

Advanced Practice Nurses and Their Roles in Swiss Cancer Care: A Cross-Sectional Study

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ABSTRACT

Objectives: To examine the advanced practice nurse workforce in Swiss cancer care and how their roles are being implemented (eg, role structures, processes) to achieve optimal outcomes for patients and their families, care organizations, and the broader health care system.

Methods: A cross-sectional study was conducted. The sample included master-prepared advanced practice nurses in cancer care, who completed an online questionnaire from December 2021 to January 2022. Thirty-nine items assessed structures (eg, role characteristics, utilization), processes (eg, role activities, interventions), and perceived outcomes (eg, for patients, the health care system) of advanced practice nurses in Swiss cancer care. Data from closed questions were analyzed using descriptive statistics. Data from open-ended questions were organized and summarized into categories related to domains of advanced practice nursing and its reported frequency by the advanced practice nurses.

Results: The participating advanced practice nurses (n = 53), worked in half of the 26 Swiss cantons. Interventions were identified within nine categories, of which most were targeted to patients and their families (n = 7), followed by health care professionals (n = 2). Perceived positive outcomes were patient symptom management, length of hospital stay, and health care costs. Participants felt less confident in cancer care (eg, autonomous practice) and reported 15 professional development needs (eg, medical interventions, teaching).

Conclusions: This study provides a comprehensive examination of 53 advanced practice nurses, detailing the characteristics of their roles and utilization across various jurisdictions and health care settings. The results highlight the diverse dimensions of advanced practice nursing and its potential to enhance cancer services and outcomes in Switzerland. Opportunities for role development support and expansion are identified.

Implications for Nursing Practice: More systematic health human resource planning is needed to expand the deployment of advanced practice nurses across jurisdictions, practice settings, and more diverse patient populations. Role development needs show the desire for specialized educational preparation in cancer care.

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Worldwide, there is rising demand for cancer care, driven by factors such as aging populations prone to developing cancer, and treatment advancements resulting in more people living longer following a cancer diagnosis.¹ The combined effect of this growing cancer incidence and prevalence, coupled with increasing patient acuity and complexity of care, is straining health care systems² that are challenged by shortages of nurses and other providers and burgeoning costs.^{3,4} To address these challenges, strategies to optimize the cancer care workforce and to implement innovative and sustainable models

of care are critical for ensuring access to and the quality of cancer services.² The World Health Organization⁵ has advocated for better utilization of specialized and advanced nurses to improve access to care and to address health disparities. Advanced practice nurses are master's-educated nurses with an extended scope of practice.⁶ Through graduate education and specialty practice experience, they acquire advanced clinical, problem-solving, and evidence-based practice skills to tackle complex patient and health care system needs.^{7,8} The two most common types of advanced practice nursing (APN) roles are the clinical nurse specialist (CNS) and the nurse practitioner (NP).⁶ Evidence from systematic reviews demonstrates that the utilization of these roles in cancer care result in better patient and organizational outcomes.^{7,9,10} Patients with cancer benefit from systematic

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Layperson Summary

What we investigated and why

We explored the roles of advanced practice nurses in Swiss cancer care and how these roles impact patients and their families, care organizations, and the broader health care system. Our aim was to understand factors that influence how advanced practice nurses work and also the benefits of these roles.

How we did our research

We conducted a survey involving 53 master-prepared advanced practice nurses in cancer care. The survey covered various aspects such as role characteristics, utilization, activities, interventions, and perceived outcomes. This data was collected through an online questionnaire between December 2021 and January 2022.

What we have found

The participating nurses were spread across half of the 26 Swiss cantons and provided a variety of clinical services that benefited patients and their families. Perceived positive outcomes included improved patient symptom management, reduced hospital stays, and lower health care costs. Participants felt less confident in some medical and cancer-specific aspects of their roles and identified 15 professional development needs.

What it means

Our study provides a detailed description of advanced practice nurses in Swiss cancer care, showcasing their varied roles and potential to enhance services and outcomes. The results highlight the need for additional support to help advanced practice nurses develop in their roles and to expand their roles within the health care system.

315 of the 505 respondents worked in APN roles, including 35 specializing in cancer care.¹⁸ While Swiss studies have explored APN role implementation in cancer care for specific populations,^{19,20} there is limited evidence about advanced practice nurses caring for patients with breast and other gynecological cancers.²¹ This gap is notable, given the high incidence of breast cancer in Switzerland.¹ Existing studies detail how advanced practice nurses address specific cancer populations' needs but offer limited insight into the broader advanced practice nurse workforce in cancer care and the effectiveness of their utilization in achieving optimal outcomes for patients and families, care organizations, and health care systems.

Conceptual Framework

Study aims and methods were informed by PEPPA-Plus, a conceptual framework that promotes optimal health outcomes for patients and families and the deliver high-quality, patient-centered, and cost-effective care through evidence-informed decision-making about the development and use of APN roles.²² A main strength of this framework is that it integrates Donabedian's model²³ to examine relevant structures, processes, and outcomes across three stages of APN role development, each with distinct evaluation objectives. Structures include factors that influence role implementation such as funding, education and mentoring, and legislation and regulation for the extended scope of practice. Processes relate to how advanced practice nurses implement their roles and the types of services and interventions they provide. Outcomes are the results of APN role structures and processes and thus impact on patients, organizations, and health systems.²⁵ In the Introduction stage, evidence is gathered to determine the patient population, nursing practice, and health service needs for an APN role. Here, it is relevant to determine the type of APN role and role activities that are best suited to address identified needs. The Implementation stage examines the extent to which appropriate structures are in place to support APN effective role implementation and to monitor progress in achieving anticipated outcomes. The long-term sustainability stage aims to demonstrate APN role benefits and impact and to ensure the role meets health care needs in the long term.

The implementation stage of the PEPPA-Plus framework is most relevant to APN roles in Switzerland, given that the roles are already established, but at an early stage of development within the national health care system. Existing research has examined APN roles in Switzerland across care settings and populations and concerning factors such as legislation,^{19,20} regulation,²⁴ and education²⁴ that might influence APN role implementation. There is a lack of research or workforce data that describes the number or characteristics of advanced practice nurses working in Swiss cancer care, the patient populations they serve and where they are deployed across the health system, or the types of services and interventions they provide. Thus, it is important to understand where advanced practice nurses are utilized in the Swiss cancer care system (eg, jurisdiction, practice settings). Additionally, it is important to know how APN roles are being implemented in cancer care, what advanced practice nurses do in their role, and perceived role outcomes.

The aim of this study is to examine the advanced practice nurse workforce in Swiss cancer care and how their roles are being implemented to achieve optimal outcomes for patients and their families, care organizations, and the broader health care system. Study results will inform future directions for health human resource planning, the development of health care policies, and other strategies to necessary strengthen APN role implementation for improved delivery of cancer services in Switzerland. This aim will be achieved by addressing the following research question: What are the structures (eg, role characteristics, use or deployment in the health system), processes (eg, role activities and interventions), and perceived outcomes (eg, for

assessment and management of their health needs, care coordination, provision of education and self-management support, timely prescription of (non-)pharmaceutical therapies, and referrals to relevant health care providers and services. Advanced practice nurse interventions notably enhance patient outcomes with improved symptom management, increased access to care, and lower health care costs.¹⁰ Numerous studies consistently reveal significant barriers to the effective implementation of APN roles.^{11,12} These barriers, such as lacking role recognition and acceptance, constraints on working autonomously, and confusion about role responsibilities, contribute to poor advanced practice nurse job satisfaction and retention.¹³ Jones¹⁴ emphasizes that personal factors, such as low confidence levels, further hinder role implementation.

Advanced Practice Nurses in Switzerland

In the early 2000s, Switzerland introduced APN roles alongside the start of the first Master's program at University of Basel,¹⁵ followed by programs at Universities of Applied Sciences in 2010. The educational preparation for advanced practice nurses in Switzerland has been aligned with Hamric's model¹⁶ outlining competencies for advanced nursing practice. APN roles have been established across diverse settings to address the health needs of specific patient populations and to enhance evidence-based care.^{15,17} About 1,200 master's-prepared nurses are estimated to work in Switzerland. A recent survey of these master's nursing program graduates, indicated that

patients, organizations, and the health care system) of advanced practice nurses in Swiss cancer care?

Methods

Study Design

A cross-sectional study using an online questionnaire was conducted to provide a comprehensive snapshot of the current advanced practice nurse workforce in the Swiss cancer care system.²⁵ The reporting of this study is based on the STrengthening the Reporting of OBservational studies in Epidemiology (STROBE) checklist.²⁶

Sample and Setting

Registered nurses in Switzerland who were employed in an APN role and providing cancer care were the target population for this study. The International Council of Nurses' definition of an advanced practice nurse⁶ was used to set the inclusion and exclusion criteria for participants. Eligible participants had completed a Master of Science in Nursing degree, were working in an APN role with a clinical focus, and were caring for patients with a cancer diagnosis in any practice setting in Switzerland. Advanced practice nurses not able to complete the questionnaire in English, German, or French were not eligible for the study.

There is no mandatory or central registry of advanced practice nurses in Switzerland, making it difficult to estimate the population size and to identify and recruit eligible participants for the study. Based on the 1,200 estimated master graduates²⁷ and the 315 working in an APN role¹⁸ only a few might work in cancer care. Therefore, a multipronged recruitment strategy was required that included snowball and network sampling, and engaging professional associations and educational institutions offering master's nursing programs. Associations and institutions, recognizing the multilingual context, shared study calls in German and French, with English for inclusivity in Italian-speaking regions. Recruitment efforts included reminders, social media promotion, and dissemination across professional networks. The written call outlined the study aim, eligibility criteria, questionnaire link, contact details, and encouraged recipients to share within their networks. The online questionnaire included a welcome message, study details, APN role definition, informed consent, and data protection information. Participants were advised to enter data once and informed of the inability to temporarily store entered information for later completion.

Measures

The online questionnaire was developed using the tailored design method.²⁸ This method provides guidance on developing an effective data collection tool for high-quality distribution in a national context by reducing total questionnaire errors.^{28,29} This study and the questionnaire were part of a larger workforce investigation, the Swiss national advanced practice nurses' cancer care workforce study (APNCC-Swiss – Advanced Practice Nursing Roles in Cancer Care in Switzerland: A Mixed-Methods Study). The data collection process included validated questionnaires, but also study-specific questions for which face and content validity were assessed.

The questionnaire was informed by research literature to create a pool of relevant items related to APN roles and service characteristics,³⁰ preparedness for clinical practice,³¹ confidence levels in cancer care practice, professional development needs,^{32,33} cancer care interventions,³⁴ and contributions of advanced practice nurses.³⁵ In this regard, contributions are understood as perceived benefits or outcomes achieved through role activities. In total, the final questionnaire had thirty closed and six open-ended items. Permission was received from the author of the confidence level items developed for

a study on oncology advanced practice nurses in Canada³³ to use, translate, and if necessary, adapt the questionnaire. The scale of the validated confidence questionnaire ranged from 4=very confident, 3=confident, 2=somewhat confident, 1=not at all confident.

Content and face validity were examined using a qualitative approach with two think-aloud rounds with experts,³⁶ each lasting 120 minutes. Think-aloud rounds are a widely used method to validate a questionnaire by asking experts to read each item aloud and share their thoughts directly about item understanding and appropriateness, logical flow and absence of items, and content relevance.^{28,36} Informed by Devon et al,³⁷ in total, seven experts (two advanced practice nurses, one nurse manager, three nurse scientists, and one sociologist) who were familiar with APN roles in Switzerland, cancer care, and/or questionnaire development participated in the rounds. A research assistant provided protocols for each round summarizing the experts' feedback, which was integrated into the questionnaire. The content validity assessment process resulted in adding further questions to the questionnaire to explore APN role characteristics and educational preparation for cancer care more precisely.

A stepwise approach for cross-cultural adaptation, related to Beaton et al,³⁸ was used to develop the questionnaire first in English before translation into French and German. The final version of the English questionnaire was translated forward and backward into German and French by one bilingual researcher and using the program DeepL[®] for efficiency reasons. Two native German- and French-speaking researchers, who are experts in this field, assessed translation validity of the German and French questionnaires, to ensure accurate and reliable cross-cultural assessments.³⁸ The researchers received a table with all items to rate and comment on the accuracy of the translation. Face validity of these two questionnaire versions was achieved by commenting on the relevance of items. This iterative process was repeated twice to achieve final agreement on the German and French questionnaire. The multilingual questionnaire was then implemented in LimeSurvey Professionals (Version 3.28.17), a tool that permits the collection and storage of questionnaire data. A LimeSurvey link was sent to three researchers who are nonexperts in the field to test the online questionnaire in English, German, and French regarding its electronic usability and functionality. Feedback was included in the design of the online questionnaire before generating the final link. The questionnaire was open for data collection from December 2021 to January 2022.

Data Analysis

Descriptive statistics were used to analyze the data for closed-ended questions by using IBM SPSS Statistics, Version 28³⁹ and Excel.⁴⁰ Categorical variables were presented in frequency counts, percentages, and a pie chart. Continuous variables were presented as mean scores with standard deviation. No adjustments were required for missing data as this was limited, accounting for less than one on any item.⁴¹

Data from open-ended questions were summarized thematically following the domains of APN as defined by the Hamric model.¹⁶ This model was selected because it is used in all Swiss APN education programs to define practice domains and competencies and thus is familiar to advanced practice nurses. The frequency of reported interventions per domain was also analyzed to get a better understanding of the development and implementation of APN role domains in cancer care. The MAXQDA Software (Version 2022.0.0)⁴² was used to manage the data from open-ended questions. Semantic validity was offered through a research team member, who refined the thematic summary if clarity was not given.

Ethical Consideration

Ethical approval was requested from the Cantonal Ethics Committee, which determined this study does not fall under the Swiss

Federal Act on Research Involving Human Beings (Req-2021-01238). However, the study followed the Helsinki ethical principles.⁴³ Potential survey participants were informed about the study aim, data protection, and anonymization of data in the introduction to the online questionnaire. Study participation was voluntary, and implied informed consent when answering the online questionnaire.

Results

Characteristics of Advanced Practice Nurses and Their Roles

Overall, 53 master's-educated advanced practice nurses providing cancer care participated in the study. A detailed description of participants is provided in Table 1. Most of the advanced practice nurses were female (83%) with a mean age of 43.2 years and had obtained their master's degree in Switzerland. Some participants were enrolled in a further education program (26.2%). Although most participants had one or more qualifications relevant to cancer care, almost one third had no cancer-specific qualification. The majority of participants perceived that their master's education had prepared them well or very well to work in an APN role; however, over one third felt just partly or not prepared. Most participants had many years of work experience in cancer care and in their APN role.

TABLE 1
Characteristics of Advanced Practice Nurse Participants

Demographic variables	n = 53	%
Age		
30-45 years	34	64.5
46-63 years	19	35.5
Sex		
Female	44	83.0
Male	9	17.0
Children		
Yes	25	47.2
No	28	52.8
Highest level of education		
Master of Science in Nursing	50	94.3
Doctorate	3	5.7
Origin country of highest education		
Switzerland	43	81.1
United Kingdom	5	9.4
USA	2	3.8
France	1	1.9
Netherlands	1	1.9
Missing	1	1.9
Enrolled in education program		
Not enrolled	38	71.7
Qualification without ECTS	3	5.7
Certificate of Advanced Studies	2	3.8
Diploma of Advanced Studies	1	1.9
Master of Science	3	5.7
Doctorate	4	7.5
Other	1	1.9
Missing	1	1.9
Qualification relevant to cancer care^a		
Qualification without academic credit points	23	43.4
Certificate of Advanced Studies	5	9.4
Diploma of Advanced Studies	6	11.3
Master of Advanced Studies	6	11.3
Master of Science (eg, Palliative Care)	2	3.8
No qualification	17	32.1
Feeling prepared by master's program		
Not at all prepared	2	3.8
Somewhat prepared	19	35.8
Well prepared	25	47.2
Very well prepared	7	13.2
Work experience in years	mean	SD
Registered nurse (n = 53)	14.6	10.0
Advanced practice nurse (n = 53)	6.8	6.3
Cancer care (n = 49)	12.7	9.5

ECTS, European Credit Transfer System; SD, standard deviation.

^a Multiple replies.

Relevant characteristics of APN cancer services can be found in Table 2. Most participants identified themselves as an advanced practice nurse and a minority as a CNS or NP. Half of the participants had received supervision from a physician or advanced practice nurse during their transition into the APN role, while 37.7% had no supervision. Participants worked in cancer services across 13 of 26 cantons (50%) including German (n = 45, 85.1%), French (n = 4, 7.6%) and Italian (n = 2, 3.8%) speaking regions, with two participants not reporting this information. The advanced practice nurses worked mostly in acute care hospitals in inpatient and/or outpatient settings. On average, 60.9% (SD 32.1) of the patients they care for were diagnosed with cancer, including lung, gastrointestinal, urological, hematological, gynecological, brain, and bone cancers. Advanced practice nurses cared for pediatric and adult patients of all ages, but most often for older adults over 60 years of age. Based on the cancer care continuum,² the majority of APN services focused on the treatment phase and continued until end-of-life care. Few provide services related to cancer prevention, screening, or diagnosis.

Confidence Levels and Professional Development Needs

Participants were asked to rate their level of confidence in providing cancer care when starting their current APN position (Table 3). The participants felt somewhat confident (mean scores <3.0) in most areas. The lowest levels of perceived confidence related to research skills, autonomous practice, and knowledge about medical interventions and diagnostic skills. The highest levels of perceived confidence

Table 2
Characteristics of APN Roles in Cancer Care

APN role variables	n = 53	%
Associated role		
Advanced practice nurse	34	64.2
Clinical nurse specialist	10	18.9
Nurse practitioner	8	15.1
Missing	1	1.9
Provision of supervision in current APN role		
No supervision	20	37.7
By physician	18	34.0
By advanced practice nurse	13	24.5
By registered nurse	2	3.8
Setting of cancer service		
Acute care hospital, inpatient and outpatient	19	35.8
Acute care hospital, inpatient	15	28.3
Acute care hospital, outpatient	9	17.0
Community care	5	9.4
Long-term care	2	3.8
Self-employed	1	1.9
Other (eg, oncology center/institute)	2	3.8
Proportion of cancer diagnosis^a		
Lung cancer	25	47.2
Gastrointestinal cancer	24	45.3
Urological cancer	22	41.5
Hematological cancer	16	30.3
Gynecological cancer	14	26.4
Brain cancer	14	26.4
Bone cancer	9	17.0
Patient age groups^a		
≥ 75 years	25	47.2
60-74 years	43	81.1
40-59 years	25	47.2
20-39 years	8	15.1
0-19 years	4	7.5
Phase of cancer care continuum^a		
Prevention/screening	5	9.4
Diagnosis	18	34.0
Therapy	39	73.6
Follow-up/survivorship	25	47.2
End-of-life/palliative care	27	50.9

APN role, advanced practice nursing role.

^a Multiple replies.

TABLE 3
Confidence Levels at the Beginning of Current Advanced Practice Nursing Role Position in Cancer Care

Level of confidence	n = 53	mean (SD)
Professional development skills (eg, identifying your own learning needs)	52	3.2 (.696)
Knowledge about nursing interventions in cancer care (eg, pain assessment and management)	52	3.2 (.731)
Performing procedures in cancer care (eg, inserting nasogastric tube)	48	3.0 (.838)
Interprofessional collaborative practice skills in cancer care (eg, working with other providers / professions)	53	3.0 (1.00)
Project management skills (eg, time management, setting role priorities)	53	3.0 (.831)
Supportive care skills in cancer care (eg, emotional support, counseling)	53	2.9 (.908)
Knowledge about common cancer-related problems	52	2.8 (.831)
Teaching skills (eg, teaching/coaching nurse colleagues)	53	2.8 (.928)
Evidence-based practice skills (eg, implementing cancer care guidelines)	53	2.8 (.968)
Organizational leadership skills (eg, performing change management, practice development)	52	2.8 (.871)
Managing workplace conflicts (eg, between colleagues)	53	2.8 (.669)
Diagnostic skills in cancer care (eg, diagnosing fatigue)	52	2.5 (.979)
Knowledge about medical interventions in cancer care (eg, watchful waiting, chemotherapy, radiotherapy)	51	2.5 (1.06)
Level of autonomy/independent practice in cancer care (eg, having the authority and feeling to make professional decisions)	53	2.5 (.992)
Research skills (eg, evaluating your role or service)	52	2.4 (.958)

SD, standard deviation.

related to professional development skills, knowledge about nursing interventions, and performing procedures. Participants (n = 45) had to name two current professional development needs, of which knowledge about medical interventions, teaching, supportive care skills, and leadership were the most often reported (Fig. 1). These professional development needs are consistent with lower levels of perceived confidence in Table 3.

Advanced Practice Nurses' Cancer Activities, Interventions, and Contributions

Overall, 581 responses were provided by participants (n = 51), who were asked to describe the three main interventions they provide in cancer care and the three most important contributions across three

levels: patients and their families, organization, and Swiss health care system. Seven categories of interventions targeting patients and their families and health care professionals were identified (Fig. 2) and mirrored the advanced nursing practice core competencies of the Hamric model.¹⁶ The most frequently reported interventions for patients and their families were providing education, planning and coordinating care, and monitoring of disease symptoms and treatment side effects. Activities such as leading practice development and mentoring were described for health care professionals.

For all three levels (patient/family, organization, health care system), participants (n = 45) identified perceived outcomes of their APN role (Fig. 3). For patients and their families, role activities such as providing care coordination and care continuity, assessing and managing symptoms, and imparting cancer-relevant knowledge were perceived to result in positive outcomes related to symptom management, self-efficacy, patient safety, and patient satisfaction with care. At the organizational level, participants felt they contributed to the mentoring, coaching, and training of nurses and other health care professionals; clinical leadership; interprofessional and interdisciplinary collaboration; and evidence-based cancer care and research. These role activities were perceived to improve outcomes such as hospital length of stay, rehospitalization, and quality of care. For the Swiss health care system, participants felt they facilitated patient access to cancer care and reductions in health care costs.

Discussion

The study results provide a comprehensive overview of the characteristics of 53 advanced practice nurses and how their roles are implemented across jurisdictions and health care settings in Switzerland. Participants report feeling prepared for their APN role, but also identify areas of cancer care where they feel less confident and report more than 15 professional development needs. The results contribute to a better understanding of the advanced practice nurse cancer care workforce and opportunities to further support role development and expansion. Aligned with the PEPPA-Plus framework and the study's research question, the results are discussed in relation to APN role structures, processes, and outcomes.²³

Structures

The availability of specialized advanced practice nurses is a pertinent structural factor.²³ The sample size of 53, surpassed the

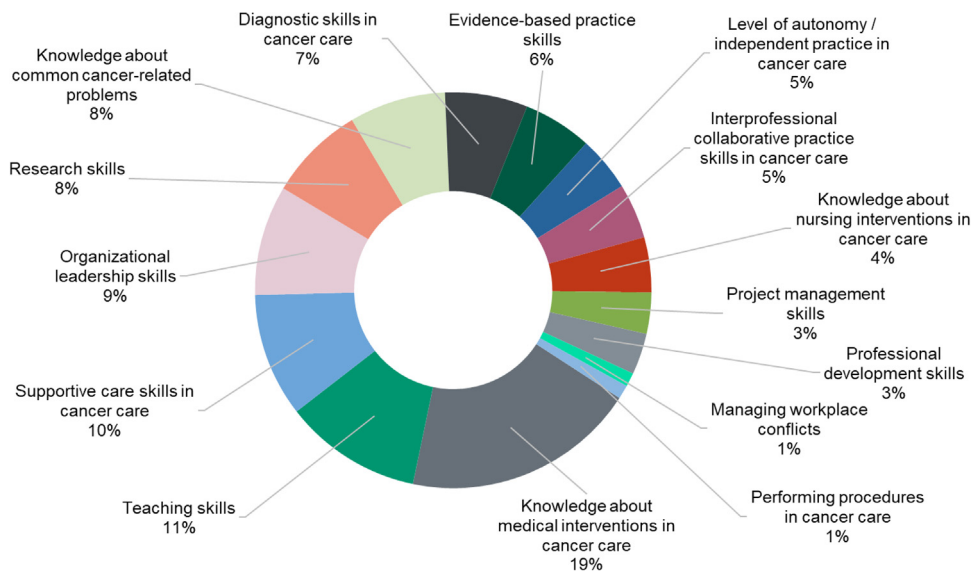


FIG. 1. Overview of advanced practice nurses' professional development needs in cancer care; n = 45.

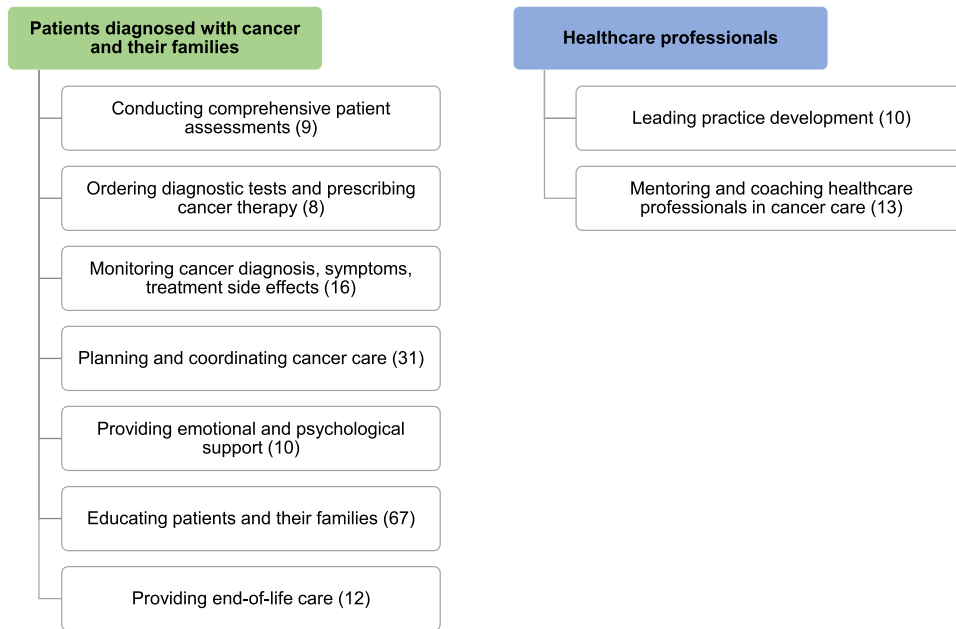


FIG. 2. Overview of advanced practice nurses' cancer care interventions and their frequency count.

estimated population of cancer care advanced practice nurses (n = 35) identified in a recent Swiss study of master's nursing program graduates.¹⁸ Study participants were deployed in 50% of Swiss cantons, covering all language areas. Lower numbers of participants in French- and Italian-speaking cantons may stem from historical APN master's program growth in German speaking cantons.⁴⁴ Most advanced practice nurses worked in hospital-based care settings, managing patients receiving cancer treatment and follow-up care. They mostly cared for patients over 60 years of age, diagnosed with high-incidence lung, gastrointestinal, or urological cancers. However, breast and gynecological cancers received less attention. While utilization of the advanced practice nurses across cantons, settings, and patient populations is promising, there is room for further integration into the health care system to encompass a broader range of patient populations, jurisdictions, and settings. Notably, only 50% of cantons have an advanced practice nurse, and just a few operate outside acute care hospitals. Workforce planning has not occurred to estimate the number of advanced practice nurses required to address the growing cancer care demands in Switzerland. However, it is unlikely that the

current number of 53 advanced practice nurses is sufficient. To better inform and direct the growth of the advanced practice nurses' cancer care workforce and therefore, meet the cancer care demands, health human resource planning is essential.³³ Identifying advanced practice nurses to better monitor, and then build human resource capacity in care organizations and in the national context might contribute to a sustainable workforce and increase the advanced practice nurses' intention to stay in the profession or current position.⁴⁵

Only four advanced practice nurses focused on pediatric populations in this study, and despite breast cancer being the most common cancer in Swiss women,¹ only one advanced practice nurse worked in this area. In Switzerland, specialized registered nurses often provide breast cancer care instead of advanced practice nurses, aligning with international trends emphasizing diverse educational models for breast and cancer care nurses.⁴⁶ Switzerland has its educational framework for breast care nurses,⁴⁷ but there's limited evidence on how this education prepares advanced practice nurses for specialized care. Further, scant information exists on the characteristics, interventions, and contributions of the breast cancer care nurse workforce

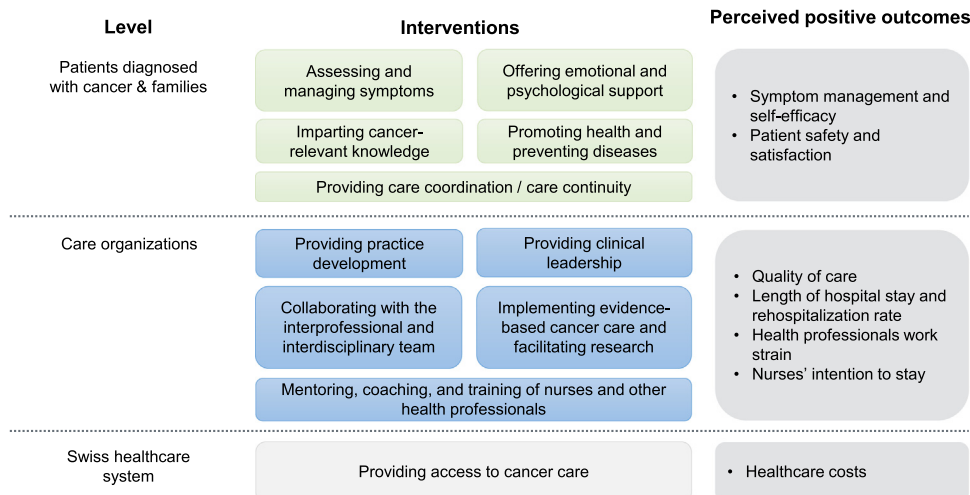


FIG. 3. Perceived positive outcomes by advanced practice nurses in the Swiss cancer care system.

in Switzerland and their alignment with patient and organizational needs. Clarifying distinctions between APN and specialized registered nurse roles in breast cancer care is crucial to avoid overlap, duplication, and optimize their respective expertise.

The majority of participants in this study identified themselves broadly as an advanced practice nurse rather than having a specific type of role (eg, CNS or NP). Three factors may explain this phenomenon in Switzerland. Firstly, with the exception of just a few CNS and NP programs, most master programs up to 2022 were generic focusing broadly on APN.¹⁸ Secondly, APN roles currently lack regulation, which is a frequently reported barrier to effective role implementation and role clarity.¹¹ Role regulation usually confers title protection (eg, CNS or NP) for nurses meeting specific education and other practice requirements that may vary by role in terms of scope of practice.⁶ Current efforts driven by the Swiss Nursing Initiative⁴⁸ include activities for APN role regulation, which can contribute to the further development of consistent competency-based role-specific education programs.⁴⁹ This initiative is highly relevant for the advanced practice nurse workforce in Switzerland as a minimum standard of educational level will be defined to become an advanced practice nurse. However, further guidance is needed to establish mechanisms for a credentialing process for licensure, registration, or certification of advanced practice nurses. Such a credentialing process can support the health care system to better monitor the advanced practice nurses' workforce and implement strategies for human resource planning.⁵⁰ Further, nurses and managers are challenged to understand the differences in role types and how to best utilize their expertise, resulting in the inconsistent use of role titles and advanced practice nurses being limited to work to their full potential.^{19,51} A recent critical discourse study by Thompson and McNamara⁵² suggests that regulatory policies and the language used to define APN roles, matter. The authors found that health care professionals use a language describing the NP role that does not contribute to role identity, such as using language like "substituting" and "role-reversal." This wording might make physicians feel they are being replaced or that aspects of their role (eg, responsibilities, power) are being taken away. Advanced practice nurses have to be educated about their language use that emphasizes the complementary nature of their roles for improving patient health outcomes and quality of care so that they communicate this more clearly to stakeholders, including physicians, and thus are more likely to gain their support.⁵²

Study participants demonstrated extensive experience in cancer care (mean = 12.7 years) and as advanced practice nurses (mean = 6.8 years), indicating they may be experts in cancer care, aligned with Benner's "from novice to expert" model.⁵³ While all participants held master's or doctoral degrees, only two had cancer-specific graduate nursing education for advanced practice, with most having general cancer education for registered nurses and some lacking cancer-related education. This explains their confidence in clinical practice but lower confidence in cancer-specific areas such as supportive care, teaching, diagnostics, and independent practice.³¹ The considerable number of identified professional development needs (n = 15) underscores the necessity for cancer-related education to enhance confidence and expertise in specialized care for advanced practice nurses. The absence of cancer specialty programs and certification, a challenge also noted in Spain,¹² may hinder the full implementation of APN roles in health care systems, potentially causing role ambiguity.^{11,50} Encouragingly, 60% of advanced practice nurses in the study receive supervision during the transition into the APN role, suggesting the value of mentoring and orientation programs.^{11,54} Care organizations are advised to offer such support, with senior advanced practice nurses mentoring junior colleagues serving as a promising resource. The literature review by Bowyer et al⁸ emphasizes the importance of role definitions for quality assurance and patient safety, particularly in the absence of local mentors.

Process

Specific APN interventions described in this study focus predominantly on patients and their families. Relevant were interventions such as conducting comprehensive health assessments, ongoing monitoring and managing of symptoms, providing education, and coordinating care to facilitate care access through timely referrals to other health care providers. Supporting health care professionals by providing education and leading initiatives to support evidence-based practice within practice settings were other reported activities. These results are in accordance with international literature.^{10,11} The certification of cancer centers in Switzerland began in 2013.⁵⁵ Specialized nurses and advanced practice nurses were implemented to fulfill certification requirements for specialized cancer care, and therefore, are mainly hospital-based. Providing patient education was a major focus of the APN role in this study. Given that their patients were mostly receiving treatment or post-treatment follow-up care, this education is likely to be cancer-related. Evidence presents that advanced practice nurses are doing post-treatment follow-up care and supporting cancer survivors to prevent long-term consequences.⁵⁶ However, one aspect of APN roles in Swiss cancer care that was limited relates to the involvement in health promotion and disease prevention. Advanced practice nurses working in the community may provide such interventions; nevertheless, this study did not focus specifically on advanced practice nurses and their interventions in primary care, therefore, it is not possible to fully explain this issue. The results show that the focus of the APN role is caring for patients and families during the treatment and post-treatment follow-up phases, not at the beginning of the cancer continuum focused on cancer prevention, screening, early detection, and diagnosis. The need for further research is given examining advanced practice nurses' involvement in cancer prevention to better understand their contributions to the community and along the care trajectory. Advanced practice nurses specializing in cancer care have the potential to contribute to public health by empowering patients to live healthily and to perform cancer screening in the community.⁵⁷ In this study, just a small number of advanced practice nurses work as a NP in the community. The reasons might be that decision-makers are not yet fully aware of the potential advanced practice nurses bring to the health care system by providing cancer care from cancer screening to end-of-life care in the different care settings.¹¹ Further, a lack of legislation for autonomous practice and a financial reimbursement system that does not recognize APN services might be hindering the provision of cancer-related care in the community.²⁴

Perceived Outcomes

The advanced practice nurses in this study perceived their roles and interventions contributed to improved patient, organizational, and health care system outcomes. The number of reported interventions demonstrates the multidimensional nature of APN roles in meeting the health and service needs of patients diagnosed with cancer. These results are consistent with APN outcomes in cancer care reported in international literature.¹⁰ Perceived outcomes, such as the reduction of the patient's length of hospital stay and rehospitalization rate are relevant to care organizations and the health care system. Several systematic reviews evaluating APN roles in cancer care^{10,46,57} report on a significant reduction in unnecessary hospitalizations and length of hospital stay and increased access to care, which results in lower health care costs. However, perceived outcomes might vary due to the level of role implementation and the variations of APN interventions to address a specific service gap and issue.⁵⁸ To better identify cancer-related contributions regarding, for example, their Swiss care context, the development of a logic model with perceived role and service outcomes might be considered to facilitate evaluations.²²

Strengths and Limitations

This study's strength lies in its systematic and evidence-informed approach to developing and translating the questionnaire, offering a comprehensive snapshot of advanced practice nurses in cancer care across multilingual cantons in Switzerland. It marks the first national workforce study in this domain and surpassed expectations in participant numbers, even amid the challenges of the post-COVID-19 pandemic period. The authors attribute this to the high motivation of advanced practice nurses to share their experiences. Despite the comprehensive recruitment methods and cross-sectional online questionnaire design, limitations exist. The concentration of participants from the canton Bern, where the first author works, may introduce selection bias. Additionally, a potential nonresponse error may arise from a low response rate among nurses caring for patients with other cancer types. The inability to translate the questionnaire into Italian might have hindered participation from Italian-speaking cantons.

Implications for Policy and Nursing Education, Practice, and Research

Applying the PEPPA-Plus²² as the conceptual framework facilitated identifying and describing APN role structures, processes, and perceived outcomes in cancer care. Employing evidence-based and systematic approaches to study APN role implementation is crucial for optimizing integration and sustainability in the health care system. The findings offer valuable insights for decision-makers, enabling evidence-informed health human resource policies and decisions regarding APN roles in cancer care and other settings. Educational institutions can leverage these results to enhance existing curricula or introduce new learning opportunities, supporting advanced practice nurses in developing the knowledge, skills, and confidence required for specialized areas like cancer care.

In the early stages of integrating APN roles into a health care system, the distinction between CNS and NP roles and their interventions is often unclear.³⁴ While there is substantial international evidence on the effectiveness of APN roles in various settings, further research is required to enhance understanding of the utilization and perceived outcomes of CNS and NP roles in cancer care in Switzerland. This study focused solely on advanced practice nurses' perceptions of their role outcomes. Future research should assess and measure CNS and NP outcomes from the perspectives of patients, other health care providers, and organizational/system perspectives. This information would guide country-specific strategies to further develop the advanced practice nurses' cancer care workforce, ensuring optimal role utilization to enhance access, quality of care, and patient health outcomes.

Conclusions

The study shows that advanced practice nurses in Swiss cancer care implement all recognized domains of APN,¹⁶ with a primary focus on comprehensive patient care and the potential to enhance outcomes. The results indicate that the integration of APN roles, particularly CNSs and NPs, is at an early stage of development, offering potential for expansion to more diverse patient populations, practice settings, and cantons. To fully integrate and sustain APN roles in the cancer care system, systematic workforce planning and development approaches are crucial. Strategies to enhance access to cancer-specific education and learning opportunities are needed for better preparation of advanced practice nurses in their specialized roles.

Consent for Publication

All study participants were informed that with their survey participation, they declared that the anonymized data can be used for study purposes and publication.

Declaration of Generative AI and AI-Assisted Technologies in the Writing Process

During the preparation of this work, the author used DeepL[®] and ChatGPT in order to improve language and readability. After using these tools, the author(s) reviewed and edited the content as needed and take(s) full responsibility for the content of the publication.

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Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

CRediT authorship contribution statement

Franziska Geese: Writing – original draft, Visualization, Software, Resources, Project administration, Methodology, Investigation, Funding acquisition, Formal analysis, Data curation, Conceptualization. **Denise Bryant-Lukosius:** Writing – review & editing, Validation, Supervision, Methodology, Formal analysis, Conceptualization. **Sandra Zwakhalen:** Writing – review & editing, Supervision, Methodology. **Sabine Hahn:** Writing – review & editing, Validation, Supervision, Methodology, Conceptualization.

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References

1. GLOBOCAN. Cancer today. World Health Organization. Available at: <https://gco.iarc.fr/today/data/factsheets/populations/900-world-fact-sheets.pdf>. Accessed July 04, 2023.
2. Committee on Improving the Quality of Cancer Care: Addressing the Challenges of an Aging Population. Board on Health Care Services et al. Delivering high-quality cancer care: charting a new course for a system in crisis. 2013.
3. Haakenstad A, Irvine CMS, Knight M, et al. Measuring the availability of human resources for health and its relationship to universal health coverage for 204 countries and territories from 1990 to 2019: a systematic analysis for the Global Burden of Disease Study. *Lancet*. 2019;399(10341):2129–2154. [https://doi.org/10.1016/S0140-6736\(22\)00532-3](https://doi.org/10.1016/S0140-6736(22)00532-3).
4. Clarke JL, Bourn S, Skoufalos A, Beck EH, Castillo DJ. An innovative approach to health care delivery for patients with chronic conditions. *Popul Health Manag*. 2017;20(1):23–30. <https://doi.org/10.1089/pop.2016.0076>.
5. WHO. *State of the World's Nursing Report -2020*. World Health Organization; 2020.
6. ICN. Definition and regulation of advanced nursing practice. ICN nurse practitioner/advanced nursing practice network. Available at: https://www.icn.ch/system/files/documents/2020-04/ICN_APN%20Report_EN_WEB.pdf Accessed June 23, 2023.
7. Kerr H, Donovan M, McSorley O. Evaluation of the role of the clinical nurse specialist in cancer care: an integrative literature review. *Eur J Cancer Care (Engl)*. 2021;30(3):e13415. <https://doi.org/10.1111/ecc.13415>.

8. Bowers S, Schofield D. The role of oncology nurse practitioners in current oncology practice and lessons for Australia. *MJA*. 2014;200(7):382–384. <https://doi.org/10.5694/mja13.10535>.
9. Kilpatrick K, Kaasalainen S, Donald F, et al. The effectiveness and cost-effectiveness of clinical nurse specialists in outpatient roles: a systematic review. *J Eval Clin Pract*. 2014;20(6):1106–1123. <https://doi.org/10.1111/jep.12219>.
10. Alotaibi T, Al Anizi CA. The impact of advanced nurse practitioner (ANP) role on adult patients with cancer: a quantitative systematic review. *Appl Nurs Res*. 2020;56: 151370. <https://doi.org/10.1016/j.apnr.2020.151370>.
11. Torrens C, Campbell P, Hoskins G, et al. Barriers and facilitators to the implementation of the advanced nurse practitioner role in primary care settings: a scoping review. *Int J Nurs Stud*. 2020;104: 103443. <https://doi.org/10.1016/j.ijnurstu.2019.103443>.
12. Serra-Barril MA, Benito-Aracil L, Pla-Consuegra M, Ferro-García T. Delphi survey on the application of advanced practice nursing competencies: strong points and unfinished business in cancer care. *J Nurs Manag*. 2022;30(8):4339–4353. <https://doi.org/10.1111/jonm.13843>.
13. Geese F, Zwakhalen S, Lucien B, Hahn S. Job satisfaction of advanced practice nurses in cancer care: a systematic review. *Eur J Oncol Nurs*. Feb 2022;56: 102089. <https://doi.org/10.1016/j.ejon.2021.102089>.
14. Jones ML. Role development and effective practice in specialist and advanced practice roles in acute hospital settings: systematic review and meta-synthesis. *J Adv Nurs*. 2005;49(2):191–209. <https://doi.org/10.1111/j.1365-2648.2004.03279.x>.
15. Spirig R. 10 years advanced nursing practice in Switzerland: retrospect and prospects. *Pflege*. 2010;23(6):363–366. <https://doi.org/10.1024/1012-5302/a000075>.
16. Tracy MF, O'Grady ET. *Hamric and Hanson's Advanced Practice Nursing: An Integrative Approach*. 6th ed. St. Louis, Missouri: Elsevier Saunders; 2018.
17. Spichiger E, Zumstein-Shaha M, Schubert M, Herrmann L. Focused development of advanced practice nurse roles for specific patient groups in a Swiss university hospital. *Pflege*. 2018;31(1):41–50. <https://doi.org/10.1024/1012-5302/a000594>.
18. Osinska M, Koch, R., Mahrer-Imhof, R., Zuniga, F. Masterumfrage 2022: Befragung von in der Schweiz berufstätigen Absolventinnen und Absolventen eines pflegewissenschaftlichen Master of Science in Nursing Studiums. [Master's survey 2022: Survey of graduates working in Switzerland. Graduates of a Master of Science in Nursing degree programme.]. 2022. Available at: https://www.apn-ch.ch/documents/498219/0/Masterumfrage+2022_D.pdf/ce758239-a54c-853d-0a37-aaaea9bafef6?t=1670243053608 Accessed May 19, 2023.
19. Serena A, Dwyer AA, Peters S, Eicher M. Acceptance of the advanced practice nurse in lung cancer role by healthcare professionals and patients: a qualitative exploration. *J Nurs Scholarsh*. 2018;50(5):540–548. <https://doi.org/10.1111/jnu.12411>.
20. Geese F, Molis S, Schucht P, Raabe A, Schmitt K-U. Evaluation of an APN service in acute inpatient care of patients with a malignant brain tumor: a qualitative study in a Swiss university hospital /Evaluation eines APN-Angebots in der akut-stationären Versorgung von Patienten und Patientinnen mit malignem Hirntumor: eine qualitative Studie in einem Schweizer Universitätsspital. *Int J Health Prof*. 2022;9(1):1–12. <https://doi.org/10.2478/ijhp-2022-0001>.
21. Kobleider A, Mayer H, Senn B. 'Feeling someone is there for you': experiences of women with vulvar neoplasia with care delivered by an advanced practice nurse. *J Clin Nurs*. 2017;26(3-4):456–465. <https://doi.org/10.1111/jocn.13434>.
22. Bryant-Lukosius D, Spichiger E, Martin J, et al. Framework for evaluating the impact of advanced practice nursing roles. *J Nurs Scholarsh*. 2016;48(2):201–209. <https://doi.org/10.1111/jnu.12199>.
23. Donabedian A. Quality assurance. Structure, process and outcome. *Nurs Stand*. 1992;7(11 suppl QA):4–5.
24. Gysin S, Sottas B, Odermatt M, Essig S. Advanced practice nurses' and general practitioners' first experiences with introducing the advanced practice nurse role to Swiss primary care: a qualitative study. *BMC Fam Pract*. 2019;20(1):163. <https://doi.org/10.1186/s12875-019-1055-z>.
25. Gray JR, Grove SK. *Burns and Grove's The Practice of Nursing Research*. 9th ed. St. Louis, Missouri: Elsevier; 2021:880.
26. STROBE statement—checklist of items that should be included in reports of observational studies (STROBE initiative). *Int J Public Health*. 2008;53(1):3–4. [10.1007/s00038-007-0239-9](https://doi.org/10.1007/s00038-007-0239-9).
27. VFP. Overview of number of master graduates in nursing sciences. Swiss Association of Nursing Science. Available at: <https://www.vfp-apsi.ch/pflegewissenschaft/bildung/> Accessed June 23, 2023.
28. Dillman D, Smyth J, Christian L. *Internet, Phone, Mail and Mixed-Mode Surveys: The Tailored Design Method*. 4th ed. Hoboken, New Jersey: John Wiley & Son; 2014.
29. Dillman DA, Smyth JD. Design effects in the transition to web-based surveys. *Am J Prevent Med*. 2007;32(suppl 5):S90–S96. <https://doi.org/10.1016/j.amepre.2007.03.008>.
30. Gardner G, Duffield C, Doubrovsky A, Adams M. Identifying advanced practice: a national survey of a nursing workforce. *Int J Nurs Stud*. 2016;55:60–70. <https://doi.org/10.1016/j.ijnurstu.2015.12.001>.
31. Schneider F, Kempfer SS, Backes VMS. Training of advanced practice nurses in oncology for the best care: a systematic review. *Rev Esc Enferm USP*. 2021;55: e03700. <https://doi.org/10.1590/s1980-220x2019043403700>.
32. Mick DJ, Ackerman MH. Advanced practice nursing role delineation in acute and critical care: application of the strong model of advanced practice. *Heart Lung*. 2000;29(3):210–221. <https://doi.org/10.1067/mhl.2000.106936>.
33. Bryant-Lukosius D, Green E, Fitch M, et al. A survey of oncology advanced practice nurses in Ontario: profile and predictors of job satisfaction. *Nurs Leadersh (Tor Ont)*. 2007;20(2):50–68.
34. Gardner G, Chang AM, Duffield C, Doubrovsky A. Delineating the practice profile of advanced practice nursing: a cross-sectional survey using the modified strong model of advanced practice. *J Adv Nurs*. 2013;69(9):1931–1942. <https://doi.org/10.1111/jan.12054>.
35. Molassiotis A, Liu XL, Kwok SW. Impact of advanced nursing practice through nurse-led clinics in the care of cancer patients: a scoping review. *Eur J Cancer Care (Engl)*. 2021;30(1):e13358. <https://doi.org/10.1111/ecc.13358>.
36. Charters E. The use of think-aloud methods in qualitative research: an introduction to think-aloud methods. *Brock Educ J*. 2003;12(2):68–82. <https://doi.org/10.26522/brocked.v12i2.38>.
37. DeVon HA, Block ME, Moyle-Wright P, et al. A psychometric toolbox for testing validity and reliability. *J Nurs Scholarsh*. 2007;39(2):155–164. <https://doi.org/10.1111/j.1547-5069.2007.00161.x>.
38. Beaton DE, Bombardier C, Guillemin F, Ferraz MB. Guidelines for the process of cross-cultural adaptation of self-report measures. *Spine (Phila Pa 1976)*. 2000;25(24):3186–3191. <https://doi.org/10.1097/00007632-200012150-00014>.
39. IBM Corporate. IBM SPSS Statistics for Windows, Version 28. IBM Corp. 18.10.2023, <https://www.ibm.com/support/pages/downloading-ibm-spss-statistics-28>.
40. Microsoft Excel Corporate. Microsoft Excel. 18.10.2023, <https://office.microsoft.com/excel>.
41. Mirzaei A, Carter SR, Patanwala AE, Schneider CR. Missing data in surveys: key concepts, approaches, and applications. *Res Soc Adm Pharm*. 2022;18(2):2308–2316. <https://doi.org/10.1016/j.sapharm.2021.03.009>.
42. MAXQDA. MAXQDA. <https://www.maxqda.com/de/>.
43. WMA. WMA Declaration of Helsinki-Ethical principles for medical research involving human subjects. Available at: <https://www.wma.net/policies-post/wma-declaration-of-helsinki-ethical-principles-for-medical-research-involving-human-subjects/> Accessed August 27, 2019.
44. Adomeit P, Brenner G, Gaylord J, De Geest S, Gislis I, Dwyer A, Eicher M, Herrmann A, Larkin Ph, Lehn I, Mabire C, Mauthner O, Ramelet A-S, Roulin MJ, Schäfer M, Serena A, Simon M, Vetterli M-L, Zuniga F. Arbeitspapier unimesuisse zur Entwicklung eines Berufsprofils «Nurse Practitioner» [Working paper unimesuisse on the development of a professional profile “Nurse Practitioner”]. 09.06.2023. https://www.unimesuisse.ch/application/files/3616/8372/1689/20230502_unimesuisse_ArbeitspapierNP_DE.pdf.
45. Bryant-Lukosius D, Martin-Misener, R. ICN policy brief. Advanced practice nursing: an essential component of country level human resources for health. International Council of Nurses. Available at: <https://fhs.mcmaster.ca/ccapnr/documents/ICNPoliBrief6AdvancedPracticeNursing.pdf> Accessed October 20, 2023.
46. Brown T, Cruickshank S, Noblet M. Specialist breast care nurses for support of women with breast cancer. *Cochrane Database Syst Rev*. 2021;2(2): CD005634. <https://doi.org/10.1002/14651858.CD005634.pub3>.
47. Eicher M, Kadmon I, Claassen S, et al. Training breast care nurses throughout Europe: the EONS postbasic curriculum for breast cancer nursing. *Eur J Cancer*. 2012;48(9):1257–1262. <https://doi.org/10.1016/j.ejca.2011.07.011>.
48. Confederation S. Pflegeinitiative: Neues Gesetz und weitere Massnahmen für bessere Arbeitsbedingungen in der Pflege. 2023. <https://www.admin.ch/gov/de/start/dokumentation/medienmitteilungen.msg-id-92653.html>.
49. Wheeler KJ, Miller M, Pulcini J, Gray D, Ladd E, Rayens GK. Advanced practice nursing roles, regulation, education, and practice: a global study. *Ann Glob Health*. 2022;88(1):42. <https://doi.org/10.5334/aogh.3698>.
50. Bryant-Lukosius D, Wong, F., Martin-Misener, R., et al. Certification of specialty practice for advanced practice nursing roles. Establishing evidence-informed recommendations for Canada and the International Advance Practice Nursing Workforce. Final Report for the Canadian Council of Registered Nurse Regulators and the International Council of Nurses. 2022.
51. Leary A, MacLaine K, Trevatt P, Radford M, Punshon G. Variation in job titles within the nursing workforce. *J Clin Nurs*. 2017;26(23-24):4945–4950. <https://doi.org/10.1111/jocn.13985>.
52. Thompson W, McNamara M. Revealing how language builds the identity of the advanced nurse practitioner. *J Clin Nurs*. 2022;31(15-16):2344–2353. <https://doi.org/10.1111/jocn.16054>.
53. Benner P. From novice to expert. *Am J Nurs*. 1982;82(3):402–407.
54. Audet L-AG A, Sarasua I. Post-graduate integration programs for recently graduated nurse practitioners: a rapid review. *Qual Adv Nurs Educ*. 2023;9(3):1–51. <https://doi.org/10.17483/2368-6669.1400>.
55. International Atomic Energy Agency. Setting Up a Cancer Centre: A WHO-IAEA Framework. International Atomic Energy Agency. 10.01.2023. <https://www.iaea.org/publications/15052/setting-up-a-cancer-centre-a-who-iaea-framework>.
56. Charalambous A, Wells M, Campbell P, et al. A scoping review of trials of interventions led or delivered by cancer nurses. *Int J Nurs Stud*. 2018;86:36–43. <https://doi.org/10.1016/j.ijnurstu.2018.05.014>.
57. Kilpatrick K, Tchouaket E, Savard I, et al. Identifying indicators sensitive to primary healthcare nurse practitioner practice: a review of systematic reviews. *PLOS One*. 2023;18(9): e0290977. <https://doi.org/10.1371/journal.pone.0290977>.
58. Savard I, Al Hakim G, Kilpatrick K. The added value of the nurse practitioner: an evolutionary concept analysis. *Nursing Open*. 2023;10(4):2540–2551. <https://doi.org/10.1002/nop2.1512>.