>The intervention group had greater overall quality of life at 12 weeks (P<.05) and in the physical dimension at 2 weeks (P<.01) and 12 weeks (P<.05).</p> <p>No statistical differences in functional status between groups.</p>	<p>The master prepared nurses had general expertise in the management of heart failure conditions.</p> <p>The nurses further received 2 month training focusing on developing their competencies in early recognition and treatment of acute episodes of heart failure in this population.</p> <p>Intervention group had more home visit after hospital discharge.</p>

Wheeler (2000)	<p>Patients on units with CNSs had an overall shorter total LOS than patients on units without CNSs (ANCOVA 20.60, $p=.001$).</p> <p>There was a lower percentage of preventable complications on the units with CNSs (9%) than on units without CNSs (26%).</p> <p>There were higher nursing interventions performed on units with CNSs versus units without CNSs. The total nursing care interventions performed to prevent complications for the first 24 hours were associated with a decreased total LOS ($r = -0.46$, $p < 0.001$).</p>	<p>Patients on units with CNSs received more nursing care interventions more frequently than patients on units without CNSs.</p> <p>The CNSs were master prepared, but their qualification were not linked to patient outcomes.</p>
Theme 3:- Patient satisfaction		
Bergman et al. (2013)	<p>Most respondents were satisfied with the care offered by APNs (mean total satisfaction score of 35.7), and 86.6% of the respondents were very satisfied.</p> <p>Those who had been informed of the role of APNs as new professional caregivers were significantly more satisfied, as evidenced in ($P = 0.022$) and ($P = 0.004$).</p> <p>The respondents felt APNs possessed the competence needed to provide quality care. Respondents reported that although an APN was able to provide a diagnosis and ordain treatment, the approval of a GP was needed in all instances involving the prescription of medication.</p>	<p>Small sample size ($n= 4$).</p> <p>The reliability and validity of the survey tool was unknown.</p> <p>Some patients were aware of the role of APN as new professional practitioners.</p>
Naylor et al. (2004)	<p>Satisfaction with care was greater in intervention patients at two (mean= 83.0), and six (mean=83.1) weeks ($P<.001$).</p>	<p>The patient satisfaction tool was developed and tested by the investigators. No further details were given on reliability and validity.</p>
Saur et al. (2007)	<p>A majority of patients (78%) perceived PCNS care as excellent.</p> <p>Patients (88%) were highly satisfied with the relationship with the PCNS, would seek future treatment with the PCNS (85%).</p> <p>Patients who were very satisfied with care, had significantly lower PHQ-9 scores ($t[1]=-2.208$), had a greater clinical improvement ($t[1]=2.174$), and a greater reduction in depressive symptoms $t[1]=3.538$).</p> <p>General descriptors of the PCNSs included “good professional nurse,” “excellent therapist,” and “genuinely interested and involved in my care and health improvement.”</p>	<p>Small sample size.</p> <p>Only one nurse working in a single health service.</p> <p>The master educated PCNS were also certified by the American Nurses Credentialing Centre (ANCC) as a nurse psychotherapist which required years of previous experiences.</p>

<p>Wisur-Hokkanen et al. (2015)</p>	<p>The participants reported asking for feedback from satisfied patients. Many of them mentioned that their patients were very satisfied because the new APN models improved accessibility to flexible care.</p>	<p>Eight focus group interviews with 22 APN and interviews with another two APNs in Finland. Patient satisfaction are self-reported by the nurses, and therefore are not evident based.</p>
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