



The integration of new nurse practitioners into care of older adults: A survey study

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Abstract

Aims and objectives: To assess Norwegian advanced geriatric nurses' (AGNs) use of their knowledge and skills, and factors that may influence AGNs' opportunities to use their knowledge and skills to reach their full potential.

Background: Despite the need for nurses with advanced knowledge and skill in the care of older adults, the introduction of new advanced nursing roles has been challenging. Countries in the process of establishing advanced roles need to monitor and identify possible implementation issues.

Design: A cross-sectional descriptive survey.

Methods: We invited the total population of AGNs in Norway ($n = 26$) and some of their colleagues ($n = 465$) to answer an online questionnaire. Twenty-three (88.5%) of the AGNs and 195 (42.0%) of the invited colleagues completed and submitted the questionnaires. The data were analysed with descriptive statistics. STROBE guidelines were used in reporting this study.

Results: Of the AGNs, 16 (69.6%) used their knowledge and skills to their full potential when providing direct care. However, a minority used their knowledge and skills to their full potential when providing indirect care ($n = 11$, 47.8%), teaching/supervision ($n = 11$, 47.8%) and coordination ($n = 5$, 21.8%). A total of 47 (24.1%) colleagues experienced the AGNs' scope of practice as completely clear and 52 (26.6%) collaborated with the AGNs several times a week. Of the colleagues, 131 (67.2%) considered the AGNs' role and scope of practice contributed positively to a high degree to health service for older adults.

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3 **Conclusion:** The results indicate the need for greater focus on organisational adjustment for
4 the AGNs to utilise their knowledge and skills to their full potential.
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7 **Relevance to clinical practice:** There is a need for greater focus on organisational adjustment
8 to integrate AGNs at the workplace, as complete integration may improve the AGNs' use of
9 their knowledge and skills.
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15 **KEYWORDS:** Advanced Nursing, Knowledge, Nurse Practitioners, Nurse Roles, Survey
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For Peer Review

What does this paper contribute to the wider global clinical community?

- Nurse practitioners who specialise in the care of older adults use their knowledge and skills to their full potential related to direct care. However, they do not use their knowledge and skills to their full potential related to indirect care, teaching/supervision and coordination.
- Nurse practitioners who specialise in the care of older adults believe that there is a need for organisational adjustments for them to use their knowledge and skills to their full potential.
- Nurse practitioners who specialise in the care of older adults are not fully integrated into their field of practice.

Introduction

Globally, there is a trend towards strengthening primary care by introducing highly qualified nurses who are able to provide specialised healthcare to older adults (Maier, Aiken, & Busse, 2017) and decreasing the length of stay in hospitals (OECD, 2013). Older adults often have multifaceted care requirements due to complex and interrelated health problems (Ruiz, Bottle, Long, & Aylin, 2015). Shorter hospital stays result in patients being discharged “quicker and sicker” than before and are thus at an earlier stage of the rehabilitation process (LeClerc, Wells, Craig, & Wilson, 2002; Qian, Russell, Valiyeva, & Miller, 2011). The multimorbidity and early discharge from hospitals have led to increased demands on a primary care system that is often fragmented and staffed with employees with varying degrees of education (Maier et al., 2017). To meet these demands and the need for coordination of services within the primary care system, nurses’ roles and clinical practice have been expanded by advancing nurses’ skills and knowledge through the development of advanced practice nurse roles (Laurant et al., 2018; Maier et al., 2017). **This study explores the introduction of nurse practitioners into care of older adults in Norway.**

Background

There is no common understanding of the role of advanced practice nurses and there is variation in the education, regulation, licencing and credentialing requirements (Heale & Rieck Buckley, 2015). Still, the International Council of Nurses (2015) has offered the following definition of advanced practice nursing independent of field of practice:

A Nurse Practitioner/Advanced Practice Nurse is 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

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3 country in which s/he is credentialed to practice. A master's degree is recommended
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5 for entry level (International Council of Nurses, 2015, para. 2).
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9 To meet the need for qualified nurses in the care of older adults with complex health care
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11 needs, the University of Oslo, Norway started a master's degree programme in advanced
12
13 practice nursing in 2011. The graduates, entitled Advanced Geriatric Nurses (AGNs) comply
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15 with the definition from the International Council of Nurses (2015), and have a specific focus
16
17 on the complex care for older adults.
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21 Nurse practitioners caring for older adults need **advanced** knowledge and skills **in order to be**
22
23 **prepared for managing complex patient situations and for extended roles and functions. In line**
24
25 **with advanced practice nursing internationally, the AGNs are prepared for extended roles both**
26
27 **with regard to** direct and indirect care, teaching/supervision and coordination functions
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29 (Bentley et al., 2015; Delamaire & Lafortune, 2010; G. Gardner et al., 2010; Henni,
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31 Kirkevold, Antypas, & Foss, 2018; Kennedy-Malone, Penny, & Fleming, 2008; Martin-
32
33 Misener et al., 2015). During their education, the AGNs gain **advanced** theoretical and
34
35 practical knowledge and skills related to **these** different functions focusing on the specific
36
37 health challenges associated with older adults. **They attend courses on** the normal aging
38
39 process, pathophysiology and medical treatment, physical assessment skills **and**
40
41 pharmacology. **Furthermore, they are prepared to provide advanced direct and indirect** acute
42
43 and subacute care, **disease prevention and** health promotion related to public and individual
44
45 health, **and rehabilitation and palliative care. They also attend** courses addressing **laws,**
46
47 **reforms and regulations related to care of older adults as well as** research and development
48
49 work. The AGNs are taught comprehensive nursing care to older adults with different health
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51 challenges as well as medical care by independently examining, assessing and treating the
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53 care needs of older adults. The AGNs also learn to supervise colleagues and students in
54
55 challenging patient cases, teach colleagues and students fixed subjects, guide/teach patients
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3 and next of kin, and coordinate care between health professions both within and outside the
4 organisation of employment by setting up a multidisciplinary treatment plan and to manage
5 patient cases.
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11 Despite the need for nurses with a wide range of knowledge and skills to meet the needs of
12 older adults (Bing-Jonsson, Bjork, Hofoss, Kirkevold, & Foss, 2015; Kiljunen, Valimaki,
13 Kankkunen, & Partanen, 2017), research has found that nurse practitioners in these new roles
14 express that they are not able to practice to their full potential (Henni et al., 2018; Poghosyan
15 et al., 2013). One possible explanation for the inability to practice is related to a lack of
16 integration into their work situation.
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26 Andregard and Jangland (2015) show that it is a complex process to integrate the new nurse
27 practitioners role into an existing workplace. A nurse practitioner is integrated at the
28 workplace when they are included in the routine care provided (Maier et al., 2017). In this
29 study, we assume that integration is related to the degree to which colleagues of the AGNs
30 have knowledge about the AGNs' role and scope of practice, draw on the AGNs' expertise
31 through collaboration and see AGNs as partners who contribute to health services
32 (Contandriopoulos et al., 2015; Maier et al., 2017).
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43 International literature has identified multiple factors that influence integration of nurse
44 practitioners into practice settings (Contandriopoulos et al., 2015; Maier et al., 2017;
45 Sangster-Gormley, Martin-Misener, Downe-Wamboldt, & Dicenso, 2011). A factor that may
46 affect integration is workplace preparation for the introduction of the new nurse practitioner
47 (Bryant-Lukosius, Dicenso, Browne, & Pinelli, 2004; Contandriopoulos et al., 2015;
48 Sangster-Gormley et al., 2011). Involvement of staff members in the planning process of a
49 nurse practitioner's arrival can lead to a common understanding of the role and scope of
50 practice (Contandriopoulos et al., 2015; Sangster-Gormley et al., 2011). Hence, team
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3 consensus on role definition is a factor. Sangster-Gormley et al. (2011) have shown that
4
5 managers can promote integration of the new nurse practitioner by introducing the person to
6
7 staff members and providing information about how the new role fits into the practice setting.
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9 Another factor that may affect integration is the collaborative culture at the workplace, as
10
11 collaboration between the nurse practitioner and staff members can lead to a joint practice
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13 where workers understand each other's roles and contributions (Contandriopoulos et al., 2015;
14
15 Sangster-Gormley et al., 2011). Research has further shown that acceptance and support of
16
17 the new role from managers and staff members is also a factor, as it may influence the nurse
18
19 practitioners' opportunities to practice all dimensions of the role (Contandriopoulos et al.,
20
21 2015; Maier et al., 2017; Sangster-Gormley et al., 2011). The final factor found to affect
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23 integration is whether the workplace is organised in a way that makes it possible for the nurse
24
25 practitioner to meet the care needs of older adults, such as access to resources, collaborative
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27 relationship with a physician and internal communication (Contandriopoulos et al., 2015;
28
29 Maier et al., 2017; Poghosyan et al., 2013).

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31 Nurse practitioners have had a specific role for more than 40 years in Canada and the United
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33 States (American Association of Nurse Practitioners, 2016a; Canadian Nurses Association,
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35 2017). Advanced practice nursing is also expanding in Europe. For instance in the United
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37 Kingdom, the Netherlands and Ireland specific nurse practitioner roles are well established
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39 (Maier et al., 2017; Schober, 2016; Sheer & Wong, 2008). However, nurse practitioner roles
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41 are established to a lesser extent in France, Germany and Nordic countries (Maier et al., 2017;
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43 Schober, 2016; Sheer & Wong, 2008). The lack of formal regulation of the nurse practitioner
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45 role is common in many European countries (Carney, 2016) and is found to be likely to
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47 hamper integration (Maier et al., 2017). The AGNs have expressed in qualitative interviews
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49 that the type of position they had affected their possibilities to develop their role, and many of
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3 them stated that their managers had not done enough to customise an AGN position that
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5 optimised the use of knowledge and skills (Henni et al., 2018).
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9 As it is a political goal to strengthen the care of older adults through nurse practitioners
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11 (Boerma, 2006; Boerma et al., 2015; Kringos et al., 2015; Report to the Storting No. 26.,
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13 2015), there is a need for knowledge about how nurse practitioners who specialise in the care
14
15 of older adults can use their knowledge and skills to their full potential. The degree to which
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17 nurse practitioners use their knowledge and skills may have different reasons. This study
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19 focuses on the degree to which the AGNs are integrated into healthcare settings. According to
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21 Maier et al. (2017), there is a need to pursue more information about the uptake of nurses in
22
23 advanced roles and their knowledge and skills in different countries, as the information about
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25 nurse practitioners in countries without regulation is scarce. Sharing information on the
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27 uptake of nurse practitioners may foster successful uptake of nurse practitioners in countries
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29 that are in the infancy of introducing nurse practitioner roles.
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33 34 **Aim**

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36 To investigate the level of integration of AGN's in their fields of practice, we assess AGNs'
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38 use of their knowledge and skills, and factors that may influence AGNs' opportunities to use
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40 their knowledge and skills to reach their full potential. The specific research questions in this
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42 study were as follows:
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47 • To what degree do AGNs **estimate** that they use their knowledge and skills related to
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49 the following functions: direct and indirect care, teaching/supervision and
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51 coordination?
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55 • What factors do the AGNs believe influence their opportunities to use their knowledge
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57 and skills to their full potential?
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- What relationship are there between the AGNs position and their reported use of their knowledge and skills related to the following functions: direct and indirect care, teaching/supervision and coordination?
- To what degree are AGNs integrated at their workplaces, measured through their colleagues' knowledge about the AGN role and scope of practice, collaboration between colleagues and AGNs, and colleagues' opinions of whether the AGNs contribute positively to health services?

Methods

Design

This study had a cross-sectional descriptive survey design (Siedlecki, Butler, & Burchill, 2015). We used STROBE guidelines for cross-sectional studies in reporting this study (see Supplementary File 1).

Sample

The master's degree programme in advanced practice nursing at the University of Oslo is a new education in Norway, and the total population of AGNs is just 26. The total population of AGNs were invited by email to participate in the study during autumn 2017. They were asked to provide their workplace and their manager's contact information, so a sample of the AGNs' colleagues could be invited to participate in the study. Twenty-four AGNs provided information. One of the AGNs did not want to participate in the study, while another AGN wanted to participate in the study but did not want the colleagues to participate. Three of the AGNs that provided information did not work clinically at the time of data collection, but were instructors at nursing education programmes or involved in research. However, they had worked clinically after they graduated as an AGN and were therefore also included in the

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3 study. Twenty-one AGNs that provided information worked in clinical positions at 19
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5 different workplaces. To optimise the strategy for the recruitment of colleagues, possibilities
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7 were discussed with some of the managers and the AGNs who worked in clinical positions.
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9 There was consensus that most colleagues would answer the questionnaire if they were
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11 recruited by their manager. Furthermore, the managers judged they had the capacity to recruit
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13 a maximum of 30 persons. We emailed the managers a formal enquiry, asking them to recruit
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15 30 colleagues from the AGNs' workplaces that were willing to answer a questionnaire. We do
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17 not know the number of the total population of colleagues. The managers were asked to
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19 register those who did not want to participate in the study, but only a few of the managers did
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21 report it. For variation in the sample and to recruit colleagues involved in the care of older
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23 adults we provided managers with the following inclusion criteria for the selection of
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25 colleagues:
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31 • Persons must be involved in the care of older adults in the municipality/institution
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33 where the AGN works.
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35 • The sample should include participants from all system levels and with different job
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37 titles.
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39 • There should be a minimum of one to two persons from all health professions
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41 involved in the care of older adults at the workplace.
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47 Sixteen of the managers participated in recruiting colleagues either personally or by
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49 delegating the task. Four of the managers did not manage to recruit 30 persons due to scarce
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51 capacity and lack of persons to recruit. At five workplaces, more than 30 colleagues were
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53 recruited. In total 465 colleagues were recruited to the study.
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Data collection

At the beginning of January 2018, 25 AGNs and 465 colleagues were emailed a hyperlink forwarding them to a questionnaire. Follow-up reminders were sent by email two, four and six weeks after the initial email, and data collection was finished 12 weeks after the first email. In the last reminder managers and AGNs were asked to encourage people to respond. AGNs who did not currently work in a clinical position were asked to answer the questions based on their previous clinical experiences as an AGN.

The questionnaires

The research team conducted a literature search to identify existing psychometrically tested questionnaires within the research area, but did not identify any such questionnaire. The research team therefore developed one questionnaire for the AGNs and another questionnaire for their colleagues. The questionnaires consisted of three sections. The two questionnaires were designed to match within the sections, but the wording of the questions was adjusted to match each target group. This study have used data from section one from both questionnaires, section two from the AGN questionnaire and section three from the colleague questionnaire.

The questions from the first section describes the respondents' gender, age, job title/position, years worked in current position and work hours. In section two, the AGNs were asked to estimate the degree they used their knowledge and skills related to different functions. In line with international policies for advanced nursing practice, the educational program stressed that AGNs should have their own patient load. Therefore, we explored how the AGNs used their new knowledge and skills related to both direct and indirect care. Furthermore, we explored how they used their knowledge and skills related to teaching/supervision and coordination (one question per function). The response options were: "To a high degree", "To some degree", "To a low degree", "Absolutely not". The different functions were

operationalised into more specific questions of the AGNs activities as shown in Table 1. However, the context-specific nature of nursing combined with the need to avoid that the questionnaires became too long, made it impossible to operationalise all the activities at the same level of specification. Some of the activities are therefore described as broad patient situations reflecting the educational orientation of the AGN program. We also included specific tasks related to extended roles and functions. All the included activities are based upon literature describing common tasks for nurse practitioners internationally (American Association of Nurse Practitioners, 2016b; Bentley et al., 2015; Delamaire & Lafortune, 2010; G. Gardner et al., 2010; International Council of Nurses, 2015; Kennedy-Malone et al., 2008; Martin-Misener et al., 2015). We judged this to be appropriate as the aim of the questionnaires was to explore the use of knowledge and skills acquired during their education, not to describe the AGNs specific work performance.

In section two in the questionnaire, the AGNs were also asked about reasons for not using their knowledge and skills to a high degree. The question had seven different reasons as response options (with a possibility to select more than one option), in addition to a free text field where the AGNs could write down their answer in their own words (the response options are presented in Table 4). The third section covered integration of AGNs in healthcare settings, measured through colleagues' knowledge about the AGN role and scope of practice, collaboration between colleagues and AGNs, and colleagues' opinions of whether the AGNs contribute positively to health services. The specific questions with response options are presented in Table 6. The data that are not used in this study will be used in another study exploring the AGNs scope of practice.

The entire research team reviewed the questionnaires for content and face validity. Only questions and response categories that reached 100% consensual validation by the research team were retained. In the next step, two AGNs tested the AGN questionnaire and one

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3 manager, one physician, one registered nurse, one auxiliary nurse and one assistant tested the
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5 colleague questionnaire for face and content validity. The testers were instructed to give
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7 feedback on whether the questions and response categories were comprehensible, relevant,
8
9 and appropriate, whether the questionnaires were easy to fill out and if they contained
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11 ambiguous questions and or response categories. The testers were also asked to give feedback
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13 on the wording of the questionnaire and whether additional relevant questions and or response
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15 categories were missing. A few questions in the questionnaires were slightly changed as a
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17 consequence of the testers' responses. Once again, only question and response categories that
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19 reached 100% consensual validation by the whole research team were retained.
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23 24 **Ethical considerations**

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26 Participation in the study was voluntary. Submission of the questionnaires was considered
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28 consent for participation. The study received ethical approval from the Norwegian Centre for
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30 Research Data (project number: 46618).
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33 34 **Data analysis**

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36 The respondents had to answer all the questions to submit the questionnaire online. Missing
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38 data were therefore not a problem and all submitted questionnaires were included in the
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40 analysis. The first author prepared the data for analysis by inspecting the data for errors and
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42 irregularities. The majority of the answers in the free text field of the question regarding
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44 reasons for lack of use of knowledge and skills, seemed to correspond well to already existing
45
46 response options. Therefore, they were coded to the corresponding existing option for the data
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48 analysis.
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54 The data were analysed using R version 3.4.4 (R Core Team, 2018). A descriptive data
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56 analysis of all variables was conducted by calculating the mean and SD of the continuous
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58 variables and the frequency and percentage distribution of the categorical variables. A series
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3 of cross-tabulations, Fisher's exact test and Kruskal-Wallis test were conducted to identify if
4
5 it was possible to identify a pattern between the AGNs' position and the AGNs' reported use
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7 of their knowledge and skills. We divided the colleagues into three groups by their job title to
8
9 see whether there were differences in what they reported regarding different variables. One
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11 group consisted of managers and leaders and another group of registered and specialist nurses.
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13 The last group are named "other colleagues" and consists of physicians, occupational
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15 therapists, physical therapists, auxiliary nurses, assistants, executive officers and colleagues
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17 who had job titles other than those included in the three groups. Thereafter, a series of cross-
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19 tabulations, Pearson's chi-squared test/Fisher's exact test and Kruskal-Wallis test was
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21 conducted on colleagues' knowledge about the AGNs' variables, collaboration variables and
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23 the variable regarding the AGNs' contributions to examine if there were any differences
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25 among the three groups of colleagues. We have conducted both Pearson's chi-squared
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27 test/Fisher's exact test and Kruskal-Wallis test because the Pearson's chi-squared test/Fisher's
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29 exact test tests associations between the variables, while the Kruskal-Wallis test tests
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31 differences between the groups. Analyses with a *p*-value lower than 0.05 were considered
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33 statistically significant.
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42 **Results**

43
44 Twenty-three (88.5%) of the AGNs and 195 (42.0%) of the invited colleagues completed and
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46 submitted questionnaires. Table 2 shows the respondents' demographic characteristics. Nine
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48 (39.1%) of the AGNs had a designated AGN-position and the rest had positions as leaders,
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50 specialist nurses or staff nurses.
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53 **AGNs' use of their knowledge and skills related to different functions**

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55 The degree to which the AGNs use their knowledge and skills related to different functions
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57 was examined (Table 3). The analysis showed that more than two thirds of the AGNs
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3 expressed that they used their knowledge and skills to their full potential when providing
4 direct care. Almost half of the AGNs claimed to use their knowledge and skills to their full
5 potential when providing indirect care and teaching/supervision. Looking at the coordination
6 function, under a quarter of the AGNs stated that they used their knowledge and skills to their
7 full potential. Only a few of the AGNs reported that they did not use their knowledge and
8 skills related to different functions at all. Almost all of the AGNs stated that they used their
9 knowledge and skills to some degree or higher when providing direct and indirect care,
10 teaching/supervision and coordination.
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21 22 **Factors AGNs believe influence opportunities to use their knowledge and skills**

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24 Over half of the AGNs stated that the way the workplace was organised influenced their
25 opportunities to use their knowledge and skills, while other factors were identified by only a
26 few respondents (Table 4). Looking at the cross-tabulation of results we did not observe a
27 relationship between having a designated AGN position and the AGNs' use of knowledge and
28 skills in relation to direct care and coordination (Table 5). The results do, however, show a
29 significant relationship between position and the use of knowledge and skills related to
30 indirect care (Fisher's exact test: $p = 0.046$, Kruskal-Wallis test: $H(1) = 6.024$, $p = 0.014$).
31
32 There also seems to be a relationship between position and the use of knowledge and skills
33 related to teaching/supervision, as the Fisher's exact test shows a nearly significant
34 relationship ($p = 0.052$) and the Kruskal-Wallis test shows a significant relationship ($H(1) =$
35 5.754 , $p = 0.016$). The degree to which the AGNs used their skills and knowledge in these
36 areas was higher among responders with a designated AGN position than those in other
37 positions.
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Integration of AGNs in the workplace

The cross-tabulation of results showed no significant differences between job title when it came to colleagues' answers regarding their knowledge about the AGN role and scope of practice, collaboration with AGNs and opinion of whether the AGNs contribute positively to the health service of older adults (Table 6). To study colleagues' knowledge about the AGNs we examined whether they knew which nurse was the AGN at their workplace, and found that almost all knew (Table 6). We also examined whether colleagues felt adequately informed about the role and scope of practice of the AGNs. Over half of the colleagues reported that they either had not been informed at all about the role and scope of practice of the AGNs or that the information provided was not sufficient ($n = 109, 55.9\%$). The rest of the colleagues reported that the information provided was sufficient. Just under a quarter of the colleagues experienced the AGNs' scope of practice as completely clear (Table 6). To study collaboration between AGNs and their colleagues, we examined the frequency of collaboration and found that slightly under three quarters of the colleagues collaborated with the AGNs once a week or less (Table 6). We also found that a quarter of the colleagues provided contact between patients and the AGNs to a high degree (Table 6). Finally, over half of the colleagues reported that the role and scope of practice of the AGN contributed positively to the health services for older adults to a high degree (Table 6).

Discussion

The results indicate that AGNs have positions that facilitate the delivery of direct care, as most use their knowledge and skills to their full potential within direct care. This result is in line with the strong emphasis in the educational program of the importance of making the advanced knowledge and skills of AGNs accessible to older patients in need. It is also consistent with previous national (Henni et al., 2018) and international studies (Martin-

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3 Misener et al., 2015; Sangster-Gormley, Martin-Misener, & Burge, 2013; Ter Maten-
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5 Speksnijder, Dwarswaard, Meurs, & van Staa, 2016). Contemporary health policy promotes
6
7 advanced care for frail older adults in the community (World Health Organization, 2015). The
8
9 AGNs' **therefore seem to** use their knowledge and skills in direct care in line with society's
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11 needs.
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14
15 The majority of AGNs expressed **that** they used their knowledge and skills in indirect care to
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17 some degree or higher, though under half of them to a high degree. Nurse practitioners have
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19 stated **that** lack of authority to **order tests**, write prescriptions and lack of legislative support
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21 hinder them in practicing to their full potential (A. Gardner, Gardner, Middleton, & Della,
22
23 2009). **Our results suggest that there is room for improvement in order to fully capitalise on**
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25 **the AGNs' knowledge and skills in this area.**
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29 Looking at the AGNs' function related to teaching/supervision, the majority of AGNs express
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31 that they use their knowledge and skills related to teaching/supervision to some degree or
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33 higher, though under half of them to a high degree. Educational activities for staff members in
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35 primary care is important, as nurses caring for older adults often need more knowledge (Bing-
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37 Jonsson, Hofoss, Kirkevold, Bjork, & Foss, 2016; Kiljunen et al., 2017). Also, many **staff**
38
39 **members** caring for older adults have little or no formal training within healthcare in general
40
41 and within care of older adults in particular (World Health Organization, 2015). Caring for
42
43 older adults is complex (Ruiz et al., 2015), and research has found that nurse practitioners are
44
45 well suited to teach health personnel advanced knowledge and skills within the field of care of
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47 older adults (Perfetto, Holden, & McNabney, 2018; Walsh, Moore, Barber, & Opsteen, 2014).
48
49 Nurse practitioners caring for older adults have a cross-disciplinary perspective and can for
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51 example teach health personnel when and how to seek information from others and what **are**
52
53 **relevant questions to ask** (Perfetto et al., 2018). The AGNs have expressed in qualitative
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55 interviews that health professionals from other disciplines ask them for consultations
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3 regarding the care of older adults (Henni et al., 2018), which indicates that health personnel
4 from different disciplines recognise the AGNs' knowledge and skills and want to learn from
5 them. This may contribute to explain the result that over half of the colleagues considered that
6 the AGNs contributed positively to the health services of older adults.
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13 The majority of AGNs stated that they used their knowledge and skills related to coordination
14 to some degree or higher, but only a few to a high degree. A care and treatment plan for older
15 adults, as well as coordination of multiple care providers, professions, institutions and levels
16 of care, are described as particularly important in improving quality of care for older adults
17 (Donald et al., 2013; Morilla-Herrera et al., 2016). Research has documented that the care of
18 older adults is frequently fragmented, leading to inadequate follow up and care (Lafortune,
19 Huson, Santi, & Stolee, 2015; Melby, Obstfelder, & Helleso, 2018). Adequate use of the
20 knowledge and skills of AGNs might help address the complexity related to geriatric
21 syndromes of multiple and complex chronic conditions, polypharmacy and the social and
22 cognitive frailty of older adults. AGNs may use what they have described as an increased
23 understanding of the organisation of services at their workplace and knowledge and skills
24 within the field of care of older adults, collaboration and coordination to work as case
25 managers and to lead healthcare teams (Delamaire & Lafortune, 2010; Henni et al., 2018;
26 Maier et al., 2017). Our results indicate that the AGNs are not adequately integrated with
27 regard to this function.
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48 When AGNs look at the factors that influence opportunities to use their knowledge and skills
49 to their full potential, the way the workplace is organised is stated as a main barrier. The
50 AGNs have expressed earlier in qualitative interviews that it was important that their
51 workplace was organised in a way that provided them with the opportunity to work
52 independently through a well-defined AGN role and to prioritise which patients were in
53 greatest need of consultation by an AGN (Henni et al., 2018). The importance of
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3 organisational facilitation to integrate a new nurse practitioner role was also pointed out by a
4 recent OECD working group (Maier et al., 2017). Furthermore, qualitative interviews with
5 AGNs also indicate that it is important that the workplace is organised in a way that fosters
6 collaboration between AGNs and their colleagues, especially with physicians, and that the
7 AGNs have the opportunity to demonstrate their knowledge to their colleagues so that the
8 colleagues would understand how AGNs could contribute to the care of older adults (Henni et
9 al., 2018). In Norway, the manager at each workplace can decide themselves how the AGN's
10 position should be in order to fulfil the needs at the workplace, which is consistent with
11 practice in the United Kingdom (Maier et al., 2017). Maier et al. (2017) have shown that lack
12 of regulation of positions often leads to confusion or lack of knowledge about the nurse
13 practitioners' scope of practice, and this lack of role clarity can result in poor utilisation of the
14 nurse practitioners' knowledge and skills. Our results indicate that it may be favourable to
15 have a designated AGN position in order to use the AGN's knowledge and skills related to
16 indirect care and teaching/supervision in an effective way. The results indicate, however, that
17 a designated AGN position is not equally necessary in order to use their knowledge and skills
18 related to direct care. This is consistent with results from qualitative interviews with the
19 AGNs (Henni et al., 2018).

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43 The last research question concerned the integration of AGNs, as measured through the
44 colleagues' knowledge about the AGN role and scope of practice, collaboration between
45 colleagues and AGNs, and colleagues' opinions of whether the AGNs contribute positively to
46 health services. Our results indicate that the scope of practice of the AGNs is not clear to a
47 majority of their colleagues, which is not an uncommon finding in the literature
48 (Contandriopoulos et al., 2015; Henni et al., 2018; Maier et al., 2017; Sangster-Gormley et al.,
49 2011). Clarity of the new role and the relationship with physicians and managers are among
50 the factors found to be of vital importance for the uptake of a new professional role (Maier et
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3 al., 2017). Only a small proportion of colleagues reported they collaborated weekly with the
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5 AGNs and routinely provided contact between the older adults and the AGN. One way of
6
7 interpreting the low rate of collaboration is that colleagues were not used to having an AGN
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9 in their workplace, and changing practices is known to take time (Lau et al., 2016). **Improving**
10
11 **the information to colleagues about the AGN role could speed up this process.**

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15 Even though **a majority of the** colleagues of **the** AGNs **claim to** not have adequate knowledge
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17 about the AGN role and do not collaborate with AGNs often, they report **that** the role and
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19 scope of practice of the AGN contributes positively to health services for older adults. This
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21 positivity can be interpreted as an acknowledgement of the need for a person that has
22
23 expanded knowledge and skills within the field of care of older adults. **Furthermore, just**
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25 **above 44% reported having received sufficient information about the AGN role and scope of**
26
27 **practice and almost all of the colleagues knew who the AGN in their workplace was. Most of**
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29 **the colleagues who had reported that they had received sufficient information also reported**
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31 **that the role and scope of practice of the AGN contributed positively to health services for**
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33 **older adults to a high degree. This indicates some degree of familiarity with the AGN role and**
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35 **how it contributes to health services for older adults among the colleagues, e.g. through more**
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37 **timely and precise communication with physicians and other healthcare professionals and**
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39 **better follow up of the health condition and treatment in home care and nursing homes.**
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41 **Another possible interpretation may be that the colleagues experienced that introduction of an**
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43 **AGN at their workplace did not generate redundancies and conflicts among the colleagues,**
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45 **contrary to previous research that has found that introduction of new nurse practitioner roles**
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47 **often leads to tension between healthcare professionals (Contandriopoulos et al., 2015;**
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49 **Sangster-Gormley et al., 2011).**

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52 The overall result of this study indicates **that** the uptake of the AGNs' role in their workplace
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54 is not yet complete and the AGNs **are** not fully integrated. Maier et al. (2017) suggests **that**
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3 process evaluation research is needed for the integration of new nurse practitioner roles to
4 understand the characteristics important to an organisation for successful integration. The
5 process evaluation might benefit from international cooperative research, as many countries
6 struggle with the same barriers.
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12 **Methodological considerations**

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15 The study has some methodological limitations that may affect the results. Our goal was that
16 inclusion of the total population of AGNs in Norway and criteria for selection of the
17 colleagues should result in a sample that was representative of the total population of AGNs
18 and their colleagues. However, the recruiters managed to recruit fewer colleagues than
19 anticipated and under half responded to the questionnaire. We do not have information about
20 the characteristics of those who refused to participate in the study and therefore we cannot be
21 sure that the sample of colleagues are representative of the total population. Furthermore, the
22 recruiters were asked to include colleagues regardless of whether they knew the AGNs or not
23 in order to provide a realistic picture of the integration of AGNs in their work setting.
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36 However, we have no data to tell us if health professionals that do not know of AGNs have
37 been included in the recruitment of colleagues. According to email and phone correspondence
38 between the recruiters and the first author, it seems that most followed the criteria strictly.
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43 However, we observed deviations as some seem to have recruited random persons who were
44 present at the workplace at the time they decided to recruit participants to the study, or
45 recruited persons they knew had collaborated with the AGN. If all the recruiters followed the
46 inclusion criteria strictly, there might have been more colleagues that reported they did not
47 have knowledge of the AGNs' role and scope of practice, more colleagues that had not
48 collaborated with the AGNs and more colleagues that did not consider the AGNs a positive
49 contribution to health services.
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3 The question regarding the degree to which AGNs use their knowledge and skills related to
4 different functions must be interpreted with caution. In any health profession there would
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6 always be functions that are more prominent than others depending, among other things, on
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8 the specific healthcare context and the uptake of the role. We have therefore discussed the
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10 AGNs' estimation of their use of knowledge and skills related to different functions and
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12 compared this with what research has shown to be important functions in the care of older
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14 adults and health policy promotion. As pointed out in the description of the questionnaires,
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16 the different functions are not all operationalised at the same level of specificity. The
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18 vagueness of some of the activities may have affected the validity of the questionnaires. The
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20 broad patient situations may have generated differences in the AGNs' interpretation, which in
21
22 turn can affect the AGNs' estimation of the use of knowledge and skills related to the
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24 different functions. However, the questionnaires were pilot tested and reviewed for content
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26 and face validity and none of the testers expressed confusion about what was meant by the
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28 functions. Still, we acknowledge that the broad and partial operationalisation of the functions
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30 may generate different associations. The main focus of the study is integration measured
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32 through the AGNs' use of knowledge and skills estimated by the AGNs themselves and their
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34 colleagues' knowledge about the AGN role and scope of practice, collaboration between
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36 colleagues and AGNs, and colleagues' opinions of AGNs contribution to health services. We
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38 therefore argue that our results are relevant as they provide knowledge of the level of
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40 coherence between use of nurse practitioners' knowledge and skills and factors that influence
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42 integration of nurse practitioners.
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53 **Conclusion**

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56 A range of challenges, including those related to the complex care needs of older adults, have
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58 led countries to introduce nurse practitioners into the health care system, especially in primary
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3 care (Maier et al., 2017). Nursing practice has been acknowledged by policy makers to be
4 important in increasing quality of care (Laurant et al., 2018; Maier et al., 2017). This study
5 confirms that not only policy makers, but also health professionals believe that nurse
6 practitioners specialised in the care of older adults make a positive contribution in enhancing
7 the quality of care for this vulnerable group.
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12 As demonstrated with nurse practitioners and other advanced practice nurse roles (Maier et
13 al., 2017), the results of this study indicate that optimal integration of AGNs rely on a clear
14 and regulated definition of the scope of practice of AGNs that is in line with the advanced
15 level of their knowledge and skills. Countries regulating the level and content of education
16 and the scope of practice at a national or a central level are achieving greater role clarity,
17 integration and use than countries with decentralised regulations (Maier et al., 2017). The
18 results of this study provide reasons to believe this principle is highly relevant for AGNs.
19 Different socio-political and professional forces have shaped and will continue to shape
20 further development of the AGN role. The results in this study indicate that in order to utilise
21 the full potential of advanced nursing roles for older adults, there is a need to establish
22 regulations at a central level and focus on organisational adjustments that will enhance the
23 integration of these roles.
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44 **Relevance to clinical practice**

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46 The AGNs use, to a varying degree, their knowledge and skills. Still, there is room for
47 enhanced use of their knowledge and skills through improved integration of AGNs in health
48 services for older adults. In order for AGNs to use their knowledge and skills to their full
49 potential, organisational adjustments for the new role must be implemented at the workplace.
50 Establishment of designated and well-regulated AGN positions with clear descriptions of role
51 and scope of practice could enable the AGN's enhanced use of their specific knowledge and
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3 skills, and could also provide a clearer understanding of the new AGN role and a better
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5 integration in local settings.
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References

- American Association of Nurse Practitioners. (2016a). Historical timeline. Retrieved from <https://www.aanp.org/all-about-nps/historical-timeline>
- American Association of Nurse Practitioners. (2016b). What's an NP? Retrieved from <https://www.aanp.org/all-about-nps/what-is-an-np>
- Andregard, A. C., & Jangland, E. (2015). The tortuous journey of introducing the nurse practitioner as a new member of the healthcare team: A meta-synthesis. *Scandinavian Journal of Caring Sciences*, 29(1), 3-14. doi:10.1111/scs.12120
- Bentley, M., Minstrell, M., Bucher, H., Sproule, L., Robinson, A., & Stirling, C. (2015). Aged care nurse practitioners working in general practice. *Journal of Clinical Nursing*, 24(23-24), 3745-3747. doi:10.1111/jocn.13066
- Bing-Jonsson, P. C., Bjork, I. T., Hofoss, D., Kirkevold, M., & Foss, C. (2015). Competence in advanced older people nursing: Development of 'nursing older people - competence evaluation tool'. *International Journal of Older People Nursing*, 10(1), 59-72. doi:10.1111/opn.12057
- Bing-Jonsson, P. C., Hofoss, D., Kirkevold, M., Bjork, I. T., & Foss, C. (2016). Sufficient competence in community elderly care? Results from a competence measurement of nursing staff. *BMC Nursing*, 15, 5. doi:10.1186/s12912-016-0124-z
- Boerma, W. G. W. (2006). Coordination and integration in European primary care. In R. B. Saltman, A. Rico, & W. G. W. Boerma (Eds.), *Primary care in the driver's seat? Organizational reform in European primary care* (pp. 3–21). Berkshire, UK: Open University Press.
- Boerma, W. G. W., Bourgueil, Y., Cartier, T., Hasvold, T., Hutchinson, A., Kringos, D. S., & Kroneman, M. (2015). Overview and future challenges for primary care. In D. S. Kringos, W. G. W. Boerma, A. Hutchinson, & R. B. Saltman (Eds.), *Building primary care in a changing Europe* (pp. 119–134). Copenhagen (Denmark): European Observatory on Health Systems and Policies.
- Bryant-Lukosius, D., Dicenso, A., Browne, G., & Pinelli, J. (2004). Advanced practice nursing roles: Development, implementation and evaluation. *Journal of Advanced Nursing*, 48(5), 519-529. doi:10.1111/j.1365-2648.2004.03234.x
- Canadian Nurses Association. (2017). Nurse Practitioners - Untapped resource. Retrieved from https://cna-aiic.ca/-/media/cna/page-content/pdf-en/nurse-practitioners_untapped-resource.pdf?la=en&hash28E6BD0019F663E05DE8567640D41D9EF2A1DA82
- Carney, M. (2016). Regulation of advanced nurse practice: Its existence and regulatory dimensions from an international perspective. *Journal of Nursing Management*, 24(1), 105-114. doi:10.1111/jonm.12278
- Contandriopoulos, D., Brousselle, A., Dubois, C. A., Perroux, M., Beaulieu, M. D., Brault, I., . . . Sangster-Gormley, E. (2015). A process-based framework to guide nurse practitioners integration into primary healthcare teams: Results from a logic analysis. *BMC Health Services Research*, 15, 78. doi:10.1186/s12913-015-0731-5
- Delamaire, M.-L., & Lafortune, G. (2010). *Nurses in advanced roles: A description and evaluation of experiences in 12 developed countries*. Paris: OECD Publishing.
- Donald, F., Martin-Misener, R., Carter, N., Donald, E. E., Kaasalainen, S., Wickson-Griffiths, A., . . . DiCenso, A. (2013). A systematic review of the effectiveness of advanced practice nurses in long-term care. *Journal of Advanced Nursing*, 69(10), 2148-2161. doi:10.1111/jan.12140

- 1
2
3 Gardner, A., Gardner, G. E., Middleton, S., & Della, P. R. (2009). The status of Australian
4 nurse practitioners: The first national census. *Australian Health Review*, 33(4), 679-
5 689.
- 6 Gardner, G., Gardner, A., Middleton, S., Della, P., Kain, V., & Doubrovsky, A. (2010). The
7 work of nurse practitioners. *Journal of Advanced Nursing*, 66(10), 2160-2169.
8 doi:10.1111/j.1365-2648.2010.05379.x
- 9 Heale, R., & Rieck Buckley, C. (2015). An international perspective of advanced practice
10 nursing regulation. *International Nursing Review*, 62(3), 421-429.
11 doi:10.1111/inr.12193
- 12 Henni, S. H., Kirkevold, M., Antypas, K., & Foss, C. (2018). The role of advanced geriatric
13 nurses in Norway: A descriptive exploratory study. *International Journal of Older*
14 *People Nursing*, 13(3), e12188. doi:10.1111/opn.12188
- 15 International Council of Nurses. (2015). Definition and characteristics of the role. Retrieved
16 from <http://international.aanp.org/Practice/APNRoles>
- 17 Kennedy-Malone, L., Penny, J., & Fleming, M. E. (2008). Clinical practice characteristics of
18 gerontological nurse practitioners: A national study. *Journal of the American Academy*
19 *of Nurse Practitioners*, 20(1), 17-27. doi:10.1111/j.1745-7599.2007.00275.x
- 20 Kiljunen, O., Valimaki, T., Kankkunen, P., & Partanen, P. (2017). Competence for older
21 people nursing in care and nursing homes: An integrative review. *International*
22 *Journal of Older People Nursing*, 12(3), e12146. doi:10.1111/opn.12146
- 23 Kringos, D. S., Boerma, W. G. W., Bourgueil, Y., Cartier, T., Dedeu, T., Hasvold, T., . . . R.,
24 P. D. (2015). Diversity of primary care systems analysed. In D. S. Kringos, W. G. W.
25 Boerma, A. Hutchinson, & R. B. Saltman (Eds.), *Building primary care in a changing*
26 *Europe* (pp. 103–118). Copenhagen (Denmark): European Observatory on Health
27 Systems and Policies.
- 28 Lafortune, C., Huson, K., Santi, S., & Stolee, P. (2015). Community-based primary health
29 care for older adults: a qualitative study of the perceptions of clients, caregivers and
30 health care providers. *BMC Geriatrics*, 15, 57. doi:10.1186/s12877-015-0052-x
- 31 Lau, R., Stevenson, F., Ong, B. N., Dziedzic, K., Treweek, S., Eldridge, S., . . . Murray, E.
32 (2016). Achieving change in primary care - causes of the evidence to practice gap:
33 Systematic reviews of reviews. *Implementation science*, 11, 40. doi:10.1186/s13012-
34 016-0396-4
- 35 Laurant, M., van der Biezen, M., Wijers, N., Watananirun, K., Kontopantelis, E., & van
36 Vught, A. J. (2018). Nurses as substitutes for doctors in primary care. *Cochrane*
37 *Database Syst Rev*, 7, CD001271. doi:10.1002/14651858.CD001271.pub3
- 38 LeClerc, C. M., Wells, D. L., Craig, D., & Wilson, J. L. (2002). Falling short of the mark:
39 Tales of life after hospital discharge. *Clinical Nursing Research*, 11(3), 242-263.
40 doi:10.1177/10573802011003002
- 41 Maier, C. B., Aiken, L. H., & Busse, R. (2017). *Nurses in advanced roles in primary care:
42 Policy levers for implementation*. Paris: OECD Publishing.
- 43 Martin-Misener, R., Donald, F., Wickson-Griffiths, A., Akhtar-Danesh, N., Ploeg, J., Brazil,
44 K., . . . Taniguchi, A. (2015). A mixed methods study of the work patterns of full-time
45 nurse practitioners in nursing homes. *Journal of Clinical Nursing*, 24(9-10), 1327-
46 1337. doi:10.1111/jocn.12741
- 47 Melby, L., Obstfelder, A., & Helleso, R. (2018). "We Tie Up the Loose Ends": Homecare
48 Nursing in a Changing Health Care Landscape. *Glob Qual Nurs Res*, 5,
49 2333393618816780. doi:10.1177/2333393618816780
- 50 Morilla-Herrera, J. C., Garcia-Mayor, S., Martin-Santos, F. J., Kaknani Uttumchandani, S.,
51 Leon Campos, A., Caro Bautista, J., & Morales-Asencio, J. M. (2016). A systematic
52 review of the effectiveness and roles of advanced practice nursing in older people.
53
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59
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2
3 *International Journal of Nursing Studies*, 53, 290-307.
4 doi:10.1016/j.ijnurstu.2015.10.010
5
6 OECD. (2013). *Health at a Glance 2013: OECD Indicators*. Paris: OECD Publishing.
7 Peretto, C., Holden, M., & McNabney, M. K. (2018). Nurse practitioners as primary
8 educators for medical trainees in geriatric medicine. *Journal for Nurse Practitioners*,
9 14(1), 45-52. doi:10.1016/j.nurpra.2017.10.016
10 Poghosyan, L., Nannini, A., Smaldone, A., Clarke, S., O'Rourke, N. C., Rosato, B. G., &
11 Berkowitz, B. (2013). Revisiting scope of practice facilitators and barriers for primary
12 care nurse practitioners: A qualitative investigation. *Policy, Politics & Nursing*
13 *Practice*, 14(1), 6-15. doi:10.1177/1527154413480889
14 Qian, X., Russell, L. B., Valiyeva, E., & Miller, J. E. (2011). "Quicker and sicker" under
15 Medicare's prospective payment system for hospitals: New evidence on an old issue
16 from a national longitudinal survey. *Bulletin of Economic Research*, 63(1), 1-27.
17 R Core Team. (2018). R: A Language and environment for statistical computing. Retrieved
18 from <https://www.r-project.org/>
19
20 Report to the Storting No. 26. (2015). *The primary health and care services of tomorrow -*
21 *localised and integrated* (Vol. no. 26 (2014–2015)). Oslo: Norwegian Ministry of
22 Health and Care Services.
23
24 Ruiz, M., Bottle, A., Long, S., & Aylin, P. (2015). Multi-morbidity in hospitalised older
25 patients: Who are the complex elderly? *PloS One*, 10(12), e0145372.
26 doi:10.1371/journal.pone.0145372
27 Sangster-Gormley, E., Martin-Misener, R., & Burge, F. (2013). A case study of nurse
28 practitioner role implementation in primary care: What happens when new roles are
29 introduced? *BMC Nursing*, 12, 1. doi:10.1186/1472-6955-12-1
30 Sangster-Gormley, E., Martin-Misener, R., Downe-Wamboldt, B., & Dicenso, A. (2011).
31 Factors affecting nurse practitioner role implementation in Canadian practice settings:
32 An integrative review. *Journal of Advanced Nursing*, 67(6), 1178-1190.
33 doi:10.1111/j.1365-2648.2010.05571.x
34 Schober, M. (2016). *Introduction to Advanced Nursing Practice: An international focus*
35 Advanced practice in nursing, C. Debout (Ed.) (pp. 166). doi:10.1007/978-3-319-
36 32204-9
37 Sheer, B., & Wong, F. K. (2008). The development of advanced nursing practice globally.
38 *Journal of Nursing Scholarship*, 40(3), 204-211. doi:10.1111/j.1547-
39 5069.2008.00242.x
40 Siedlecki, S. L., Butler, R. S., & Burchill, C. N. (2015). Survey design research: A tool for
41 answering nursing research questions. *Clinical Nurse Specialist*, 29(4), E1-8.
42 doi:10.1097/NUR.000000000000134
43 Ter Maten-Speksnijder, A. J., Dwarswaard, J., Meurs, P. L., & van Staa, A. (2016). Rhetoric
44 or reality? What nurse practitioners do to provide self-management support in
45 outpatient clinics: An ethnographic study. *Journal of Clinical Nursing*, 25(21-22),
46 3219-3228. doi:10.1111/jocn.13345
47 Walsh, A., Moore, A., Barber, A., & Opsteen, J. (2014). Educational role of nurse
48 practitioners in a family practice centre: Perspectives of learners and nurses. *Canadian*
49 *Family Physician*, 60(6), e316, e318-321.
50 World Health Organization. (2015). *World report on ageing and health*. Geneva: World
51 Health Organization.
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TABLE 1. Description of different functions and activities that can be related to the functions

Functions	Activities that can be related to the functions
Direct care	
Nursing care for and in the presence of a particular patient, including guidance/teaching given to patients and next of kin (20 activities)	Provision of nursing care for patients suffering from an acute health condition/illness Provision of nursing care for patients suffering from a subacute health condition/illness Provision of nursing care for patients with impaired cognitive impairment Provision of nursing care for patients with a psychiatric disorder Provision of nursing care for chronically ill patients Provision of nursing care for rehabilitation patients Provision of nursing care for patients in the palliative phase Provision of nursing care for patients with wounds Assessment of patients for risk factors and early signs of disease Systematic clinical examination (inspection, palpation, percussion and auscultation) Systematic gathering of medical history Perform life story interviews and incorporate into patient treatment Patient guidance/teaching Next of kin guidance/teaching Echocardiography Blood sample collection Blood gases sample collection Insertion of nutritional probe Insertion of permanent catheter Management of intravenous fluid treatment
Indirect care	
Nursing care performed away from a patient but for a particular patient, including delegated medical activities (18 activities)	Planning and documenting care and follow-up of patient treatment Helping patients use their right to participate in decisions regarding their own care Referring patients across service levels (e.g. from primary care to hospitals) Referring patients within service levels (e.g. from home care to nursing home) Discharging patients from hospitals Discharging patients from primary care Use of eHealth and care technology Perform drug review in collaboration with the patient's physician Evaluation of patient services Prescription and assessment of haemoglobin Prescription and assessment of C-reactive protein Prescription and assessment of other blood samples Prescription and assessment of bladder scanning Prescription and assessment of fluid treatment

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Prescription of x-ray
Prescription of ultrasound
Prescription and ordering of medical supplies
Prescription of a pre-agreed selection of drugs

Coordination

Coordination of collaboration outside of and within the organisation of employment (2 activities)

Coordination of collaboration outside of the organisation
Coordination of collaboration within the organisation

Teaching/supervision

Teaching and supervision of colleagues and nursing students (5 activities)

Teaching colleagues a fixed subject
Supervision of colleagues in specific patient situations
Supervision of nursing students
Supervision of nurses who are taking a master's degree or further education in nursing
Other types of teaching/supervision functions

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TABLE 2. Demographic characteristics of respondents to the two questionnaires ($n = 218$)

Variables	AGNs ($n = 23$)	Colleagues ($n = 195$)
Gender		
Female	21 (91.3)	175 (89.7)
Male	2 (8.7)	20 (10.3)
Age [years]	45.4 [9.4]	44.3 [11.5]
Job title		
Manager		9 (4.6)
Leader	1 (4.4)	29 (14.9)
Physician		5 (2.6)
AGN	9 (39.1)	
Specialist nurse	8 (34.8)	3 (1.5)
Staff nurse	5 (21.7)	64 (32.8)
Occupational therapist		18 (9.2)
Physical therapist		10 (5.1)
Auxiliary nurse		30 (15.4)
Assistant		7 (3.6)
Executive officer		10 (5.1)
Other		10 (5.1)
Worked in current position [years]†	7.8 [7.7]	6.4 [6.6]
Work hours		
Day, evening and night		10 (5.1)
Day and evening	9 (39.1)	73 (37.4)
Day	14 (60.9)	112 (57.5)

Values are expressed as mean [SD] or n (%).

† The AGNs range from 1–27 years and colleagues from 0–37 years. The range explains why the SD is larger than the average years the colleagues had worked in their current position.

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TABLE 3. The degree AGNs report they use their knowledge and skills related to different functions (*n* = 23)

Functions	Absolutely not	To a low degree	To some degree	To a high degree
Direct care	1 (4.3)	1 (4.3)	5 (21.8)	16 (69.6)
Indirect care		5 (21.8)	7 (30.4)	11 (47.8)
Teaching/supervision		4 (17.4)	8 (34.8)	11 (47.8)
Coordination	2 (8.8)	4 (17.4)	12 (52.2)	5 (21.8)

Values are expressed as *n* (%).

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TABLE 4. Reasons why AGNs do not use their knowledge and skills to a high degree ($n = 23$)

Reasons for not using knowledge and skills to a high degree†	AGNs
The way the workplace is organised	12 (52.2)
Lack of request from managers/leaders and or other colleagues	6 (26.1)
The role and scope of practice of the AGN is too wide	3 (13.0)
Lack of support from managers/leaders	3 (13.0)
The role and scope of practice of the AGN is too narrow	2 (8.7)
Lack of support from colleagues	2 (8.7)
Lack of confidence to assume the role	1 (4.3)

Values are expressed as n (%).

† The respondents could tick off one or several response categories.

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TABLE 5. The degree AGNs report they use their knowledge and skills related to different functions by position ($n = 23$)

Functions	Designated AGN position ($n = 9$)	Other position ($n = 14$)	Total sample ($n = 23$)	Fisher's exact test	Kruskal-Wallis test
Direct care					
To a high degree	8 (88.9)	8 (57.2)	16 (69.6)	$p = 0.566$	H(1) = 2.675, $p = 0.102$
To some degree	1 (11.1)	4 (28.6)	5 (21.8)		
To a low degree		1 (7.1)	1 (4.3)		
Absolutely not		1 (7.1)	1 (4.3)		
Indirect care					
To a high degree	7 (77.8)	4 (28.6)	11 (47.8)	$p = 0.046^*$	H(1) = 6.024, $p = 0.014^*$
To some degree	2 (22.2)	5 (35.7)	7 (30.4)		
To a low degree		5 (35.7)	5 (21.8)		
Teaching/supervision					
To a high degree	7 (77.8)	4 (28.6)	11 (47.8)	$p = 0.052$	H(1) = 5.754, $p = 0.016^*$
To some degree	2 (22.2)	6 (42.9)	8 (34.8)		
To a low degree		4 (28.6)	4 (17.4)		
Coordination					
To a high degree	2 (22.2)	3 (21.4)	5 (21.7)	$p = 0.685$	H(1) = 0.858, $p = 0.354$
To some degree	6 (66.7)	6 (42.9)	12 (52.2)		
To a low degree	1 (11.1)	3 (21.4)	4 (17.4)		
Absolutely not		2 (14.3)	2 (8.7)		

Values are expressed as n (%).

* P -value lower than 0.05

TABLE 6. Integration of AGNs at their workplaces measured through colleagues' knowledge about the AGN role and scope of practice, collaboration between colleagues and AGNs, and colleagues' opinion of whether AGNs contribute positively to health services by colleague job title ($n = 195$)

	Managers and leaders ($n = 38$)	Staff and specialist nurses ($n = 67$)	Other colleagues ($n = 90$)	Total sample ($n = 195$)	Pearson's chi- squared test or Fisher's exact test	Kruskal- Wallis test
Know who the AGN is at the workplace						
Yes	35 (92.1)	55 (82.1)	70 (77.8)	160 (82.1)	$p = 0.155^\dagger$	– ‡
No	3 (7.9)	12 (17.9)	20 (22.2)	35 (17.9)		
Clear scope of practice of the AGN						
To a high degree	11 (28.9)	15 (22.4)	21 (23.3)	47 (24.1)	$p = 0.914^\dagger$	H(2) = 0.696, $p = 0.706$
To some degree	13 (34.2)	24 (35.8)	29 (32.2)	66 (33.8)		
To a low degree	8 (21.1)	14 (20.9)	25 (27.8)	47 (24.1)		
Absolutely not	6 (15.8)	14 (20.9)	15 (16.7)	35 (18.0)		
Frequency of collaboration with the AGN§						
Several times a day	5 (13.2)	2 (3.0)	2 (2.2)	9 (4.6)	– ¶	H(2) = 5.805, $p = 0.055$
Once a day		1 (1.5)	2 (2.2)	3 (1.5)		
Several times a week	7 (18.4)	16 (23.9)	17 (18.9)	40 (20.5)		
Once a week	4 (10.5)	11 (16.4)	5 (5.6)	20 (10.3)		
About every 14th day	3 (7.9)	4 (6.0)	12 (13.3)	19 (9.8)		
Rarely	14 (36.8)	18 (26.8)	18 (20.0)	50 (25.6)		
Never	5 (13.2)	15 (22.4)	34 (37.8)	54 (27.7)		
Provide contact between patients and the AGN						
To a high degree	12 (31.6)	17 (25.4)	20 (22.2)	49 (25.1)	$p = 0.078^\dagger$	H(2) = 3.408, $p = 0.182$
To some degree	13 (34.2)	37 (55.2)	36 (40.0)	86 (44.1)		
Absolutely not	13 (34.2)	13 (19.4)	34 (37.8)	60 (30.8)		
The degree the role and scope of practice of the AGN contributes positively to health service						
To a high degree	29 (76.3)	46 (68.7)	56 (62.2)	131 (67.2)	$p = 0.062_j$	H(2) = 4.031, $p = 0.133$
To some degree	6 (15.8)	14 (20.9)	12 (13.3)	32 (16.4)		

To a low degree		2 (3.0)	2 (2.2)	4 (2.1)
Absolutely not		1 (1.5)		1 (0.5)
The role and scope of practice is unknown	3 (7.9)	4 (6.0)	20 (22.2)	27 (13.8)

Values are expressed as n (%).

† Pearson's chi-squared test.

‡ Not possible to perform Kruskal-Wallis test as the dependent variable is not ordinal.

§ Only asked if the colleague had stated on another question that they had collaborated with the AGN, those who had not collaborated are coded "never."

¶ Not possible to estimate the P -value with Pearson's chi-squared test/Fisher's exact test due to the large number of response options.

⌋ Fisher's exact test.

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Supplementary File 1

STROBE Statement—Checklist of items that should be included in reports of *cross-sectional studies*

	Item No	Recommendation	Reported in section
Title and abstract	1	(a) Indicate the study's design with a commonly used term in the title or the abstract	Abstract – Design (p. 1)
		(b) Provide in the abstract an informative and balanced summary of what was done and what was found	Abstract –Methods and Results (p. 1)
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	Introduction/Background (p. 4-8)
Objectives	3	State specific objectives, including any prespecified hypotheses	Background – Aim (p. 8-9)
Methods			
Study design	4	Present key elements of study design early in the paper	Method – Design (p. 9)
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	Method – Sample and Data collection (p. 9-13)
Participants	6	(a) Give the eligibility criteria, and the sources and methods of selection of participants	Method – Sample (p. 9-10)
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	Method – Data collection (p.10-12)
Data sources/ measurement	8	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	Method – Data collection (p.10-12)
Bias	9	Describe any efforts to address potential sources of bias	Discussion – Methodological considerations (p. 21-22)
Study size	10	Explain how the study size was arrived at	Method – Sample and Data collection (p. 9-13)
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	Method – Data analysis (p. 13-14)
Statistical methods	12	(a) Describe all statistical methods, including those used to control for confounding	Method – Data analysis (p. 13-14)
		(b) Describe any methods used to examine subgroups and interactions	Method – Data analysis(p. 13-14)
		(c) Explain how missing data were addressed	Method – Data analysis (p. 13-14)
		(d) If applicable, describe analytical methods taking account of sampling strategy	Not relevant
		(e) Describe any sensitivity analyses	Not relevant

Results			
Participants	13	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	Result – Sample characteristics and in the tables (Table 2-6, p. 30-35)
		(b) Give reasons for non-participation at each stage	Not relevant
		(c) Consider use of a flow diagram	Not relevant
Descriptive data	14	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	Table 2 (p. 30)
		(b) Indicate number of participants with missing data for each variable of interest	Not relevant
Outcome data	15	Report numbers of outcome events or summary measures	Not relevant
Main results	16	(a) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	Not relevant
		(b) Report category boundaries when continuous variables were categorized	Not relevant
		(c) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	Not relevant
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	Not relevant
Discussion			
Key results	18	Summarise key results with reference to study objectives	Discussion (p. 16-21)
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	Discussion – Methodological considerations (p. 21-22)
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	Discussion (p. 16-22)
Generalisability	21	Discuss the generalisability (external validity) of the study results	Discussion and Conclusion (16-23)
Other information			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	Founding (Title page)