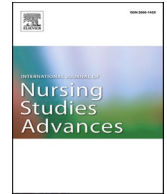


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Doctoral education, advanced practice and research: An analysis by nurse leaders from countries within the six WHO regions

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ABSTRACT

Doctoral education, advanced practice and research are key elements that have shaped the advancement of nursing. Their impact is augmented when they are integrated and synergistic. To date, no publications have examined these elements holistically or through an international lens. Like a three-legged stool they are inter-reliant and interdependent. Research is integral to doctoral education and influential in informing best practice. This significance and originality of this discussion paper stem from an analysis of these three topics, their history, current status and associated challenges. It is undertaken by renowned leaders in 11 countries within the six World Health Organisation (WHO) regions: South Africa, Egypt, Finland, United Kingdom, Brazil, Canada, United States, India, Thailand, Australia, and the Republic of Korea. The first two authors used a purposive approach to identify nine recognized nurse leaders in each of the six WHO regions. These individuals have presented and published papers on one or more of the three topics. They have led, or currently lead, large strategic organisations in their countries or elsewhere. All these accomplished scholars agreed to collect relevant data and contribute to the analysis as co-authors. Doctoral education has played a pivotal role in advancing nurse scholarship. Many Doctor of Philosophy (PhD) prepared nurses become faculty who go on to educate and guide future nurse researchers. They generate the evidence base for nursing practice, which contributes to improved health outcomes. In this paper, the development of nursing doctoral programmes is examined. Furthermore, PhDs and professional doctorates, including the Doctor of Nursing Practice, are discussed, and trends, challenges and recommendations are presented. The increasing number of advanced practice nurses worldwide contributes to better health outcomes. Nonetheless, this paper shows that the role remains absent or underdeveloped in many countries.

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Moreover, role ambiguity and role confusion are commonplace and heterogeneity in definitions and titles, and regulatory and legislative inconsistencies limit the role's acceptance and adoption. Globally, nursing research studies continue to increase in number and quality, and nurse researchers are becoming partners and leaders in interdisciplinary investigations. Nonetheless, this paper highlights poor investment in nursing research and a lack of reliable data on the number and amount of funding obtained by nurse researchers. The recommendations offered in this paper aim to address the challenges identified. They have significant implications for policy makers, government legislators and nurse leaders.

What is already known about the topic

- As individual topics, nursing doctoral education, advanced practice and nursing research have been the subjects of many papers in national journals or in specialty journals.
- Nurse doctoral education is the main feeder route for capacity building in nursing research.
- Significant differences exist internationally regarding the number and type of doctoral education and advanced nursing practice programmes, and the extent and impact of nursing research.

What this paper adds

- Analysis of advances in the three topics is presented holistically by leaders/scholars of 11 countries representing the six WHO regions. Originality and the authenticity of their lived experience/observations as prominent leaders in strategic positions underpin the authority of this paper.
- Data based on the up-to-date literature provide a comprehensive, global view of nurses' demographic profile, current status of two types of nursing doctoral programmes, advanced nursing practice and nursing research.
- Challenges and recommendations for addressing these are presented to provide direction and a road map for nurses worldwide.

Introduction

The [World Health Organisation \(WHO\) \(2020\)](#) highlighted that the global nursing workforce is 27.9 million, representing 59% of total healthcare workers. Doctoral education, advanced practice, and research ensure that such a workforce not only contributes to health and wellbeing but is vibrant and sustainable. Their advancement in one country can help drive their progression in others and enhance nursing's impact globally. Doctor of Philosophy (PhD) prepared nurses are necessary for the development of nursing research, scholarly leadership and the education of the future workforce.

Informed by such developments, advanced nurse practitioners (ANPs) can make transformative changes to the lives of patients, families, and communities. It should be noted that the Advanced Practice Nurse acronym, APN, is employed in some countries but for the sake of consistency, ANP will be used in this paper.

There is a lack of published papers that examine doctoral education, advanced practice and research in an integrated way and take an international perspective. This makes it difficult to obtain a comprehensive understanding of nursing's progress internationally. This paper goes some way in addressing this and, in the process, provide a degree of originality and significance to the extant knowledge base.

Advanced nursing practice "...is characterised by high-level autonomous decision-making, including assessing, diagnosing and treating patients with complex multidimensional problems. ANPs have the authority to refer, admit and discharge within defined clinical areas." ([Chief Nursing Officer Directorate, 2017](#), page 12). Similar definitions are common in many countries where ANPs work independently without medical direction or supervision. The [WHO \(2020\)](#) identified 78 countries as having ANP roles. The effects of such roles were outlined in a recent systematic review by [Htay and Whitehead \(2021\)](#). They found positive impacts on patient satisfaction, waiting times, control of chronic diseases, and cost-effectiveness, especially when directly compared to medical practitioner-led care.

The exponential growth in nursing research globally has been highlighted ([Im et al., 2020](#)). They have reported trends related to demographic alterations, individualised or personal care, population health initiatives, health policies and regulations, and nursing workforce changes. However, such trends rely on a growing cohort of PhD prepared nurses and the availability of sufficient and accessible sources of research funding. This paper provides insights into the challenges relating to how and where nurses access such funding.

This discussion paper aims to

- 1 describe the current state of nursing doctoral education, advanced practice, and research in selected countries within the six WHO regions;
- 2 discuss these three topics from the perspectives of 11 nurse leaders who live and work in the six WHO regions;
- 3 outline and discuss the challenges relating to the three topics; and

4 offer recommendations to address the challenges and in the process contribute to advancing understanding within the nursing profession.

The authors

This is not a research paper in the true sense; rather it is a discussion paper that aims to gather views and data from a select group of nurses who are scholars/researchers with extensive experience in leadership positions. A purposive approach was employed in recruiting them. They have all presented and published on one or more of the three topics, meaning that they can identify and understand the related challenges. Therefore, they are accomplished scholars with reputable profiles, who are leaders within and outside their respective WHO regions.

The first two authors have had research collaborations with nurses from many different countries (Kim et al., 2015). They identified the co-authors from collaborative research projects, and from publications and presentations at international conferences. All nine of the research leaders accepted the invitation to co-author this discussion paper. In total, ten Zoom meetings were held to share progress, discuss salient points and incorporate their insights into the development of the manuscript. Virtual meetings, numerous emails and telephone calls via WhatsApp and Kakao clarified any outstanding issues and ensured their full co-operation and contribution.

Demographic profiles

It was important to gauge the percentage of doctorally prepared nurses. In the 11 participating countries, the percentage of those with PhD degrees in nursing ranged from 0.05% in Egypt to 4.7% in Brazil (see Table 1). It was acknowledged that some nurses also possessed PhDs in other subjects such as psychology, sociology, and education. While they may also make a valued contribution to nursing, no reliable data exist as to their numbers or career options, and they were not included in Table 1.

It was considered important to examine differences in the nurse to population ratios. In a small number of databases, nursing data were not separated from that of midwifery, and this is a limitation. Table 1 shows wide variations in the density of nursing and midwifery per 1000 of population. In Finland, the figure is 14.3 per 1000 populations, whereas in South Africa it is 1.1 per 1000. Examining the data by WHO regions, the variations are even more stark, with one nurse per 121 people in the Region of the Americas and one per 973 people in the African Region (WHO, 2021).

It might be assumed that the ratio of nurses to medical doctors could provide some insights into the development of advanced nurse practitioners. A higher ratio might signal the possibility of advanced nurse practitioners working independently. Table 1 shows that the ratio varied from 0.8 in Brazil to 4.4 in Finland. The United States (US), Canada, Thailand, Australia, and the Republic of Korea all had ratios higher than 3.0. Nurses outnumber physicians in most Organisation for Economic Co-operation and Development (OECD) countries with slightly less than three nurses to every doctor (OECD, 2021).

The data in Table 2 seem to support the above assumption for Finland, Canada, Australia, and Thailand. The existence of an advanced nursing role is more common in countries with a low density of medical doctors. This suggests that more professional autonomy for nurses might be a policy response to mitigate for the shortages of medical doctors (WHO, 2020).

A rigorous content analysis of the challenges identified by authors was carried out by two independent nurse experts (not co-

Table 1
Demographic data.

Countries	Group 1 (AFR, EMR and EUR)				Group 2 (AMR)			Group 3 (SEAR and WPR)			
	South Africa	Egypt	Finland	UK	Brazil	Canada	US	India	Thailand	Australia	Republic of Korea
1. Practising nurses per 1000 population and (latest year)	1.1 (2019)	1.9 (2020) [†]	14.3 (2014) [‡]	8.2 (2019)	7.4 (2019)	10.0 (2019) [‡]	12.0 (2019) ^{‡,*}	2.4 (2019)	2.8 (2018)	12.2 (2019)	7.9 (2019)
2. Percent of RNs with doctoral degrees and (latest year)	0.26% (2018)	0.05% (2019/2020)	0.7–1.0% (2021)	<1% (2021)	4.7% (2013)	N/A [§]	1.9% (2018)	N/A [§]	0.65% (2020)	N/A [§]	0.7% (2019)
3. Ratio of Nurses to Medical Doctors and (latest year)	1.6 (2017)	1.8 (2020) [†]	4.4 (2019)	2.8 (2019)	0.8 (2017)	3.6 (2019)	4.3 [§] (2019)	1.7 (2021)	3.4 (2018)	3.2 (2019)	3.2 (2019)

AFR: African Region; EMR: Eastern Mediterranean Region; EUR: European Region; AMR: Region of the Americas; SEAR: South-East Asian Region; WPR: Western Pacific Region; UK: United Kingdom; US: United States; RN: registered nurse.

[§] denotes not available.

[†] Data include nurses and midwives.

[‡] Associate professional nurses with a lower level of qualifications make up about one-third in Finland and Canada; and about 18% in the United States.

* Data include nurses working in the health sector as managers, educators, researchers and similar.

[§] For countries that have not provided data for practising nurses and/or practising doctors, the numbers relate to the “professionally active” concept for both nurses and doctors.

Table 2
Data on nursing doctoral programme, advanced nursing practice, and research.

Countries	Group 1 (AFR, EMR and EUR)			Group 2 (AMR)			Group 3 (SEAR and WPR)				
	South Africa	Egypt	Finland	UK	Brazil	Canada	US	India	Thailand	Australia	Republic of Korea
Nursing Doctoral Programme											
1. Start year of Research focused (PhD) programme	1967	1971	1979	1957	1982	1991	1934	1985	1997	1988	1978
2. Start year of Professional doctorate programme	N/A [§]	2021	N/A [§]	1995 (DNS)	2018 (UNESP) 2019 (UFSC)	N/A [§]	1979 (ND) 2001(DNP)	N/A [§]	1984	2000	N/A [§]
3. Number of PhD programmes and (latest year)	18 (2019)	13 (2021)	5 (2021)	91 (2021)	38 (2019)	18 (2018)	135 (2019)	N/A	8 (2021)	35 (2021)	47 (2019)
4. Number of Professional/ practice doctorate programmes and (latest year)	N/A [§]	N/A [§]	N/A [§]	<10 (2021)	2 (2019)	N/A [§]	357 (2019)	N/A [§]	1 (2021)	N/A [§]	N/A [§]
Advanced Nursing Practice											
5. Number of ANPs and (latest year)	35,479 (2020)	N/A [§]	750 (2021)	3300 (2019)	N/A [§]	6661 (2020)	325,000 (2021)	N/A [§]	28,124 (2021)	2251 (2021)	16,054 (2020)
6. Countries where ANPs have FPA, independent practice, and (latest year)	N/A [§]	N/A [§]	All Finland (2021)	All UK (2021)	N/A [§]	All Canada (2021)	23/50 states approved FPA for NPs (2021)	N/A [§]	All Thailand in Primary care only (2020)	All Australia	N/A [§]
Research											
7. Name of main research funding agency where nurses can apply for funding, and (start year)	National Research Foundation (1999)	Ministry of Finance (1856) and Academy of Scientific Research and Technology (1971)	Ministry of Social Affairs and Health (VTR, 1997); Academy of Finland (1979)	National Institute of Health Research (2006)	CAPES National Council for Scientific and Technological Development (CNPq) (1951)	Canadian Institutes for Health Research (2000)	National Institute of Nursing Research (formerly NCNR); NIH (1986)	Indian Council of Medical Research (1949)	National Research Council of Thailand (2019)	National Health and Medical Research Council (1926)	National Research Foundation of Korea (Chief of Review Board of Nursing) (2013)

AFR: African Region; EMR: Eastern Mediterranean Region; EUR: European Region; AMR: Region of the Americas; SEAR: South-East Asian Region; WPR: Western Pacific Region; UK: United Kingdom; US: United States; PhD: Doctor of Philosophy; DNS: Doctor of Nursing Science; UNESP: Universidade Estadual Paulista; UFSC: Universidade Federal de Santa Catarina; ND: Doctor of Nursing; DNP: Doctor of Nursing Practice; ANP: advanced nurse practitioner; FPA: full practice authority; NP: nurse practitioner; CAPES: Coordination for the Improvement of Higher Education Personnel; NCNR: National Center for Nursing Research; NIH: National Institute of Health.

[§] denotes not available/not applicable.

authors), using the methods of [Graneheim and Lundman \(2004\)](#). Any inconsistencies were discussed and agreed. The challenges identified in each of the 11 countries showed similarities and these will be presented in the following sections.

International perspective on nursing doctoral programmes

This section explores the data presented in [Tables 1 and 2](#) and the insights provided by authors. It shows the trends in doctoral education and related challenges (Aims #1,2,3). Professional doctorates (e.g., Doctor of Nursing Practice, Doctor of Nursing Science) have emerged in nursing as alternatives to the traditional PhD. These are often tailored to nurses in clinical or managerial roles. Hence, where available, the data include the number of PhD and professional doctorate programmes across the 11 countries and when they first commenced.

The region of the Americas

The first PhD in nursing programme in the US was at New York University in 1934 ([Dreher and Glasgow, 2017](#)). PhD programmes were the mainstay until the nursing doctorate was launched in 1979 by Case Western Reserve University and the first Doctor of Nursing Practice (DNP) programme was introduced in 2001 at the University of Kentucky. Between 2007 and 2019, the number of PhD programmes increased from 113 to 135 (a 19% increase), whereas the DNP programmes grew from 53 to 357 (a 573% increase) ([American Association of Colleges of Nursing, 2020](#); [Dreher and Glasgow, 2017](#)).

The first Canadian doctoral programme in nursing was established on January 1, 1991, at the University of Alberta. Since then, government-funded PhD fellowships have become available to help students with tuition fees and expenses. Graduate-level funding is also available for nurses registered on doctoral programmes, but it is much less than what nurses can earn clinically. Currently, there are no Canadian universities offering professional doctorates.

In Brazil, there is great diversity in nursing doctoral programmes, with the PhD being the preferred doctoral route. Nurses with PhDs are expected to serve as leaders in widely different spheres of practice. These roles focus on the interdependence of the social determinants of health and global health conditions ([Mendes et al., 2020](#)). Although the Brazilian National Graduate Plan (2011–2020) was intended to prioritise doctoral education, there are no such programmes in the northern region of the country. However, there are two professional nursing doctoral programmes in the south and southeast regions, with the key goal of enhancing nursing practice.

The European region

The United Kingdom (UK) was the first country in Europe to introduce nursing PhDs with the first nurse graduating from the University of Edinburgh in 1961. Traditionally, nurses enrolled for PhDs in other subjects such as sociology, psychology, and education. Currently, there are 91 universities in the UK (out of 157) offering nursing PhDs ([UK Research and Innovation, 2022](#)). The first Doctorate of Nursing Science (DNSc) in Europe was offered at Ulster University in 1995. In the following years, a small number of UK universities provided professional doctorates, with a plethora of different titles (e.g., DNS, DNSc). However, such programmes have become less popular, and the PhD has retained its position as the doctorate of choice for nurses ([McKenna, 2018](#)).

In Finland, the doctoral degree is the PhD (since 1979 in nursing science), which is cost free for European Union citizens and those within the European Economic Area. Doctoral students are supported through a national collaborative network in nursing science ([Finnish Doctoral Education Network in Nursing Science](#)). There is also a Baltic/Nordic network, and the European Academy of Nursing Science, established in 1998 to provide doctoral summer schools for PhD students ([European Academy of Nursing Science, 2021](#)). Finnish universities also have postdoctoral nursing programmes and while these play a major role in building careers and research capacity in nursing, they are not numerous, a trend seen in all 11 countries represented in this paper.

The Eastern Mediterranean region

In Egypt, the University of Alexandria started a PhD for nurses in 1971, producing its first graduates in 1975. Since then, the number of programmes has increased considerably. Thirteen out of 23 public colleges offer PhDs in nursing. To date, there have been no professional doctorates in nursing, but in March 2021, Egypt's Prime Minister's Resolution # 466 proposed to establish an Egyptian Doctor of Nursing Practice.

The African region

In 1967, the University of Pretoria in South Africa was the first university in the African region to offer a PhD in Nursing Science. By 2021, 18 out of 26 universities were accredited to offer such PhDs. This has raised the profile of nursing scholarship in the country. To date, South Africa has no professional doctorate programmes for nursing.

The South-East Asian region

In India, the first PhD in nursing was provided in 1984 at the Post Graduate Institute of Medical Education and Research in Chandigarh. In 2006, the Indian Nursing Council, in partnership with the Rajiv Gandhi University of Health Sciences in Bangalore, launched a national consortium for PhDs in nursing ([Hayter et al., 2019](#)). The nursing PhD programmes have been heavily

oversubscribed. There are currently no professional doctorate programmes for nurses in India.

In Thailand, the first nursing PhD programme was introduced in 1984, with a focus on public health nursing. Because of low numbers of doctorally prepared nursing faculty, a collaborative doctorate in nursing science was launched in 1990 by four Thai universities. Seven years later, as each developed its own resources, they began offering their own PhD programmes. Currently, eight nursing PhD programmes are provided across Thailand. There is only one professional doctorate programme (i.e., DNS), focusing on practice enhancement.

The Western Pacific region

In contrast to the very nursing-based genesis of doctoral degrees seen elsewhere, nursing PhD degrees in Australia have been influenced by institutions, with a strong focus on multidisciplinary research. As in many other countries, debates, and discussions on the professional doctorates versus the PhD have occurred in Australia. There are a small number of professional doctoral programmes, with the preferred pathway being the PhD. The reasons for this are complex and multifaceted and have been influenced by the limited discussion, debate and endorsement of professional doctoral programmes.

The Republic of Korea had the first nursing PhD programme in Asia in 1978 at Yonsei University (Kim et al., 2012). By 2019, the number had increased to 47 (Korean Nurses Association, 2020). Although doctoral programmes have contributed to producing Korean nurse leaders in nursing education, research and policy (Oh et al., 2014), their rapid growth has raised concerns regarding programme quality and inadequate financial support, issues noted in other Asian countries (Molassiotis et al., 2020). While initial discussions have begun around professional doctorate programmes in nursing, none currently exist in Korea.

International challenges for nursing doctoral education

Table 2 shows that the PhD is the doctorate of choice in most of the countries. The US is the exception, with the exponential growth in the Doctor of Nursing Practice. Both doctoral routes have benefits. This greater focus on the PhD is advantageous for nursing science, providing a cohort of future research leaders. Conversely, DNP nurses advance nursing practice in clinical settings and teach students at schools of nursing as clinical faculty.

The lack of funding for full-time PhD study leading to nurses delaying or undertaking part-time study over a more prolonged period is a pervading issue. In addition, the poor support for postdoctoral careers in nursing is a perennial problem (McKenna, 2021). Other challenges are the absence of reliable national databases on the number of PhD prepared nurses and nursing PhD programmes worldwide. It could be argued that if we do not know baseline figures, how will we know if nursing's research capacity is increasing or diminishing. The challenge of limited cross-country collaboration on doctoral education in nursing was also identified.

There was also concern that in the US the number of PhD students was not increasing compared with that of DNP students. The WHO (2020) concurred with this, highlighting that the shortage of PhD prepared faculty internationally is an impediment to establishing higher degree nursing education programmes. It claimed that "*this also impacts on the ability of the profession to conduct research needed to develop evidence to inform practice, and to assume leadership roles in academic and health care sectors.*" (Page 27)

Finally, the authors identified the lack of available evidence on the impact of PhD research as a challenge. Do such programmes exist to educate nurses as beginner researchers, or should they also bring benefits for clinical practice and policy? After all, one hallmark of a completed PhD is that it extends the boundaries of knowledge in the field. However, we are not aware of any database that records such information and without one, calls for funding for more PhD programmes in nursing and more full-time PhD students may go unheeded.

International perspective on advanced nursing practice

This section analyses the data presented in Table 2 and the insights provided by the authors regarding advanced nursing practice. They were asked to provide information on the number of ANPs in their countries and whether they worked independently. They were also asked to highlight whether they worked within a regulated scope of practice without medical direction or supervision. This section also outlines their perceptions of the challenges facing advanced nursing practice. Here again, relevant data are not available or applicable for some countries.

The region of the Americas

In the US, advanced practice registered nurses (APRNs) include nurse practitioners (NPs), clinical nurse specialists, certified nurse midwives and certified registered nurse anaesthetists (APRN Consensus Workgroup and National Council of State Boards of Nursing APRN Advisory Committee, 2008). Of these, NPs are the most numerous, with more than 325,000 licensed in 2021 (American Association of Nurse Practitioners, 2021). However, in 27 out of 50 states, NPs do not have full practice authority and cannot prescribe medication, diagnose patient problems, or provide treatment without the approval of physicians. Recently, nurse leaders in the US supported the following recommendation, "*To eliminate restrictions on the scope of practice of APRNs so that they can practise the full extent of their education and training*" (National Academies of Sciences, Engineering, and Medicine, 2021, page 40).

The advanced nursing practice position in Canada has also evolved with two roles currently recognised: clinical nurse specialist and nurse practitioner. The former are registered nurses who hold a master's or doctoral degree with expertise in a specific sub-speciality. The latter are registered nurses who hold a master's degree and demonstrate competencies to practise autonomously. The Canadian

Provinces and Territories ($n = 13$) regulate nurse practitioners with some variation in their scopes of practice. By the 1970s, interest in this role increased and more education programmes commenced (Kassalainen et al., 2010). Currently, nurse practitioners are an important part of the Canadian healthcare system, working as independent autonomous practitioners.

ANPs are not regulated or legislated for in Brazil. A discussion about the role has been initiated at different levels, especially by the Federal Council of Nurses. This has also been supported by the Pan American Health Organisation (PAHO) and the PAHO/WHO Collaborating Centre for Nursing Research Development at the University of São Paulo at Ribeirão Preto College of Nursing. In this context, one of the aims of the professional masters and doctoral programmes is to focus on enhancing good practices by the ANP (Parada et al., 2020).

The European region

In the UK, the trajectory of advanced nursing practice has been fraught with problems. Leary et al. (2017) identified 595 job titles in use. This situation could no longer continue and there was a determination to clarify the ANP role. This resulted in it being defined and its core competencies and learning outcomes identified (Royal College of Nursing, 2018). To function as an ANP, a nurse must have completed a master's programme in the relevant area of practice (Royal College of Nursing, 2018). The UK regulatory body, the Nursing and Midwifery Council, is currently considering regulating advanced nurse practitioners.

In Finland, the first ANPs emerged at the beginning of the 21st century in university hospitals (Fagerström, 2009). Currently, ANPs are educated at both universities and universities of applied sciences. However, since there is no legislation governing ANPs, the role is still under development and there are no reliable statistics. This has been addressed by organisations such as the Finnish Nurses Association (Finnish Nurses Association, 2016). ANPs (currently 120) have established a national network for collaboration and for influencing decision-makers (J. Kotila, personal communication, December 8, 2021). There are also about 600 ANPs with prescriptive authority in Finland (Maier, 2019). The high nurse to population ratio in the country (see Table 1) means that public health nurses, midwives and nurses undertake practices that correspond to the duties of ANPs (Flinkman, 2018). This has contributed to the confusion regarding the ANP role and its scope.

The Eastern Mediterranean region

In Egypt, there are no ANP educational programmes. However, the Official Order by Egypt's Prime Minister, published in March 2021, directed the establishment of an ANP programme with specialisation at graduate level. But nurse graduates from overseas who have worked as ANPs elsewhere cannot be registered for this role in Egypt. However, with the support of WHO, nursing legislation is currently being reviewed and updated to include an ANP role.

The African region

Up until 2012, advanced nursing practice in South Africa used mixed terminologies (Leach, 2017). This led to the approval of a position paper published in March 2012 (South African Nursing Council, 2017). Under the provisions of the Nursing Act of 2005, the aim was to ensure consistent use of terminology. The umbrella term 'advanced practice nurse', as defined by the International Council of Nurses (ICN) (2020), was used as the basis for differentiation. The South African Nursing Council acknowledges the role based on two advanced practice nursing levels: (i) clinical nurse specialists and (ii) advanced nurse practitioners. The latter is defined as a person who focuses on primary care, health assessment, diagnosis, and treatment, and can practise independently within an expanded scope of practice, including assessment, diagnosis, treatment, management, and prescribing.

The South-East Asian region

In 2017, the Indian Nursing Council implemented a Nurse Practitioner programme with the approval of the Ministry of Health & Family Welfare. The goal of this programme was to engage registered nurses more fully as autonomous professionals. Currently, the ANP role is still maturing in India and there is no full independent practice (Jose, 2017).

In 2003, there was a major change in the curriculum structure in Thailand and advanced practice courses were included in adult health, elderly nursing, community nursing and mental health and psychiatric nursing. In addition to a master's degree programme, some nursing educational institutes offer a four-month training programme in advanced practice nursing in primary medical care. In 2003, the first group of nurses was certified as ANPs (Sheer and Wong, 2008). There are currently around 2000 master and post-master ANPs registered with the Thailand Nursing and Midwifery Council (TNMC). Compared to other clinical nurses, ANPs have expanded roles based on further education in various specialties (TNMC, 2010).

The Western Pacific region

The introduction of advanced practice roles in Australia has not been without objections and hesitancy and there are differences across jurisdictions (Appel and Malcolm, 2002). Guidelines have been developed outlining key attributes: clinical care; support of systems; education; research and professional leadership (Chief Nursing and Midwifery Officers Australia, 2021). Emerging data have identified the potential of advanced nursing practice to improve clinical service delivery (Smith et al., 2019). Nonetheless, the true integration of these roles still requires a strategic approach that includes collaboration amongst universities, the health service, and

professional organisations to ensure good workforce planning.

In 2000, the Republic of Korea adopted a consistent approach to the development of ANPs, agreeing that an ANP is a registered nurse who has successfully completed at least two years of a master's programme. By 2020, there were 16,054 ANPs trained in 37 government-designated educational institutions (Korean Nurses Association, 2020). Nonetheless, the annual number of ANPs graduating has decreased from 520 in 2011 to 338 in 2020. This is because ANPs have not been active in clinical practice (Korean Accreditation Board of Nursing Education, 2021). Several challenges exist, including the increased number of medical support staff and disagreement between nursing and medicine regarding the ANPs' qualifications and speciality areas (Kim et al., 2020, 2021).

International challenges for advanced nursing practice

Table 2 shows that several of the countries represented here support ANP roles, and the number has increased globally. ANPs practise independently in Finland, the UK, Canada, Australia, and Thailand (primary care only), whereas they only have 'Full Practice Authority' in 23 out of 50 US states. An important caveat is that in most instances across the WHO regions, the role independence varied with little standardisation.

The identified challenges include a lack of agreed upon definitions or terminologies to describe the role and a variation in the required education standards. This terminological challenge still exists; a WHO report (2020) indicated that there are at least 144 distinct titles of nurses around the world that require a licensure examination, including specialist and advanced practice titles. It highlighted 10 different titles in the WHO South-East Asian Region to over 30 in the Region of the Americas and the European Region. It also indicated that the definition of the advanced practice nurse role and the related competencies differ widely across countries.

Confusion between the clinical nurse specialist and the advanced nurse practitioner was seen as a global challenge. This is accentuated by the apparent reluctance of national regulatory bodies to legislate and licence these roles. Yet another challenge relates to medically dominated health care systems in some countries setting a limit on the development and practice of ANPs. Moreover, it was highlighted by some co-authors that in their countries there were no reliable data available on the number of ANPs or the levels of role independence.

On a more positive note, there is an increased emphasis by international associations on clarifying the ANP role and there is evidence that advanced practice roles increase the attractiveness of nursing as a career (WHO, 2020). In September 2021, the Chief Executive Officer of the ICN's called for governments to invest rapidly in ANP roles to maximise the effectiveness of healthcare systems in a post-pandemic world (ICN, 2021). This may also be related to a global shortage of medical doctors. However, it is important that ANPs advance the practice of nursing as opposed to simply undertaking medical tasks in situations where physicians cannot be recruited or retained.

International perspective on nursing research

This section explores the data presented in Table 2 and the insights provided by authors on trends in nursing research. They were asked to provide available data on the development of nursing research in their countries and on how it is funded. Views were also sought on the nurses' role in interdisciplinary research, the challenges regarding this and nursing research generally. Unfortunately, there is very little reliable data from most countries regarding the amount of funding that nurse researchers obtain and the sources of funding.

The region of the Americas

Nursing research in the US has made impressive progress in recent decades, particularly after the establishment of the National Institute of Nursing Research (NINR) in 1986. Studies supported by this Institute have helped to develop "strategies for improving health and wellness across populations, health care settings and the lifespan, with an emphasis on achieving health equity" (NINR, 2021). Furthermore, it is encouraging that an increasing number of nurses obtain funding for interdisciplinary studies from other institutes within the National Institutes of Health (NIH) and other funding agencies. The NINR began with funding of \$20 million in 1987 and in 2022 it is projected to be \$199,755,000 (NINR, 2021). Although this appears substantial, NINR funding has consistently ranked close to the bottom of the funding available across the NIHs' 27 Institutes and Centres.

In Canada, research funding for nurses is available through the Canadian Institutes of Health Research (CIHR), a national funding agency. The CIHR includes 13 institutes, each dedicated to a specific area. The institutes range from biomedical and clinical research to research on health systems, health services, the health of populations, societal and cultural dimensions of health and environmental influences on health. Nurses can apply as principal applicants or as part of a team to any one of the institutes. In the early 2000s, there were nurse-specific funds in targeted provinces across the country. For example, the Ontario government maintained a Health Services Research Fund with a stream dedicated to nursing research. This funding has since ceased and absorbed into transdisciplinary initiatives.

In Brazil, the main organisations for research funding are the National Council for Scientific and Technological Development and the Coordination for the Improvement of Higher Education Personnel, both of which were created in 1951. Funds began to be allocated to nursing research projects in 1969. Like other countries, Brazilian nurse researchers compete for limited funding with other disciplines, often with partial success.

The European region

In the UK, there are well recognised trends that are also seen in other countries. For example, nursing research studies have increased in number, there is a greater sophistication in the use of methods, studies have become more clinically focused and there is an increasing emphasis on achieving research impact. Data from the Research Excellence Framework ([UK Research and Innovation, 2022](#)) showed that UK nurse researchers publish world leading research and produce outstanding research impact. The National Institute of Health and Caring Research is the UK's largest funder of healthcare research. The funding calls are highly competitive, and nurses can apply to different streams. While many are successful in capturing large grants as principal investigators or co-investigators, exact data are not available on the number of nurse researchers, or the amount of funding nurses obtain.

Nursing research in Finland dates back to the 1960s, and analyses of content, methods and evaluations have been made ([Academy of Finland, 2003](#); [Leino-Kilpi and Stolt, 2019](#)). Progress has been rapid, from small-scale studies to larger programmes, most including international and multidisciplinary collaboration. Strategically, universities have established their research programmes where master's level and PhD students in nursing science participate. Although health science is still a rather small group of disciplines, data show an increase in outcomes, especially in the number of faculty and publications ([Academy of Finland, 2018](#)). International research funding comes partly from the European Union, and there is very limited funding for nursing research from the Academy of Finland.

The Eastern Mediterranean region

Historically, Egypt has been the regional leader in undertaking health research. The National Research Centre was established in 1956 and the Academy of Scientific Research and Technology in 1971. However, these offer very limited support for nursing research. Currently, research funding comes from the Ministry of Finance and universities have called for innovative research ideas to access these grants. There are also research competition grants from bodies such as United States Agency for International Development, the Ford Foundation and United Nations Agencies such as WHO. Like other disciplines, nursing must compete in a crowded market for limited research grants, often with limited success.

The African region

The National Research Foundation (NRF) funds a broad spectrum of disciplines in South Africa. Clinical health science research is funded by the Medical Research Council. Nurse researchers can apply to both these organisations, but the competition is intense and has led to limited research funding for nurses. Consequently, in 2013 the NRF identified nursing science as a 'vulnerable science' and agreed to support an intervention programme (2013–2017) to develop it in South Africa. The SANTRUST/PLUME structured support programme was designed to support nursing schools and nurse researchers to develop research programmes. In its four-year time-frame, 55 PhD students and 26 lead researchers were supported.

The South-East Asian region

The establishment of the Nursing Research Society of India (NRSI) in 1987 marked an important milestone in the historical development of Indian nursing research. Today, the NRSI has 3050 members and has played a leading role in promoting research, disseminating findings, as well as providing high-quality research evidence for nursing practice and education. Furthermore, the Indian Nursing Council has made research an essential element in undergraduate and postgraduate nursing education in the country ([Hayter et al., 2019](#)). Nonetheless research funding for nursing in India is small and highly competitive.

In Thailand, nursing research has focused on clinical practice, education, leadership, management, policy, and outcomes, but funding is limited. There is also an emphasis on health and wellness, health innovation, health systems, and health workforce. Recent interdisciplinary research has concentrated on food and nutrition for the elderly. Moreover, research and innovation, research utilisation and evidence-based practice are also promoted. Applied research is emphasised to ensure impact in real settings and to improve health, society, and the environment. Nonetheless, nurses have difficulty accessing research funds from highly competitive sources.

The Western Pacific region

Despite its late entry into the academy, nursing research in Australia is dynamic and vibrant, even in the absence of a dedicated funding scheme for nursing ([Thelwall and Mas-Bleda, 2020](#); [Zhu et al., 2021](#)). This is evidenced by the fact that three Australian nursing schools were in the top 20 of the World QS rankings in 2021. Issues of diversity, equity and inclusion are seen as critical ([Jackson et al., 2021](#)). Nursing continues to perform exceptionally well in the interdisciplinary Evaluation of Research in Australia, which emphasises the quality of research publications and research impact.

In the Republic of Korea, nurse researchers receive grants mostly from the nursing section of the NRF of Korea. However, the budget is quite limited and only 18 million US dollars was available in 2020 (J. Hwang, personal communication, June 15, 2021). Nurse researchers also seek competitive funding from various government research and development bodies for interdisciplinary research, health services research and centre grants ([Lee and Bae, 2016](#); [Lee et al., 2019](#)). Nonetheless, there is still a significant gap in the academic impact of Korean research compared to other countries such as the US, UK and Australia ([Yanbing et al., 2021](#)).

International challenges for nursing research

Across all six WHO regions, the amount and quality of nursing research is mainly determined by the amount and quality of research funding. In all countries, nurses must compete with more established disciplines for limited research funding. Nonetheless, as their research capability and capacity have increased, their success in securing grants has also increased. It has been mentioned above that it is not possible to precisely identify the amounts of funding obtained by nurse researchers. This is because many of the bids are interdisciplinary or simply because funders do not collect separate data for individual disciplines. Without such data, it is difficult to know exactly how successful nurses are in capturing research funding and the amounts obtained.

There is consensus amongst the authors of this paper that the grants obtained by nurse researchers are small in number and amount. This may have the impact of limiting the reach and significance of their findings and undermine the development of a robust evidence base. Even in the US, it is noted that the NINR's funding level remains close to the bottom of the 27 institutes and Centres in the NIH. Over the years, there have been unsuccessful calls from nurse researchers in other to have dedicated funding for nursing research. However, there is a view that nursing can better raise its research profile and have greater impact globally, through competition and collaboration for funding with more established disciplines. However, this should not be an either-or situation and the benefits of having access to both sources of funding are obvious.

There was a view by some authors that nursing research was more mature and developed in countries such as Australia, the US and in Europe. This may be related to the earlier timeframe for the provision of nursing PhDs and the better funding opportunities available. This echoes a perspective from the WHO in their assertion that research evidence from nursing tended to be generated in high-income country settings (WHO, 2020). Greater collaboration across countries is one 'levelling up' solution. Table 3 synthesises the main challenges across the WHO regions.

Concluding remarks and recommendations for addressing the challenges

Across the 11 countries within the six WHO regions, there are great variations in doctoral education, advanced practice and research. Nonetheless, there are also some similarities, especially concerning the challenges. A prevailing one relates to the lack of reliable national data on all three of these topics. This echoes a call from the State of the World's Nursing report (WHO, 2020, page 18) to use data to guide policy development and investment decisions. It stressed that "...collation of nursing data will require participation across government bodies as well as engagement of key stakeholders such as the regulatory councils, nursing education institutions, health service providers and professional associations." Such participation can be enabled by instigating, increasing and improving global collaborations. Thus, the following remarks and recommendations are offered (Aim #4).

Doctoral education

More reliable national data on the number of doctorally prepared nurses, their career pathways and the impact of their research are critical for gauging research capacity and capability, and for enhancing nursing science. National agencies and professional organisations need to be lobbied to ensure that there is sustained funding for full-time doctoral students. It is also suggested that an agreed upon system of doctoral quality assurance be adopted internationally. One option is based on the work of Kim et al. (2020), who developed a reliable and valid instrument to assess PhD programme quality. The adoption of this tool internationally would help in the pursuit of international quality standards and consistency. This includes how best to evaluate the quality of doctoral programmes, including professional doctorates such as the DNP. Given the explosive growth of the DNP programme in the US in recent decades, it is

Table 3
Global challenges.

Area	Challenges
Doctoral Education	<ol style="list-style-type: none"> 1 Need to increase the number of PhD programmes and PhD students. 2 Lack of national standardised database on PhD students and programmes. 3 Variations in quality across PhD programmes. 4 Lack of data on the impact of research done by PhD graduates. 5 Limited cross-country collaboration in PhD education. 6 Lack of consideration and evaluation of professional doctorates (including Doctor of Nursing Practice) in some countries.
Advanced Nursing Practice	<ol style="list-style-type: none"> 1 Limited number of national or professional organisations that legislate or regulate ANPs. 2 Limited number of ANP programmes and lack of qualified ANPs and faculty to educate ANPs. 3 Lack of standardised terminologies for ANPs full practice authority, and the roles and education standards for ANPs. 4 Ambiguity in the global definitions of ANP. 5 Medically dominated health care system limiting the role and practice of ANPs.
Research	<ol style="list-style-type: none"> 1 Lack of government investment in nursing research and in doctoral and post-doc research training and support. 2 Limited resources for nurse researchers to address big global health problems. 3 Need to promote the role of nurses in interdisciplinary research and appropriate allocation of resources. 4 Need to seek English language support to publish in top-ranked international journals.

ANP: advanced nurse practitioner; PhD: Doctor of Philosophy.

advantages, disadvantages and career pathways merit consideration by nursing leaders in other countries.

Advanced nursing practice

We propose that nurse leaders must lobby national governments and relevant professional organisations on the issues raised pertaining to ANP. The focus of the campaign should be to increase the number of ANP programmes, to legislate and regulate ANPs to have full independence, to develop an approved definition of ANPs, agreed terminologies and established educational standards that can be used worldwide. Finally, we propose that more published evidence should be produced on the positive impact that ANPs have on the healthcare of patients, their families, and communities. Without this, the support of governments for this role may not be forthcoming.

Nursing research

Recommendations related to nursing research focus on urging governments, foundations and other grant awarding bodies to increase dedicated funding. This should be based upon evidence that such investment provides benefits for health and wellbeing. This should include enhancing the support for doctoral education and post-doctoral training. Such training would increase the knowledge, skills and competencies of nurse researchers to compete successfully for and take on the roles of principal, co-principal or co-investigators on large and prestigious nursing and interdisciplinary grants. This in turn, would encourage the targeted dissemination of their work and widen the reach and significance of their research impact.

It is a given that global health problems such as the care of older people, chronic diseases, and mental ill health will not be addressed by any one discipline working independently. The solutions to these problems do not come in neat unidisciplinary packages (McKenna, 2020). Therefore, nurse researchers must collaborate with other professionals. The importance of developing leadership skills to do so is well described by Casciaro et al. (2019) and Hafsteindottir et al. (2019). Furthermore, nurse leaders should advocate, encourage and influence the appointment of nurses onto the boards of national funding bodies and committees that set research funding policies and priorities and allocate research grants.

While this paper has analysed doctoral education, advanced practice and research in separate sections, they must and should be viewed as being integrated and interdependent. A helpful analogy is that they resemble the legs of a three-legged stool. If one is absent or weak, the stool collapses. All three must be strong and must be supported strategically, financially and practically by governments, health care bodies, nursing regulatory organisations and professional bodies. When this is achieved, there will be full recognition and acceptance that doctoral programmes produce future nurse researchers, these researchers provide evidence for informing advanced practice and this creates the best possible healthcare for patients and communities worldwide.

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Supplementary materials

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