ORIGINAL RESEARCH

A lack of allocated research time challenges the extent of the implementation of evidence-based practice - A three-year retrospective follow-up cohort study of Master of Science in Nursing graduates

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ABSTRACT

Objective: To describe and compare the development of Master of Science in Nursing graduates' research utilization and improvement of knowledge, one to three years after graduation, and to describe their beliefs, abilities and implementation regarding evidence-based practice in the workplace.

Methods: Sixty-five Master of Science in Nursing (MSN) graduates, associated with an academic cohort, were invited to participate in a three-year retrospective follow-up study. Forty-five MSN graduates replied, providing a response rate of 69.23%. A questionnaire of four areas, consisting of the customary cohort questionnaire combined with the EBP Belief scale and the EBP Implementation scale, was sent to the participants using SurveyMonkey ®.

Results: An overall increased development in MSN graduates' research utilization and knowledge improvement in all parameters was found from one to three years after graduation, along with greater knowledge of, and a stronger belief in the value of, evidence-based practice. However, a strong decrease in allocated time for research was found, leading to a very limited implementation of evidence-based practice by the MSN graduates.

Conclusions: The study ends with a question about whether time is still an issue – even for academic nurses, who are educated and employed to implement evidence-based practice. If the barriers to nursing research are not taken seriously by nursing management then the extent of implementation of evidence-based practice and the improvement of quality in patient care and trajectories will continue to be very limited.

Key Words: Academic nurses, Belief, Evidence-based practice, Implementation, Master of science in nursing, time

1. INTRODUCTION

In recent decades, many nurses have studied at the Master's and Doctorate levels in order to improve clinical nursing care and nursing practice,[1,2] to gain increased professional confidence, personal and professional growth, and to improve their knowledge regarding clinical decision-making.[3] Studies show how patient mortality[4] and patient outcomes[3] correlate with the educational level of nurses. Furthermore, nurses who follow a MSN degree program learn about research methodology, which improves their research knowledge and their competencies to utilize research and implement evidence-based practice.[5] Nurses are often crit-

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icized for their synonymous use of research utilization and evidence-based practice.[6,7] According to Hulme,[6] the two approaches differ and are two different ways of working. Research utilization is the mere use of research methods to develop and implement research results.[6] Evidence-based practice has been described in the context of medicine as the collection and integration of the most valid research-based, clinically observed, and patient-reported evidence.[8] Rycroft-Malone and colleagues[9] expanded the concept of evidence-based practice in nursing by adding knowledge from the local context on a micro (individual), meso (team within the department), and macro (hospital) level. Research utilization is therefore only a part of evidence-based practice – the research-based practice.

Implementation of evidence-based practice is described as the uptake of the most valid knowledge from research, clinical experience, and patients' preferences into routine practice to improve quality of patient care.[9] To strengthen the implementation procedure several strategies and models have been developed concerning nursing.[10] Amongst these are the Stetler-model for applying research findings into practice, where six phases guides the researchers from considering the use of findings to evaluation of actual use in practice,[11] and the PARiSH model in which building bridges between innovation and the implementation context is of key relevance and focus.[12] The implementation process does however also require an interest and motivation[13] and knowledge on research[14,15] from the clinical nurses. Also the research findings needs to be applicable to implementation, which Hallberg[16] describes through the concept of translational research, where research needs to be translated to direct use in patient care in clinical practice. Despite the increased need for evidence-based practice, the implementation process by healthcare providers has been slow and inconsistent due to many barriers of a personal and organizational character.[17] The barriers vary between clinical nurses and academic nurses. Barriers such as lack of academic role models,[18] lack of support from the management,[19] and colleagues,[14] and lack of knowledge,[13,14] are predominantly for clinical nurses. The barriers for academic nurses are battling the "anti-academic" nursing culture[18] and acceptance from medical doctors.[15] The barrier of lack of time seems to be a mutual barrier across educational levels for nurses[15,18] and is found to be the most consistent number one barrier to research utilization in recent decades.[20]

The objective of this three-year retrospective follow-up cohort study was to investigate whether the MSN graduates had developed their research knowledge and competencies one to three years after graduation and whether they actually used this knowledge to implement evidence-based practice.

The aim of the study was to describe and compare the development of MSN graduates' research utilization and improvement of knowledge, one to three years after graduation, and to describe their beliefs, abilities and implementation regarding evidence-based practice in the workplace.

Three research questions were developed to investigate the study aim:

-How have the MSN graduates developed their research utilization and improvement of knowledge one to three years after graduation?

-How do the MSN graduates describe their belief regarding evidence-based practice and their ability to implement it?

-To what extent do MSN graduates implement evidence-based practice in the workplace?

2. METHODS

2.1 Design

This study presents a three-year retrospective follow-up cohort study of MSN graduates from a Danish university.[21] The cohort design was appropriate for measuring the MSN graduates' progress of development over time[22] and for exploring their use of research knowledge to implement evidence-based practice.

2.2 Participants and settings

Participants for this study consisted of 65 MSN graduates, who had previously participated in the cohort study six and 12 months after their graduation.[21] The participating MSN nurses had graduated from a Danish university and they lived and worked on the three main islands of Denmark: Zealand, Funen and Jutland. The participants were invited by email to participate in the three-year follow-up and were simultaneously offered a copy of the published articles of the prior cohort results.[21,23] Blind carbon copy was used to support the participants' anonymity in the emails. Completion of the questionnaire was considered to mean consent to participate.

2.3 Data collection

Data were collected through a questionnaire in January of 2020 using SurveyMonkey®. The questionnaire was first sent electronically to all 65 participating cohort-members. Gentle reminders were posted after one and two weeks, respectively, from the original date of submission.

2.3.1 *The questionnaire*

The questionnaire for the three-year retrospective follow-up cohort study consisted of a combination of the purposive-constructed questionnaire from the cohort study[21] supplemented with the EBP (evidence-based practice) Belief scale and the EBP Implementation scale.[17]

2.3.2 *The cohort questionnaire*

The purposive-constructed questionnaire from the cohort study[21] was originally developed for a cross-sectional study investigating MSN students' expectations regarding participation in nursing research-related tasks in daily clinical practice after completion of their education.[24] The questionnaire was based on a combination of items from six published questionnaires.[25–30] The identification of the six questionnaires was based on a systematic literature search, where eligible questionnaires were assessed for content and construct validity and the specific items were selected after a critical discussion among the authors.[24] Modifications of the questionnaire were made for the first cohort study,[21] where questions on the students' expectations regarding opportunities for research utilization[29] and motivation for research collaboration[30] were omitted.[21] Minor corrections were made for the current follow-up study questionnaire to avoid superfluous questions, hence Drennan's[25] measurement of the nurses' professional qualifications was omitted. The cohort questionnaire for the three-year retrospective follow-up study therefore consisted of nine items from three previously published questionnaires[26–28] to describe and compare the development of MSN graduates' research utilization and improvement of knowledge:

-Seven items were included from the 59-item instrument developed to investigate clinical nurses' research capacity by Akerjordet and colleagues,[26] covering work setting, employment position, weekly working hours, utilization of research in clinical practice, improvements in research knowledge, and time spent on research in clinical practice.

-One item was included from the 24-item questionnaire developed to investigate orthopedic nurses' attitudes towards clinical nursing research by Berthelsen and Hølge-Hazelton,[27] covering utilization of research in the workplace.

-One item was included from the 11-item questionnaire developed to investigate research utilization and research-related activities of nurses by Parahoo,[28] covering current participation in research projects in clinical practice.

2.3.3 *The evidence-based practice questionnaires*

Two additional questionnaires, the EBP Belief scale and the EBP Implementation scale,[17] were included for the three-year retrospective follow-up cohort study to describe the MSN graduates' confidence in, abilities to, and extent of implementation of evidence-based practice in the workplace. Melnyk and colleagues[17] define evidence-based practice as "a problem-solving approach to the delivery of care that incorporates the best evidence from well-designed studies in combination with a clinician's expertise and patients' preferences within a context of caring". The scales were developed to investigate the extent of healthcare providers' use of evidence-based practice in clinical settings.

-The EBP Belief scale proposed to measure healthcare providers' beliefs in the value of evidence-based practice and confidence in their ability to implement it.[17] The scale consists of 16 items with responses on a five-point Likert-scale from 1 (strongly disagree) to 5 (strongly agree). The two last items consist of a reversed score based on a negative phrase. Inspired by the study of Stokke and colleagues[31] the scale was divided into four subscales: (1) knowledge beliefs, (2) value beliefs, (3) resource beliefs, and (4) time and difficulty beliefs. All 16 items were included in the follow-up questionnaire.

-The EBP Implementation scale was designed to measure the extent of healthcare providers' implementation of evidence-based practice.[17] The scale consists of 18 items with a 5-point frequency scale indicating how many times the respondent has performed the item in the last eight weeks. The scale ranges from 0 meaning "0 times" to 4, meaning ">8 times". All 18 items were included in the follow-up questionnaire.

Cronbach alpha reliability coefficients of the scales were .90 (EBP Belief Scale) and .96 (EBP Implementation Scale).[17]

2.3.4 *The final questionnaire for the three-year retrospective follow-up cohort study*

The final questionnaire consisted of four areas and took, on average, 10 minutes to complete:

1) Demographic characteristics of the participants:

The demographic data of the participating MSN graduates, consisting of age, number of years qualified as a nurse, and number of years of experience in clinical practice. Characteristics also covered the participants' place and position of employment, and their working hours per week.[26]

2) Research utilization and improvement of knowledge:

The second theme covered the MSN graduates' utilization of research,[26,27] their participation in research projects,[28] weekly time spent on research,[26] and their improvements in research knowledge.[26]

3) Beliefs relating to evidence-based practice and abilities to implement it in the workplace:

The third theme covered the MSN graduates' beliefs about the value of evidence-based practice and their confidence in being able to implement it in the workplace based on the EBP Belief Scale.[17]

4) Extent of implementation of evidence-based practice in the workplace. The fourth theme covered the extent to which the MSN graduates had implemented evidence-based practice in the workplace, based on the EBP Implementation Scale.[17]

The last question gave the participants an opportunity to describe concrete examples of implementing evidence-based

practice in the workplace.

2.4 Data analysis

Descriptive statistics using IBM SPSS version 25.0 were applied and the results are presented as numbers and percentages. A quantitative content analysis[22] was performed to describe the MSN graduates' statements in the open-ended questions of the questionnaire.

2.5 Ethical considerations

The three-year retrospective follow-up cohort study was approved by The Danish Data Protection Agency (J. nr. 2016-051-000001/1694) and required no further approval from scientific or ethics committees. The participating MSN graduates were informed in writing, in the invitation sent by e-mail, about their ethical and judicial rights. They were also informed that the completed questionnaire would be considered to mean consent to participate.

3. RESULTS

Of the 65 MSN graduates, 31 completed the questionnaire after the first survey round. A gentle reminder was sent to those who had not replied, one and two weeks after the initial invitation, which resulted in an additional 14 MSN graduates completing the questionnaire after one (N = 8) and two weeks (N = 6) respectively. Forty-five MSN graduates completed the questionnaire, giving a response rate of 69.23%.

3.1 Characteristics of the participants

The majority of the MSN graduates were ages 30-39 (59.9%), 26.7% were 40-49, and 6.7% were over 55 years of age (see Table 1).

As shown in Table 1, half of the MSN graduates (48.9%) had completed their nursing training 0 to 9 years previously, while 33.3% had completed their training 10 to 19 years previously. Only a small proportion (2.2%) had completed their training more than 30 years previously. The majority of MSN graduates (55.6%) had worked in clinical practice for 0 to 9 years and 33.3% for 10 to 19 years. None of the MSN graduates had worked in clinical practice for more than 30 years (see Table 1).

The largest differences in employment settings were a decrease in 31.9% in hospital employment from one year after graduation (81.9%) and three years after graduation (50.0%) (see Table 2).

An increase of 9.9% was found in MSN graduates' employment in educational institutions. One-fourth (21.4%) of MSN graduates reported other employment settings, such as hospices, clinical research units, and regional and municipal settings. The largest decrease in positions of employment was in the research and development area, from 59.2% to 22.7% (-36.5%). However, 40.5% of the MSN graduates reported being employed in other positions closely related to research and development, such as PhD students (15.9%), specialist nurses (6.8%), and clinical educators (6.8%). No large differences were detected in the MSN graduates' full-time working hours (-0.7%). However, a small increase was found in MSN graduates working 30 to 35 hours per week (+6.7%) and a small decrease in part-time positions with less than 29 hours per week (-6.1%) (see Table 2).

Table 1. Characteristics of the participating MSN graduates

	3 years after graduation (N = 45)
Age	
30-34 years	14 (31.1%)
35-39 years	13 (28.8%)
40-44 years	8 (17.8%)
45-49 years	4 (8.9%)
50-54 years	3 (6.7%)
>55 years	3 (6.7%)
Years as qualified nurse	
0-9 years	22 (48.9%)
10-19 years	15 (33.3%)
20-29 years	7 (15.6%)
>30 years	1 (2.2%)
Years in clinical practice	
0-9 years	25 (55.6%)
10-19 years	15 (33.3%)
20-29 years	5 (11.1%)
>30 years	0 (0.0%)

3.2 Research utilization and improvement of knowledge

The MSN graduates had improved their utilization of the majority of their research activities from one to three years after graduation (see Table 3).

An increase was found in the majority of the MSN graduates' utilization of research. The largest increase was found in using qualitative methods and analysis (+20.2%), designing projects from own ideas (+19.6%), conducting presentations using power points (+17.3%), using statistical methods (+16.6%), and applying for research funding (+11.3%). However, the MSN graduates also increased their usage and abilities to getting ideas for new projects (+8.9%), searching for literature in databases (+8.6%), performing projects from own ideas (+7.5%), project management (+5.2%), and a smaller increase was found in understanding and evaluating English research papers (+1.1%) and developing clinical guidelines (+0.2%) (see Table 3).

Table 2. The MSN graduates' employment and working hours

	1 year after graduation	3 years after graduation	Difference (- %)	(+ %)
Place of employment (setting)	**(N = 33)**	**(N = 42)**		
Community care	2 (6.0%)	4 (9.5%)		+3.5%
Hospital care	27 (81.9%)	21 (50.0%)	-31.9%	
Educational institution	3 (9.1%)	8 (19.0%)		+9.9%
Private care	1 (3.0%)	0 (0%)	-3.0%	
Other	-	9 (21.4%)	-	
Position of employment	**(N = 27)**	**(N = 44)**		
Management	1 (3.7%)	2 (4.5%)		+0.8%
Research/development	16 (59.2%)	10 (22.7%)	-36.5%	
Staff nurse	6 (22.2%)	9 (20.5%)	-1.7%	
Teaching	4 (14.8%)	6 (13.6%)	-1.2%	
Other	-	17 (40.5%)	-	
Working hours (per week)	**(N = 47)**	**(N = 41)**		
Full-time (37 hours)	37 (78.7%)	32 (78.0%)	-0.7%	
Part-time (30-35 hours)	6 (12.8%)	8 (19.5%)		+6.7%
Part-time (< 29 hours)	4 (8.5%)	1 (2.4%)	-6.1%	

Table 3. The development of the MSN graduates' utilization of research (multiple answers given)

	1 year after graduation (N = 49)	3 years after graduation (N = 43)	Difference	
			(- %)	(+ %)
Getting ideas for new projects	23 (46.9%)	24 (55.8%)		+8.9%
Designing projects from own ideas	13 (26.5%)	20 (46.1%)		+19.6%
Performing projects from own ideas	18 (36.7%)	19 (44.2%)		+7.5%
Using qualitative methods and analysis	22 (44.9%)	28 (65.1%)		+20.2%
Using statistical analysis	8 (16.3%)	14 (32.6%)		+16.6%
Searching for literature in databases (PubMed, CINAHL mm)	22 (44.9%)	23 (53.5%)		+8.6%
Can understand and evaluate Danish research papers	19 (38.8%)	13 (30.2%)	-8.6%	
Can understand and evaluate English research papers	20 (40.8%)	18 (41.9%)		+1.1%
Developing posters	11 (22.5%)	9 (20.9%)	-1.6%	
Conducting presentations using PowerPoint	20 (40.8%)	25 (58.1%)		+17.3%
Writing professional papers	13 (26.5%)	9 (20.9%)	-5.6%	
Writing scientific papers	13 (26.5%)	11 (25.6%)	-0.9%	
Applying for research funding	7 (14.3%)	11 (25.6%)		+11.3%
Project management	10 (20.4%)	11 (25.6%)		+5.2%
Developing clinical guidelines	9 (18.4%)	8 (18.6%)		+0.2%

A decrease in the MSN graduates' utilization of research was found in understanding and evaluating Danish research papers (-8.6%), writing professional papers (-5.6%), developing posters (-1.6%), and writing scientific papers (-0.9%) (see Table 3).

An increase was also found in all items of the MSN graduates' participation in research projects (see Table 4).

Three years after graduation 46.2% of the MSN graduates participated in a research project, giving an increase of 21.8%. A further increase was found in the MSN graduates developing (+18.1%), executing (+21.8%), and presenting (+7.8%) a project (see Table 4).

Significant changes were found in the MSN graduates' weekly time spent on research from one to three years after graduation (see Table 5).

Table 4. The MSN graduates' participation in research projects (multiple answers given)

	1 year after graduation (N = 49)	3 years after graduation (N = 39)	Difference	
			(- %)	(+ %)
No	30 (61.2%)	21 (53.8%)	-7.4%	
Yes	12 (24.4%)	18 (46.2%)		+21.8%
I am participating in developing a project	10 (20.4%)	15 (38.5%)		+18.1%
I am participating in executing a project	12 (24.4%)	18 (46.2%)		+21.8%
I am participating in presenting a project	10 (20.4%)	11 (28.2%)		+7.8%

Table 5. Weekly time spent on research

Hours spent on research per week	1 year after graduation (N = 41 (%))	3 years after graduation (N = 35 (%))	Difference	
			(- %)	(+ %)
0 hours	6 (19.4%)	8 (22.9%)		+3.5%
1-5 hours	12 (29.3%)	18 (51.4%)		+22.1%
6-10 hours	12 (29.3%)	3 (8.6%)	-20.7%	
11-15 hours	4 (9.8%)	2 (5.7%)	-4.1%	
16-20 hours	4 (9.8%)	3 (8.6%)	-1.2%	
>21 hours	3 (7.3%)	7 (20.0%)		+12.7%

The MSN graduates had less allocated time for research, from one to three years after graduation, where 74.3% spent less than five hours per week on research, which was an increase of 25.6%. This essentially means that more MSN graduates spent fewer hours on research three years after graduation. However, an increase in 12.7% was detected in MSN graduates spending 21 hours per week or more on research (see Table 5).

An overall increase was found in the MSN graduates' work in improving their research knowledge (Table 6). An improvement was found in the MSN graduates' research knowledge in design (+4.5%), theory of science (+9.3%), qualitative methods (+7.9%), and analysis (+5.2%), and the largest increase was in learning about quantitative methods (+17.5%) and statistics (+16.8%) (see Table 6).

Table 6. The MSN graduates' improvement of research knowledge (multiple answers given)

	1 year after graduation (N = 49 (%))	3 years after graduation (N = 37 (%))	Difference	
			(- %)	(+ %)
Designs	15 (30.6%)	13 (35.1%)		+4.5%
Theory of science	10 (20.4%)	11 (29.7%)		+9.3%
Qualitative methods	20 (40.8%)	18 (48.7%)		+7.9%
Qualitative analysis	20 (40.8%)	17 (46.0%)		+5.2%
Quantitative methods	6 (12.2%)	11 (29.7%)		+17.5%
Statistical analysis	5 (10.2%)	10 (27.0%)		+16.8%

3.3 Beliefs relating to evidence-based practice and ability to implement it

Thirty-five MSN graduates answered this theme and the average total score was 58.0, median 59.0, and range 48-72 (possible scores 16 to 80). The majority of the MSN graduates (83.4%) scored highest in belief in the value of evidence-based practice; overall, the MSN graduates had a strong belief in the value of evidence-based practice and their ability to implement it (see Table 7).

A total of 94.3% of the MSN graduates agreed or strongly agreed that critically appraising evidence is an important step in the evidence-based practice process. 88.6% agreed or strongly agreed that evidence-based guidelines can improve clinical care and that implementation of evidence-based practice will improve the care they deliver to their patients; 85.7% agreed or strongly agreed that evidence-based practice results in the best clinical care for patients. The lowest scores were seen in the MSN graduates' belief in their abilities to ac-

cess the best resources in order to implement evidence-based practice (37.1%) and only one (2.8%) MSN graduate agreed or strongly agreed that evidence-based practice takes too much time. However, 74.3% of the MSN graduates agreed or strongly agreed that evidence-based practice is difficult (see Table 7).

Table 7. Beliefs relating to evidence-based practice (EBP) and ability to implement it

	Mean average score	Strongly agree or agree (N = 35 (%))
1) Knowledge beliefs		**(60.6%)**
I am clear about the steps of EBP	3.57	23 (65.7%)
I am sure that I can implement EBP	3.80	26 (74.3%)
I am sure about how to measure the outcomes of clinical care	3.34	18 (51.4%)
I know how to implement EBP sufficiently to make changes in practice	3.54	19 (54.3%)
I am confident in my ability to implement EBP where I work	3.60	20 (57.1%)
2) Value beliefs		**(83.4%)**
I believe that EBP results in the best clinical care for patients	4.11	30 (85.7%)
I believe that critically appraising evidence is an important step in the EBP process	4.40	33 (94.3%)
I am sure that evidence-based guidelines can improve clinical care	4.20	31 (88.6%)
I am sure that implementing EBP will improve the care that I deliver to my patients	4.03	31 (88.6%)
I believe the care that I deliver is evidence based	3.57	21 (60.0%)
3) Resource beliefs		**(57.8%)**
I believe that I can search for the best evidence to answer clinical questions in a time efficient way	3.60	20 (57.1%)
I believe that I can overcome barriers to implementing EBP	3.77	27 (77.1%)
I am sure that I can implement EBP in an efficient way	3.49	21 (60.0%)
I am sure that I can access the best resources in order to implement EBP	3.26	13 (37.1%)
4) Time and difficulties beliefs		**38.6%**
I believe that EBP takes too much time (reverse scored)	2.06	1 (2.8%)
I believe EBP is difficult (reverse scored)	3.77	26 (74.3%)

3.4 The extent of implementation of evidence-based practice

Thirty-five MSN graduates answered this theme and the average total score was 13.6, median 10.0, and range 0 to 46 (possible score 0-72) and the majority of MSN graduates (52.4%) answered that they had not implemented any of the evidence-based practice within the last eight weeks (see Table 8).

Despite the very weak measure of the extent of implementation of evidence-based practice by the MSN graduates, 36.0% had implemented evidence-based practice one to four times and 8.9% had implemented evidence-based practice in the workplace five or more times during the last eight weeks (Table 8). Almost one-fourth of the MSN graduates had read and critically appraised a clinical research study (25.7%) and collected data on a patient problem (22.6%) five times or more within the last eight weeks. Additionally, 14.3% of the MSN graduates had evaluated a care initiative bycollecting patient outcome data, and critically appraised evidence from a research study. In contrast, research activities not performed by the MSN graduates were using an evidence-based practice guideline or systematic review to change clinical practice where I work (65.7%), changing practice based on a patient outcome data (62.9%), and evaluating the outcomes of a change in practice (62.9%) (see Table 8).

The open-ended questions of the questionnaire gave the MSN graduates an opportunity to describe an example of how they had implemented evidence-based practice in the workplace. Twenty-six of the MSN graduates (57.8%) chose to use this opportunity. Six MSN graduates (23.1%) explained the impact and influence that their concrete research projects had on their workplace. The projects described were: systematically oral screening for early warning on mucositis, collecting data from patients after discharge to adapt and change nursing trajectories, talking to intensive care patients' relatives about their expectations in order to attain improved collaboration, and involving patients and nurses in research, teaching, and clinical decision-making. Three MSN graduates (11.5%)

worked with quality improvements in nurses using evidence-based knowledge, data protection for patients, and recruitment and retention of nurses. Four MSN graduates (15.4%) expressed hope to one day be able to implement evidence-based practice. Ten (38.5%) of the MSN graduates' answers were inconclusive.

Table 8. The extent of implementation of evidence-based practice (EBP) in the last eight weeks (N = 35)

	0 times (N = (%))	1 to four times (N = (%))	5 or more times (N = (%))	Mean average score
Shared the outcome data collected with colleagues	14 (40.0%)	16 (45.7%)	5 (14.3%)	1.17
Shared evidence from a study or studies in the form of a report or presentation > 2 colleagues	14 (40.0%)	17 (48.6%)	4 (11.4%)	1.00
Shared an EBP guideline with a colleague	17 (48.6%)	15 (42.9%)	3 (8.6%)	0.80
Shared evidence from a research study with a multidisciplinary team member	17 (48.6%)	17 (48.6%)	1 (2.9%)	0.74
Used an EBP guideline or systematic review to change clinical practice where I work	23 (65.7%)	11 (31.4%)	1 (2.9%)	0.51
Changed practice based on patient outcome data	22 (62.9%)	10 (28.6%)	3 (8.6%)	0.63
Evaluated a care initiative by collecting patient outcome data	20 (57.1%)	9 (25.7%)	5 (14.3%)	0.89
Evaluated the outcomes of a change in practice	22 (62.9%)	11 (31.4%)	2 (5.7%)	0.54
Promoted the use of EBP to my colleagues	18 (51.4%)	14 (40.0%)	3 (8.6%)	0.86
Used evidence to change my clinical practice	19 (54.3%)	14 (40.0%)	2 (5.7%)	0.69
Shared evidence from a research study with a patient/family member	21 (60.0%)	13 (37.1%)	0 (0.0%)	0.43
Read and critically appraised a clinical research study	14 (40.0%)	10 (28.6%)	9 (25.7%)	1.34
Informally discussed evidence from a research study with a colleague	13 (37.1%)	17 (48.6%)	2 (5.7%)	0.91
Critically appraised evidence from a research study	13 (37.1%)	15 (42.9%)	5 (14.3%)	1.14
Generated a PICO question about my clinical practice	24 (68.6%)	8 (22.9%)	1 (2.9%)	0.37
Collected data on a patient problem	15 (42.9%)	10 (28.6%)	8 (22.6%)	1.23
Accessed the National Guidelines Clearinghouse	23 (65.7%)	10 (28.6%)	0 (0.0%)	0.37
Accessed the Cochrane database of systematic reviews	21 (60.0%)	10 (28.6%)	2 (5.7%)	0.51
Mean average	**52.4%**	**36.0%**	**8.9%**	**0.79**

4. DISCUSSION

The results of the three-year retrospective follow-up cohort study showed an overall increased development in MSN graduates' research utilization and knowledge improvement. The MSN graduates described how they had increased their performance of the majority of their research activities, and increased their improvement of research knowledge and participation in research projects on all parameters. However, a decrease in time allocated to research was found, where 74.3% of the MSN graduates spent less than five hours per week on research three years after graduation, as opposed to 48.7% one year after graduation. This paradox could indicate that the MSN graduates spent their spare time on research. It is not a new phenomenon that academic nurses[23] and clinical nurses[27,32–34] use their spare time on research-related activities. A mixed methods study by Loke and colleagues[33] on clinical nurses' research activities showed how the clinical nurses were aware that research should be undertaken in their own time and found it difficult to balance non-paid research work with family life. Renolen and colleagues[34] conducted a grounded theory study on hospital nurses' struggle to balance daily workflow with evidence-based practice, where the nurses described limited time for evidence-based practice, which was considered to be over and above the normal workload. Despite research activities being listed as part of the academic nurses' job descriptions, many of these nurses perform research activities outside their normal working hours. A qualitative study showed how MSN graduates engaged in nursing research-related tasks in their spare time or while working shifts, in order to stay in focus and continue their motivation for conducting research.[23]

Even though the MSN graduates had fewer hours allocated to research activities, from one to three years after graduation, they still believed strongly in the value of evidence-based practice and were confident in their ability to implement it.

The MSN graduates expressed an overall strong belief in the value of evidence-based practice (83.4%) and in their knowledge of evidence-based practice (60.6%); the average overall score for the MSN graduates' belief in evidence-based practice was 58.0 (possible scores 16 to 80). Findings from other studies using the EBP Belief scale were different regarding population and education of nurses.[31,35,36] A cross-sectional study of 185 clinical oncology nurses in a Norwegian hospital showed an average overall mean score of 42 in the nurses' belief in evidence-based practice, and 71.8% agreed or strongly agreed in the value of evidence-based practice.[31] Another survey revealed a mean average score of 60 for 3,901 chief nurse executives' belief in evidence-based practice.[35] In a cross-sectional survey of 6,800 registered nurses in nine hospitals in Washington DC, Warren and colleagues[36] evaluated the strength of and opportunities for implementing evidence-based practice across the population. The study showed how younger nurses had more positive beliefs regarding evidence-based practice (mean score 59) than older nurses (mean score 57).[36] Warren and colleagues[36] also found a statistically significant difference for belief in evidence-based practice between nurses at the lowest educational levels, such as associate degree (mean 56), diploma (mean 55), or bachelor degree (mean 58), compared to the highest educational degrees: the mean score for nurses with MSN degrees was 61 and the mean score for nurses with doctoral degrees was 66. Compared to the results of these studies, the present follow-up cohort study shows how the MSN graduates have stronger beliefs regarding evidence-based practice than nurses with a lower level of education. However, their scores were lower than those of the American chief and academic nurses. It is difficult to estimate the real differences; however, there seems to be a correlation between academic education, research competence and knowledge, with belief in the value of evidence-based practice.

The extent of implementation of evidence-based practice was very limited for the MSN graduates resulting in an average overall score of 13.6 (possible scores 0–72). The total score was higher than the results from Stokke and colleagues'[31] study of clinical nurses (7.8), but lower than the average score for MSN graduates (22.18) and Doctorates (22.22) in Warren and colleagues' survey.[36] Half of the MSN graduates (52.4%) answered that they had not (0 times) implemented evidence-based practice within the last eight weeks; only 36.0% of the MSN graduates had implemented evidence-based practice one to four times; and 8.9% had implemented evidence-based practice in the workplace five or more times during the last eight weeks. The results indicate how the MSN graduates increased their research knowledge and activities over the last three years, but only few used it directly to implement evidence-based practice. The top five evidence-based practice implementation initiatives performed by the MSN graduates five or more times during the last eight weeks were critical appraisal of a clinical research study (25.7%), collecting data on a patient problem (22.6%), evaluating a care initiative by collecting patient outcome data, (14.3%), and critical appraisal of evidence from a research study and (14.3%). All of these activities could be performed by the MSN graduates themselves. Whereas the activities not performed within the recent eight weeks by half of the MSN graduates were using an evidence-based practice guideline or systematic review to change clinical practice where I work (65.7%), changing practice based on a patient outcome data (62.9%), and evaluating the outcomes of a change in practice (62.9%). The MSN graduates' choice to perform research activities that could be initiated by themselves could also correlate with their lack of allocated time to conduct research during their working hours. In that case, the MSN graduates needed to select research activities that could be conducted at home or during their shifts.

However, if the MSN graduates conduct their research at home, the level of implementation of evidence-based practice will decrease even more, since it is defined as a hands-on change and improvement of the quality and trajectory of patient care through well-designed studies, including systematic research, clinical expertise, and patients' preferences.[17,37] Implementation of evidence-based practice must be performed in close contact with clinical practice to ensure a successful change process.[37] However, despite the low score on the EBP Implementation scale, the open-ended questions suggested that 23.1% of 26 MSN graduates conducted research activities that influenced evidence-based practice in their workplace. The research and developmental projects concerned close-to-practice issues, such as oral screening for early warning on mucositis, adapting and changing nursing trajectories, strengthening collaboration with relatives, data protection for patients, recruitment and retention of nurses, and working with quality improvements in nurses' use of evidence-based knowledge by involving patients and nurses in research, teaching, and clinical decision-making.

Limitations

The greatest limitation of this study was the medium response rate of 69.23% with only 82% replying to all items in the questionnaire. The level of response rate is an important factor in assessing the value of research findings.[38] However, the methodological literature recommends a minimum response-rate level of 50%,[39] 60%,[40] and 80%,[41] which is why the response rate in this follow-up cohort study is sufficient.

Data were collected at one university in Denmark from a cohort of MSN nurses.[21,23] Including participants from other Masters programs in Denmark could have made a difference to the results regarding beliefs about evidence-based practice and competencies to implement it. However, in accordance with the methodological structure of cohort studies,[22] no further inclusion was made.

5. Conclusion

A three-year retrospective follow-up cohort study of MSN nurses graduating from a Danish university was performed to describe and compare the development of the MSN graduates' research utilization and improvement of knowledge, and to describe their beliefs relating to evidence-based practice and their ability to implement it in the workplace.

The results showed an overall increased development in MSN graduates' research utilization and improvement in knowledge, and an overall stronger belief in the value of evidence-based practice, and in their knowledge of it. However, a decrease in time allocated to research was also found. 74.3% of the MSN nurses spent less than five hours per week on research, which could explain the very weak measure of the extent of implementation of evidence-based practice by the MSN nurses, where half (52.4%) of the participants replied that they had not implemented evidence-based practice within the last eight weeks.

The study concludes that the MSN nurses' knowledge and perceived importance of research is not enough to overcome the barrier of time to implement evidence-based practice. The conclusion therefore ends with a question about whether time is still an issue–even for academic nurses, who are employed to implement evidence-based practice. If the barriers to nursing research are not taken seriously by nursing management, then the extent of implementation of evidence-based practice and the improvement of quality in patient care and trajectories will continue to be very limited. There is a need to explore future considerations about how to profit from the research expertise of the academic nurses in clinical practice.

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Conflicts of Interest Disclosure

The authors declare that there are no conflicts of interest.

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