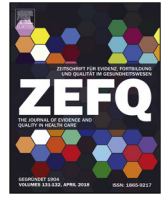




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World views on shortage in nursing resource: Challenges and opportunities

Der Pflegekräftemangel aus internationaler Sicht: Herausforderungen und Chancen

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ABSTRACT

Background: Shortage in nursing resource results from the combination of a lack of nurses, an increased patient volume and workload, and other factors. This seems to be a worldwide phenomenon, leading to multiple health care related challenges and a decreased quality of care, but is different in extent in high- vs. low-income countries. An international perspective can alleviate challenges to keep our patients safe through increasing our health workers' safety.

Purpose & Method: To exchange experiences with the shortage in nursing resource globally, an international online conference event was hosted. Speakers from Germany, the Philippines, Poland, Tanzania, the United Kingdom and the United States presented their national challenges and strategies to deal with this phenomenon.

Results: Conference presentations included information about the health care systems, comparable numbers of hospital beds, nurses, and nursing education. Speakers reported challenges such as an imbalance between a high nurse vacancy rate and demands, but also war and refugees, high human immunodeficiency virus (HIV) and other infection rates, or nurses' migration to other countries; the solutions reported included buy-in from other countries, nurses-attracting projects such as Magnet hospitals, improved job opportunities like higher wages, career prospects, or improved education, and others.

Conclusions: Shortage in nursing resource seems to be a global phenomenon. Nursing managers and researchers should exchange and communicate challenges and solutions continuously and cooperate globally.

Abbreviations: DBfK, The German Nurses Association; HIV, human immunodeficiency virus; ICN, International Council of Nurses; VPU, The Association of Nursing Directors of University Hospitals and Medical Universities in Germany

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ZUSAMMENFASSUNG

Hintergrund: Ein Mangel an Pflegeressourcen ist das Ergebnis einer Kombination aus einem Mangel an Pflegefachpersonen, einem erhöhten Volumen an Arbeit und Patient:innen sowie anderen Faktoren. Dies scheint ein weltweites Phänomen zu sein, das zu zahlreichen Problemen im Gesundheitswesen und zu einer geringeren Pflegequalität führt, aber in Ländern mit hohem vs. niedrigem Einkommen unterschiedlich stark ausgeprägt ist. Mit einer internationalen Perspektive könnten die Herausforderungen für die Sicherheit der Patient:innen durch die Verbesserung der Sicherheit des Personals verringert werden.

Zweck & Methode: Um die Erfahrungen mit dem Mangel an Pflegefachpersonen weltweit auszutauschen, wurde eine internationale Online-Konferenz veranstaltet. Referent:innen aus Deutschland, den Philippinen, Polen, Tansania, dem Vereinigten Königreich und den Vereinigten Staaten stellten ihre nationalen Herausforderungen und Strategien vor, wie sie mit diesem Phänomen umgehen.

Ergebnisse: Die Konferenzvorträge enthielten Informationen über die Gesundheitssysteme, vergleichbare Zahlen von Krankenhausbetten, Pflegefachpersonen und die Ausbildung. Die Referent:innen berichteten über Herausforderungen wie das Ungleichgewicht zwischen der hohen Zahl an freien Stellen für Pflegefachpersonen und dem Bedarf, aber auch über Krieg und Flüchtlinge, hohe HIV- und andere Infektionsraten oder die Abwanderung von Pflegefachpersonen in andere Länder; als Lösungen wurden u. a. genannt: die Übernahme von Aufgaben durch andere Länder, Projekte, die Pflegefachpersonen anziehen wie z. B. Magnet-Krankenhäuser, verbesserte Beschäftigungsmöglichkeiten wie höhere Löhne, Karrieremöglichkeiten oder eine bessere Ausbildung und anderes.

Schlussfolgerungen: Der Mangel an Pflegeressourcen scheint ein globales Phänomen zu sein. Pflegemanager:innen und -wissenschaftler:innen sollten Herausforderungen und Lösungen kontinuierlich austauschen, kommunizieren und weltweit zusammenarbeiten.

Topic

Worldwide, nurses play a vital role in holistic physical, psychosocial, and spiritual care in disease prevention, health enhancement, primary care, emergency care, rehabilitation and other setting [1]. Nurses are key figures to the achievement of universal health coverage.

Approximately 27 million professionals make up the global nursing workforce [2]. This accounts for nearly 50% of the global health workforce. During the last years, the combination of increased workload, work-related stress, absenteeism and despite recruiting more nurses, the balance between demands and fulfillments in health care shifted towards a shortage in nursing resource [3]. There is a demand of health workers, in particular nurses and midwives, who represent more than 50% of the current shortage in health professionals. The WHO estimates about a need of almost six Million nurses worldwide by 2030 [4]. Recent surveys done in several countries reveal this fact [5]. An aging baby-boom population (highest group of retirement-age individuals), increasing access to health care and more people suffering from chronic conditions are all contributing to an increased demand for nurses [6,7]. Furthermore, there is the impact of the pandemic, global warming, and other global challenges which make the addressing of shortage nursing resource more critical [8,9].

High nurse vacancy rates in hospitals have an adverse impact on the health of whole hospital teams, patients, and their relatives, and affect patients' safety [10,11]. Another key fact is the frequency of changing jobs among nurses [12]. Pandemic related stressors like additional patient load, longer working shifts, short swift between shifts, poor sleeping quality, psychological strain, anxiety, low job satisfaction, questions about ethical responsibilities, moral distress were some among the reasons reported for leaving the job or shifting to other industries [13–16]. The disbalance between high nurse vacancy rate and demand of nurses over these years, points out the urgency of political and social actions in terms of

education and finance to retain and engage the existing nurse population [17]. Additionally, the increases in cost according to staff burnout and overtime in nursing profession makes the situation more complex [12,18–20].

To recognize the great work that nurses do 24 h a day, 365 days a year and to exchange the experiences about Nursing Resources globally, an international online conference event was held on August 25th 2022. The conference has been facilitated by the Association of Nursing Directors of University Hospitals and Medical Universities in Germany (VPU) e.V. and the Network of Nursing Science and Practice Development. The hosts of this event were German Professional Association for Nursing Professions (DBfK) and the International Council of Nurses (ICN). The conference goal was to create a joint exchange platform with nursing experts and managers from various countries. The focus of the event was to learn mutually from participating countries in terms of implementing strategies to counteract the shortage of nurses' resource, best practices and lessons learned.

Purpose and method

The organizing core team, seven nursing scientists from university hospitals in Germany met six times to discuss relevant themes in relationship with challenges in nursing practice. The goal was to identify a unifying theme for the international conference. Topics were identified by literature review, ongoing discussions in social media, and discussions in nursing practice, clustered, and ranked in a consensus process. After identifying the main theme of conference, nursing resource shortage, the core team started to identify the speakers around the world by personal contacts and/or publications. For stimulating a multifaceted discussion and based on world bank data, speakers from exporting, low-income countries and speakers from importing, high-income countries were selected to discuss different aspects of nurses' workforce migration [21]. This was done in different ways like contacting worldwide Associ-

ations, Institutions and Personalities via Email. Financial support was guaranteed by the VPU. After the final decision of speakers, nursing managers and nurse workforce analysts from four high income countries (Germany, Poland, United Kingdom, and United States) and managers from lower income countries (Philippines and Tanzania) were invited via email. Speakers were recruited by snowball requests via scientific networks and experts in this field. All speakers received a template to structure their presentation including aspects of information about the health care systems, comparable numbers of hospital beds, nurses, nursing education, challenges and solutions. The conference was held on August 25th 2022 and lasted two hours, with 60 participants joining. The conference was scheduled into two sessions, the first one included six 10-minute presentations by the speakers, and in the second session contained a group discussion with speakers and the audience. Five speakers could join the conference in presence and one among them participated via prerecorded session because of time differences between the countries. Further questions were answered via Email. The presentations and references were used for the data extraction (see Table 1).

Content covered

There is a large heterogeneity in nursing management within different health care systems (Table 1). In general, all countries offer a type of healthcare, provided by the government. But the ratio of health expenditure to gross domestic product ranges between 4.4% (Philippine) and 16.8% (United States). As consequence, health services are not available for everyone, in some countries additional private insurance is required. Provision of hospital beds and nurses per 1,000 capita ranges between 1 bed, resp. 4.9 nurses (Philippine), till 7.8 beds and 12.1 nurses (Germany).

The challenges for the nursing workforce in all countries are an increasing workload, stress, and lack of nurses. All speakers mentioned the impact of the Covid-19 pandemic as additional contributing factor. Beside these general aspects, each country has its unique challenges. In Germany, the high number of beds leads to more health service availability, but also more patients per nurse, questioning the quality and ethic of nursing. In Poland, nursing managers have to deal with the war in Ukraine and its refugees and wounds of war, but also missing health care resources or public awareness for health prevention. In United Kingdom is an increasing dissatisfaction of nurses due to unraised wages and economic burden by high inflation rates, leading to strike. In United States, it is difficult to keep new qualified nurses in work, leading to a high turnover rate. In Tanzania, there are limited economic resources, high HIV infection and mortality rates, challenges in nursing education due to limited practical education, and a high rate of nursing migration. In Philippines, the health care sector is developing, but the country has still one of the lowest hospital beds per capita in the world, nurses wages are low, career options limited, so that the best nurses leave the country: up to 88,500 nurses are working overseas.

Several strategies for fighting the shortage of nursing resource have been presented. On the political level, the several high-income countries like Germany, United States, and others increase the wages for nurses, provide advertising campaigns for recruitment, and acknowledge working staff to keep resilience and pride. In United Kingdom, a national workforce plan is in development; in the United States, the concept of Magnet Hospitals has been developed including several measurements to increase engagement for nurses; Tanzania increases the opportunities for nurses to gain academic degrees. Managers from the Philippines increased nurses'

wages, but moreover, cared for nurses by no-blame policies, DAISY awards in recognizing extraordinary contributions of nurses, nurses' celebration days, and others. In Poland, more public awareness on health prophylaxis and prevention would reduce the burden of hospitalized patients.

On hospital level, managers buy-in nurses from other countries, offer flexibility in shift work and working hours (Germany), offer career structures and support students (United Kingdom), or implement engagement strategies and revision of the model of care to focus on additional resources for newly licensed nurses (United States). Even in low-income countries such as Philippines, nursing managers are offering training courses such as Tai Chi for nurses, to enhance their coping abilities.

Basically, shortage of nursing resource seems to be a worldwide phenomenon, and most countries have to deal with this. But the reactions are individual and based on national political systems and socioeconomic possibilities. According to these insights and based on the speakers' content, we developed seven recommendations to deal with shortage of nursing resource worldwide.

Recommendations

At international level the low-income countries should be backed up by the international community. This could be done with long-term vision and plan through rebuilding, profiling, and investing in global nursing workforce. On country level, the goal is to improve the sustainability of nurse workforce by enhancing training capacities and retention rate for nurses. Based on the individual conference's lectures and the insights above, following solutions are recommended:

1. New hire preboarding, check ins and onboarding best practices can help to avoid early turnover

In order to mitigate early turnover among newly hired nurses and enhance their integration into the healthcare workforce, it is essential to implement a series of comprehensive preboarding, check-in, and onboarding strategies. These measures should be rooted in evidence-based practices, incorporating transition-to-practice programs akin to residencies. The establishment of mentoring initiatives will play an important role in promoting professionalism and mitigating instances of overwhelming demands.

Creating a culture of inclusivity and warmth for all incoming nurses establishes a welcoming environment. These professionals feel valued and motivated from day one. Additionally, recognizing the unique challenges faced by young nurses and offering tailored support programs will further bolster their success.

Efforts to streamline bureaucratic processes related to foreign placements, accommodations, transportation, and other logistical aspects are essential. This will facilitate a smoother transition for international nurses and enhance their overall experience.

2. Recruiting sufficient numbers of well-trained and educated nurses from own countries

The challenge of recruiting an ample number of well-qualified nurses from own sources necessitates multifaceted strategies. This entails crafting appealing career pathways that align with individual aspirations, coupled with facilitating interprofessional education to bolster communication and collaboration across healthcare domains. A strong commitment to work-life balance and family-friendly policies will enhance the allure of the nursing profession. Embracing diversity and capitalizing on technological

Table 1
Comparison of Different Health Care Systems, Challenges, and Solutions.

Item ¹	Germany	Philippines	Poland	Tanzania	United Kingdom	United States
Ratio of total health expenditure to gross domestic product	12,5%	4,4%	7,2%	3,6%	12,8%	16,8%
Health Care System	Health insurance, Health for all	Partially disbursement from the National Health Insurance, with health benefits	Health Insurance, Health for all	National Health Insurance Fund & private Insurances	Publicly funded healthcare	Universal health care & private insurances
Hospital Beds ²	7,8	1,0	6,2	0,7	2,3	2,8
Nurse per capita ²	12,1	4,9	5,1	0,6	8,7	12
Nursing Education	Education, optional study	Bachelor of Science in Nursing	Study (Bachelor in Nursing)	Study (Bachelor in Nursing)	University based Education, optional study Bachelor degree	Education, optional study, 50% Bachelor degree
Challenges	<ul style="list-style-type: none"> ↑ Nurses' demands ↑ Absenteeism No chamber or general professional organization 	<ul style="list-style-type: none"> ↓ Economic resources ↑ Nurse Migration ↑ Shifting to other industries like call centers, education, administration >7,600 islands Never-say-no attitude 	<ul style="list-style-type: none"> ↓ Economic resources ↓ Health Care Service ↓ Awareness of Health Protection Deficiencies in health care workers ↑ War in Ukraine, refugees 	<ul style="list-style-type: none"> ↑ HIV infections ↑ Perinatal Mortality ↓ Economic resources ↓ Number of nurses ↓ Practical education ↓ Equipment ↑ Nurse to Patient Ratio ↑ Nurse Migration 	<ul style="list-style-type: none"> ↑ Nurses' demands ↑ Absenteeism ↑ Workload, Burnout ↓ Working hours ↑ Inflation (10%) 	<ul style="list-style-type: none"> ↑ Nurses' demands ↑ Absenteeism ↑ Early intention to leave ↑ Turnover in new graduated nurses
Solutions	<ul style="list-style-type: none"> ↑ Wages ↑ Flexibility in shift work ↑ Staff pools ↑ Training opportunities ↑ Recruitment of int. Nurses 	<ul style="list-style-type: none"> ↑ Virtual education ↑ Career options ↑ Care for nurses Free transportations of RN No-Blame culture Daisy Awards for nurses Celebrating nurses' days Courses for relaxing (Tai Chi) Promoting happiness! 	<ul style="list-style-type: none"> Revision of the health care system ↑ Complementary health insurances ↑ Prophylaxis ↑ Education 	<ul style="list-style-type: none"> ↑ Autonomous Nurses ↑ Post Graduation Training Framework ↑ Mentorship ↑ Support of midwifery ↑ Prevention & Management of Infections 	<ul style="list-style-type: none"> ↑ Recruitment of int. Nurses ↑ UK based training ↑ Support of students ↑ Career structure National health care workforce plan 	<ul style="list-style-type: none"> ↑ Magnet Hospitals ↑ Recruitment of int. Nurses ↑ Engagement Strategies ↑ Post-Graduation Career & Education ↑ Nursing Quality Indicator Observations ↑ Revision of Leadership

Abbreviations: HIV, Human immunodeficiency virus; int., international; RN, Registered Nurse; UK, United Kingdom.

¹ Reported data are based on information of speakers' lectures.

² Per 1,000 inhabitants.

advancements are pivotal in enhancing the profession's attractiveness.

3. Regulation for fair pay and recognition commensurate with the services and quality of care that they provide

Addressing fair compensation and recognition is pivotal in retaining skilled nursing professionals. Implementing equitable pay structures for various roles, including those involving direct clinical care and leadership positions, is essential. Recognizing the value of responsibility, commitment, and innovation through commensurate compensation is equally crucial. Collective bargaining agreements should span all nursing domains, promoting fair remuneration. A flexible approach to compensation based on qualifications and performance will further incentivize excellence.

4. Investment in education

Investment in education is a linchpin of nurturing a skilled nursing workforce. Encouraging formal education, professional board certification, and continuous career development is essen-

tial. Institutions should offer robust professional development programs to ensure nurses are equipped with the latest knowledge and skills.

5. Investment in job creation

Enriching job opportunities necessitates a strategic roadmap. This includes new working models and schedules adapted to the needs of health care workers and the population, differentiated grade- and skill mix with different job profiles, mentorship, transparent and fair career models, and opportunities for caring for families, sabbaticals, or scheduled withdrawal and retirement. These opportunities cultivate intelligent and resilient workforces, fostering shared governance structures in healthcare systems, and establishing empowerment mechanisms for nurses. Improving nurse-to-patient ratios, optimizing working environments, and redefining decision-making processes will strengthen job attractiveness and satisfaction.

6. Establish new models of care and deploy extended nursing roles

Innovative models of care must be developed to address evolving challenges. This includes carving out novel nursing roles, such as experts in areas like refugee health, climate change, and pandemic management. Active participation in political associations amplifies nursing's influence. Elevating nurses' roles through advanced educational programs fosters both their psychological well-being and their capacity to contribute effectively.

Senior nurses can play a key role in supporting and retaining newer colleagues, while maintaining a strong focus on safety and quality. This involves designing specialized roles that provide mentorship and guidance.

7. Measures for the sustainable transformation of the societal role image of nursing care

To transform the societal perception of nursing care, investing in evidence-based management practices is paramount. Developing a knowledge base to tackle nursing resource shortages through data-driven solutions is essential. Facilitating international research collaborations and networking opportunities will elevate the nursing profession on a global scale.

In essence, by incorporating these holistic measures, healthcare systems can uplift nursing professionals, strengthen their impact, and ensure sustainable excellence in patient care.

Strengths and limitations

First, the recommendations' general character enables a broad applicability, allowing implementation in different countries and health care settings. Second, the recommendations include multiple strategies to convince nursing resource shortage, allowing health care providers to address barriers on different levels. Third, the recommendations can be adapted to specific health care systems for developing specific programs for improving resources. Contrary, the recommendations are based on the views of the speakers and influenced by personal and cultural backgrounds, which limit the generalizability of the recommendations; contrary, the speakers are international experts and authors, and the limitation might have only limited effects. Another limitation is a missing report of the underlying scientific evidence; hence the probability of the recommendations' success might be limited.

Conclusions

Shortage of nursing resource can be seen as a worldwide phenomenon that has a certain impact depending on the overall development of the country. In high-income countries, the need for caregivers will become one of the most important overall social problems of the next 50 years, while societies with younger populations will experience this development only passively, in the sense of a loss of trained staff. Recruitment of nurses by high-income countries creates serious deficits in clinical care expertise in these exporting countries, with unclear effects on sustainable and future-orientated consequences. Therefore, nursing managers and researchers should exchange and communicate their challenges and solutions continuously and cooperate globally.

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Conflict of Interest

All authors declare no conflicts in relation to this work.

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References

- [1] Catton H. International Council of Nurses: putting nurses at the centre of the world's policymaking has benefits for us all. *Int Nurs Rev* 2019;66(3):299–301.
- [2] World Health Organization. *State of the world's nursing 2020: investing in education, jobs and leadership*. 2020 Oct. 14th, 2022]; Available from: <https://www.who.int/publications/i/item/9789240003279>.
- [3] Newman K, Maylor U, Chansarkar B. "The nurse satisfaction, service quality and nurse retention chain": implications for management of recruitment and retention. *J Manag Med* 2002;16(4–5):271–91.
- [4] World Health Organization. *Year of the Nurse and Midwife 2020*. 2020 Oct. 14th 2022]; Available from: <https://www.who.int/news-room/campaigns/year-of-the-nurse-and-the-midwife-2020>.
- [5] Catton H. International Council of Nurses representing nursing at the World Health Organization: COVID-19, policy and holding politicians to account. *Int Nurs Rev* 2021;68(3):267–9.
- [6] Chan ZC, Tam WS, Lung MK, Wong WY, Chau CW. A systematic literature review of nurse shortage and the intention to leave. *J Nurs Manag* 2013;21(4):605–13.
- [7] Schaller A, Gernert M, Klas T, Lange M. Workplace health promotion interventions for nurses in Germany: a systematic review based on the RE-AIM framework. *BMC Nurs* 2022;21(1):65.
- [8] International Council of Nurses. *Climate Change and Health*. 2018 Oct. 14th, 2022]; Available from: <https://www.icn.ch/sites/default/files/inline-files/ICN%20PS%20Nurses%252c%20climate%20change%20and%20health%20FINAL%20.pdf>.
- [9] Khumalo GE, Lutge EE, Naidoo P, Mashamba-Thompson TP. Barriers and facilitators of rendering HIV services by community health workers in sub-Saharan Africa: a meta-synthesis. *Fam Med Community Health* 2021;9(4).
- [10] Pearson A, Pallas LO, Thomson D, et al. Systematic review of evidence on the impact of nursing workload and staffing on establishing healthy work environments. *Int J Evid Based Healthc* 2006;4(4):337–84.
- [11] Twigg DE, Kutzer Y, Jacob E, Seaman K. A quantitative systematic review of the association between nurse skill mix and nursing-sensitive patient outcomes in the acute care setting. *J Adv Nurs* 2019;75(12):3404–23.
- [12] Halter M, Boiko O, Pelone F, et al. The determinants and consequences of adult nursing staff turnover: a systematic review of systematic reviews. *BMC Health Serv Res* 2017;17(1):824.
- [13] Al Yahyaeei A, Hewison A, Efstathiou N, Carrick-Sen D. Nurses' intention to stay in the work environment in acute healthcare: a systematic review. *J Res Nurs* 2022;27(4):374–97.

- [14] Tolksdorf KH, Tischler U, Heinrichs K. Correlates of turnover intention among nursing staff in the COVID-19 pandemic: a systematic review. *BMC Nurs* 2022;21(1):174.
- [15] Ding S, Deng S, Zhang Y, et al. Experiences and needs of front-line nurses during the COVID-19 pandemic: A systematic review and qualitative meta-synthesis. *Front Public Health* 2022;10:805631.
- [16] Catton H. Nursing in the COVID-19 pandemic and beyond: protecting, saving, supporting and honouring nurses. *Int Nurs Rev* 2020;67(2):157–9.
- [17] Brook J, Aitken L, Webb R, MacLaren J, Salmon D. Characteristics of successful interventions to reduce turnover and increase retention of early career nurses: A systematic review. *Int J Nurs Stud* 2019;91:47–59.
- [18] Stemmer R, Bassi E, Ezra S, et al. A systematic review: Unfinished nursing care and the impact on the nurse outcomes of job satisfaction, burnout, intention-to-leave and turnover. *J Adv Nurs* 2022;78(8):2290–303.
- [19] Tamata AT, Mohammadnezhad M. A systematic review study on the factors affecting shortage of nursing workforce in the hospitals. *Nurs Open* 2022.
- [20] Abed SN, Abdulmuhsin AA, Alkhwaldi AF. The factors influencing the innovative performance of leaders in nurses' professional: a developing country perspective. *Leadersh Health Serv (Bradf Engl)* 2021;35(2):228–45.
- [21] Eaton J, Baingana F, Abdulaziz M, et al. The negative impact of global health worker migration, and how it can be addressed. *Public Health* 2023;225:254–7.