MS RÉGINE GOEMAES (Orcid ID : 0000-0001-7792-4533)

Leadership in nursing and midwifery: activities and associated competencies of advanced practice nurses and midwives

Keywords

Short running title

Activities and competencies of APNs and AMPs

Author information

Ann VAN HECKE[1,2], PhD MSc RN (Professor in Nursing and Midwifery)

Affiliation: (a) University Centre for Nursing and Midwifery, Department of Public Health and

Primary Care, Ghent University, Belgium; (b) Nursing Science, Ghent University Hospital, Belgium

Correspondence address: Ghent University, Department of Public Health and Primary Care (5K3),

University Centre for Nursing and Midwifery, Corneel Heymanslaan 10, 9000 Ghent, Belgium.

Tel. +32 9 332 83 49; FAX +32 9 332 49 94; E-mail: Ann.VanHecke@UGent.be

Régine GOEMAES[1], MSc RM (PhD Candidate)

Affiliation: University Centre for Nursing and Midwifery, Department of Public Health and Primary

Care, Ghent University, Belgium

Address: Ghent University, Department of Public Health and Primary Care (5K3), University Centre

for Nursing and Midwifery, Corneel Heymanslaan 10, 9000 Ghent, Belgium.

Sofie VERHAEGHE, PhD MSc RN (Professor in Nursing and Midwifery)

Affiliation: (a) University Centre for Nursing and Midwifery, Department of Public Health and

Primary Care, Ghent University, Belgium; (b) VIVES University College, Belgium

Address (a): Ghent University, Department of Public Health and Primary Care (5K3), University

Centre for Nursing and Midwifery, Corneel Heymanslaan 10, 9000 Ghent, Belgium.

Address (b): VIVES University College, Wilgenstraat 32, 8800 Roeselare, Belgium.

Wim BEYERS, PhD (Professor in Developmental Psychology)

Affiliation: Department of Developmental, Personality and Social Psychology, Ghent University,

Belgium

---

[1] Ann Van Hecke and Régine Goemaes should be considered joint first author.

[2] Corresponding author

Address: Ghent University, Department of Developmental, Personality and Social Psychology,

Faculty of Psychology and Educational Sciences, Henri Dunantlaan 2, 9000 Ghent, Belgium.

Elsie DECOENE, MSc RN (Advanced Practice Nurse)

Affiliation: Cancer Centre, Ghent University Hospital, Belgium

Address: Ghent University Hospital, Cancer Centre, Corneel Heymanslaan 10, 9000 Ghent, Belgium.

Dimitri BEECKMAN, PhD MSc RN (Professor in Nursing and Midwifery)

Affiliation: University Centre for Nursing and Midwifery, Department of Public Health and Primary

Care, Ghent University, Belgium

Address: Ghent University, Department of Public Health and Primary Care (5K3), University Centre

for Nursing and Midwifery, Corneel Heymanslaan 10, 9000 Ghent, Belgium.

Acknowledgements

Conflict of Interest Statement

Funding statement

Abstract

Aim

To explore the practice profile and competencies of advanced practice nurses (APN) and midwives (AMPs), and factors associated with task non-execution.

Background

Advanced practitioner roles are increasingly implemented internationally. Unofficial role introduction led to confusion regarding task performance. Studies examining associations between APNs'/AMPs' task performance and competency levels, and factors associated with task non-execution are lacking.

Method

A cross-sectional study among APNs/AMPs in Flanders (Belgium) explored tasks and competencies in seven domains: clinical/professional leadership, change management/innovation, research, clinical expertise/guidance/coaching, consultation/consultancy, multidisciplinary cooperation/care coordination, and ethical decision-making. Task performance and competency level frequencies were calculated. Regression analysis identified factors associated with task non-execution on domain/item level.

Results

Participants (n=63) executed tasks in all domains. Task non-execution related to research and clinical expertise was associated with work setting; task non-execution regarding care coordination and ethical decision-making was associated with competency perception. Several tasks were performed by few APNs/AMPs despite many feeling competent. Five of ten tasks performed by fewest participants belonged to the leadership domain.

Conclusion and implications for nursing and midwifery management

Supervisors could play an important part in APNs'/AMPs' role development, especially regarding leadership and tasks executed by few participants. Future studies should provide in-depth knowledge on task non-execution.

Keywords

Advanced Practice Nursing, Leadership, Midwifery, Professional competence, Task performance and analysis

Introduction

The introduction and development of "Advanced Practice Nursing" was one of the most important developments in nursing during the twentieth century (Oddsdottir & Sveinsdottir, 2011). The International Council of Nurses' (ICN) defines an Advanced Practice Nurse (APN) as "a registered nurse who has acquired the expert knowledge base, complex decision-making skills and clinical competencies for expanded practice, the characteristics of which are shaped by the context and/or country in which s/he is credentialed to practice. A master's degree is recommended for entry level" (Shober & Affara, 2006). Compared to advanced practice nursing and with the exception of certified nurse-midwives as one of the four major APN roles defined in the consensus model for Advanced Practice Registered Nurse regulation (2008), advanced midwifery practice is a more recent development (APRN Consensus Work Group & National Council of State Boards of Nursing APRN Advisory Committee, 2008). Apart from primarily Anglo-Saxon countries (e.g. Ireland, United Kingdom), advanced midwifery practice has been explored to a lesser extent internationally (Goemaes et al., 2016). However, it is clear that advanced practice covers a variety of roles in which

nurses and midwives work at an advanced level, such as clinical and professional leader, innovator, researcher, policy advisor, expert, consultant, educator, and ethical decision facilitator (Hamric, Hanson, Tracy, & O'Grady, 2013).

An increasing number of countries have implemented advanced practitioner roles over the past decades (Jones, 2005), which has led to confusion about advanced practitioners' titles, roles, and scope of practice internationally (Jokiniemi, Pietila, Kylma, & Haatainen, 2012). Attempts have been made to clarify the content of advanced practice and the practice profile of APNs with the aim of bringing stability and universality to its meaning (Dowling, Beauchesne, Farrelly, & Morphy, 2013; Gardner, Duffield, Doubrovsky, & Adams, 2016; Sevilla-Guerra & Zabalegui, 2018). Furthermore, increasing attention has been paid to measuring the impact of advanced practitioners on a clinical, professional and organizational healthcare level (Begley, Murphy, Higgins, & Cooney, 2014). A growing number of publications show that advanced practitioner care is superior to the usual/physician-only care, e.g. in reducing mortality in intensive care units (Woo, Lee, & Tam, 2017), post-discharge mortality in surgical patients (Bryant-Lukosius et al., 2015), hospital readmission rates (Chavez, Dwyer, & Ramelet, 2018; Mora, Dorrejo, Carreon, & Butt, 2017), and invasive interventions during childbirth (Newhouse et al., 2011). Advanced practitioner care improves adherence to treatment recommendations, the number of immunized infants at 8 weeks (Bryant-Lukosius et al., 2015), and clinical outcomes such as blood pressure, glycated haemoglobin levels, and lipid profile in elderly patients (Chavez et al., 2018). Advanced practitioner care also reduces the hospital length of stay for very low birthweight infants and post-partum mothers (Bryant-Lukosius et al., 2015), reduces waiting lists (Begley et al., 2014), and shortens waiting time during service delivery (Jennings, Clifford, Fox, O'Connell, & Gardner, 2015). In addition, APN/AMP care improves the continuity of care (Begley et al., 2014) and patient satisfaction (Jennings et al., 2015; Woo et al., 2017).

Advanced practitioners' leadership capability has been increasingly highlighted in the international literature as an important factor in the provision of improved patient outcomes (Higgins et al., 2014; Wong, Cummings, & Ducharme, 2013). Stimulating advanced practitioners to fully enact their leadership role is also vital because they are considered important resources for building leadership capacity in nursing and midwifery (Elliott, Begley, Sheaf, & Higgins, 2016). In fact, building leadership capacity, i.e. organizational-level systems and practices to increase the number and level of leaders, has become a priority in healthcare (Elliott, 2017). Leadership capability and capacity building is deemed essential to meet current and future challenges in a healthcare system that is undergoing major changes (Elliott, 2017; Lamb, Martin-Misener, Bryant-Lukosius, & Latimer, 2018). These changes are triggered by economic challenges, pressures of an increasing aging population, the growing number of people living with long-term illness and having complex care requirements, health and safety concerns associated with stressful work environments, an increasing number of leaders nearing retirement, and projected workforce shortages (Lamb et al., 2018; Wong, 2013). Although the entire nursing and midwifery workforce should be stimulated to participate in leadership or assume leadership positions at all levels (Elliott et al., 2016; IOM, 2011), APNs and AMPs are particularly well suited for the leadership role. After all, they have completed graduate education, possess an expert level of knowledge and complex decision-making skills, and have additional responsibility for practice innovation and strategic professional development (Elliott et al., 2016; Lamb et al., 2018). In the advanced practice context, leadership is characterized by mentoring, innovation, and activism (Hamric et al., 2013). Elliott et al. (2016) define clinical leadership in the advanced practice context as "activities supporting the development of practice in the service", while professional leadership is described as "activities supporting developments outside of the service at national or international level".

As in many countries, the introduction of advanced practice roles in healthcare is frequently discussed in Belgium (Belgian Federal Public Service Health Food Chain Safety and Environment, 2016). The implementation of academic master's programs for nurses and midwives in the 1980s has

led to the unofficial introduction of these roles (De Geest et al., 2008). Advanced practitioner roles in Belgium are mainly implemented in hospital settings. Despite the progress in educational programs and professional practice, the legal regulation and formal recognition of APN and AMP roles in Belgium is limited. A formal system or regulatory body for the registration and certification of APNs and AMPs has not been established. Therefore, the "advanced practitioner" job title is not protected in Belgium and its use is not officially regulated. This results in confusion regarding role expectations and performance among APNs/AMPs, their hierarchical and functional supervisors, and nurses and midwives not in advanced practice roles. As the task performance and self-reported competency level of advanced practitioners in Belgian hospitals is currently unclear, greater knowledge and understanding is required about the extent to which APNs and AMPs perform advanced practice activities in their current positions. Therefore, the purpose of this study is (1) to explore the practice profile of APNs and AMPs in Flanders, the northern part of Belgium, (2) to examine the extent to which these practitioners feel competent in advanced practice task performance, and (3) to identify factors associated with task non-execution. This information is important to support a legitimate debate about job differentiation and task reallocation in healthcare, and to provide a basis for accurate job descriptions and for the development of advanced practitioner curricula and certification requirements (Sastre-Fullana et al., 2017). In addition, the identification of factors associated with task non-execution could substantiate measures allowing advanced practitioners to reach their full potential as strong sources for increased access to quality healthcare and as leaders within and beyond the healthcare organization. To the authors' knowledge, studies examining the association between advanced practitioners' task performance, their competency levels and factors related to task non-execution are lacking internationally. Finally, the results of this study could contribute to the comparison of advanced practice roles internationally.

Methods

Design

A questionnaire-based, cross-sectional study was executed to examine APNs' and AMPs' task performance and competencies, and factors associated with task non-execution.

Setting and sample

APNs and AMPs working in peripheral and university hospitals in Flanders were included in the study if they met the following criteria: (a) work in direct patient/client care, (b) hold a master's degree in a health-related discipline, (c) serve in a variety of roles as described in Hamric's model of advanced practice nursing (Hamric et al., 2013), and (d) be mandated from hospital management to work as advanced practitioner. As the use of an "advanced practitioner" job title is not officially regulated and different terminology for APNs across hospitals is used, participants were not required to have an advanced practitioner job title for inclusion. Participants from both university and peripheral hospitals were included as these types of hospitals provide different contexts for care provision. Besides providing the care of peripheral hospitals, the mission statement of university hospitals includes the provision of expert care in complex care situations, care innovation and development, clinical training for (medical) students and specialists, and research (Royal Decree of 7 June 2004).

Advanced practitioners working in primary care, mental healthcare, and rehabilitation were excluded because of the following reasons: (1) the number of advanced practitioners in these healthcare settings is very limited in Belgium, and (2) there is a significant difference in employment context compared to advanced practitioners in general hospitals.

All general hospitals in Flanders were listed based on data from the website of the Federal Public Service Health, Food Chain Safety and Environment. Subsequently, hospital management (most often the chief nursing officer) was asked by telephone or e-mail (n=66) for contact details of nurses

and midwives meeting the inclusion criteria. Ten general hospitals did not respond despite several contact attempts. According to the hospital management, no advanced practitioners were employed in 39 hospitals. Eight AMPs and 79 APNs meeting the inclusion criteria were identified in 17 hospitals.

Instrument

A questionnaire was used to inventory the competencies and task performance of APNs and AMPs. The questionnaire's structure was based on the domains defined by Hamric et al. (2013): (a) clinical and professional leadership, (b) change management and innovation, (c) research, (d) clinical expertise, expert guidance and coaching, (e) nurse/midwife consultation and consultancy, (f) multidisciplinary cooperation and coordination of care, and (g) ethical decision-making (Hamric et al., 2013). A questionnaire for the Belgian context of APNs was drafted using (a) a questionnaire regarding the task performance of clinical nurse specialists and physician assistants used in a previous Dutch study (Laurant, Van De Camp, Boerboom, & Wijers, 2014), (b) job descriptions of one APN working in a university hospital and two of APNs working in peripheral hospitals in Flanders, and (c) non-participant one-day observations of six APNs. The draft questionnaire was sent to six APNs with a minimum of five years of APN experience and working in different areas of specialization for content validation. These APNs were asked to critically evaluate the questionnaire in preparation of a consensus meeting, during which all items of the questionnaire were assessed for relevance and clarity. Opportunities were provided to indicate missing items, but no new items were added. Two items were each divided into two separate items. After minor adjustments to increase the consistent wording of some of the items, a final version of the questionnaire was approved by the six APNs and the researchers [X1, X2].

As nursing and midwifery are two separate disciplines in Belgium with different educational programs, the need for adjustments of the APN questionnaire for the AMP survey was checked using (a) midwifery legislation (Coordinated Law on the execution of healthcare professions of May 10, 2015), (b) the professional and competency profile of Belgian midwives (Federal Council for Midwives, 2015), (c) non-participant observations of five AMPs, and (d) semi-structured face-to-face interviews with five AMPs. No job descriptions of AMPs were found. A two round Delphi-procedure with 10 experts was executed for content validation of the AMP questionnaire. The expert panel consisted of midwives with the following profile: AMP, specialized midwife, head midwife, head of bachelor education in midwifery, midwifery researcher. In the first round, the experts were asked to score the relevance and clarity of the sociodemographic questions and all items using a 5-point Likert scale. Comprehensiveness of the items was assessed for each domain by asking the experts for notable omissions. A content validity index (CVI) was calculated for each sociodemographic question and each item. Two items were removed from the APN questionnaire for AMPs due to insufficient CVI-scores according to Lynn (1986): 'guidance of family/carers' and 'patient home visits'. The following items were added as AMP tasks based on the experts' comprehensiveness suggestions: 'prescription authority', 'pelvic floor re-education', 'functional ultrasound during pregnancy', 'inform the patient in the context of scientific research', 'make arrangements with healthcare professionals about the division of tasks and responsibilities', and 'signaling ethical problems of midwifery colleagues or other health professionals'. Six experts participated in the second round, in which only reworded or added items were assessed for clarity and relevance. All reworded and added items were retained as CVIs were satisfactory.

The APN and AMP questionnaire consisted of 78 and 82 tasks respectively. For each task, APNs and AMPs reported whether they carried out the task or not (yes/no) and to what extent they felt competent for this task (competent/moderately competent/incompetent). Sociodemographic variables and the percentage of working time APNs/AMPs spent on direct patient contacts (tasks performed in the presence of or with involvement of the patient, e.g. patient education), on indirect

patient related contacts (tasks performed for the benefit of the patient but not necessarily in the presence of the patient, e.g. updating patient records), on non-patient related contacts (tasks not related to direct patient care, e.g. involvement in teaching), and tasks not belonging to their job profile (e.g. operational management related tasks) were also registered.

Data collection

An invitation for study participation containing a reminder about the inclusion criteria was emailed to all identified APNs and AMPs. The APNs received a link to the electronic questionnaire (created in LimeSurvey) in autumn 2015. Responses were stored anonymously in the database. AMPs received a Word-copy of the questionnaire in spring 2016. Completed AMP questionnaires could be sent back to the researchers either by mail or e-mail. Responses of AMPs were anonymized. A reminder of the invitation for study participation was sent to all eligible APNs and AMPs after a fortnight.

Data analysis

For each task, task performance and competency level frequencies were calculated. For this purpose, the level of perceived competency was dichotomized into 'incompetent' versus 'moderately competent' or 'competent'. Chi-Squared tests were used to assess differences in task performance and competency by type of healthcare setting (peripheral vs university hospitals), the APN/AMP position appointment percentage (≤50% vs >50%), the number of years as an advanced practitioner in the specialty (≤5 years vs >5 years), task performance (carrying out vs not carrying out), financing source for the advanced practitioner ([partial]funding by a medical head of department or doctor vs no physician funding), and hierarchical supervisor of the advanced practitioner ([partial] supervision by a medical head of department or doctor vs no physician supervision). Fisher's Exact tests were used when the expected cell count was below 5.

The following variables were entered in a multivariate binary logistic regression model if p<0.25 in a univariate logistic regression analysis: type of healthcare setting, position appointment percentage, number of years of work experience as an advanced practitioner in the specialty, competency level, financing source for the advanced practitioner, and type of hierarchical supervisor (Bursac, Gauss, Williams, & Hosmer, 2008). If the univariate logistic regression analysis resulted in p<0.25 for only one independent variable, results for this analysis were reported. P-values <0.05 were considered statistically significant.

Furthermore, mean task execution and competency scores were calculated for each domain. For this purpose, binary task execution and competency scores on all items were considered as metric data (Velleman, & Wilkinson, 1993). Task execution and competency domain scores were considered as missing when more than 20% of the domain items were left open. Reliability testing of the task execution domain scores yielded Cronbach's alphas between 0.65 and 0.82, except for the domain of "clinical expertise, expert guidance and coaching". An acceptable Cronbach's alpha of 0.60 was reached by deleting the following item: "Supervision / intervision with other healthcare professionals" (Hair, Black, Babin, & Anderson, 2014). All analyses regarding the domain of "clinical expertise, expert guidance and coaching" were executed without the deleted item.

Task execution were dichotomized into 'task non-execution for ≥ 25% of the tasks in the domain' versus 'task non-execution for < 25% of tasks in the domain' in order to execute a multivariate binary logistic regression analyses for task execution domain scores. A multivariate logistic regression analysis was executed with the following independent variables if p<0.25 in a univariate logistic regression analysis: type of healthcare setting, position appointment percentage, number of years of work experience as an advanced practitioner in the specialty, competency domain score, financing source for the advanced practitioner, and type of hierarchical supervisor. Results for the univariate logistic regression analyses were reported if only one independent variable resulted in p<0.25. All statistical analyses were done using IBM SPSS Statistics 23.

Ethical considerations

The study was approved by the central Ethics Committee of [X] (B670201524082 and B670201525527). Advanced practitioners received an information letter prior to the study indicating that completion and return of the survey implied consent to study participation.

Results

Sample characteristics

Figure 1 shows that a total of 92 questionnaires were obtained, of which 29 were excluded as they did not meet the criteria for data analysis (response rate: 68.5%). Table 1 illustrates the demographics of the participants (n=63), the majority of which were APNs. The largest proportion of APNs/AMPs was female (87.3%), aged between 23 and 40 years (69.8%), and held a position in a university hospital (66.7%). The majority of participants had less than five years of experience as advanced practitioner (60.3%) and 58.7% were appointed between 76 and 100% as APN/AMP. A combination of an advanced practitioner position with another function was carried out by 38.1% of the participants. Hospitals were the sources of funding for the majority of advanced practitioner positions (88.9%). Most participants had a middle manager as a hierarchical supervisor (58.7%), while doctors were the functional supervisors for over half of the advanced practitioners (52.4%).

On average, APNs and AMPs spent 43.3% of their working time on direct patient contacts, 22.6% on indirect patient related contacts, 25.1% on non-patient related contacts, and 8.6% on tasks not belonging to their APN/AMP job profile.

Practice patterns and factors associated with task non-execution by domains

Table 2 shows that none of the independent variables in the study were associated with task non-execution on a domain level for clinical and professional leadership, change management and innovation, and nurse/midwife consultation and consultancy. However, the non-execution of at least 25% of the activities in the domains of research and clinical expertise was associated with the type of healthcare setting. The odds of APNs/AMPs in university hospitals performing less than 75% of the activities in the domain of research were smaller than the odds of APNs/AMPs in peripheral hospitals (OR .14, 95% CI .03-.58). Similarly, APNs/AMPs in university hospitals were more likely to perform at least 75% of activities in the clinical expertise domain compared to colleagues in a peripheral hospital (OR .06, 95% CI .01-.33). Non-execution of at least 25% of the activities in the multidisciplinary cooperation and ethical decision-making domain was associated with the average competency domain score. Advanced practitioners who felt incompetent for less than 25% of the activities in these domains were more likely to execute at least 75% of the activities.

Practice patterns and factors associated with task non-execution by items

As leadership capacity is essential for innovation and advancement in nursing and midwifery (Elliott et al., 2016), the results below mainly focus on the leadership, innovation, and research domain. For the sake of completeness, however, results of multivariate binary logistic regression analyses for the domains of clinical expertise, expert guidance and coaching, nurse/midwife consultation and consultancy, multidisciplinary cooperation and coordination of care, and ethical decision-making are shown in Table 3 in the supporting information section.

Clinical and professional leadership

As shown in Table 4, participants' focus regarding clinical and professional leadership seemed mainly directed towards guideline and care protocol development within the hospital (95.0%), extending and maintaining contacts with advanced practitioners in other healthcare organizations (85.0%), and participating in policy development meetings regarding domain-specific topics (81.7%).

A minority of APNs/AMPs participated in policy meetings on a hospital or hospital department level (36.7% and 43.3% respectively), although almost two thirds felt competent to do so (62.1% and 67.2% respectively). Advanced practitioners working in peripheral hospitals [odds ratio (OR) 8.73, 95% confidence interval (CI) 1.35-56.42] and not feeling competent (OR 11.11, 95% CI 1.66-74.45) were less likely to participate in policy meetings on a hospital level. Non-participation in policy meetings on a hospital department level was only associated with APNs/AMPs not feeling competent to do so (OR 34.80, 95% CI 3.64-332.54). Less than 40% of participants extended and maintained contacts with international professional associations and patient organizations. Participation in national and international advisory boards was only performed by 23.3% and 10.0% of participants respectively, despite 62.1% and 55.2% of APNs/AMPs feeling competent.

Change management and innovation

Table 4 shows that all change management and innovation related tasks were performed by more than 85% of the advanced practitioners, and at least 91.5% of participants felt competent doing so. However, feeling incompetent made initiating quality improvement strategies less likely (OR 27.00, 95% CI 2.41-302.19). Similar results were found for implementing quality improvement strategies (OR 41.32, 95% CI 3.03-563.21) and for evaluating them (OR 16.90, 95% CI 1.28-222.46). Advanced practitioners who were at least partly funded by a physician were more likely not to actively contribute to the innovation of the APNs'/AMPs' care domain (OR 15.41, 95% CI 1.05-226.08).

Research

Table 4 illustrates that advanced practitioners mainly used their research skills to read and review the literature (88.3%), to translate the findings into evidence-based practice (80.0%), to purposefully disseminate the literature to professionals in the healthcare organization (81.7%), and to guide bachelor (81.7%) and master (73.3%) students. Over two thirds of APNs/AMPs initiated (68.9%) and cooperated (78.7%) in nursing/midwifery research in their domain of specialization. Advanced practitioners not initiating research were more likely to have a physician as a hierarchical supervisor (OR 4.52, 95% CI 1.31-15.63), while participants not cooperating in domain-specific research were more likely to work in peripheral hospitals (OR 4.39, 95% CI 1.18-16.34). A minority wrote research proposals (34.4%). The odds of not writing a research proposal were higher when feeling incompetent (OR 24.70, 95% CI 1.31-15.63). Tasks related to the dissemination of research results were performed less frequently. A minority of participants published in international, peer reviewed journals (30.5%) or in other journals (38.3%). Just over half of the APNs/AMPs presented research results during conferences or symposia (55.0%). Presenting research results was less likely for participants working in peripheral hospitals (OR 19.97, 95% CI 3.03-131.81), having five years or less of APN/AMP experience (OR 11.30, 95% CI 1.53-83.34), and feeling incompetent for it (OR 30.26, 95% CI 2.29-400.47). Similarly, not publishing in other journals was associated with working in a peripheral hospital [(OR 8.27, 95% CI 1.29-53.11), having limited APN/AMP experience (OR 8.94, 95% CI 1.85-43.27), and feeling incompetent to do so (OR 11.46, 95% CI 1.66-79.21).

Discussion

This study examined the task performance and competency level of APNs/AMPs, and factors associated with task non-execution. Advanced practitioners in hospitals in Flanders were relatively young and had limited APN/AMP experience. Moreover, 43.1% of APNs had no work experience in the specialization for which they became an advanced practitioner.

Results showed that participants executed tasks in all advanced practice domains as defined by Hamric et al. (2013). They devoted the largest part of their time to direct patient contacts, which is consistent with clinical work accounting for the largest part of advanced practitioners' activities in other studies (Martin-Misener et al., 2015; Norton, Sigsworth, Heywood, & Oke, 2012). On a domain level, only a limited number of factors were associated with task non-execution. This could indicate that factors not examined in this study influenced APNs'/AMPs' task execution. Figure 2 shows a non-exhaustive overview of factors having an impact on task execution as described in the literature. This preliminary model was based on the frameworks for APN/AMP role development and role enactment by De Geest et al. (2008) and Elliott et al. (2016), and supplemented with factors examined in our study. Results of future studies could further refine the model. As many of the studies included by Elliott et al. (2016) used qualitative research methods, quantitative research methods could quantify factors influencing task execution. Such results could inform the targeted deployment of interventions.

Despite the limited number of factors associated with task non-execution on a domain level, several associations were found on the level of individual activities. Several tasks were executed by few participants despite many feeling competent. The underuse of advanced practitioners' competencies could be a missed opportunity and lead to competency level deterioration and a reduction of care quality improvement. On a people management level, APNs/AMPs feeling competent for tasks they may or cannot perform could lead to job dissatisfaction and leaving the profession (Lamb et al., 2018). One of the main reasons for clinical nurse specialists to not work in the role is the inability to implement all its dimensions (Kilpatrick et al., 2014). It therefore seems vital that advanced practitioners' supervisors and collaborating professions purposefully stimulate APNs and AMPs to maximize task performance in all advanced practice domains. However, special attention should be given to the leadership domain, as five of the ten tasks performed by fewest participants belong to this domain. Building leadership capacity should be a priority in healthcare to meet current and future challenges due to economic constraints, shifting population demographics, and increasing

numbers of chronically ill patients (Lamb et al., 2018). Nonetheless, several barriers for leadership enactment of advanced practitioners have been identified (Elliott et al., 2016), such as organization-level gaps in leadership development, the absence of leadership capacity building strategies, and heavy clinical workload reducing advanced practitioners' time for leadership activities (Elliot, 2017). According to Elliott (2017), the following factors facilitate leadership enactment by advanced practitioners within and beyond their healthcare organization: a defined leadership role, accountability for achieving their performance targets and reporting to the organization's director, leadership mentoring availability, membership of strategic committees, networking opportunities, formal links between the healthcare organization and universities, and administrative support. First and foremost however, healthcare organizations should commit long-term to leadership capacity building by making it one of the priorities within the organization's strategic plan (Elliott, 2017).

In addition to leadership capacity building, increasing leadership capability seems equally important, as our results showed that the non-execution of several tasks in the leadership domain was associated with APNs/AMPs not feeling competent. Pre-service and tailored in-service training, e.g. leadership development programs for advanced practitioners, could provide APNs/AMPs with the capabilities and confidence needed to enact their clinical and professional leadership role. Similarly, tasks in the domains of 'research' and 'innovation and change management' were associated with task non-execution due to ANPs/AMPs not feeling competent. However, results showed that advanced practitioners who were at least partly funded by a physician were less likely to actively contribute to the innovation of APNs'/AMPs' care domains. Having a physician as a hierarchical supervisor also made it less likely to initiate domain-specific nursing or midwifery research. As the non-execution of some tasks was related to ANPs/AMPs being at least partly funded or supervised by a physician, it is vital that ANPs/AMPs and their non-medical supervisors are aware of these associations in order to secure the nursing/midwifery focus of the advanced practitioners' task performance. Moreover, both leadership, innovation and research are specifically important domains for advanced practitioners as advancement is essential on a healthcare organizational,

national and international level. The competencies in these domains are crucial for the implementation of evidence-based practice and innovations in patient care, and for the further professionalization of nursing and midwifery policy and science.

Limitations

The following study limitations need to be considered. Firstly, not all general hospitals could be reached to inventory APNs/AMPs. Secondly, the telephone calls to members of the hospital management revealed that they did not always know which nurses or midwives met the inclusion criteria. Therefore, potential participants could have been missed. Thirdly, we did not perform sample size calculations. As formal regulation for the registration and certification of APNs and AMPs was not in place and the "advanced practitioner" job title was not protected in Belgium, there was no information on the number of nurses and midwives in an advanced practice role. All peripheral and university hospitals in Flanders were contacted to inventory nurses and midwives that met the inclusion criteria. As only 79 APNs and 8 AMPs were identified, all were invited to participate in the study. As 58 APNs and 5 AMPs completed the questionnaire, results are valid for the Belgian healthcare context. Caution is required regarding the external validity of the study in an international context due to the limited sample size. However, the strength of this study lies in the fact that data about APNs'/AMPs' activities and competencies are available from a country where advanced practice is emerging. Such data are scarce, as most data in the literature come from countries in which advanced practice nursing is well established. Fourthly, there was no identification of non-responders. Hence, potential differences in task execution and level of competency between responders and non-responders could not be determined. In addition, more questionnaires were returned than links to the questionnaire were sent. As the survey was executed during a period of national discussion about APN roles, it is possible that not-master educated, specialized nurses wanted to increase the visibility of their roles. The link to the electronic version of

the questionnaire could also have been forwarded easily. Therefore, all participants were carefully checked for meeting the inclusion criteria before data analysis. Fifthly, a threat to validity could exist as both task execution and competency level were self-reported measures. Sixthly, 38.1% of APNs/AMPs held another position simultaneously with the advanced practitioner position. This could have led to an overestimation regarding the execution of tasks, as tasks might have been performed in another professional context than in the APN/AMP role. Seventhly, we did not use a comprehensive framework to examine the variables associated with task non-execution, given the exploratory nature of the study. Potential overfitting in the logistic regression models should also be taken into account due to the sample size. The authors are aware of a 30% chance for at least one false positive result by executing seven multivariate binary logistic regression analyses on the task non-execution rates for each domain separately. Finally, anonymous participation and the lack of an identifier for the healthcare organization in the digital and paper-based questionnaires impeded information on the distribution of participants per institution. Hence, adjustment of the logistic models for the hospital cluster effect could not be executed as only data on the type of healthcare setting were collected.

Conclusion

As this study examined activities and competencies of APNs/AMPs, and factors associated with task non-execution, results added to the limited international knowledge thereon. In addition, Belgium is a country with emerging but not yet fully established APN/AMP roles. The study thus contributed to the comparison of advanced practice roles internationally.

Results showed that APNs/AMPs in hospitals in Flanders practiced according to all advanced practice domains. As many APNs/AMPs were rather young and had limited advanced practitioner experience, their supervisors could play an important part in enhancing APNs'/AMPs' role development and expertise. Several tasks were executed by few participants despite many feeling competent. It therefore seems appropriate to examine barriers hindering APNs/AMPs in reaching their full

potential. Providing APNs/AMPs with the opportunities for professional development might prevent job dissatisfaction and advanced practitioners leaving the profession. However, further research gaining in-depth knowledge on factors and circumstances that influence task execution beyond the factors in this study, particularly related to clinical and professional leadership activities, could provide valuable insights. More profound research on underlying reasons for APNs/AMPs not feeling competent for task execution also seems important as this could equip APN/AMP supervisors with valuable guidance in providing tailored in-service programs. The results could also provide curriculum developers of advanced practitioner courses with information on potential program changes in order to educate competent and confident APNs/AMPs taking responsibility for their full scope of practice. This is particularly important in the domains of leadership, innovation, and research as to safeguard the advancement of nursing and midwifery as a profession and science. Finally, as this study examined tasks and competencies of APNs/AMPs working in a hospital setting, future research could focus on the task performance, competencies and factors associated with task non-execution regarding APNs/AMPs working in primary and mental healthcare.

Supporting information

Table 3 Results of multivariate binary logistic regression analyses for the domains of clinical expertise, expert guidance and coaching, nurse/midwife consultation and consultancy, multidisciplinary cooperation and coordination of care, and ethical decision-making.

References

APRN Consensus Work Group & National Council of State Boards of Nursing APRN Advisory
Committee. (2008). Consensus model for APRN regulation: Licensure, accreditation,
certification and education. APRN Joint Dialogue Group Report. Retrieved from
http://www.aacn.nche.edu/education-resources/APRNReport.pdf

Begley, C., Murphy, K., Higgins, A., & Cooney, A. (2014). Policy-makers' views on impact of specialist
and advanced practitioner roles in Ireland: the SCAPE study. *Journal of Nursing
Management, 22*(4), 410-422. doi:10.1111/jonm.12018

Belgian Federal Public Service Health Food Chain Safety and Environment. (2016).
Gezondheidszorgberoepen in evolutie. Naar een geïntegreerde gezondheidszorg [Healthcare
professions in evolution. Towards an integrated healthcare]. Retrieved from
http://www.kb78.be/

Bryant-Lukosius, D., Carter, N., Reid, K., Donald, F., Martin-Misener, R., Kilpatrick, K., … DiCenso, A.
(2015). The clinical effectiveness and cost-effectiveness of clinical nurse specialist-led
hospital to home transitional care: a systematic review. *Journal of Evaluation in Clinical
Practice, 21*, 763-781. doi:10.1111/jep.12401

Bursac, Z., Gauss, C. H., Williams, D. K., & Hosmer, D. W. (2008). Purposeful selection of variables in
logistic regression. *Source Code for Biology and Medicine, 3*, 17. doi:10.1186/1751-0473-3-17

Chavez, K.S., Dwyer, A.A., & Ramelet, A.-S. (2018). International practice settings, interventions and
outcomes of nurse practitioners in geriatric care: A scoping review. *International Journal of
Nursing Studies, 78*, 61-75. doi:10.1016/j.ijnurstu.2017.09.010

De Geest, S., Moons, P., Callens, B., Gut, C., Lindpaintner, L., & Spirig, R. (2008). Introducing Advanced Practice Nurses / Nurse Practitioners in health care systems: a framework for reflection and analysis. *Swiss Medical Weekly, 138*(43-44), 621-628.

Dowling, M., Beauchesne, M., Farrelly, F., & Murphy, K. (2013). Advanced practice nursing: A concept analysis. *International Journal of Nursing Practice, 19*(2), 131-140. doi:10.1111/ijn.12050

Elliott, N. (2017). Building leadership capacity in advanced nurse practitioners - the role of organisational management. *Journal of Nursing Management*, *25,* 77-81.

Elliott, N., Begley, C., Sheaf, G., Higgins, A. (2016). Barriers and enablers to advanced practitioners' ability to enact their leadership role: A scoping review. *International Journal of Nursing Studies, 60*, 24-45.

Federal Council for Midwives, 2015. Het beroeps- en competentieprofiel van de Belgische vroedvrouw [The professional and competency profile of the Belgian midwife]. http://www.vroedvrouwen.be/sites/default/files/Beroepsprofiel%2012%2005-1.pdf

Gardner, G., Duffield, C., Doubrovsky, A., & Adams, M. (2016). Identifying advanced practice: A national survey of a nursing workforce. *International Journal of Nursing Studies, 55*, 60-70. doi:10.1016/j.ijnurstu.2015.12.001

Goemaes, R., Beeckman, D., Goossens, J., Shawe, J., Verhaeghe, S., & Van Hecke, A. (2016). Advanced midwifery practice: An evolutionary concept analysis. *Midwifery, 42*, 29-37. doi:10.1016/j.midw.2016.09.004

Hair, J.F., Black, W.C., Babin, B.J., & Anderson, R.E. Multivariate Data Analysis (7th ed.). Pearson Education Limited, Essex, England.

Hamric, A. B., Hanson, C. M., Tracy, M. F., & O'Grady, E. T. (2013). *Advanced Practice Nursing: An Integrative Approach* (5th ed.): Elsevier Health Sciences.

Higgins, A., Begley, C., Lalor, J., Coyne, I., Morphy, K., & Elliott, N. (2014). Factors influencing advanced practitioners' ability to enact leadership: a case study within Irish healthcare. *Journal of Nursing Management, 22*, 894-905.

IOM (Institute of Medicine). (2011). *The Future of Nursing: Leading Change, Advancing Health*. Washington, DC: The National Academies Press.

Jennings, N., Clifford, S., Fox, A.R., O'Connell, J., & Gardner, G. (2015). The impact of nurse practitioner services on cost, quality of care, satisfaction and waiting times in the emergency department: A systematic review. *International Journal of Nursing Studies, 52*, 421-435. doi:10.1016/j.iknurstu.2014.07.006

Jokiniemi, K., Pietila, A. M., Kylma, J., & Haatainen, K. (2012). Advanced nursing roles: a systematic review. *Nursing and Health Sciences, 14*(3), 421-431. doi:10.1111/j.1442-2018.2012.00704.x

Jones, M. L. (2005). Role development and effective practice in specialist and advanced practice roles in acute hospital settings: systematic review and meta-synthesis. *Journal of Advanced Nursing, 49*(2), 191-209. doi:10.1111/j.1365-2648.2004.03279.x

Kilpatrick, K., DiCenso, A., Bryant-Lukosius, D., Ritchie, J. A., Martin-Misener, R., & Carter, N. (2014). Clinical nurse specialists in Canada: why are some not working in the role? *Nurse Leadership (Tor Ont), 27*(1), 62-75.

Lamb, A., Martin-Misener, R., Bryant-Lukosius, D., Latimer, M. (2018). Describing the leadership capabilities of advanced practice nurses using a qualitative descriptive study. *Nursing Open, 5,* 400-413.

Laurant, M., Van De Camp, K., Boerboom, L., & Wijers, N. (2014). *Een studie naar functieprofielen, taken en verantwoordelijkheden van physician assistants en verpleegkundig specialisten [A study into practice profiles, tasks and responsibilities of physician assistans and clinical nurse specialists]*. Retrieved from Nijmegen, The Netherlands:

Lynn, M. (1986). Determination and quantification of content validity. *Nursing Research, 35*, 382-385.

Martin-Misener, R., Donald, F., Wickson-Griffiths, A., Akhtar-Danesh, N., Ploeg, J., Brazil, K., . . . Taniguchi, A. (2015). A mixed methods study of the work patterns of full-time nurse practitioners in nursing homes. *Journal of Clinical Nursing, 24*(9-10), 1327-1337. doi:10.1111/jocn.12741

Mora, K., Dorrejo, X.M., Carreon, K.M., & Butt, S. (2017). Nurse practitioner-led transitional care interventions: An integrative review. *Journal of the American Association of Nurse Practitioners, 29*, 773-790. doi:10.1002/2327-6924.12509

Newhouse, R. P., Stanik-Hutt, J., White, K. M., Johantgen, M., Bass, E. B., Zangaro, G., … Weiner, J. P. (2011). Advanced Practice Nurse Outcomes 1990-2008: A Systematic Review. *Nursing Economics, 29*, 230-251.

Norton, C., Sigsworth, J., Heywood, S., & Oke, S. (2012). An investigation into the activities of the clinical nurse specialist. *Nursing Standard, 26*(30), 42-50.

Oddsdottir, E. J., & Sveinsdottir, H. (2011). The content of the work of clinical nurse specialists described by use of daily activity diaries. *Journal of Clinical Nursing, 20*(9-10), 1393-1404. doi:10.1111/j.1365-2702.2010.03652.x

Royal Decree of 7 June 2004 laying down the conditions for appointment as a university hospital, university hospital service, university hospital or university care program. Brussels, Belgium: Belgian Official Gazette.

Sastre-Fullana, P., Morales-Asencio, J. M., Sese-Abad, A., Bennasar-Veny, M., Fernandez-Dominguez, J. C., & De Pedro-Gomez, J. (2017). Advanced Practice Nursing Competency Assessment Instrument (APNCAI): clinimetric validation. *BMJ Open, 7*(2), e013659. doi:10.1136/bmjopen-2016-013659

Sevilla Guerra, S., Salmerón, J.M., & Zabalegui, A. (2018). Profile of advanced nursing practice in Spain: A cross-sectional study. Nurs Health Sci, 20, 99-106.

Shober, M., & Affara, F. (2006). *International Council of Nurses: Advanced Nursing Practice*. Oxford, England: Blackwell Publishing.

Velleman, P.F., & Wilkinson, L. Nominal, ordinal, interval, and ratio typologies are misleading. *The American Statistician, 47*, 65-72. doi:10.1080/00031305.1993.10475938.

Wong, C.A., Cummings, G.G., Ducharme, L. (2013). The relationship between nursing leadership and patient outcomes: a systematic review update. *Journal of Nursing Management, 21*, 709-724.

Woo, B., Lee, J., & Tam, W. (2017). The impact of the advanced practice nursing role on quality of care, clinical outcomes, patient satisfaction, and cost in the emergency and critical care settings: a systematic review. *Human Resources for Health, 15*:63. doi:10.1186/s12960-017-0237-9

Table 1 Demographic characteristics of the participants (n=63)

Characteristics	n	%
Age		
23-30 years	22	34.9
31-40 years	22	34.9
41-50 years	14	22.2
>50 years	5	7.9
Gender		
female	55	87.3
female	8	12.7
Education		
Master of Science in Nursing and Midwifery	40	63.5
Master of Science in Health Education and Health Promotion	2	3.2
Master of Science in Health Care Management and Policy	4	6.3
Master in Medical-Social Sciences	17	27.0
Master in Primary Health Care	1	1.5
Healthcare setting		
University hospital	42	66.7
Peripheral hospital	21	33.3
Number of hospital beds		
0-199	2	3.2
200-299	4	6.3
≥450	57	90.4
APNs[†]: nursing specialization[‡]		
Oncology/Hematology	13	20.6
Pain	10	15.9
Wound care	8	13,3
Anesthesiology	5	7.6
Cardiology	5	7.6
Pediatric nursing	5	7.6
Pneumology and tuberculosis	3	4.8
Diabetes care	2	3.2
Nephrology	2	3.2
Neurology	2	3.2
Surgery	2	3.2
AMPs[§]	5	7.9
Number of years of work experience as an advanced practitioner in the current specialization		
1-5	38	60.3
6-10	17	27.0
11-15	6	9.5
16-20	2	3.2
Number of years of work experience in current specialization before being advanced practitioner		
<5	13	39.4
5-9	13	39.4
10-14	4	12.1
>15	3	9.1
Position appointment percentage		
0-25%	5	7.9
26-50%	18	28.6
51-75%	3	4.8
76-100%	37	58.7
Financing source for the advanced practitioner		
Hospital	56	88.9
Medical head of department/doctors	8	12.7
External financing	6	9.5
Number of advanced practitioners simultaneously having another position (combined positions)		
No	39	61.9
Yes	24	38.1
Hierarchical supervisor of the advanced practitioner		

Middle management	37	58.7
Chief nursing officer	21	33.3
Doctor(s)	16	25.4
Head nurse/head midwife	12	19.0
Medical head of department	12	19.0
Functional supervisor of the advanced practitioner		
Doctor(s)	33	52.4
Medical head of department	21	33.3
Middle management	19	30.2
Chief nursing officer	8	12.7
Head nurse/head midwife	7	11.1
None	3	4.8

[†]APN: advanced practice nurse

[‡]An APN could check multiple domains of specialization simultaneously and register additional domains of specialization via the 'other' option. The following domains of specialization were registered only once or as the option 'other': dermatology and venereology, geriatrics, infectious diseases, orthopedics, plastic surgery, urology, hemophilia, nutrition, multiple sclerosis, cardiac transplantation, and palliative care.

[§]AMP: advanced midwife practitioner

Table 2 Results for multivariate binary logistic regression analysis for ≥ 25% domain task non-execution[†]

Task non-execution for ≥ 25% of tasks / domain (dependent variable)

Independent variables

	Type of healthcare setting[a]		Position appointment percentage[b]		Number of years of APN/AMP[‡] experience[c]		Competency perception level[d]		Financing source[e]		Type of hierarchical supervisor[f]	
	Odds ratio	P	Odds ratio	P	Odds ratio	P	Odds ratio	P	Odds ratio	P	Odds ratio	P
Clinical and professional leadership	.19	.14	.25	.13	NA	NA	.15	.11	NA	NA	.12	.07
Change management and innovation	NA	NA	NA	NA	.00**	1.00	.15	.06	NA	NA	NA	NA
Research skills	.14	.01*	NA	NA	.65	.501	.24	.06	NA	NA	NA	NA
Clinical expertise, and expert guidance and coaching	.06	.00*	3.30	.11	.61	.483	NA	NA	.62	.66	.47	.25
Nurse/midwife consultations and consultancy	NA	NA	.34	.08	NA	NA	NA	NA	NA	NA	NA	NA
Multidisciplinary cooperation and coordination of care	NA	NA	NA	NA	.49	.307	.10	.01*	NA	NA	NA	NA
Ethical decision-making skills	.38	.14	NA	NA	NA	NA	.13	.01*	NA	NA	.36	.12

Reference categories: [a] working in a peripheral hospital; [b] position appointment percentage ≤ 50%; [c] number of years of work experience as an advanced practitioner ≤ 5 years; [d] feeling incompetent for ≥ 25% of the tasks per domain; [e] financing source is a doctor or medical head of department; [f] a doctor or medical head of department is (one of the) hierarchical supervisor(s) of the APN/AMP.

[¶]NA (not applicable) due to p ≥ 0.25 for independent variable in univariate logistic regression analysis.

*p < 0.05; **p < 0.001

Table 4 Leadership, change management/innovation, and research: results for self-reported competency, task performance, task non-execution, and for multivariate binary logistic regression analysis for task non-execution[†]

Task (dependent variable)	Competent N (%)	Do N (%)	Do not N (%)	Type of healthcare setting[a] Odds ratio	Position appointment percentage[b] Odds ratio	Number of years of APN/AMP[‡] experience[c] Odds ratio	Competence perception level[d] Odds ratio	Financing source[e] Odds ratio	Type of hierarchical supervisor[f] Odds ratio
Clinical and professional leadership									
Participate in a policy meeting at the hospital level as an advisor (linked or not linked to the domain of specialization)	36 (62.1)	22 (36.7)	38 (63.3)	8.73*	NA[¶]	1.57	11.11*	2.52	4.98
Participate in a policy meeting at departmental / ward level as an advisor (linked or not linked to the domain of specialization)	39 (67.2)	26 (43.3)	34 (56.7)	2.33	NA	2.66	34.80*	NA	3.60
Participate in a policy meeting as an advisor linked to the domain of specialization and advise your supervisors on care related aspects	50 (86.2)	49 (81.7)	11 (18.3)	NA	NA	NA	9.44*	4.18	2.91
Develop domain-specific guidelines / protocols	58 (98.3)	57 (95.0)	3 (5.0)	NA	NA	NA	NA	0.06*	NA
Develop quality criteria and/or actively participate in quality systems	48 (82.8)	38 (63.3)	22 (36.7)	0.34	NA	4.45*	2.79	NA	NA
Extend and maintain relevant contacts with APNs/AMPs and co-workers in other hospitals	52 (89.7)	51 (85.0)	9 (15.0)	NA	NA	NC[§]	67.50*	NA	NA
Extend and maintain relevant contacts with home care organizations	42 (71.2)	29 (48.3)	31 (51.7)	NA	NA	NA	4.14*	3.00	3.11
Actively participate in governmental working groups	43 (74.1)	20 (33.3)	40 (66.7)	NA	2.80	2.41	NA	NA	NA
Extend and maintain relevant contacts with and actively participate in national professional associations	47 (81.0)	39 (66.1)	20 (33.9)	1.01	NA	1.34	18.49*	NA	3.93
Extend and maintain relevant contacts and actively participate in international professional associations	41 (70.7)	20 (33.3)	40 (66.7)	NA	NA	NA	0.17*	NA	NA

Participate in national advisory councils	36 (62.1)	14 (23.3)	46 (76.7)	NA	NA	1.95	8.14	NA	2.57
Participate in international advisory councils	32 (55.2)	6 (10.0)	54 (90.0)	NA	NA	NA	0.22	NA	NA
Extend and maintain relevant contacts with university colleges	48 (81.4)	41 (68.3)	19 (31.7)	NA	1.74	NA	48.72*	NA	NA
Extend and maintain relevant contacts with universities	48 (82.8)	37 (61.7)	23 (38.3)	NA	NA	1.19	25.45*	NA	NA
Extend and maintain relevant contacts with patients' associations	41 (70.7)	23 (38.3)	37 (61.7)	NA	4.75*	2.31	NA	NA	3.15
Participate in external education programs (e.g. teach in bachelor or master programs)	51 (86.4)	43 (71.7)	17 (28.3)	13.01*	NA	2.40	11.06	NA	NA
Care-related consultancy at the request of external organizations (e.g. expertise-related participation in a working group in another hospital)	46 (79.3)	23 (38.3)	37 (61.7)	NA	NA	0.33*	NA	NA	NA
Change management and innovation									
Detect and analyze gaps / bottlenecks in domain-specific care	55 (91.7)	53 (88.3)	7 (11.7)	NA¶	NA	NA	6.50	3.03	NA
Initiate / design quality improvement strategies	56 (93.3)	56 (93.3)	4 (6.7)	NA	NA	NA	27.00*	NA	NA
Implement quality improvement strategies / testing care innovations	54 (91.5)	52 (86.7)	8 (13.3)	NA	NA	NC§	41.32*	NA	6.39
Evaluate and monitor quality improvement strategies	55 (93.2)	52 (86.7)	8 (13.3)	0.17	NA	NA	16.90*	NA	NA
Actively contribute to domain-specific care innovation on the basis of substantive expertise	57 (95.0)	57 (95.0)	3 (5.0)	NA	NA	NA	11.31	15.41*	NA
Research									
Initiation of domain-specific nursing / midwifery research	55 (93.2)	42 (68.9)	19 (31.1)	NA	NA	NA	5.93	NA	4.52*
Write research proposals for the acquirement of external / internal scientific research funds	36 (61.0)	21 (34.4)	40 (65.6)	2.10	NA	2.80	24.70*	NA	NA
Conduct / assist in domain-specific nursing / midwifery research	56 (93.3)	48 (78.7)	13 (21.3)	4.39*	NA	NA	NA	NA	2.23
Conduct / assist in multidisciplinary scientific research	52 (88.1)	39 (65.0)	21 (35.0)	3.11	NA	5.64*	26.91*	NA	NA
Conduct / assist in clinical scientific research (e.g. medication trials)	39 (66.1)	25 (41.0)	36 (59.0)	NA	2.20	NA	NA	0.49	NA
Read and critically appraise (inter)national scientific literature to substantiate	58 (100)	53 (88.3)	7 (11.7)	NA	NA	NA	NC	NA	NA

	(n, %)			(a)	(b)	(c)	(d)	(e)	(f)
the evidence basis for the own practice									
Summarize a large amount of scientific literature (e.g. for a literature review)	52 (89.7)	32 (53.3)	28 (46.7)	NA	NA	NA	0.15	NA	NA
Translate scientific literature into practice	56 (94.9)	48 (80.0)	12 (20.0)	NA	0.37	NA	10.64	2.01	NA
Disseminate scientific literature / knowledge to co-workers and in the organization in a targeted manner	53 (91.4)	49 (81.7)	11 (18.3)	NA	0.00	NA	NC	NA	NA
Guide master students in the context of their education (e.g. master thesis)	48 (84.2)	44 (73.3)	16 (26.7)	11.63*	NA	2.90	80.91*	NA	NA
Guide bachelor students in the context of their education (e.g. bachelor thesis)	53 (96.4)	45 (81.8)	10 (18.2)	NA	NA	NA	NA	NA	NA
Publish (own) research results in international, peer-reviewed journals	34 (58.6)	18 (30.5)	41 (69.5)	2.61	NA	7.15*	2.93	NA	NA
Publish (own) research results in other journals	38 (65.5)	23 (38.3)	37 (61.7)	8.27*	NA	8.94*	11.46*	NA	1.15
Present (own) research results (e.g. at a congress, symposia)	45 (76.3)	33 (55.0)	27 (45.0)	19.97*	NA	11.30*	30.26*	NA	NA

[†]The first authors translated the instrument from Dutch into English for publication purposes only. No validation of the translation was performed.

[‡]APN: advanced practice nurse; AMP: advanced midwife practitioner

Reference categories: [(a)] working in a peripheral hospital; [(b)] position appointment percentage ≤ 50%; [(c)] number of years of work experience as an advanced practitioner ≤ 5 years; [(d)] feeling incompetent for task execution; [(e)] financing source is a doctor or medical head of department; [(f)] a doctor or medical head of department is (one of the) hierarchical supervisor(s) of the APN/AMP.

[¶]NA (not applicable) due to $p \geq 0.25$ for independent variable in univariate logistic regression analysis.

[§]NC (not calculated) due to the low frequency of the independent variable.
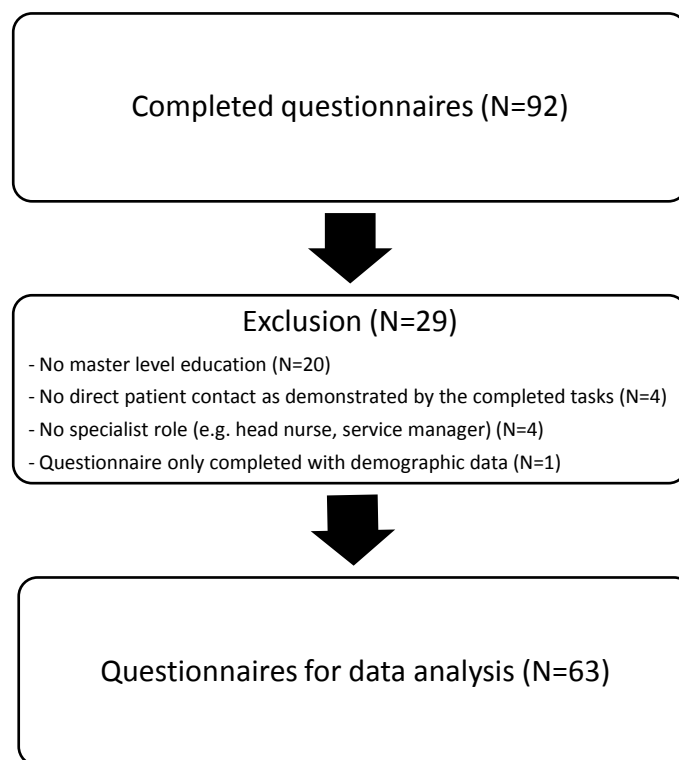
*$p < 0.05$; **$p < 0.001$

Figure 1 Flowchart of participant selection process for data analysis

Legal, policy and economic context

- National accreditation and re-accreditation requirements
- Lack of opportunities to work at strategic level
- Insufficient resources (e.g. financial/IT/library access)
- Clarity in leadership role incl. at organizational and strategic level
- **Physician as financing source**
- ...

Practice patterns

- **Type of healthcare setting (university hospital)**
- Reporting structure at director level
- Leadership opportunities/participation in organizational committees
- Networking opportunities within organization and with external groups
- Large clinical caseload
- Research support / links
- Lack of time/support for research
- ...

Workforce issues

- **Type of hierarchical supervisor**
- Lack of authority position within organization
- **Position appointment percentage**
- Lack of support from nursing management/medical consultants/clinical staff
- Mentoring/support from senior managers
- **Number of years of APN/AMP experience**
- Lack of 'critical APN/AMP mass' / lone APN/AMP position
- Multiple APNs/AMPs
- Lack of clerical/administrative support
- Administration support
- ...

Education

- Lack of leadership skill development / education
- MSc level education
- Lack of clarity and understanding of leadership and research role
- Lacking APN/AMP attributes
- Personal leadership attributes
- **Perceived competency for task execution**
- ...

Right-hand categories:

- Clinical expertise, expert guidance and coaching
- Research
- Clinical and professional leadership
- Change management and innovation
- Nurse/midwife consultation and consultancy
- Multidisciplinary cooperation and coordination of care
- Ethical decision-making