



Health Workforce Maldistribution and Physician Migration: Challenges to Rural Healthcare Access in Eastern Indonesia

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Abstract

Indonesia, the world's largest archipelagic nation, faces long-standing inequality in the distribution of healthcare workers, particularly in its eastern regions such as Papua, Maluku, and East Nusa Tenggara. This study investigates the structural causes of health workforce maldistribution and the limited success of physician retention programs over the last decade. Using a descriptive qualitative approach, the study combines a systematic literature review, policy document analysis, and secondary data evaluation, including findings from recent Discrete Choice Experiments (DCE) involving over 500 physicians. Results reveal that despite government programs like Nusantara Sehat and mandatory rural service, the national ratio of healthcare workers (3.84 per 1,000 population) remains below the WHO standard for Universal Health Coverage (UHC), and retention in remote areas is still critically low (<25% after two years). Regional disparities persist, with Papua and NTT suffering from the highest shortages up to 48% of community health centers lack doctors. The DCE findings confirm that non-monetary factors such as guaranteed safety, adequate hospital infrastructure, career development opportunities, and legal housing significantly influence physician retention, more so than financial incentives alone. Policy interventions remain fragmented and overly reliant on temporary placement incentives, without addressing systemic issues such as geographic isolation, weak intersectoral coordination, and limited rural training pathways. In response, the study recommends a shift toward holistic, long-term solutions, including CBME-based medical education, integrated specialist training in remote areas, expanded telemedicine capacity, and real-time health workforce planning systems. Addressing the maldistribution of healthcare workers is vital not only for equity in health access but also for national development. With coordinated, evidence-based policy reform, Indonesia has the potential to strengthen rural healthcare systems and accelerate progress toward its 2030 SDG and UHC targets.

Keywords: Health workforce distribution, physician retention, rural healthcare, discrete choice experiment, indonesia health policy

1. Introduction

Indonesia, as the world's largest archipelagic nation, faces persistent healthcare inequality due to its complex geography, decentralized governance, and uneven economic development. Nowhere is this disparity more visible than in Eastern Indonesia, where access to basic health services remains far below the national average. Despite major health reforms and increased investment in infrastructure, rural and remote provinces such as Papua, Maluku, and East Nusa Tenggara continue to suffer from a chronic shortage of healthcare professionals particularly physicians (Lelyana & Sarjito, 2024).

Health workforce maldistribution, defined as the unequal geographic allocation of medical personnel, is a long-standing systemic challenge in Indonesia's healthcare system. Physicians disproportionately cluster in urban areas with better facilities, higher salaries, and more career development opportunities, leaving rural and remote communities underserved. Data from the Indonesian Ministry of Health shows that doctor-to-population ratios in Eastern provinces are well below the WHO-recommended threshold, contributing to preventable morbidity and mortality in these regions (Armando et al., 2023).

Physician migration, both internal (rural-to-urban) and external (international migration), exacerbates this imbalance. Young medical graduates tend to avoid placements in remote areas due to perceived professional isolation, limited training opportunities, and poor living conditions. Even programs like Nusantara Sehat and internship mandates have shown limited success in creating long-term retention of physicians in rural Eastern Indonesia.

The consequences of this maldistribution are profound. Delays in diagnosis, limited specialist care, and overburdened health workers in rural areas weaken the effectiveness of primary healthcare. This has a direct impact on maternal and child health, infectious disease control, and chronic disease management (Zaidman et al., 2023). Furthermore, the absence of sustainable medical staffing undermines public trust in health services and limits the effectiveness of universal health coverage (UHC) programs in the region.

Several factors drive this maldistribution, including policy inefficiencies, lack of financial incentives, and inadequate rural health education in medical schools. Moreover, weak inter-sectoral coordination between health, education, and regional development ministries has led to fragmented workforce planning. This complexity is heightened by Indonesia's decentralized governance, where regional governments have autonomy but limited resources to recruit and retain qualified medical staff.

Efforts to address the problem have included incentive-based placements, remote area bonuses, and compulsory rural service schemes. However, these have had mixed results due to insufficient long-term support, unclear career pathways, and often poor implementation. Moreover, structural and cultural challenges such as lack of community integration and linguistic barriers remain unaddressed in policy design.

Globally, physician maldistribution is a common issue in low- and middle-income countries (LMICs), yet successful models from other nations highlight the importance of rural medical education pipelines, robust retention policies, and telemedicine support (Jinah et al., 2024). Indonesia stands to benefit from adapting these strategies while acknowledging its own unique geographic and socio-political context.

This paper aims to examine the scope, drivers, and implications of health workforce maldistribution and physician migration in Eastern Indonesia. Through a systematic review of policy documents, workforce data, and recent scholarly studies, the paper critically analyzes the structural barriers to equitable rural healthcare access and evaluates policy interventions that have been implemented over the past decade.

Ultimately, addressing physician maldistribution is not only a matter of human resources it is a matter of justice, equity, and national development. Ensuring that all citizens, regardless of location, have access to competent and timely medical care is central to achieving Indonesia's broader health goals and Sustainable Development Goals (SDGs) by 2030 (Permatasari et al., 2021).

2. Research Methods

This research uses a descriptive qualitative approach with a systematic literature-based study and policy document analysis. This method was chosen based on the primary objective of the study, which is to explore in-depth the various factors driving the maldistribution of healthcare workers and doctor migration in Eastern Indonesia, as well as to evaluate the impact and effectiveness of policies implemented over the past decade. This approach allows the researcher to present a comprehensive analysis based on secondary data, both narrative and statistical, thus uncovering the structural dynamics that influence unequal access to healthcare services in remote areas. The research flow is shown in Figure 1 below.

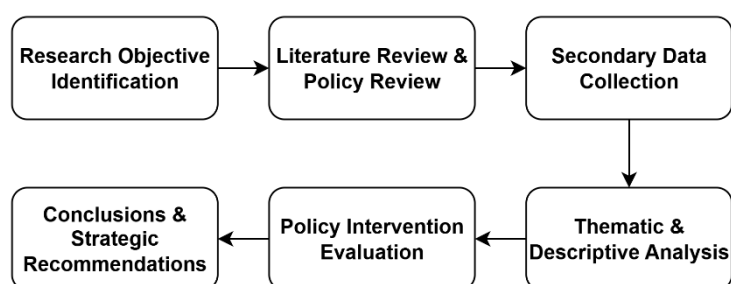


Figure 1: research flow

2.1. Systematic Literature Review

The initial step in this research was to conduct a systematic literature review of various relevant scientific publications and policy reports. The literature sources analyzed included national and international journal articles, government agency reports (such as the Ministry of Health and Statistics Indonesia), and documents from global organizations such as the WHO and the World Bank. The literature review focused on publications published within the last ten years (2013–2023) that specifically addressed healthcare worker distribution, doctor migration, and healthcare access in Papua, Maluku, and East Nusa Tenggara.

2.2. Policy Document Analysis

In addition to scientific literature, this study also conducted an in-depth review of various policy documents related to the distribution of medical personnel. The documents analyzed included national policies such as the Healthy Archipelago Program and the Compulsory Doctors' Work Program, as well as regional regulations governing the recruitment of health workers in remote areas. The analysis was conducted to evaluate policy consistency, implementation challenges at the regional level, and alignment between central and regional policies in the context of a decentralized health system.

Secondary Data Collection and Analysis

To strengthen the qualitative findings, this study also utilized quantitative secondary data. This data included information on the ratio of doctors to the population, the distribution of health facilities, doctor migration rates (internal and external), and indicators of public health status. Data sources came from Riskesdas (Basic Health Research), the Indonesian Health Profile, and statistical data on the health workforce. The analysis was conducted descriptively to describe the objective conditions of the distribution of medical personnel in the study area.

2.3. Thematic Synthesis

After data collection, the next step was to conduct thematic synthesis. This technique was used to identify key themes emerging from the analyzed data. The themes focused on in this synthesis include: factors causing maldistribution (such as financial incentives, medical education policies, and geographic conditions), barriers to policy implementation, the effectiveness of interventions, and the impact of maldistribution on primary health care performance. This process resulted in a thematic mapping that illustrates the complexity of the problem and helps formulate evidence-based policy recommendations.

2.4. Policy Intervention Evaluation

This stage focuses on assessing the effectiveness of government programs and policies to address the unequal distribution of healthcare workers, particularly doctors, in Eastern Indonesia. Programs such as Nusantara Sehat (Healthy Archipelago), incentives for remote areas, mandatory post-internship service, and the involvement of foreign healthcare workers are evaluated based on implementation documents, performance reports, and evaluative studies from academic institutions or government agencies. The evaluation includes the extent to which these programs have succeeded in increasing the ratio of doctors in underdeveloped areas, whether they have impacted access to basic services, and whether the policies have generated long-term effects such as healthcare worker retention. Furthermore, implementation barriers such as lack of coordination between institutions, inconsistencies between central and regional policies, and local socio-cultural factors are analyzed to understand why some programs have failed to achieve their objectives. This assessment is critical and evidence-based, providing realistic input for future policy improvements.

2.5. Conclusions & Strategic Recommendations

The final stage of this research is to formulate conclusions and strategic recommendations based on the results of the previous analysis and evaluation. The conclusions will answer the main research questions regarding the scope, causes, and impacts of the maldistribution of healthcare workers and doctor migration in Eastern Indonesia. By emphasizing empirical and thematic findings, the conclusions will address the structural root causes of the problem, stemming from policy design, geographic challenges, and inequalities in healthcare education and incentives.

Strategic recommendations are formulated to provide more contextual and sustainable policy direction. Initial recommendations include strengthening rural-based medical education, cross-sectoral integration between health, education, and regional development, reforming the incentive system based on local needs, and utilizing technology such as telemedicine to support medical practice in remote areas. Recommendations also emphasize the importance of involving local communities in healthcare workforce integration processes and enhancing the capacity of local governments to design recruitment and retention strategies for healthcare workers. Therefore, this research is expected to contribute to the development of more equitable, efficient, and inclusive healthcare policies within the framework of achieving Indonesia's Sustainable Development Goals (SDGs) by 2030.

3. Results and Discussion

3.1. Disparity in the Ratio of General Practitioners to Specialists

Based on secondary data analysis compiled from Ministry of Health reports and national news sources (ANTARA News, 2023; Nela, 2023), it was found that there is a significant disparity in the distribution of healthcare workers between western and eastern Indonesia. The ratio of general practitioners to specialists in Eastern Indonesia remains far below the WHO-recommended minimum standard (1 doctor per 1,000 population).

Table 1: Ratio of Doctors to Specialists by Region in Indonesia (2023–2024)

Regions	Estimated Population	General Practitioner Ratio	Specialist Physician Ratio	% of Community Health Centers Without Doctors
Java-Bali	± 150 million	0.16 / 1,000 people	0.17 per 1,000 people	± 0%
Sumatra-Kalimantan	± 70 million	0.10 / 1,000 people	0.10 per 1,000 people	± 8%
Sulawesi	± 20 million	0.08 / 1,000 people	0.07 per 1,000 people	± 14%
NTT - Maluku - Papua	± 11 million	0.05 / 1,000 people	0.04 per 1,000 people	Papua: 48%, NTT: 25%

Table 1 shows significant disparities in the distribution of medical personnel across regions in Indonesia, characterized by striking differences in the ratio of general practitioners to specialist doctors per 1,000 population, as well as the availability of doctors in community health centers (Puskesmas). The Java-Bali region dominates with the highest ratio, with nearly all community health centers staffed by doctors, reflecting the concentration of healthcare resources in economic and urban centers.

Conversely, eastern Indonesia, particularly East Nusa Tenggara (NTT), Maluku, and Papua, is experiencing an acute deficit. Papua even recorded 48% of community health centers without doctors, while NTT's figure reached 25%. The ratio of doctors in these regions is only 0.05–0.04 per 1,000 population, indicating a distribution crisis that directly impacts poor access to basic healthcare services, chronic disease management, and overall quality of life.

This data is supported by the findings of the Discrete Choice Experiments study conducted by Kurniati et al. (2024). This research identified the key factors most influential in the retention of specialist doctors in remote areas. The results show that a specialist doctor's decision to remain working in a particular region is largely determined by:

- 1) Availability of adequate hospital facilities
- 2) Opportunities for career development and further training
- 3) Guaranteed security and family support
- 4) Clear and competitive financial incentives

The implication is that medical personnel distribution policies can no longer rely solely on mandatory placements or short-term incentives, but must be designed systematically and sustainably, taking into account the factors that truly influence individual healthcare worker motivation.

3.2. Health Workforce Distribution Inequality Index in Indonesia

The distribution of health workers in Indonesia still faces significant challenges, both in terms of quantity and equity. National data shows that the ratio of health workers (including general practitioners, specialists, midwives, nurses, and dentists) is only 3.84 per 1,000 population. This figure remains below the minimum threshold of 4.45 per 1,000 population set by the World Health Organization (WHO) to achieve 80% Universal Health Coverage (UHC). This indicates that to achieve the ideal ratio, Indonesia still needs an additional 166,000 health workers. The challenge lies not only in quantity but also in the unequal distribution between regions, particularly between urban and rural areas, and between districts/cities. The following table illustrates the unequal distribution of health workers in Indonesia based on key indicators.

Table 2 progress is evident in the distribution of specialists across provinces. The Gini index for the distribution of specialist doctors across provinces decreased from 0.57 in 1993 to 0.44 in 2022, indicating improvements in equity. However, when examined more closely at a smaller scale, namely between districts/cities, distribution inequality remains high, with a Gini index value of 0.53. This value indicates that most specialist doctors are still concentrated in urban areas or provincial capitals, while districts, especially in remote and border areas, experience significant shortages of medical personnel.

Table 2: National Health Workforce Distribution Inequality Index and Estimated Need for UHC

Indicators	Value/Description
Total ratio of health workers (GPs, specialists, midwives, dentists, etc.)	3.84 per 1,000 population, still below the WHO threshold of 4.45 per 1,000 (UHC 80%).
Health worker shortage (estimated)	Approximately 166,000 additional health workers are needed to achieve the target.
Specialist Gini Index among provinces (1993 & 2022)	Decreased from 0.57 (1993) to 0.44 (2022) -indicating marginal improvement.
Specialist Gini Index among districts/cities (2022)	High, at 0.53 - indicating a still highly unequal distribution.

(Muharram et al., 2024)

This inequality is also reflected in the distribution across professions. Professions such as midwives and nurses are relatively more evenly distributed compared to specialist doctors and dentists, who tend to be concentrated in areas with more comprehensive health facilities. This indicates that administrative decentralization in the health sector has not optimally addressed distribution issues. The need for more specific policy interventions, based on regional microdata, and a cross-sectoral approach is crucial to addressing this gap.

Within the policy context, distribution strategies must consider the local context at the district/city level, including geographic factors, infrastructure availability, and the region's attractiveness to medical personnel. Providing financial and non-financial incentives, such as housing facilities, access to advanced training, and guaranteed career paths, can be an important approach to increasing the interest of healthcare workers, particularly specialist doctors, to work in underdeveloped areas. Furthermore, a more accurate and integrated healthcare worker information system at the regional level is needed to develop distribution plans based on real and dynamic needs.

Considering these findings, solving the healthcare worker distribution problem in Indonesia cannot simply involve increasing the number of graduates or opening new civil servant positions. Policies are needed that focus on strategic redistribution, improving the quality of regional facilities, and providing adaptive incentives tailored to regional characteristics. Going forward, technology-based solutions such as telemedicine and digital doctor programs can also be integrated as part of efforts to ensure equitable access to quality healthcare services across Indonesia.

3.3. Medical Personnel Retention Based on Discrete Choice Experiment (DCE) Results

Let's examine the results of a Discrete Choice Experiment (DCE) study comparing retention preferences between general practitioners/dentists (N = 158 participants from 78 primary care facilities in 15 provinces) and specialist physicians (N = 341 physicians from 48 district general hospitals in 10 provinces). The following OR (Odds Ratio) data only displays factors that are statistically significant at $p < 0.001$. The results can be seen in Table 3 below.

Table 3: Physician Retention Factors Based on Discrete Choice Experiment (DCE) Studies in Indonesia

Retention Factors			General Practitioner/Dentist (OR)	Specialist Physician (OR)
Postgraduate Scholarships/Training	(not continuing)		5.65	-
Security Guarantee from the Local Government			Dentist: 4.87	6.11
Legal Residence (not a temporary contract)			3.60*	-
CPD Program (continuing education)			-	2.84
Access to district-level hospital medical facilities			-	2.35

(Kurniati et al., 2024)

The results in Table 3 show that scholarships or advanced training (OR = 5.65) proved to be a very prominent retention motivator for general practitioners and dentists. They preferred opportunities for further formal education after the mandatory period, and this was a game-changer in encouraging them to work in the 3T (Underdeveloped, Outlying, and Transmigration) areas. These findings are consistent with the preferences of young doctors who value career investment and increasing clinical capacity. Local security from the local government received the highest OR (dentists 4.87; specialists 6.11), indicating that a safe environment is a critical factor, especially in conflict-prone or indigenous areas like Papua. Without strong safety guarantees, retention will be difficult, even if financial incentives are substantial. Adequate legal housing (OR = 3.60) was a key preference for general practitioners/dentists they preferred adequate housing over short-term contracts or uncertain accommodation, creating a sense of stability and a sense of attachment to the location. Continuous CPD programs (OR = 2.84) and access to medical facilities equivalent to district general hospitals (OR = 2.35) were key factors for specialists. This suggests that providing a work environment that supports specialist competency, both professionally and technically, is crucial to encouraging them to stay beyond their initial placement.

3.4. Interim Evaluation of Policy Interventions

Since the launch of Nusantara Sehat (NS) in 2015 and the implementation of mandatory service for intern doctors from 2016-2017, there has been increased access for doctors to DTPK Community Health Centers. The Public Health Index has improved significantly compared to controls, but post-assignment studies indicate that long-term retention remains low: only a small percentage (<25%) of alumni return to their placement locations two years after the program ends (Sari et al., 2019). Interview studies by Soewondo et al. (2022) highlight that NS experience (both team and individual) is not yet recognized as a career framework by many institutions, leading many alumni to migrate to larger cities after their contracts expire. Attracting, Recruiting, and Retaining (Noya, 2023) also revealed that although mandatory and incentive schemes have succeeded in attracting healthcare workers to remote areas, retention remains below ideal due to weak monitoring mechanisms and structured sanctions. Financial incentives such as DTPK allowances or recruitment bonuses are effective for initial placement, but do not impact long-term retention without the support of local managerial policies and advanced career pathways. A qualitative study by Soewondo et al. confirmed that doctoral motivation remains driven by non-monetary factors: local professional recognition, access to specialists and advanced CPD training, and security of tenure. These factors were also observed in the Discrete Choice Experiments study, which showed that local security and career development proved more influential than bonuses alone.

Community-based medical education (CBME) models, such as the rural pathway program, are still implemented to a small extent by medical faculties and state universities. Expert commentary from Gadjah Mada University (UGM) (2023) supports that CBME and the social-accountability approach through community-based competencies have proven effective in addressing the needs of remote areas, but they have not been systematically integrated into national accreditation and the curricula of most medical faculties (Grehenson, 2024). Meanwhile, telemedicine adopted since COVID-19 has been proven to expand basic consultations (internist care, remote prescriptions), but is still limited by uneven digital infrastructure (congested internet, inadequate devices), as well as low digital literacy among rural communities (Saputra, 2024).

3.5. Long-Term Policy Recommendations

To address the disparity in the distribution of medical personnel sustainably, a more comprehensive and integrated retention policy is needed. One key proposal is the development of a locally needed retention package, encompassing continuing education scholarships (both after internship and CPD training) combined with security guarantees and the provision of official housing for medical personnel serving in very remote areas. Furthermore, a special selection pathway for medical schools based on Community-Based Medical Education (CBME) should be established, directly recruiting prospective students from priority areas and requiring reassignment to their home regions upon graduation. To ensure the sustainability of specialist services, it is crucial to develop regional specialist medical education programs (PPDS), along with adequate training facilities outside Java, within a unified Academic Health System (AHS) that aligns services with local needs.

Furthermore, expanding digital infrastructure in remote community health centers (Puskesmas) should be a priority, along with digital literacy training programs for healthcare workers and the community, so that telemedicine can be utilized as a sustainable supporting healthcare service. All of these efforts require a strong data foundation. Therefore, the development of a real-time, integrated Health Human Resources Information System (SISDMK) across institutions including the Indonesian Health Commission (KKI), the Indonesian Doctors Association (IDI), the Ministry of Health, and local governments is crucial to improving the effectiveness of evidence-based coordination and placement of health human resources. With a holistic, structured, and cross-sectoral policy approach, Indonesia has the opportunity to significantly improve the distribution of medical personnel, particularly in Eastern Indonesia, while accelerating the achievement of Universal Health Coverage and the 2030 SDGs targets.

4. Conclusion

This study aims to evaluate the unequal distribution and effectiveness of medical personnel retention policies in Indonesia, particularly in underdeveloped regions and Eastern Indonesia. The analysis shows that unequal distribution of healthcare workers remains a crucial challenge, with a high Gini index for doctor distribution between districts and a national healthcare worker ratio (3.84 per 1,000 population), which falls short of the WHO Universal Health Coverage (UHC) standard of 4.45 per 1,000 population. This inequality is most pronounced in the distribution of specialist doctors and essential services in remote areas, directly impacting access to and quality of healthcare.

Evaluations of various intervention policies over the past decade, such as the Nusantara Sehat Program, mandatory post-internship placements, and financial incentives in DTPK regions, indicate that their impacts are temporary. Long-term retention rates (<25% after two years of assignment) remain low, indicating that policies based solely on economic incentives are insufficient. The Discrete Choice Experiments study (Kurniati et al., 2024) highlighted that

doctors' decisions to remain in remote areas are influenced by a combination of factors: adequate service facilities, career development and advanced training opportunities, security and family support, and competitive financial incentives.

Based on these findings, the study recommends a more structured and contextualized long-term policy approach. This includes: (1) designing an integrated retention package that includes continued scholarships, security guarantees, and the provision of official housing in the assigned area; (2) implementing a dedicated FK–CBME pathway based on the prospective student's hometown to ensure post-graduation re-employment; (3) developing regional specialist education programs (PPDS) and training facilities outside Java that align with the Academic Health System (AHS) network; (4) expanding digital infrastructure and providing telemedicine literacy training in community health centers (Puskesmas) in remote areas as a strategy to improve access to basic services; and (5) strengthening the real-time and integrated health human resource information system (SISDMK) across institutions (KKI, IDI, Ministry of Health, and local governments) to support evidence-based allocation.

By implementing a holistic, cross-sectoral, and data-driven policy framework, the distribution and retention of healthcare workers in Indonesia, particularly in eastern and underdeveloped regions, can be sustainably improved. This step is crucial to ensuring the sustainability of the national healthcare system and accelerating the achievement of Universal Health Coverage (UHC) and the 2030 SDG targets, which focus on equity and justice in healthcare services.

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