



Systemic and political determinants of the global nursing and midwifery shortages: A discussion based on human resources for health data

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ABSTRACT

Background: Nurses and midwives constitute a substantial proportion of the global health workforce and are essential to universal health coverage, maternal and newborn health, and health-system resilience. Despite workforce expansion, persistent shortages, maldistribution, gender inequities, poor working conditions, leadership gaps, and migration pressures continue to undermine both professions. The Global Burden of Disease 1990–2023 Human Resources for Health estimates provide an opportunity to examine these challenges across three decades.

Aim: This discussion paper reframes global nursing and midwifery shortages as outcomes of systemic, political, economic, and gendered determinants rather than solely numerical workforce deficits.

Sources of evidence: The paper draws on Global Burden of Disease 1990–2023 Human Resources for Health estimates and integrates contemporary evidence from nursing and midwifery workforce research, global health, migration, gender equity, maternal and newborn health, and health policy literature.

Discussion: Although the global nursing and midwifery workforces have expanded, growth has not produced equitable distribution or sufficient workforce capacity. In 2023, published estimates indicated approximately 33.30 million nurses and 3.32 million midwives globally. These figures require cautious interpretation because national definitions of professional nurses, associate-professional nurses, midwives, and nurse-midwives vary, limiting cross-country comparability. The midwifery estimate is also higher than figures reported in other global analyses and may reflect differences in occupational classification, source data, and modelling assumptions. Shortages and low workforce densities remain concentrated in low- and middle-income countries, where limited education capacity, constrained public financing, insufficient funded positions, weak retention systems, regulatory limitations, and outward migration interact with structural inequities. These challenges are particularly consequential for midwifery because of its contribution to sexual, reproductive, maternal, newborn, and adolescent health. Both professions remain highly feminised, with women comprising approximately 85% of nurses and 98% of midwives. Gendered labour structures and negative cultural norms influence remuneration, professional recognition, working conditions, leadership representation, and policy authority. International

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migration further reflects unequal relationships between source and destination countries, particularly when wealthier health systems recruit from countries already experiencing workforce constraints.

Conclusion: Global nursing and midwifery shortages are not only workforce-planning failures but manifestations of interconnected political, economic, institutional, and gendered inequities. This paper contributes by synthesising three decades of workforce estimates through an integrated political economy and gender-responsive framework linking workforce planning, financing, education, employment, regulation, migration, leadership, and structural disadvantage. Sustainable progress requires coordinated investment in education, funded employment, retention, ethical mobility, workforce data, professional regulation, and stronger nursing and midwifery leadership in health policy.

What is already known

- Global nursing and midwifery shortages remain greatest in low- and middle-income countries and underserved areas.
- Both professions are highly feminised and shaped by gender inequities, poor working conditions, leadership gaps, and undervalued care work.
- High-income countries increasingly rely on international recruitment, raising concerns about workforce depletion and ethical mobility.

What this paper adds

- This discussion paper synthesises three decades of global nursing and midwifery workforce estimates through political economy and gender-responsive lenses.
- It integrates financing, education, employment, regulation, migration, leadership, and structural inequities within one framework.
- It shows that shortages are systemic, not merely numerical, and require coordinated investment and policy reform.

1. Introduction

Nursing constitutes the largest segment of the global health workforce and remains fundamental to delivering safe, equitable, and high-quality care. Yet, despite decades of recognition of its centrality, the global nursing workforce faces persistent shortages, uneven distribution, structural inequities, and growing outflows driven by international migration (Bala, 2024; WHO, 2025a, 2025b, 2025c, 2025d, 2025e).

The Global Burden of Disease dataset is a significant international research initiative that compiles and analyses health data from multiple sources, enabling consistent comparisons of disease burden and health system capacity across countries and over time. Led by the Institute for Health Metrics and Evaluation, the Global Burden of Disease database integrates data from vital registration systems, surveys, censuses, and administrative records using standardised methods (IHME, 2023). Beyond measuring disease burden, it also estimates human resources for health, including the availability and distribution of nurses and midwives, making it a valuable resource for understanding how workforce capacity aligns with population health needs, particularly for those new to health workforce research (IHME, 2023). The Global Burden of Disease Human Resources for Health estimates provide one of the most comprehensive sources of modelled global workforce information. However, the complete underlying dataset and occupational mapping decisions were not available to the authors for independent reanalysis.

The release of the Global Burden of Disease 2023 Human Resources for Health estimates offers an important opportunity to re-examine these longstanding challenges through a comprehensive, sex-disaggregated lens. With an estimated 33.3 million nurses globally in 2023, nursing represents not only the backbone of health systems but also the workforce most affected by demographic, economic, and geopolitical shifts (IHME, 2023). The magnitude of the dataset, its 30-year timespan, and its coverage of 204 countries and territories underscore the urgency of reinterpreting these findings for policy and global health workforce

planning. This coverage differs from the number of World Health Organization Member States because the Global Burden of Disease location hierarchy includes sovereign states as well as selected territories and special administrative areas, enabling comparable estimates across diverse locations.

While global nursing shortages have been widely acknowledged in multiple international policy assessments, including the State of the World's Nursing Report from the World Health Organization and other reports from the Organization for Economic Cooperation and Development, their implications are evolving in a changing landscape of policy, cooperation, and partnerships (Chang et al., 2023; OECD, 2023; WHO, 2025a, 2025b, 2025c, 2025d, 2025e). Recent global events—including the COVID-19 pandemic, rising migration flows, changes to international aid allocation, and shifting population health profiles—have reshaped both the demand for nursing care and the supply of nurses across regions (Buchan et al., 2022; Sweileh, 2024). These pressures have occurred alongside longstanding structural challenges, including unsafe staffing levels, chronic underinvestment, and limited opportunities for advancement, all of which affect not only patient and family outcomes but also nurses' well-being (e.g., burnout, moral distress). Evidence, largely from high-income countries, consistently demonstrates the detrimental effects of nursing shortages on care quality, patient mortality, and nurse well-being (Alves et al., 2021; Khajoei et al., 2025; Labrague and Kostovich, 2024; Leep-Lazar et al., 2025; Nashwan et al., 2021a; Ngune et al., 2023; Steven and Redfern, 2024; Vander Weerd et al., 2023). These studies, along with more recent analyses of pandemic-related workforce strain, highlight the critical link between nurse staffing and health system performance (Chan et al., 2021; Villar et al., 2021).

Against this backdrop, this discussion paper critically examines the implications of the Global Burden of Disease 1990–2023 nursing workforce data for global nursing policy, while considering the data's quality limitations. It argues that addressing nursing shortages requires a deeper understanding of structural inequities, gendered divisions of labour, and the global dynamics of nurse migration. The goal is to move beyond descriptive accounts of shortages toward a more analytical, policy-oriented discourse on the structural transformations needed to build a sustainable, empowered, and equitably distributed global nursing workforce.

Although political economy perspectives are increasingly recognised within health workforce scholarship, they remain less explicitly integrated into discussions interpreting global nursing and midwifery workforce estimates and shortages. Political economy is the study of how politics, governance, and institutions intersect with economic factors and impact the people affected by them (Fieno et al., 2016; Pontusson, 1995; Trein and Tosun, 2021). In health care, political economy affects how resources are allocated for health service delivery, how the health workforce is developed and sustained, and how these factors ultimately influence patient outcomes (Fieno et al., 2016). These dynamics manifest when health workforce investment is often constrained by fiscal austerity, a country's debt burden, public-sector wage suppression, and economic policies that favour short-term cost containment over long-term planning. The resulting economic frameworks systematically undervalue nursing, reduce training capacity, and

normalise chronic underinvestment (Abujaber and Nashwan, 2025; Williams and Thomas, 2017). We argue that nursing and midwifery shortages may persist not only because of demographic pressures but also because some political and economic decisions give limited priority to long-term investment in these workforces. Such decisions can reflect wider professional, gender, and class-based power relations that influence access to resources and policy authority.

Thus, we begin our discussion grounded in a political economy lens. First, we review the current trends observed in the data. We then explore signals of structural inequities that drive nursing workforce labour market dynamics in the Global Burden of Disease data and focus on the impact of gender as an additional factor. To conclude, we offer policy recommendations to address the trends observed in the Global Burden of Disease data.

This discussion paper uses the Global Burden of Disease 1990–2023 Human Resources for Health estimates as a conceptual and policy-oriented evidence base rather than as a primary empirical analysis. We focused on indicators most relevant to nursing and midwifery workforce planning, including workforce size, density per population, regional distribution, sex-disaggregated estimates, and shortage estimates linked to the Universal Health Coverage effective coverage index. These descriptive trends were interpreted through a political economy lens to examine how resource allocation, workforce financing, gendered labour structures, and migration regimes shape nursing and midwifery shortages. The policy conclusions, therefore, arise from integrating Global Burden of Disease estimates with contemporary nursing, midwifery, global health, gender equity, and health workforce literature.

The nursing and midwifery categories used in the Global Burden of Disease estimates are harmonised from heterogeneous national sources, including censuses, labour-force surveys, professional registries, administrative records, and international databases. National reporting systems differ in their classification of professional nurses, associate-professional nurses, auxiliary personnel, midwives, and nurse-midwives. The publicly available documentation does not allow consistent determination, across all locations, of whether associate-professional nurses are included in the nursing estimate or whether nurse-midwives are classified under nursing, midwifery, or another nationally defined occupational category. Consequently, these categories should not be interpreted as fully equivalent to internationally standardised professional definitions. Differences in education, regulation, occupational titles, and scope of practice may affect cross-country comparability. They may partly explain differences between the Global Burden of Disease estimates and estimates produced by other organisations.

The distinctive contribution of this discussion paper is not the identification of nursing and midwifery shortages as previously undocumented problems. Rather, it lies in synthesising three decades of global workforce estimates and interpreting them through an integrated political economy and gender-responsive lens. By bringing workforce planning, public financing, education and employment capacity, migration governance, gendered labour structures, and structural inequities into a single conceptual discussion, the paper demonstrates how these factors interact to shape the distribution, sustainability, and policy influence of the nursing and midwifery workforces.

2. Global nursing and midwifery workforces: current status and trends

The Global Burden of Disease 1990–2023 estimates highlight the fundamental role of nursing within the global health workforce, with 33.30 million nurses and 3.32 million midwives worldwide. Both nurses and midwives remain inequitably distributed across regions, with the lowest densities reported in sub-Saharan Africa and the Middle East. As summarised in Table 1, the Global Burden of Disease 1990–2023 estimates highlight the dominant role of nursing within the global health

Table 1
Summary of key findings for nurses and midwives from global burden of disease 1990–2023 human resources for health estimates.

Domain	Nurses	Midwives
Global workforce size	33.30 million (95% UI 31.18–35.72)	3.32 million (95% UI 2.88–3.83)
Share of global health workforce	Largest workforce (≈27% of all 122.4 M health workers)	≈3% of the global workforce
Sex composition	85.2% women (95% UI 79.3–86.4)	98.2% women (95% UI 83.9–98.4)
Highest regional totals	High-income regions: 13.34 M; SE Asia/E Asia/Oceania: 9.03 M	SE Asia/E Asia/Oceania highest: 1.44 M; High-income: 0.87 M
Lowest regional totals	Sub-Saharan Africa: 1.70 M; North Africa & Middle East: 1.07 M	Latin America & Caribbean: 0.09 M; Sub-Saharan Africa: 0.31 M
Regions with the greatest apparent workforce gaps*	The greatest gaps are concentrated in regions with low nurse density and/or low total workforce availability, particularly Sub-Saharan Africa, South Asia, and North Africa & the Middle East.	The greatest gaps are concentrated in regions with very low midwife density and/or low total workforce availability, particularly Sub-Saharan Africa, South Asia, Latin America & the Caribbean, and North Africa & the Middle East.
Density per 10,000 population	High-income: ~120.9; Central/Eastern Europe: ~81.9; Sub-Saharan Africa: ~17	Australasia: ~18; many LMICs: <3
Global shortage to reach UHC 80/100	An additional 16.8 million nurses are needed	Included within broader RMNCH shortages; specific UHC threshold not defined
Trend (1990–2023)	Strong growth; main driver of HRH expansion	Slower growth; still insufficient relative to population needs
Workforce feminisation impact	Gendered inequities in pay, leadership, and workload	Near-total feminisation; major implications for maternal health coverage
Structural challenges	Maldistribution, migration, and retention issues	Underproduction, low density in LMICs, and poor deployment
Policy relevance	Critical to achieving UHC, primary care, and NCD prevention	Essential for maternal/newborn outcomes; key to SDG 3.1/3.2

The table presents global workforce size, sex composition, regional distribution, density per 10,000 population, workforce shortages, and structural challenges for nurses and midwives. Values are reported with 95% UI, which reflects the range within which the true value would fall 95% of the time, based on the GBD modelling framework. Workforce density represents the number of health workers per 10,000 population. Shortage estimates refer to additional workers required to achieve an 80/100 score on the UHC Effective Coverage Index. Regional values represent totals within GBD super-regions (super-regions include: High-income; Southeast Asia, East Asia, and Oceania; Latin America and the Caribbean; Sub-Saharan Africa; North Africa and the Middle East; Central Europe, Eastern Europe, and Central Asia; and South Asia). All estimates are for 2023. *Regions with the greatest apparent workforce gaps were identified descriptively based on low workforce density, low regional totals, and relevance to UHC and maternal/newborn health needs; these should not be interpreted as formal shortage rankings unless supported by a separate shortage modelling analysis.

Abbreviations: UI: Uncertainty Interval; UHC: Universal Health Coverage; LMICs: Low- and Middle-Income Countries; RMNCH: Reproductive, Maternal, Newborn, and Child Health; HRH: Human Resources for Health; NCD: Non-communicable Disease; SDG: Sustainable Development Goal.

workforce and the need for policies that address persistent shortages and support progress toward universal health coverage.

The Global Burden of Disease 1990–2023 estimates reinforce a dual reality: the global nursing workforce has expanded substantially, yet this growth has not translated into an equitable or sustainable distribution across countries. Reflecting broader economic and resource-related disparities, high-income countries now account for the majority of global nurse density. In contrast, many low- and middle-income

countries continue to experience severe shortages despite rapid population growth. The disproportionate concentration of nurses in many high-income countries may partly reflect their greater fiscal capacity to finance education, create funded positions, offer comparatively favourable remuneration, and retain health professionals. However, substantial variation exists within income groups, and workforce density is also influenced by policy choices, labour-market organisation, health-system design, migration, and the social valuation of nursing and midwifery (Aborode et al., 2025). Regions such as Western Europe, North America, and parts of the Western Pacific maintain nurse densities many times higher than the global average, often exceeding thresholds for moderate Universal Health Coverage. These trends echo earlier analyses, which consistently demonstrate that inadequate nurse supply in low- and middle-income countries contributes to poorer patient outcomes, higher mortality, and reduced system resilience (Aiken et al., 2014; Ben-Ahmed and Bourgeault, 2023; Griffiths et al., 2018).

In addition to global maldistribution, significant intra-country disparities remain largely invisible in global estimates. Many low- and middle-income countries produce an adequate number of nurses numerically, yet experience severe shortages in rural areas, primary care, and peripheral facilities due to internal migration toward urban centres, private hospitals, and more prestigious specialities (Lehmann et al., 2008; WHO, 2025a, 2025b, 2025c, 2025d, 2025e). These patterns reflect wage differentials, safety concerns, limited housing/support (a benefit in some low- and middle-income countries), and career stagnation outside major cities. Addressing internal geographic maldistribution is as essential as addressing international flows.

Another critical trend is the rising demand for nursing services driven by population ageing, epidemiological transitions, and the growing burden of chronic diseases (Greer et al., 2021; WHO, 2015). Most health systems worldwide were not designed to care for ageing populations and lack the capacity to provide home health care, long-term care, and other support services for older adults (Rudnicka et al., 2020; WHO, 2023a, 2023b). While this presents both a challenge and an opportunity to expand the nursing role, it also indicates a lack of gerontology specialisation within nursing worldwide. To address epidemiological transitions and the growing burden of chronic diseases, recent publications have emphasised the need for nursing skill-mix, advanced practice roles, and expanded scopes of practice to meet these changing needs (Bales et al., 2025). Many countries, however, lack the appropriate workforce planning frameworks to support such transitions (Delamaire and Lafortune, 2010; Maier et al., 2017; Nashwan, 2025).

Meanwhile, the still highly feminised nature of the nursing workforce—more than 85% female worldwide—reflects deep-rooted gendered hierarchies that shape occupational trajectories, leadership opportunities, remuneration patterns, and migration decisions (Boniol et al., 2019; Graells-Sans et al., 2025; Greene et al., 2017; WHO, 2020; WHO, 2025a, 2025b, 2025c, 2025d, 2025e). These gendered patterns not only affect who enters and stays in the profession but also influence broader health system resilience and equity.

3. Shortages driven by structural inequities

The most important finding is the scale of unmet need; the Global Burden of Disease stochastic frontier analysis indicates that an additional 16.8 million nurses are needed globally to reach even a moderate level of universal health coverage, represented by a score of 80 out of 100 on the Universal Health Coverage effective coverage index (IHME, 2023). This score reflects a benchmark level of effective health-service coverage rather than a direct measure of nursing workforce sufficiency. The estimate nevertheless indicates that increases in nursing numbers have not kept pace with demographic growth, epidemiological transitions, or the expanding scope of nursing practice (IHME, 2023; WHO, 2025a, 2025b, 2025c, 2025d, 2025e). These deficits persist despite decades of international calls to scale up nursing education and

investment. For example, in the United Kingdom, reports have highlighted that newly qualified nurses may face difficulty securing registered nurse posts despite wider workforce shortages, reflecting the effect of funded-post availability and financial constraints on recruitment (RCN, 2025).

Nonetheless, evidence on the impact of nursing shortages on patient outcomes continues to grow each year. Empirical studies have repeatedly shown that nurse shortages in low- and middle-income countries correlate with higher patient mortality, increased adverse events, delayed treatment, and inadequate management of chronic disease burdens (Alsadi et al., 2025; Attree et al., 2011; Boudreau and Rhéaume, 2024; Cummings et al., 2010; Farahani et al., 2024; Imam et al., 2022; Nantsupawat et al., 2015; Reynolds et al., 2013; Yoon, 2022). Several studies have consistently highlighted that insufficient staffing severely undermines the capacity of health systems to deliver safe and timely care, including essential maternal, neonatal, and critical care services (Bettencourt et al., 2020; McTavish et al., 2025; Spencer et al., 2023; Zaranko et al., 2023; Zeleníková et al., 2023).

Structural inequities further complicate this situation. The World Health Organization defines structural inequities as the social, political, and economic factors that affect how people access and experience health care services (WHO, 2025a, 2025b, 2025c, 2025d, 2025e). A common structural factor affecting nursing workforce sustainability is a combination of limited training capacity, inadequate faculty supply, insufficient clinical placement opportunities, and constrained regulatory frameworks (Bvumbwe and Mtshali, 2018; WHO, 2025a, 2025b, 2025c, 2025d, 2025e). These challenges are evident across diverse regions. In sub-Saharan Africa, shortages of qualified nurse educators and limited clinical training sites have constrained the expansion of pre-service education despite growing demand for nurses (Bvumbwe and Mtshali, 2018). Similarly, in South and Southeast Asia, rapid growth in private nursing education has often outpaced regulatory oversight, resulting in variable training quality and limited workforce readiness (Tsujita, 2017). Meanwhile, high-income countries often rely on international recruitment to compensate for domestic shortages driven by organisational failures to retain nurses—a dynamic that exacerbates workforce depletion in low- and middle-income countries and in already fragile systems (Ben-Ahmed and Bourgeault, 2025; McPake et al., 2024).

Another dimension of structural inequity relates to working conditions. Nurses across many regions experience poor remuneration, limited career progression, high workloads, and unsafe staffing ratios, all of which drive burnout and attrition. The COVID-19 pandemic accelerated these patterns, with global evidence showing increased turnover intentions, early retirements, and long-term mental health impacts among nurses (Nashwan et al., 2021b; Ben-Ahmed and Bourgeault, 2023; Nashwan et al., 2021a; Poon et al., 2022; Squires et al., 2025). The result is a vicious cycle: understaffing increases job strain, which, in turn, fuels further workforce losses, impacting the sustainability of health systems.

Extending the discussion of structural inequities, workplace violence should be understood not as a structural inequity in itself, but as a system-level outcome of structural and organisational failures within health systems (Cunningham et al., 2022). Nurses in high-pressure environments, such as emergency, oncology, and critical care, are increasingly exposed to verbal aggression, physical assault, and harassment, risks amplified by chronic understaffing and long waiting times (Kafle et al., 2022). These experiences often intersect with moral injury when nurses feel unable to provide the level of care patients require, intensifying emotional exhaustion and prompting early departure from the profession (Rabin et al., 2023). Still, nurses may not speak up about these issues because they feel silenced and unable to express their voices in the workplace (Lee et al., 2024). Gender, class, and power differentials drive this workplace dynamic and contribute to lower retention. Strengthening workforce resilience, therefore, demands not only increasing numbers but also embedding robust violence-prevention measures, legal protections, and cultures that prioritise psychological

safety.

Structural barriers affecting midwifery are related not only to the number of education places available but also to the quality and professional orientation of education and regulation. In many low- and middle-income countries, midwifery education is delivered through heterogeneous pathways, including direct-entry programmes, post-nursing specialisation, and shorter maternity-care training routes. Limited faculty capacity, inadequate supervised clinical exposure, inconsistent accreditation, and restrictions on scope of practice can reduce graduates' ability to provide the full range of evidence-based sexual, reproductive, maternal, newborn, and adolescent health services. Consequently, an apparent numerical supply of maternity-care workers may coexist with a shortage of appropriately educated, regulated, and equitably deployed professional midwives. Low midwife density is particularly consequential in rural and underserved settings, where it can contribute to delayed access to skilled care, fragmented continuity of care, and preventable maternal and newborn morbidity and mortality.

These structural inequities also shape the gendered organisation of nursing and midwifery work. They influence who enters the professions, who remains, who advances, and whose labour is most undervalued within health systems.

4. Gendered dynamics in nursing and midwifery workforce composition and leadership

As evidenced in Table 1, the gendered composition of the profession is very clear, with women comprising 85.2% of the global nursing workforce. Nonetheless, regional gender patterns reveal important nuances that reinforce the role of cultural and societal norms in shaping the nursing workforce. While globally, nursing remains predominantly female, both the State of the World's Nursing report and Global Burden of Disease estimates indicate a gradual increase in male participation across most regions. This trend is particularly evident in Sub-Saharan Africa, where men comprise approximately 32% of the nursing workforce, a markedly higher proportion than in Europe, the Americas, or parts of the Eastern Mediterranean, where female representation often exceeds 90% (IHME, 2023; WHO, 2025a, 2025b, 2025c, 2025d, 2025e).

Nonetheless, nursing, as a predominantly female profession, is influenced by broader societal norms that shape care work. Gender wage gaps, underrepresentation in leadership positions, overrepresentation of male nurses in leadership positions, gender inequities in salaries within the profession, and the disproportionate caregiving expectations placed on women contribute to retention challenges and limit opportunities for professional advancement (Gauci et al., 2022; WHO, 2025a, 2025b, 2025c, 2025d, 2025e). These gendered structures not only undermine the nursing profession but also limit health system performance by constraining leadership diversity and decision-making capacity.

While the predominance of women in nursing reflects expanding educational opportunities and broader shifts in gender roles, it simultaneously exposes longstanding structural and sociocultural barriers that constrain professional development, leadership representation, and the valuation of nursing labour. Understanding these gendered dynamics is essential for interpreting global workforce trends and designing effective policy responses.

Gendered occupational segregation in nursing is deeply rooted in historical expectations that align caregiving with women's roles in society (Dill et al., 2016; Matysiak et al., 2025; Perez-Carceles and Nicolas-Martinez, 2025; Stier et al., 2014; Taylor, 2010; Valet, 2018). These norms not only influence who enters the profession but also affect recruitment strategies, career progression, remuneration patterns, and decision-making authority within health systems (Mbemba et al., 2016). Studies have demonstrated that occupational gender segregation reinforces power hierarchies between nursing and medicine, contributes to wage disparities, and limits the representation of nurses—particularly women—in senior leadership roles (Cottingham et al., 2018; Gauci

et al., 2022). Even in countries with strong nursing education systems, female nurses frequently encounter glass ceiling effects, reduced mobility into managerial positions, and cultural expectations that make balancing professional and domestic responsibilities difficult (Lopez et al., 2023).

Research indicates that gendered expectations of self-sacrifice and resilience may contribute to the normalisation of burnout, emotional exhaustion, and moral distress among nurses (Smith et al., 2024). Such patterns became evident during the COVID-19 pandemic, when female nurses disproportionately shouldered frontline responsibilities, experienced higher rates of psychological distress, and faced increased exposure to violence and harassment (Morgan et al., 2022; Phillips et al., 2023).

Gender inequality also limits nurses' ability to influence health policy and workforce planning (Newman et al., 2023). Despite making up the majority of the health workforce, women remain significantly underrepresented in senior decision-making structures, including ministries of health, regulatory bodies, academic leadership, and global advisory councils (Gauci et al., 2022; Gunn et al., 2019). As the State of the World's Nursing 2020 and 2025 reports highlighted, the absence of nursing leadership (particularly women leaders) restricts the profession's capacity to shape reforms in education, scope of practice, and workforce investment (WHO, 2020, 2025a, 2025b, 2025c, 2025d, 2025e). Recent analyses argue that closing the gender leadership gap is essential to improving workforce retention, promoting fair compensation, and strengthening the global visibility of nursing as a scientific and policy-relevant discipline (Doak and Freeman, 2025; Salvage and White, 2020).

The literature suggests that gendered expectations of self-sacrifice, vocation, and caregiving may contribute to the social and economic undervaluation of nursing and midwifery work. These expectations can be interpreted as one factor that weakens demands for equitable remuneration, although fiscal capacity, labour-market institutions, collective bargaining, professional regulation, and wider economic conditions also shape salaries.

Taken together, the gendered dynamics of the nursing workforce reveal that shortages and maldistribution cannot be understood purely in numerical terms. They are tightly interwoven with sociocultural norms, discriminatory labour structures, and unequal power relations within health systems. Addressing these inequities requires deliberate, gender-responsive workforce policies that recognise nursing as both a disciplined and a political profession, one that must be supported, valued, empowered, and represented at all levels of leadership.

Nursing must also reignite conversations about gender and its impact on the profession. For too long, these conversations have been one-sided, focused mainly on increasing the number of men in nursing and reducing the discrimination they have experienced in many countries. While this is, and should remain, an essential part of the gender conversation in the profession, it must expand further. Workforce research needs to draw more on feminist philosophy and theory to adequately address the power dynamics of gender and class that shape workforce representation, career advancement, and women's representation in leadership positions. Educators preparing future leaders need to foster the skill sets required to create environments where nurses can voice their concerns about critical issues affecting care delivery and patient outcomes.

Midwifery provides a particularly important illustration of the relationship between gender, occupational status, and the valuation of care work. Women constitute almost the entire midwifery workforce, yet the profession frequently operates within health systems in which decision-making authority, resource allocation, and clinical hierarchies remain concentrated elsewhere. Gendered expectations that reproductive and caregiving work is an extension of women's 'natural' role may contribute to the limited economic and institutional valuation of midwifery. Midwives may also experience restricted professional autonomy, exclusion from senior policy structures, gender-based violence or harassment, and

limited influence over the organisation of maternity services. These dynamics suggest that increasing the number of midwives without addressing gendered power relations, regulation, professional autonomy, and leadership representation will be insufficient to create a sustainable workforce.

5. International migration of nurses & midwives – the persistence of driving factors

International migration should also be understood through a political economy lens. It reflects unequal relationships between countries that finance, educate, recruit, retain, and lose nursing and midwifery labour.

Nursing is one of the few globally mobile professions where women migrate for work opportunities more often than men. Women make up the majority of internationally mobile nurses, often driven by gendered labour markets, wage disparities, lack of professional autonomy, and limited career advancement opportunities in their home countries (Kingma, 2018). Although migration can provide empowerment and economic mobility, it also reflects structural inequalities between high-income destination countries and lower-income sending regions. These inequities manifest through aggressive international recruitment practices, uneven implementation of the World Health Organization Global Code of Practice, and limited bilateral workforce development agreements—issues that disproportionately affect female nurses who migrate alone or with caregiving responsibilities (Hani and Nashwan, 2024; TruMerit, 2026).

The World Health Organization Global Code of Practice on the International Recruitment of Health Personnel was designed to promote ethical recruitment and prevent the depletion of essential workforce capacity in vulnerable countries (WHO, 2010). Implementation of ethical recruitment principles remains uneven, and post-pandemic demand for internationally educated health professionals may have intensified recruitment from countries already experiencing workforce constraints. Reports of direct and indirect recruitment from vulnerable health systems suggest continuing gaps between ethical recruitment commitments and their implementation. Evidence suggests that recruitment from “red list” countries—those with critical shortages—continues despite formal restrictions, often through indirect channels or private recruitment agencies operating outside national regulatory frameworks (Yeates and Pillinger, 2019). Moreover, bilateral agreements intended to support mutual benefits are limited in number and scope, with few having robust mechanisms for capacity transfer, training investment, or return-migration pathways (TruMerit, 2026).

A critical ethical concern is that migration often reflects failures in domestic workforce planning—not only in low- and middle-income countries, but also in high-income countries. When high-income countries recruit internationally instead of addressing poor working conditions and retention barriers at home, they externalise the costs of their workforce shortages onto countries with fewer resources. Conversely, low- and middle-income countries frequently struggle to retain their workforce due to inadequate wages, unsafe working conditions, and a lack of professional development opportunities. As recent analyses argue, solutions require shared responsibility and cross-border accountability, including investment in training pipelines in low- and middle-income countries, circular migration models, and binding ethical recruitment agreements (WHO, 2024). In some countries, nursing and midwifery education capacity has expanded faster than the health system's ability to create funded positions, contributing to unemployment, underemployment, and outward migration despite ongoing workforce shortages.

While income disparity remains a key pull factor, push factors in sending countries warrant closer attention. Chronic burnout, initiative fatigue, moral distress, lack of clinical autonomy, unsafe working conditions, limited professional recognition, and poor career advancement opportunities drive many nurses to migrate (Afshari et al., 2025;

Galbany-Estragués et al., 2024; Rabin et al., 2023). These systemic failures within domestic health systems must be addressed to reduce overdependence on international recruitment.

Gendered dimensions of migration further complicate the landscape. As most migrating nurses are women, their experiences are profoundly shaped by gender norms, external caregiving responsibilities, remittance expectations, and vulnerabilities to exploitation in destination countries. Migrant nurses may face discrimination, deskilling, credentialing barriers, and limited leadership opportunities—a contradiction to the promise of upward mobility often associated with migration (Rajpoot et al., 2024). These inequities reinforce the need for stronger protections, transparent recruitment practices, and harmonised regulatory standards across sending and receiving countries.

Migrant nurses, many of whom are women, may be exposed to exploitation through recruitment fees, debt bondage, restrictive contracts, credentialing barriers, unsafe working conditions, and limited access to legal redress (Speck et al., 2024). Recent literature has specifically identified labour trafficking risks among migrant registered nurses, including deceptive, coercive, fraudulent, and illegal recruitment practices (ICN, 2024; Speck et al., 2024; WHO, 2024). These risks are shaped by national legal frameworks, labour protections, immigration status, and the extent to which migrant workers can access justice. International guidance, therefore, emphasises the need for fair and ethical recruitment, safeguards for decent employment, and stronger protection of the rights and welfare of migrant health workers (ICN, 2024; Speck et al., 2024; WHO, 2024, 2025a, 2025b, 2025c, 2025d, 2025e).

A notable feature of international nurse migration is the persistence of its underlying drivers. The data show a steady volume over time, with the high-income recruiting country varying based on its own structural factors. The political economy of both sending and receiving countries, however, continues to shape the markets for internationally educated nurses and their recruitment. For example, after 2008, the United States saw a decline in its overall recruitment of internationally educated nurses as the global economic crisis constrained funding, while domestic production increased over the next decade. Nursing shortages became specific to 16 states, yet by the 2030s, it will extend to 42 out of 50 states (National Center for Health Workforce Analysis, 2025). Visa allocations for internationally educated nurses have not changed in 25 years and remain at just 5000 annually. Employer-sponsored green cards remain a viable option, but are expensive for employers and limit who can afford to recruit. By 2020, as talk of returning to international recruitment to address the country's nursing shortage was underway, the COVID-19 pandemic hit, and international recruitment stopped. In the United States, visa availability, processing backlogs, employer sponsorship costs, and changes in immigration policy may constrain the speed and scale at which internationally educated nurses can be recruited. These factors reinforce the limitations of relying on international recruitment as a substitute for sustained domestic education, employment, and retention policies (Bailey et al., 2026; Sarik et al., 2025).

The growing reliance of European health systems on foreign-trained nurses further illustrates the interconnected nature of national workforce policies. Recent regional evidence indicates that international recruitment may help receiving countries address immediate vacancies while contributing to workforce losses and imbalances in countries of origin. These patterns reinforce the need for coordinated workforce planning, improved mobility data, ethical recruitment, and shared investment across sending and receiving health systems (WHO, 2025a, 2025b, 2025c, 2025d, 2025e).

International mobility also affects midwifery, although it is less consistently documented than nurse migration. The departure of relatively small numbers of experienced midwives can have a disproportionate effect in countries where the workforce is already limited and where specialist maternity services depend on a small number of educators, clinical supervisors, and senior practitioners. Midwives who migrate may also experience difficulties obtaining recognition of their

professional qualifications because education pathways, regulatory standards, and scopes of practice differ across countries. Some may be registered or employed in broader nursing or maternity-support roles, resulting in deskilling and obscuring midwifery-specific migration within workforce statistics. Ethical mobility policies should therefore consider the distinct education, regulatory, and service implications of midwife migration rather than subsuming midwives within general nursing migration frameworks.

6. Implications for policy and workforce planning

The Global Burden of Disease findings, when interpreted alongside the wider health workforce literature, suggest that nursing and midwifery shortages are closely linked to broader structural, economic, and gendered inequities within health systems. Addressing these challenges requires reconsideration of how the workforce is planned, financed, supported, and governed. Historically, many countries have relied on reactive approaches, such as scaling up recruitment during crises or periods of acute shortage, without addressing underlying drivers, including inadequate workforce planning, weak retention strategies, insufficient faculty capacity, poor working conditions, and limited leadership opportunities. An additional planning gap is the inability of some health systems to absorb the graduates they produce, where nursing and midwifery education capacity may expand faster than the availability of funded posts. This can result in unemployment, underemployment, or outward migration among newly qualified health workers, even in countries reporting workforce shortages. The policy implications, therefore, span multiple levels, from national education and employment planning to international migration governance, and require coordinated reforms rather than isolated recruitment-focused interventions.

A central implication of the Global Burden of Disease findings is the need to reframe nursing workforce planning as a long-term, strategic investment rather than an operational burden. A decade ago, the Triple Impact report argued that investment in nursing can improve health outcomes, advance gender equality, and support economic growth (Nigel Crisp and Watkins Of Tavistock, 2018; WHO, 2016). More recent scholarship has further highlighted the economic and societal value generated by nursing work (Yakusheva et al., 2024).

Policy interventions must also address gendered inequities that influence who enters, remains in, and progresses within the nursing profession. With women comprising more than 80% of the workforce, gender-responsive policies, such as pay equity legislation, protections against workplace violence, parental leave support, safe staffing mandates, and leadership development programmes, are essential. Embedding gender analysis into workforce planning is not only a matter of fairness but a necessary strategy for improving retention and strengthening the quality of care (El Arnaout et al., 2019).

The Global Burden of Disease data also underscores the importance of improving the overall quality of nursing workforce data and the systems that capture it. Even with the creation of the WHO Workforce Observatories for each of its regions, many countries lack reliable data on key indicators associated with the nursing workforce, such as education system performance (e.g., dropouts and graduates), staff turnover, distribution, skill mix, and productivity and work capacity over the career (WHO, 2023a, 2023b). Without these systems, planning remains fragmented and reactive. Recent research emphasises the need for real-time workforce predictive analytics to support dynamic allocation of nursing personnel, particularly as populations age and chronic disease burdens grow (Ma and Ling, 2024; Nashwan and Abujaber, 2023). Strengthening health workforce information systems would enable governments to identify maldistribution, forecast future needs, and evaluate the impact of reforms more effectively. International institutions also need to update their data quality; for example, the World Bank classifies seven categories of personnel under “nursing” for its nurse-to-population ratio (World Bank Data, 2026). These include

midwives, nursing assistants, dental nurses, and registered nurses. There is no classification for advanced practice nursing in their system. A sustainable nursing workforce that meets a country's health care needs cannot be created without data to drive policymaking.

At the international level, ethical governance of nurse migration is essential. High-income countries must align recruitment practices with the World Health Organization Global Code of Practice and invest in cooperative workforce development models. These may include bilateral agreements that support nurse training in sending countries, advanced practice training exchanges, mutual recognition of credentials, and circular migration pathways that allow nurses to return with enhanced skills, greater confidence in their abilities, and strong leadership. Without such mechanisms, continued reliance on international recruitment risks perpetuating global inequities and undermining the stability of health systems in low- and middle-income countries (Abdi et al., 2025). Recent shifts in international aid and development financing may create both risks and opportunities for strengthening bilateral and multilateral workforce agreements, but further policy analysis is needed to assess their implications.

Finally, leadership development should be a priority. Nurses remain underrepresented in decision-making bodies despite being the largest health workforce group (Brown et al., 2025). Elevating nurses into strategic leadership roles would strengthen policy coherence, improve retention, and ensure that workforce reforms reflect on-the-ground realities. Countries that strengthen nursing and midwifery leadership, governance roles, and academic capacity may be better positioned to align workforce planning with population health needs. This is also an excellent opportunity for educational institutions around the world to partner to promote external, non-governmental leadership development in nursing. These programs should be interdisciplinary and involve experts with experience conducting women's leadership development programs. Leadership development should be embedded within broader gender-responsive workforce policies. Rather than relying on individual advocacy, workforce reforms should address the institutional, cultural, and structural conditions that limit women's advancement in nursing and midwifery. Context-specific interventions may include transparent promotion pathways, pay equity measures, mentorship and sponsorship programmes, protection from workplace violence and discrimination, and inclusive leadership training for all staff. These approaches are especially important in settings where gender inequities remain pronounced, but they are also relevant globally because nursing and midwifery remain highly feminised professions with persistent leadership gaps.

Midwifery workforce planning requires dedicated policy attention rather than being treated solely as a component of general nursing or maternal-health staffing. Governments need to assess whether education programmes meet recognised competency standards, whether regulation enables midwives to practise to their full scope, whether funded positions are available where maternal and newborn needs are greatest, and whether referral systems support continuity across community and facility settings. Strengthening midwifery leadership is equally important. Midwives remain insufficiently represented in senior governmental, regulatory, educational, and health-system decision-making roles, limiting their ability to influence service design, education investment, professional standards, and workforce deployment. National chief midwifery leadership positions, stronger professional associations, and formal representation in workforce-planning structures could help ensure that policy decisions reflect the distinct contribution and requirements of midwifery.

7. Limitations

While the Global Burden of Disease data provide the most comprehensive global workforce estimates available, their accuracy depends on the quality, completeness, and recency of country-level reporting. For some countries, workforce data may not have been updated for several

years, requiring modelled estimates that may not fully capture recent changes. National-level estimates may also mask substantial intra-country variability, including rural–urban maldistribution, regional inequities, and shortages in primary care or peripheral facilities. In addition, differences in how countries define nurses, midwives, and auxiliary personnel, as well as their scopes of practice, may limit direct comparability across settings. Accordingly, the findings should be interpreted as policy-relevant estimates rather than exact workforce counts. Furthermore, although this paper discusses both nursing and midwifery workforce estimates, the analytical focus is weighted toward nursing due to the larger global nursing workforce, the broader availability of nursing-specific literature, and the paper's primary emphasis on global nursing shortages. Nonetheless, midwifery is highlighted where relevant, particularly regarding maternal and newborn health, workforce feminisation, educational capacity, regulation, and low workforce density in many low- and middle-income countries. The estimated 3.32 million midwives should also be interpreted cautiously because it is substantially higher than estimates reported in other global midwifery assessments. This difference may reflect variations in national occupational classifications, the possible inclusion of nurse-midwives or other cadres providing maternity care, differences in the reference years and source data, and the statistical modelling used to address missing information. The estimate may therefore overstate the number of workers who meet a single internationally recognised professional definition of a midwife. Its inclusion in this discussion should not be interpreted as evidence that the global shortage of appropriately educated, regulated, and deployed midwives has been resolved. At the time of revision, the complete dataset underpinning the reported estimates was not publicly available to the authors in a form permitting independent replication. We were therefore unable to examine all country-level input data, occupational mappings, inclusion decisions, or modelling assumptions; independently verify the reported totals; or conduct sensitivity analyses using alternative workforce definitions. This limitation is particularly relevant to the interpretation of the nursing and midwifery categories and the comparatively high global estimate for midwives. Finally, this paper is a discussion paper rather than a primary empirical analysis. It uses Global Burden of Disease 1990–2023 Human Resources for Health estimates as a conceptual and policy-oriented evidence base and does not reanalyse the original Global Burden of Disease data. The interpretation of workforce indicators was therefore guided by the authors' synthesis of Global Burden of Disease estimates with contemporary literature on nursing and midwifery shortages, gendered labour structures, migration, and health workforce sustainability.

8. Conclusions

The Global Burden of Disease 1990–2023 Human Resources for Health estimates provide an important policy-oriented evidence base for reconsidering global challenges in the nursing and midwifery workforce. When interpreted alongside wider health workforce literature, these estimates reinforce a persistent concern for global health policy: nurses and midwives are indispensable to population health, universal health coverage, maternal and newborn health, and health system resilience, yet both workforces remain unevenly distributed, structurally constrained, and insufficiently supported. Although the nursing workforce has expanded substantially over the past three decades, this growth has not translated into equitable coverage across regions or settings. Similar concerns apply to midwifery, where low workforce density in many countries has direct implications for maternal, newborn, sexual, and reproductive health outcomes.

The paper's added value lies in connecting three decades of global workforce estimates with an integrated conceptual framework encompassing political economy, gender, migration, workforce planning, and structural inequities. This synthesis moves the discussion beyond parallel descriptions of workforce deficits and shows how financing decisions, employment structures, gendered norms, migration regimes,

professional regulation, and leadership representation interact. The framework may therefore support more coherent policy analysis and discourage responses that address numerical supply while leaving the underlying determinants of shortages unchanged.

The highly feminised nature of nursing and midwifery further demonstrates why workforce policy cannot be separated from gender equity. Women constitute the majority of both professions, yet gendered labour hierarchies and negative cultural norms concerning women's work, caregiving, professional authority, and leadership continue to influence pay, professional recognition, working conditions, exposure to violence or exploitation, and representation in decision-making. These inequities are further amplified by international migration, as nurses and midwives move from countries with constrained workforce capacity to wealthier health systems that have not adequately addressed their own retention and workforce planning failures. Ethical recruitment must therefore be linked to stronger domestic retention strategies, fair employment conditions, and meaningful investment in source-country workforce development.

Addressing these challenges requires coordinated, multi-level policy action. Priorities include aligning education pipelines with funded employment opportunities, strengthening faculty and regulatory capacity, improving retention through safe and supportive work environments, advancing gender-responsive workforce policies, improving workforce data systems, and ensuring ethical international recruitment consistent with the World Health Organization Global Code of Practice. Nursing and midwifery leadership must also be strengthened so that workforce reforms are informed by those closest to care delivery. Future workforce resilience will require moving beyond short-term recruitment solutions toward integrated policies that recognise nurses and midwives as strategic investments in health system performance, equity, and sustainability. While this paper focuses primarily on nursing, it also highlights the need for dedicated midwifery-focused analyses that more fully address the profession's distinct philosophy, regulatory context, workforce challenges, and contributions to maternal and newborn health.

CRediT authorship contribution statement

Abdulqadir J. Nashwan: Writing – review & editing, Writing – original draft, Conceptualization. **Houssein Eddine Ben-Ahmed:** Writing – review & editing. **Alvisa Palese:** Writing – review & editing. **Ahmad A. Abujaber:** Writing – review & editing. **Mona Gamal Mohamed:** Writing – review & editing. **Intima Alrimawi:** Writing – review & editing. **Manal Saleh Moustafa Saleh:** Writing – review & editing. **Majeda M. El-Banna:** Writing – review & editing. **Allison Squires:** Writing – review & editing.

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References

- Abdi, Y.H., Abdi, M.S., Bashir, S.G., Ahmed, N.I., Abdullahi, Y.B., 2025. Understanding global health inequality and inequity: causes, consequences, and the path toward justice in healthcare. *Public Health Chall.* 4 (4), e70156.
- Aborode, A.T., Oginni, O., Abacheng, M., Edima, O., Lamunu, E., Folorunso, T.N., Oko, C. I., Iretaiyo, A.R., Lawal, L., Amarachi, R., 2025. Healthcare debts in the United States: a silent fight. *Surgery* 87 (2), 663–672.
- Abujaber, A.A., Nashwan, A.J., 2025. Beyond cost centers: the true economic contribution of nursing in healthcare. *SAGE Open Nurs.* 11, 23779608251356144.
- Afshari, A., Masoumi, S.Z., Borzou, S.R., Safdari, A., Khazaei, A., 2025. Prioritizing drivers of nursing migration: a summative content analysis of influential factors. *BMC Nurs.* 24 (1), 632.
- Aiken, L.H., Sloane, D.M., Bruyneel, L., Van den Heede, K., Griffiths, P., Busse, R., Diomidous, M., Kinnunen, J., Kózka, M., Lesaffre, E., 2014. Nurse staffing and education and hospital mortality in nine European countries: a retrospective observational study, 383 (9931), 1824–1830.
- Alsadi, M., Schwartz, C.I., Nelson, J.W., Akin, E., Gözü, S., Itzhaki, M., 2025. Work wellbeing of nurses in MENA countries: a cross-sectional comparative secondary analysis of Jordan, Israel, and Türkiye. *Worldviews Evid.-Based Nurs.* 22 (3), e70040.
- Alves, V.P., Casemiro, F.G., Araujo, B.G., Lima, M.A.S., Oliveira, R.S., Fernandes, F.T.S., Gomes, A.V.C., Gregori, D., 2021. Factors associated with mortality among elderly people in the COVID-19 pandemic (SARS-CoV-2): a systematic review and meta-analysis. *Int. J. Environ. Res. Public Health* 18 (15).
- Attree, M., Flinkman, M., Howley, B., Lakanmaa, R.L., Lima-Basto, M., Uhrenfeldt, L., 2011. A review of nursing workforce policies in five European countries: Denmark, Finland, Ireland, Portugal and United Kingdom*/England. *J. Nurs. Manag.* 19 (6), 786–802.
- Bailey, K.D., Bastow, S.S., Kalvin, C.Y., Sullivan-Marx, E., 2026. The essential role of professional nurses in the US healthcare workforce: challenges, innovation, and opportunities. *J. Hosp. Admin.* 15 (1), 12–22.
- Bala, P., 2024. Global trends in international nurse migrations: challenges and implications, 1 (1).
- Bales, G., Hasemann, W., Kressig, R.W., Mayer, H., 2025. Scope of practice, competencies and impact of advanced practice nurses within APN-led models of care for young and middle-aged adult patients with multimorbidity and/or complex chronic conditions in hospital settings: a scoping review. *BMJ Open* 15 (4), e091170.
- Ben-Ahmed, H.E., Bourgeault, L.L., 2023. Sustaining the Canadian nursing workforce: targeted evidence-based reactive solutions in response to the ongoing crisis. *Nurs. Leadersh. (Tor. Ont)* 35 (4), 14–29.
- Ben-Ahmed, H.E., Bourgeault, L.L., 2025. Favoriser le recrutement éthique des infirmières diplômées hors Canada: appel à l'action politique, 66 (3), 549–570.
- Bettencourt, A.P., McHugh, M.D., Sloane, D.M., Aiken, L.H., 2020. Nurse staffing, the clinical work environment, and burn patient mortality. *Research* 41 (4), 796–802.
- Boniol, M., McIsaac, M., Xu, L., Wuliji, T., Diallo, K., Campbell, J., 2019. Gender Equity in the Health Workforce: Analysis of 104 Countries. World Health Organization, Geneva.
- Boudreau, C., Rhéaume, A., 2024. Impact of the work environment on nurse outcomes: a mediation analysis. *West. J. Nurs. Res.* 46 (3), 210–218.
- Brown, J.S., Davis, N., Stamps, D.C., 2025. Nurses on boards: opportunities for nurses to share their knowledge, critical thinking, experience, and understanding of health care. *Nephrol. Nurs. J.* 52 (1), 39–52.
- Buchan, J., Catton, H., Shaffer, F.A., 2022. Sustain and retain in 2022 and beyond, 71, 1–71.
- Bvumbwe, T., Mtshali, N., 2018. Nursing education challenges and solutions in sub Saharan Africa: an integrative review, 17 (1), 3.
- Chan, G.K., Bitton, J.R., Allgeyer, R.L., Elliott, D., Hudson, L.R., Burwell, P.M., 2021. The impact of COVID-19 on the nursing workforce: a national overview, 26 2, 1–17.
- Chang, Y.-H., Hsu, C.H., Tseng, Y.-C., Hsiung, C.A., 2023. Country-level factors associated with nurse salaries: empirical evidence from organisation for economic co-operation and development countries and Taiwan. *J. Nurs. Res.* 31 (6), e303.
- Cottingham, M.D., Johnson, A.H., Erickson, R.J., 2018 Jan. "I can never be too comfortable": race, gender, and emotion at the hospital bedside. *Qual. Health Res.* 28 (1), 145–158.
- Cummings, G.G., MacGregor, T., Davey, M., Lee, H., Wong, C.A., Lo, E., Muise, M., Stafford, E., 2010. Leadership styles and outcome patterns for the nursing workforce and work environment: a systematic review. *Int. J. Nurs. Stud.* 47 (3), 363–385.
- Cunningham, R., Polomano, R.C., Wood, R.M., Aysola, J., 2022. Health systems and health equity: advancing the agenda, 70 (6), S66–S76.
- Delamare, M.-L., Lafortune, G., 2010. Nurses in Advanced Roles: A Description and Evaluation of Experiences in 12 Developed Countries.
- Dill, J.S., Price-Glynn, K., Rakovsky, C., 2016. Does the "glass escalator" compensate for the devaluation of care work occupations? The careers of men in low-and middle-skill health care jobs. *Society* 30 (2), 334–360.
- Doak, J., Freeman, S., 2025. Women and leadership: perceived gender-related barriers and motivators in global healthcare, 31 (3), 1–13.
- El Arnaout, N., Chehab, R.F., Rafii, B., Alameddine, M., 2019. Gender equity in planning, development and management of human resources for health: a scoping review. *Hum. Resour. Health* 17 (1), 52.
- Farahani, M.A., Nargesi, S., Saniee, N., Dolatshahi, Z., Heidari Beni, F., Shariatpanahi, S., 2024. Factors affecting nurses retention during the COVID-19 pandemic: a systematic review. *Hum. Resour. Health* 22 (1), 78.
- Fieno, J.V., Dambisiya, Y.M., George, G., Benson, K., 2016. A political economy analysis of human resources for health (HRH) in Africa, 14 (1), 44.
- Galbany-Estragués, P., Giménez-Lajara, M.Á., Jodar-Solà, G., Casañas, R., Romeu-Labayen, M., Gomez-Gamboa, E., Canet-Vélez, O., 2024. Exploring nurses' experiences: abandoning the profession and migrating for improved opportunities, 77, 151787.
- Gauci, P., Elmir, R., O'reilly, K., Peters, K., 2022. Women's experiences of workplace gender discrimination in nursing: an integrative review, 29 (2), 188–200.
- Graells-Sans, A., Galbany-Estragués, P., Rodríguez-Martín, D., Gasch-Gallén, À., 2025. Nursing at the intersection of power and practice: a grounded theory analysis of the profession's social position. *J. Adv. Nurs.* 82 (4), 3537–3549.
- Greene, J., El-Banna, M.M., Briggs, L.A., Park, J., 2017. Gender differences in nurse practitioner salaries. *J. Am. Acad. Nurse Pract.* 29 (11), 667–672.
- Greer, S.L., Lynch, J., Reeves, A., Falkenbach, M., Gingrich, J., Cylus, J., Bamba, C., 2021. Ageing and Health. Cambridge University Press.
- Griffiths, P., Ball, J., Bloor, K., Böhning, D., Briggs, J., Dall'Or, C., Iongh, A.D., Jones, J., Kovacs, C., Maruotti, A., 2018. Nurse staffing levels, missed vital signs and mortality in hospitals: retrospective longitudinal observational study, 6 (38).
- Gunn, V., Muntaner, C., Villeneuve, M., Chung, H., Gea-Sanchez, M., 2019. Nursing professionalization and welfare state policies: a critical review of structural factors influencing the development of nursing and the nursing workforce, 26 (1), e12263.
- Hani, S.B., Nashwan, A.J., 2024. Ethical recruitment and migration of nurses is needed in Jordan, 30 (6), 402–403.
- ICN, 2024. Report Submitted to the World Health Organization Reporting Round on Implementation of the Global Code of Practice on the International Recruitment of Health Personnel. International Council of Nurses, Geneva.
- IHME, 2023. Global Burden of Disease (GBD).
- Imam, A., Obiesie, S., Aluvaala, J., Maina, J.M., Gathara, D., English, M., 2022. Identifying gaps in global evidence for nurse staffing and patient care outcomes research in low/middle-income countries: an umbrella review. *BMJ Open* 12 (10), e064050.
- Kafle, S., Paudel, S., Thapaliya, A., Acharya, R., 2022. Workplace violence against nurses: a narrative review. *J. Clin. Transl. Res.* 8 (5), 421.
- Khajoei, R., Balvardi, M., Eghbali, T., Yousefi, M.S., Forouzi, M.A., 2025. Missed nursing care and related factors: a cross-sectional study. *BMC Nurs.* 24 (1), 375.
- Kingma, M., 2018. Nurses on the Move: Migration and the Global Health Care Economy. Cornell University Press.
- Labrague, L.J., Kostovich, C.T., 2024. A global overview of missed nursing care during the COVID-19 pandemic: a systematic review. *West. J. Nurs. Res.* 46 (2), 133–142.
- Lee, S.E., Seo, J.K., Squires, A., 2024. Voice, silence, perceived impact, psychological safety, and burnout among nurses: a structural equation modeling analysis. *Int. J. Nurs. Stud.* 151, 104669.
- Leep-Lazar, K., Ma, C., Stimpfel, A.W., 2025. Factors associated with intent to leave the nursing profession in the United States: an integrative review. *Res. Nurs. Health* 48 (4), 429–440.
- Lehmann, U., Dieleman, M., Martineau, T., 2008. Staffing remote rural areas in middle- and low-income countries: a literature review of attraction and retention, 8 (1), 19.
- Lopez, L.J.S., Ramos, L.C., Masong, B.F.A., Tabin, J.R., Palaganas, E.C., 2023. Glass ceiling phenomenon in nursing: a scoping review. *J. Nurs.* 93 (2).
- Ma, D., Ling, Z., 2024. Optimization of nursing staff allocation in elderly care institutions: a time series data analysis approach. *Ann. Appl. Sci.* 5 (1).
- Maier, C.B., Aiken, L.H., Busse, R., 2017. Nurses in Advanced Roles in Primary Care: Policy Levers for Implementation.
- Matysiak, A., Hardy, W., Van der Velde, L.A., 2025. Structural labour market change and gender inequality in earnings. *Work Employ. Soc.* 39 (2), 426–448.
- Mbemba, G.I., Gagnon, M.P., Hamelin-Brabant, L., 2016. Factors influencing recruitment and retention of healthcare workers in rural and remote areas in developed and developing countries: an overview. *J. Public Health Afr.* 7 (2), 565.
- McPake, B., Dayal, P., Zimmermann, J., Williams, G.A., 2024. How can countries respond to the health and care workforce crisis? Insights from international evidence, 39 (3), 879–887.
- McTavish, C., McGillis Hall, L., Price, S., Visekruna, S., Blain, A., 2025. Worsening shortages, mass departures, intolerable working conditions: a media analysis of Canada's nursing workforce crisis. *Int. Nurs. Rev.* 72 (4), e70140.
- Morgan, R., Tan, H.-L., Oveisi, N., Memmott, C., Korzuchowski, A., Hawkins, K., Smith, J., 2022. Women healthcare workers' experiences during COVID-19 and other crises: a scoping review, 4, 100066.
- Nantsupawat, A., Nantsupawat, R., Kulnaviktik, W., McHugh, M.D., 2015. Relationship between nurse staffing levels and nurse outcomes in community hospitals, Thailand. *Nurs. Health Sci.* 17 (1), 112–118.
- Nashwan, A.J., 2025. Transforming primary care in LMICs through advanced practice nursing. *Lancet Prim. Care* 1 (3).
- Nashwan, A.J., Abujaber, A.A., 2023. Nursing in the artificial intelligence (AI) era: optimizing staffing for tomorrow. *Cureus* 15 (10), e47275.
- Nashwan, A.J., Abujaber, A.A., Villar, R.C., Nazarene, A., Al-Jabry, M.M., Fradelos, E.C., 2021a. Comparing the impact of COVID-19 on nurses' turnover intentions before and during the pandemic in Qatar. *J. Pers. Med.* 11 (6).

- Nashwan, A.J., Abujaber, A.A., Villar, R.C., Nazarene, A., Al-Jabry, M.M., Fradelos, E.C., 2021b. Comparing the impact of COVID-19 on nurses' turnover intentions before and during the pandemic in Qatar, 11 (6), 456.
- National Center for Health Workforce Analysis, 2025. Nurse Workforce Projections, 2023–2038.
- Newman, C., Nayebare, A., Gacko, N.M.N.N., Okello, P., Gueye, A., Bijou, S., Ba, S., Gaye, S., Coumba, N.D., Gueye, B., Dial, Y., N'doye, M., 2023. Systemic structural gender discrimination and inequality in the health workforce: theoretical lenses for gender analysis, multi-country evidence and implications for implementation and HRH policy, 21 (1), 37.
- Ngune, I., Myers, H., Cole, A., Palamara, P., Redknap, R., Roche, M., Twigg, D., 2023. Developing nurse-sensitive outcomes in acute inpatient mental health settings—a systematic review. *J. Clin. Nurs.* 32 (17–18), 6254–6267.
- Nigel Crisp, L., Watkins Of Tavistock, B.M., 2018. The triple impact of nursing. *Int. J. Nurs. Stud.* 78, A3–A4.
- OECD, 2023. *Health at a Glance 2023*. OECD library. <https://www.oecd.org/en/publications/health-at-a-glance>.
- Perez-Carcelles, M.C., Nicolas-Martinez, C., 2025. How has COVID-19 affected the gender gap in elite occupations? A study of the Ibero-American labor market. *Int. J. Comp. Sociol.* 67 (2), 199–223.
- Phillips, G., Kendino, M., Brolan, C.E., Herron, L.M., Kõrver, S., Motofaga, S., Cox, M., 2023 Nov. Women on the frontline: exploring the gendered experience for Pacific healthcare workers during the COVID-19 pandemic. *Lancet Reg. Health West Pac.* 9 (42), 100961.
- Pontusson, J.J.C.p.s., 1995. From comparative public policy to political economy: putting political institutions in their place and taking interests seriously, 28 (1), 117–147.
- Poon, Y.-S.R., Lin, Y.P., Griffiths, P., Yong, K.K., Seah, B., Liaw, S.Y., 2022. A global overview of healthcare workers' turnover intention amid COVID-19 pandemic: a systematic review with future directions, 20 (1), 70.
- Rabin, S., Kika, N., Lamb, D., Murphy, D., Am Stevelink, S., Williamson, V., Wessely, S., Greenberg, N., 2023. Moral Injuries in Healthcare Workers: What Causes Them and What to Do about Them?, pp. 153–160.
- Rajpoot, A., Merriman, C., Rafferty, A.-M., Henshall, C., 2024. Transitioning experiences of internationally educated nurses in host countries: a narrative systematic review, 6, 100195.
- RCN, 2025. Newly Registered Nurse Jobs Crisis: 'Use Us or Lose Us'.
- Reynolds, J., Wisaijohn, T., Pudpong, N., Watthayu, N., Dalliston, A., Suphanchaimat, R., Putthasri, W., Sawaengdee, K., 2013. A literature review: the role of the private sector in the production of nurses in India, Kenya, South Africa and Thailand, 11 (1), 14.
- Rudnicka, E., Napierała, P., Podfigurna, A., Męczekalski, B., Smolarczyk, R., Grymowicz, M., 2020. The World Health Organization (WHO) approach to healthy ageing. *Maturitas* 139, 6–11.
- Salvage, J., White, J., 2020. Our future is global: nursing leadership and global health, 28, e3339.
- Sarik, D.A., Garcia, J., Gattamorta, K.A., Reynolds, L., Andrews, S.P., 2025. Current trends and challenges in the United States of America based pediatric nursing workforce. *J. Pediatr. Nurs.* 85, 294–300.
- Smith, J., Willis, E., Hopkins-Walsh, J., Dillard-Wright, J., Brown, B.J.N.I., 2024. The Vitruvian nurse and burnout: new materialist approaches to impossible ideals, 31 (1), e12538.
- Speck, P.M., Sanchez, R.V., Montgomery, A.P., Mitchell, S.A., Ekroos, R.A., Loan, L.A., Ladores, S., Milstead, J.A., 2024. Labor trafficking of migrant registered nurses. *Nurs. Outlook* 72 (5), 102226.
- Spencer, S.A., Adipa, F.E., Baker, T., Crawford, A.M., Dark, P., Dula, D., Gordon, S.B., Hamilton, D.O., Huluka, D.K., Khalid, K.J.I.c.m., 2023. A health systems approach to critical care delivery in low-resource settings: a narrative review, 49 (7), 772–784.
- Squires, A., Dutton, H.J., Casales-Hernandez, M.G., Rodriguez López, J.I., Jimenez-Sanchez, J., Saldarriaga-Dixon, P., Bernal Cespedes, C., Flores, Y., Arteaga Cordova, M.I., Castillo, G.J.I.N.R., 2025. A descriptive analysis of nurses' self-reported mental health symptoms during the COVID-19 pandemic: an international study, 72 (1), e13099.
- Steven, A., Redfern, N., 2024. Fatigue: for safe patients we need safe nurses, 81 (9), 5627.
- Stier, H., Yaish, M.J.W., employment, society, 2014. Occupational segregation and gender inequality in job quality: a multi-level approach, 28 (2), 225–246.
- Sweilieh, W.J.S.O., 2024. Research trends and patterns on international migration of health workers (1950–2022), 14 (4), 21582440241293190.
- Taylor, C.J., 2010. Occupational sex composition and the gendered availability of workplace support. *Gend. Soc.* 24 (2), 189–212.
- Trein, P., Tosun, J., 2021. Varieties of public-private policy coordination: how the political economy affects multi-actor implementation. *Public Policy Adm.* 36 (3), 379–400.
- TruMerit, 2026. 2024 Nurse Migration Report.
- Tsujita, Y., 2017. Human resource development and the mobility of skilled labor in Southeast Asia: the case for nurses. In: *Human Resource Development*, pp. 1–5.
- Valet, P., 2018. Social structure and the paradox of the contented female worker: how occupational gender segregation biases justice perceptions of wages. *Work. Occup.* 45 (2), 168–193.
- Vander Weerd, C., Peck, J.A., Porter, T., 2023. Travel nurses and patient outcomes: a systematic review. *Health Care Manag. Rev.* 48 (4), 352–362.
- Villar, R.C., Nashwan, A.J., Mathew, R.G., Mohamed, A.S., Munirathinam, S., Abujaber, A.A., Al-Jabry, M.M., Shraim, M., 2021. The lived experiences of frontline nurses during the coronavirus disease 2019 (COVID-19) pandemic in Qatar: a qualitative study. *Nurs. Open* 8 (6), 3516–3526.
- WHO, 2010. WHO Global Code of Practice on the International Recruitment of Health Personnel.
- WHO, 2015. World Report on Ageing and Health. World Health Organization.
- WHO, 2016. Triple Impact—How Developing Nursing Will Improve Health, Promote Gender Equality and Support Economic Growth.
- WHO, 2020. State of the World's Nursing 2020: Investing in Education, Jobs, and Leadership.
- WHO, 2023a. Progress Report on the United Nations Decade of Healthy Ageing, 2021–2023. World Health Organization.
- WHO, 2023b. Strengthening the Collection, Analysis and Use of Health Workforce Data and Information: A Handbook. World Health Organization.
- WHO, 2024. In: World Health Organization (Ed.), *Bilateral Agreements on Health Worker Migration and Mobility: Maximizing Health System Benefits and Safeguarding Health Workforce Rights and Welfare Through Fair and Ethical International Recruitment*.
- WHO, 2025a. Europe's Dependence on Foreign-trained Doctors and Nurses has Cross-border Ripple Effects, Finds New WHO/Europe Report.
- WHO, 2025b. Social Determinants of Health.
- WHO, 2025c. State of the world's nursing 2025: investing in education, jobs, leadership and service delivery. In: *State of the World's Nursing 2025: Investing in Education, Jobs, Leadership and Service Delivery*.
- WHO, 2025d. State of the World's Nursing Report 2025.
- WHO, 2025e. State of the World's Nursing 2025: Investing in Education, Jobs, Leadership and Service Delivery. World Health Organization.
- Williams, D., Thomas, S., 2017. The impact of austerity on the health workforce and the achievement of human resources for health policies in Ireland (2008–2014), 15 (1), 62.
- World Bank Data, 2026. Nurses and Midwives (Per 1,000 People).
- Yakusheva, O., Lee, K.A., Weiss, M., 2024. The nursing human capital value model. *Int. J. Nurs. Stud.* 160, 104890.
- Yeates, N., Pillinger, J., 2019. *International Health Worker Migration and Recruitment: Global Governance, Politics and Policy*. Routledge.
- Yoon, H.J., 2022. The effect of nurse staffing on patient outcomes in acute care hospitals in Korea. *Int. J. Environ. Res. Public Health* 19 (23), 15566.
- Zaranko, B., Sanford, N.J., Kelly, E., Rafferty, A.M., Bird, J., Mercuri, L., Sigsworth, J., Wells, M., Propper, C., 2023 May. Nurse staffing and inpatient mortality in the English National Health Service: a retrospective longitudinal study. *BMJ Qual. Saf.* 32 (5), 254–263. <https://doi.org/10.1136/bmjqs-2022-015291> (Epub 2022 Sep 27. PMID: 36167797; PMCID: PMC10176371).
- Zeleníková, R., Jarošová, D., Mynaříková, E., Janíková, E., Plevová, I., 2023. Inadequate number of staff and other reasons for implicit rationing of nursing care across hospital types and units. *Nurs. Open* 10 (8), 5589–5596.