Article

Attracting, Recruiting, and Retaining Medical Workforce: A Case Study in a Remote Province of Indonesia

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Abstract: Indonesia, one of the Asia Pacific LMICs, has suffered from a chronic medical workforce shortage. However, there are limited published studies describing the approaches implemented by the Indonesian government regarding the recruitment and retention of the medical workforce. This case study aimed to understand the current practices for recruitment and retention of the medical workforce in Indonesian rural and remote provinces. We conducted a case study of the Maluku Province of Indonesia with document analysis and key informant interviews with officials responsible for medical workforce recruitment and retention. We used the WHO's guidelines as an analytical matrix to examine the recruitment and retention practices under four domains, i) educational, ii) regulatory, iii) financial, and iv) professional and personal development, and classified them into University/Medical School level and Government/Non-government level. Our findings suggest that Indonesia has implemented most of the WHO-recommended medical workforce recruitment and retention strategies. However, implementation is still problematic; hence, the aim of establishing an adequate, sustainable medical workforce has not been reached. Nationwide government intervention in educational aspects is important to magnify the impact of the regional medical school initiatives. Relevant programs must be re-evaluated and re-enforced concerning significance, comprehensiveness and effectiveness for sustainable rural and remote medical workforce.

Keywords: medical workforce shortage; rural and remote; recruitment and retention; sustainable rural medical workforce; medical school innitiatives

1. Introduction

Medical workforce shortage in rural and remote (RR) areas has been a significant problem globally. Since the introduction of the World Health Organisation (WHO) Global Policy Recommendation toward improved retention[1], more nations globally have implemented recommended strategies. Of those strategies implemented, educational strategies involving the active contribution of medical schools were documented as effective for improving recruitment and retention of the medical workforce.[2] Admission of students with a rural background, rural immersion, and comprehensive medical school programs were the most effective strategies reported over time and across places.[2] These strategies documented early and continuous interventions, with the term Rural Pipeline used to describe this combination of strategies.[2] Some low and middle-income countries (LMICs) in the Asia Pacific, such as Thailand, have realised improved recruitment and retention of rural medical workforce as a result of the implementation of educational strategies.[2]

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Indonesia, one LMIC the Asia Pacific, has suffered from a chronic medical workforce shortage.[3,4] Although Indonesia barely achieves the national standards for the underlying health indicators[5], there are limited published studies describing the approaches implemented by the Indonesian government regarding recruitment and retention of the medical workforce, nationally or regionally. This study focuses on the Maluku province of Indonesia, which includes some of the most remote, isolated, and underserved islands.[3,5] [3] The remote and isolated nature of the province is reported as having discouraged physicians from living and working there.[6-8] With less health infrastructure and facilities, the ratio of physicians per population is 1:7269.

The purpose of this study was to comprehend strategies regarding building a sustainable medical workforce and what constrains implementation of rural recruitment, development, and retention strategies in one remote province of Indonesia. This case study of a RR province in the eastern Indonesian archipelago, Maluku with a qualitative review of government documents and interviews with key informants allows for triangulation of data to better understand the strategies currently being implemented and challenges encountered in recruiting and retaining the RR medical workforce.

2. Materials and Methods

A case study is a qualitative study method that intensely explores the issue through one or more cases within a bounded system through comprehensive data collection involving multiple sources of information.[9] Document analysis is often used simultaneously with other qualitative research methods for data triangulation of a particular phenomenon.[10] It is expected that data is drawn from more than one source and informs each other.[10,11] In this case study, the documents were derived from government officials from the district's health offices and The Pattimura University Faculty of Medicine (PUFM) and interviews with key informants in Maluku[12,13] to explore their perspectives on policy development and implementation.

Document analysis

We collected documents published online and/or for internal use from the national, provincial, and district government officials regarding strategies for recruitment, development, and retention of the medical workforce. The documents are national policies relevant to the recruitment and retention of the medical workforce, provincial and district health strategic plan and human resources planning, medical school strategic plan, accreditation documents, and distribution data of students and graduates. Other data sources were international, national and regional published news and articles regarding the recruitment, development, and retention of the medical workforce in Indonesia and Maluku.

The researcher accessed the Maluku provincial government documents through the government website and with permission from government officials. The medical school documents were accessed through the school executives. Data collected from the documents related to the strategies implemented for the recruitment, development, and retention of physicians in the RR areas.

Key informant Interviews

The key informants (KI) were identified and listed based on their background, experience, present involvement with the medical workforce and related areas, and potential to provide valuable information on rural retention of the medical workforce across the province.

The KI interviews (KII) collected data regarding recruitment, development, and retention strategies in the province and districts. Using an interview guide, we conducted interviews with 15 respondents including provincial health officials, head of District Health Offices, medical school executive, head of the regional Indonesian Medical Asso-

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ciation, and *Puskesmas* accreditation surveyors. The questions posted related to the implementation of strategies for recruitment, development, and retention of medical workforce, including the challenges experienced.

Data analysis

The analysis framework was based on a combination of the framework from our scoping review of strategies for improved rural and remote medical workforce[2] and the WHO Global Policy Recommendations.[1] The previous adds level of implementation to the later i.e., Medical school/University level and Government/Non-Government level.

We extracted the strategies documented in the government and medical school documents and derived from the interviews, then classified them into two levels according to the framework: 1) Medical school/University and 2) Government/Non-Government (National –except for the data from Key Persons Interviews, Provincial, District).[2] Then, we mapped the strategies under each theme (and subtheme) from the WHO recommendations: Education, Regulatory, Financial Incentives, and Professional and Personal Support.[1] In this study, we report the interventions based on the predominant aspects implemented by the stakeholders. Challenges faced in each strategy are reported in the respective themes and subthemes. We used narrative reporting of the interviews to convey the intellectual and interpretative message from respondents [14], including some verbatim quotes to express the challenges faced. The complete framework can be seen in Table A1.

Trustworthiness

The informants were assured of the anonymity and confidentiality of their information and allowed to talk without being recorded anytime on issues they considered sensitive. Verbatim transcription in the Indonesian language was performed on the audio-recorded interviews and later translated to English to enable cross-analysis and verification by other researchers. The researchers have experience in medical education and the rural medical workforce that can influence the interpretation of data, but throughout maintained reflexivity and followed the analysis framework. The data extraction, coding, and interpretation adhered to the predefined themes of the analysis framework.

Ethics

Ethical approvals to undertake this study were granted by the University of Western Australia Human Research Ethics Committee (UWA HREC) and the Pattimura University HREC.

3. Results

The KIs included Provincial health officers related to human resources (n=3), heads of District Health Offices (n=7), Dean and former Dean of PUFM (n=2), head of regional Indonesian Medical Association (n=1), *Puskesmas* accreditation surveyors (n=2).

3.1. Medical school/University level

At the national level, apart from the MoH initiative to accelerate health professions education to reach minimal qualification[15], there was no educational intervention found or imposed by the Ministry of Education for universities nationwide for medical workforce recruitment and retention. Some medical schools (42 of 83) located outside Java had programs related to educational recommendations, but this was not related to a systematic agenda imposed by the Ministry of Education.[16] Pattimura University Faculty of Medicine (PUFM), the only medical school in Maluku Province, was established in 2008 with a mission to fulfil the province's needs for a medical workforce and better quality of health services.[17,18] At the PUFM level, educational interventions were employed.

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Based on both the documents and interviews, the strategies implemented in PUFM complied with all WHO educational recommendations (A.1. – A.5.) and regulations regarding compulsory service (B. 3.) by requiring its alumni to undertake a minimum of one-year compulsory service in the RR districts.

A. Education

A.1. Get the "right student"

The strategy of student selection for rural background and interest was implicitly documented in Faculty strategic planning and accreditation documents. [17,18] There were memorandums of understanding with three districts in the province to select students from the districts for their medical education at the PUFM.[17,18] Although PUFM has no stated policy/quota for rural background students, each year it admitted 20-25% of students from rural and remote districts, both districts without or with the memorandum of understanding (MoU) with the faculty.[3,19] The selection was done on two levels, by the district's officers for screening purposes and later by the university. However, the selection procedure was not documented in detail.

A.2. Train students closer to rural communities

PUFM is located in the remote province -- Maluku, far away from the capital of Indonesia. Indeed, Maluku is the second-farthest province. This means that the students were trained close to the communities they will serve when they graduate. The faculty has partner communities and *Puskesmas* where the students partake in their training during their undergraduate medical education[17,18] (related to recommendation A.3.)

A.3. Bring students to rural communities

Related to recommendation A.2., the PUFM curriculum arranges community placements for medical students in the preclinical and clinical stages. Some are in Puskesmas, communities, and floating hospitals across the islands where the students undertake clinical rotations, preclinical community service, and faculty community service programs.[17,18,20] The faculty also has several communities where research, service and education are devoted to developing those communities in health. The students are immersed in these communities, living and learning together. However, the number of these communities is limited and their location is only in rural areas near the province's capital.[17,20]

A.4. Match curricula with rural health needs

The PUFM curriculum documents reflected a rural focus, especially within the archipelagic context of Maluku province.[17,18] The learning objectives were predefined in units, blocks and learning topics, and local contents to bring the learning to the rural community context, especially the archipelagic context of Maluku. Faculty research and service programs were also mapped under the vision statement to provide community health services and address health problems in the Maluku islands.[17,18]

A. 5. Facilitate professional development

The PUFM documented its strategy regarding facilitation for professional development through programs such as seminars, specialist consultation and workshops dedicated to alums and the broader medical workforce in Maluku province, including telemedicine.[17] Together with the Regional Indonesian Medical Association (RIMA), the programs have assisted and facilitated Maluku RR physicians' professional development.

B. Regulatory intervention

B. 3. Make the most of compulsory service

Pattimura University Medical Faculty requires its alumni to undertake a minimum of one-year compulsory service. This aims to distribute the medical graduates to more

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rural and remote areas in Maluku Province, especially to the districts that send their students to be trained at PUFM. Although this intervention is enforced on the graduates, it was not documented in the strategic planning or other faculty documents.

KIIs revealed that the alumni are required to sign a written statement at the inauguration indicating that after the internship, they will participate in temporary employment programs in any district in Maluku province.

> *We oblige our alums to take temporary employment for one year in an effort to deploy personnel in the archipelago. Thus, they must sign a written statement at the inauguration indicating that after the internship, they are willing to take part in temporary employment in any district in Maluku province. (KI#9)*

Those who received regional scholarships and recommendations must return to their respective districts, while those without a regional recommendation or scholarship must go to the districts that require physicians. KIIs with district health offices confirm this arrangement and the resultant benefits. The PUFM supported its graduates for compulsory services by facilitating workplaces and continuing medical education programs.

3.2. Government/Non-government level

Strategies found at the national level related to regulatory intervention, financial incentives, and personal and professional support. We found data regarding the number of physicians at the district, provincial, and national levels. At the district level, limited documents provided data about strategies implemented or planned to improve rural and remote physicians' recruitment, development and retention. The strategic planning of the province and district health offices acknowledged the low distribution and shortage of medical workforce as one of the strategic issues affecting the population's health status. Despite this, there was no mention programs to execute or being implemented to improve the quantity and quality of human resources, including physicians in RR areas. Most strategies were revealed from interview data.

B. Regulatory intervention

B.1. Create the conditions for rural health workers to do more.

Regarding the enhanced scope of practice, the MoH and the Indonesian Council of Medicine in 2011 agreed to train general physicians with additional competencies outside their prescribed ones, known as 'General Physician Plus'.[21] This is to respond to the challenges of achieving the Millennium Development Goals (MDGs), to significantly reduce maternal and child mortality in areas of Indonesia with Maternal Mortality Rates and Infant Mortality Rates above the expected line, including Maluku.[21,22] The competencies include but are not limited to 'performing caesarean section' and 'performing abdominal ultrasonography.' [25] However, the MoH had not issued a regulation to legalise the agreement, and the training by the relevant collegium was ceased due to a tight budget.[21]

At the provincial level, Maluku has a program called '*Gugus Pulau*' or 'Islands Clusters', planned to solve geographically remote islands' health problems.[23] This island groups' health service was created to bridge the geographical, economic and socio-cultural disparity within Maluku province. This program focuses on building activities with the principle of independence, so that one cluster centre can solve health problems within a cluster without unnecessary referrals. The KIIs revealed that there is still a lack of human health resource, especially physicians in the island-based cluster centres. However, there was little acknowledgement of medical workforce shortage as one main challenge why health services are struggling in Maluku Province.

B.3. Make the most of compulsory service

Efforts to distribute the physicians are carried out through mandatory work as a service to the country to improve the quality of health services so that the community has

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access to medical services, especially in rural, remote, disadvantaged areas, borders and islands. Three programs initially utilised compulsory service of physicians with funding allocated: 'temporary employment', 'utilisation of medical specialist graduates' – initially compulsory, both programs changed over time and became voluntary[24-27] and 'medical internship.'

(1) Temporary Employment (Since 1961, Pegawai Tidak Tetap/PTT and Nusantara Sehat/NS, 2018). The Indonesian National Health Policy regarding temporary employment emphasise continuing availability of service in all divisions of healthcare workers in remote and underserved areas.11,14 Besides the incentive package, the NS participants are given the opportunity to become civil servants and can apply for scholarships for postgraduate training after completing the programme. However, the retention rate of this programme is not reported and requires further evaluation.

(2) Utilisation of Medical Specialists Graduates (Pendayagunaan Dokter Spesialis/PDGS) substitute the Mandatory Work of Medical Specialists Graduates (Wajib Kerja Dokter Spesialis/WKDS).25,26 In practice, WKDS (2016) was seen as violating the physicians' human rights and the International Labour Organization (ILO) policies regarding forced labour. The mandatory WKDS was then replaced with PDGS (2019). The MoH opens recruitment to specialist graduates offering incentives and other benefits. However, the non-mandatory nature of PDGS, led to a decrease in the number of specialist physicians serving in rural and remote areas, especially in the eastern regions, including Maluku.[28]

(3) Medical internship. Although it is not primarily aimed at rural and remote medical workforce distribution, the medical internship has partly contributed to the dissemination of the medical workforce across RR districts in Indonesia.[29,30]

At the district level, the districts that provide medical students with financial support imposed official ties. The students are obliged to return to and work in their respective districts. The PUFM supports this implementation with the signed written statement by the newly graduated alums to return to their districts. The districts support these physicians with financial incentives and recommendations for postgraduate training (specialists) besides permanent positions as civil servants in the districts.

The KIs reported that while the MoH compulsory and voluntary schemes have been employed simultaneously with districts' efforts to recruit medical graduates of local origin, many Puskesmas, especially in the remote islands, are still vacant. For example, in one of the districts, only 63% of Puskesmas are occupied by physicians.

B.4. Tie education subsidies to mandatory placements

At the national level, the MoH has policies regarding mandatory placements for physicians who the government assist through educational funding aid for their specialist training. They are required to serve in hospitals in remote areas that need specialists with a time bond minimum of n years and maximum of 2n years (n=length of study).[16,26,31,32] This regulation has increased the number of specialist physicians in rural districts.[16] However, it cannot increase the number of physicians in remote, very remote and bordering areas as specialist physicians can only work in the hospital in district capitals. Another downfall of this program is that only 73% of the specialist physicians with scholarships or financial support return to their respective districts.[16] As mentioned by the KIIs, in some districts some physicians failed to return without notice and their locations are not always tracked.

> *We have physicians trained with scholarships from the MOH through the district's recommendation. They haven't come since they graduated. One has practised in Bekasi (West Java). The MOH should fine them because MOH funded their training. But, the MOH did not give any sanctions. At least hold their registration, so they can't practice elsewhere. Well, the supervision did not work, or maybe there was someone inside, I mean, like collusion, helping them with the registration, which made the person, didn't return (here). (KI#1)*

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Aru Islands, Buru, and South Buru are three districts in Maluku with memorandums of understanding with the FMPU to send their local people to medical school.[17] Annually, these districts select 5-15 students and send them to the PUFM selection process. Those who succeed in the selection are fully funded until they complete a medical degree. Some other districts did not hold a selection process but do fund students from their area who had already been admitted to the FMPU. These students were partially or totally funded for tuition fees and living expenses. In these districts, the compulsory return of services was made possible with the educational subsidies provided by the government. The medical graduates return to their respective districts as per the agreement they made with the districts. PUFM-enforced regulation of mandatory service also directs the graduates to their respective districts. Some districts set time limits for the return services. Other districts seek to retain physicians who have already become civil servants for as long as possible, even throughout a physician's career, by providing scholarships or financial assistance.

> *When we have determined to accept (civil servants), we have warned them they cannot move and must stay here. We have a lifetime contract. Specialist physicians here were general physicians at the Puskesmas. We send them to be trained as surgeons, internists, obstetricians (etc.). Now (they have) come back. Most are civil servants. We pay the salaries of civil servants, and we provide an incentive. (KI#3)*

C. Financial incentives: Make it worthwhile to move to a remote or rural area

The Indonesian government, through MoH, provide financial incentives to physicians serving RR Indonesia under voluntary or utilisation schemes. Salary and incentives packages to PTT/NS/PGDS were higher than those with permanent positions or employed within other schemes. To increase the interest of physicians in participating in voluntary or utilisation schemes, the temporary physician employees receive almost twice as much as the permanent/government physician employee.[24,33] However, for the medical internship, the salary and incentives known as Basic Living Expenses (BLE) are smaller and deemed to have not met the necessities of life compared to the volume of work assigned to the interns.[33,34]

Besides the support given to their physicians with bonded placements, most districts also provide incentives for physicians from national employment schemes such as Nusantara Sehat and PGDS. Hence, these physicians with national appointments receive extra incentives. There were also discrepancies in the incentives provided for physicians across different districts. As exposed from the KIIs, the provision was mainly dependent on the locally generated revenues. The nominal range is between IDR 2.5-10 million for general physicians to IDR 25-35 million for specialists per month. Districts with higher income were able to place more budget to attract physicians, while those poorer mainly depended on the MoH regulation for temporary employment. Those who give more to the physicians demand their service, whatever it takes. The districts expect that they already provide significant incentives and services funds, so physicians are obliged to serve, whatever the living and working conditions.

> *They get incentives and service fees. They get houses. All specialist physicians get cars. I don't think there is a reason anymore not to stay. For physicians in remote islands, they can get incentives, they get the 60% of JKN (National Health Insurance) service fees from there, and they can still earn more if (patient) is hospitalized (transfer to the higher-level facility). They got Health Operational Assistance funds and transportation. Yes, it is pretty enough. (KI#3)*

Some of the KIs mentioned the adverse effects of this strategy. Although districts already provide significant incentives, some physicians do not stay for the duration of service. They do not like being in remote and isolated areas, especially those originating outside Maluku. The amount of money spent to retain the physicians therefore failed to

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achieve its purpose. However, some districts commended the Nusantara Sehat and locally contracted physicians' work.

In terms of transport and housing, not all physicians received the same provision. As exposed by the KIs, some districts provide vehicles and build their physicians' houses to retain them for longer. However, this is more difficult for some districts, especially in their remote areas.

D. Personal and professional support

D.1. Pay attention to living conditions

Nationally, there are programs for improving living conditions in the RR areas of Indonesia. Stakeholders of these programs are the Ministry of Finance, Ministry of National Development Planning, and technical ministries such as the Ministry of Public Works, Ministry of Health and Ministry of Villages, Development of Disadvantaged Regions and Transmigration. One of the focuses of these programs is the acceleration of development in eastern Indonesia, including Maluku.[35] 'Dana Desa' or Village Fund is one of the featured programs with funding prioritised for the village's basic needs (health and early education) and the development of village facilities and infrastructure.[36] There are also the 'Balancing Funds' sourced from national revenues such as 'Special Allocation Funds'[37] which are allocated to certain regions intending to help to fund specific regional activities in accordance with national priorities (education, health, roads, irrigation, drinking water, government infrastructure, marine and fisheries, agriculture and the environment).

At the district level, there is documentation of the link down from the national government program 'Dana Desa' (Village Fund)[38-43] and other national development plans.[37] However, as exposed in the KIIs, many districts and villages did not benefit from the programs. Despite the complete cycle of the use, monitoring and evaluation of the programs mandated by the national rules[44,45], necessities such as clean water, electricity, road access, and transport in the RR areas were still scarce.

> *Well, another thing that makes the physician more comfortable is, for example, clean water resources that support their lives. There are no good water resources available. Most villages have no electricity, but at the Puskesmas, we facilitate with a generator. But, then the problem is with the fuel, no fuel in the villages. Going to the city will take more money (far distance, sea transport with rare fuel). (KI#2)*

Government institutions did not seem to work in unison for improvements. Another example, the district health office provided a vaccine freezer for Puskesmas, but there was no electricity. In other districts, health offices provide power generators for remote Puskesmas with no electricity or ambulance boat for patients' transport, but fuel availability is another problem. Moreover, as massively reported in the local news, there are corrupt practices by the villages' officials responsible for the Village Funds.[46-48]

D.2. Ensure the workplace is up to an acceptable standard

There is a fund provided through the MoH for the procurement and upgrade of health facilities and infrastructure through 'Special Allocation Funds' and 'General Allocation Funds' from the national revenues.[37] As confirmed by the KIs, the health offices in districts are entitled to request acceptable standards of workplaces with this allocation. This considerable amount of funds covers the construction of the Puskesmas and official housing, procuring health equipment and facilities, and furniture. These funds need to be applied through the Medical Device Infrastructure Application (ASPAK)[49], which demands descriptions of baseline data and the upgrade requested. According to the KIs, not all district officials understand and are able to prepare the proposal, needing more time for the application. Another reason stated is due to the use of information system and report via a web-based application, there is no chance of scamming and fiddling with a

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project value. Hence, while decreasing the chance of corrupt applicants, it likely also reduced the use of the application, despite the critical needs. Many health facilities in RR Maluku still have substandard working conditions.

> *They must fill out an application called ASPAK (Medical Device Infrastructure Application) to get the funds. It describes the actual condition of our health facilities' medical equipment and infrastructure, so there is no fake data. For example, Puskesmas requires major renovations. Then, this need must be supported with photos of the particular Puskesmas. It is not the health sector's responsibility to state whether the Puskesmas needs severe or light renovation. The Public Work Service shall determine the level of renovation required based on records and analysis about the Puskesmas. That's the way it goes. (KI#8)*

In their strategic planning documents, some districts report the programs for improving facilities and infrastructure related to work, such as the construction of physicians' accommodations, procurement of operational service vehicles, procurements, maintenance, and upgrade of work facilities sourced from district revenues. From the KIIs, some districts acknowledged they had not given optimal support regarding transport, housing and furniture for the physicians working in their districts. Some mentioned the complicated bureaucracy regarding procurement. However, for other districts, medical service was seen as an obligation or a calling, so physicians are expected to serve whatever the working condition in the RR areas.

D.5. Facilitate knowledge exchange

The provincial health office provides personal and professional support through programs such as provision of clinical internship sites and training centres for physicians.[23] Although a recognised strategic issue is low quality and quantity of Health Human Resources (HRH), including physicians, there is little HRH planning and training data.[23] As informed in the KIIs, training and development programs are usually tied to the region's health improvement programs, often linked to nationally prioritised programs, and not generally provided to all employees or physicians, especially in the remote islands.

In the provincial level, there is a Regional Indonesian Medical Association (RIMA) to facilitate knowledge and skills exchange for physicians working across the province. The KIs informed that the RIMA often provides training, seminars and workshops for physicians from all over Maluku but also dispatches physicians and specialists from the province's capital city, including physicians from PUFM, to train and teach physicians in the RR areas. Some districts have an active medical association; some have inactive or no such support.

D. 6. Raise the profile of rural health workers.

The Indonesian government, through MoH, provided awards for health professions, including physicians, especially those who work in Puskesmas for primary care, with recognition of them as 'Exemplary Health Personnel.' [50] This award was implemented at the provincial and district level in Indonesia as a law mandate. In their activity plan, some districts documented 'Exemplary Health Professionals' selection as a program for capacity building of the personnel.

4. Discussion

This study found limited documentation at the district and provincial levels regarding strategies to improve recruitment and retention of the medical workforce despite the acknowledgement of the shortages. Our findings indicate that Indonesia, particularly Maluku province, has implemented most of the WHO-recommended strategies. However, the implementation approach taken has not achieved the desired outcomes. Many programs are still not comprehensive, and the educational approaches applied are limited to

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medical schools. Overall, there are documented achievements, also areas need improvement as summarised in Table 1.

Table 1. Summarised key achievements and areas that need improvements

WHO Recommended Intervention	Key achievements	Areas need improvement
A. Education		
	Improved number of physicians in the RR districts from local medical schools	Retention related to these strategies needs evaluation
	Continuing education and professional development of RR physicians are supported by medical school	No nationwide implementation of the WHO educational recommendations
		No Medical College for RR physicians postgraduate training and recognition
B. Regulatory interventions		
	Partially improved recruitment of RR physicians	Enhancement scopes of practice for RR physicians with regulations and funding
	Support RR physicians' professional development with scholarships and education subsidies	Regulation enforcement regarding non-adherence to return of service
C. Financial Incentives		
	Attracted more physicians to RR areas	Different amounts of incentive received across different employment schemes despite the same workload and area remoteness
D. Personal and professional support		
		Living conditions, basic needs (clean water supply, electricity, telecommunications, etc)
		Complicated bureaucracy to improve working conditions
		Minimum career development and professional support
Overall		
		Integration of all recommendations, comprehensiveness of strategies
		Enforcement of regulations

Education

We did not find any education strategy, program, or regulation that has been implemented nationwide. However, PUFM has directed their education, research, and service activities toward addressing the priority health concerns of the community in Maluku Province.[51] It is likely that as a result of interventions implemented by the PUFM, there

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is an increased number of physicians working in RR Maluku.[3] The PUFM work is exclusively motivated by their internal philosophy and commitment as a provider of the medical workforce in Maluku Province. A more systematicsolution to the chronic national shortage of the medical workforce is needed through nationwide implementation of educational interventions.

Another LMIC country, Thailand, has implemented the educational strategy as part of their national regulation. Two government-funded projects have been employed through a collaboration between the Ministry of Education and the Ministry of Public Health.[52] With regulations on job placement, duration of mandatory service and non-adherence to their obligation penalties applied, Thailand has increased their number of RR physicians significantly.[52] Learning from Thailand's success and that of developed countries such as Australia and Canada in educational interventions, Indonesia should consider applying a nationwide educational intervention. Rural Clinical Schools across Australia have been successful as a national educational intervention in terms of rural training locations, exposure and rural-focused curriculum.[2,53] This means the medical schools are not acting sporadically and exclusively but rather communally and systematically as imposed and supported by the national government. The predefined quota of rural background medical students in the admission program ensures the representativeness of rural communities and supports the 'rural pipeline' program[2,54]; in the end, it will benefit the community by having medical graduates that are more likely to return and be retained in the community.

Regulation

Our study found that temporary employment with its benefit from the MoH have partially improved recruitment of physicians to RR areas. However, there is no documentation of an increased retention rate. Currently, the ratio of physicians in Indonesia is only 3.8 physicians per 10,000 population[55], and Maluku only has 1.5 general physicians per 10,000 population.[16] Hence, this suggests that physicians may be deployed to the RR districts, but retention has its challenges. This case study confirmed a reluctance of the physicians to return, while the penalty obligation was not enforced. Many countries such as Thailand have successfully improved their RR medical workforce through imposed penalties for non-adherence.[52] This highlights the need to reinforce the regulation while addressing the main cause of the reluctance.

Financial incentives

Although offering financial incentives may attract physicians to RR places, they are still ineffective in improving retention of physicians. A study in Maluku in 2021 found that salary of more than IDR 6 million was associated with an 11 fold increase in rates of RR practice[3], confirming the importance of Indonesian government support through financial incentives included in the salary for those who practice rurally within temporary assignment schemes.[8,24,56] However, given the temporary status of many physicians, a higher incentive appears unlikely to guarantee the retention of physicians in RR practice.[3] Moreover, the difference in the amount of the financial incentive across districts and employment schemes despite the same workload creates an unfair situation. This is likely to influence physicians' reluctance to stay, preferring to find other locations with higher monetary benefits. This means that RR practice in Maluku provides no promising rewards, emphasizing the appeal from others internationally that meaningful reward for rural work is needed.[57]

Personal and professional support

Although the government arrangements included substantial funding aimed at enhancing overall development in RR Indonesia, corrupt practices in critical programs has created unconducive personal and professional conditions. This practice is common in

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Indonesian RR districts and other LMICs[58-60] and underpins reasons why physicians are reluctant to remain in RR practice.[33] Furthermore, the district governments believe they already provide significant incentives; hence, the physicians are obliged to serve, whatever the living and working conditions. The professional support and development needed by all RR physicians were not considered a priority. This case study confirms a qualitative study of RR Physicians in Maluku[33] that concluded that corrupt governance impedes the provision of personal and professional support for RR physicians.[33]

We emphasise the imperative for political actions of the district governments to enforce the implementation of multilevel programs to improve the poor RR working and living environments. Chile[61] and Thailand[52] provide good examples of what can be achieved with government enforcement and a holistic approach. They utilised educational, incentive-based and regulation enforcement approaches, while the living and working environment were improved. These have enhanced the recruitment and retention of the RR medical workforce in both countries. [52,61] Otherwise, the reluctance of medical graduates to remain in RR areas will continue, and the cycle of an inadequate RR workforce will remain. Medical Schools could support controls to ensure the government provides standard conditions for rural training and working and potentially help oversee their implementation.

In Australia, in addition to well-established living and professional conditions in RR areas, there is professional networking and recognition of RR physicians. The Australian College of Rural and Remote Medicine (ACCRM) equips physicians to work in the RR areas by providing 'Rural Generalist' training that is relevant to the community's health needs and the conditions of RR.[62] It maintains and enhances RR physicians' skills, competence and ability to sustain the RR practice.[62] This success indicates the benefits expected from establishing an Indonesian collegium of RR physicians to support and guide the postgraduate education and professional development needs of Indonesian RR physicians.

Implication for practice

Beyond the exclusive and seemingly sporadic, less supported interventions such as shown by PMFU in Maluku, there is a requisite approach that comprehensively integrates all the WHO-recommended interventions combined when possible. Australia and Canada have successfully implemented all the WHO recommended interventions nationwide through 'Rural Pipeline' and 'Rural Pathways'.[63-67] In Australia, the government provides Rural Health Multidisciplinary Training (RHMT) funding to medical schools nationwide and mandates them to apply a 25% quota for rural background students, and 25% of clinical placements provided are located in the rural communities.[2,53,54] Along the way, regulatory intervention with a return of services and bonded placements for medical graduates ensure the RR posts are always vacant. Further, the personal and professional needs of the RR physicians are supported. Continuing medical education and professional development such as 'Rural Generalist' were prioritised without the need for RR physicians to leave the posts; thus, continuity of practice is well maintained.[65-67] These comprehensive and sustainable strategies are worth implementing in the Indonesian context and therefore need consideration at the national level. The PUFM, in partnership with some district governments, has initiated educational interventions and have been supported by district government regulation for improved recruitment. This initiative needs to be followed up and supported at various levels to create a model of rural pipelines and pathways within the Indonesian context.

Study strengths and limitations

The implications from this study are generalisable to other countries, regions, and districts as common features of rural-focused medical education are applicable across different contexts. Additionally, Maluku represents Indonesia's and other archipelagic countries' rural and remote conditions regarding personal and professional support. However, caution is required concerning place-based needs assessment, capability, availability and

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willpower against corrupt governance. Further exploration of other RR districts in Indonesia will help elucidate the importance of context in implementing the best-evidence strategies and interventions.

5. Conclusions

Indonesia has implemented most of the WHO recommendations for improved medical workforce recruitment and retention in RR areas. However, there is no documentation of educational recommendations at national or government s applied to medical schools nationwide. Regional medical schools have shown their commitment to social accountability in fulfilling the country's needs of the medical workforce yet nationwide government intervention in educational aspects is imperative to magnify the impact of medical school initiatives throughout the nation. Relevant programs have been implemented nationally, regionally and locally at the district level. However, it is necessary to re-evaluate and re-enforce the programs regarding significance, comprehensiveness, integration, and effectiveness in creating a sustainable RR medical workforce. Although place-based contexts are required to implement recommended interventions, best-evidence comprehensive interventions should inform all efforts.

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Institutional Review Board Statement: This case study was conducted according to the guidelines of the Declaration of Helsinki and approved by The University of Western Australia Ethics Committee No. RA/4/20/5065 and by Pattimura University, Indonesia, with reference number 008/FK-KOM. ETIK/VIII/2019, in accordance with its ethics review and approval procedures.

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Appendix A

Table A1. Framework for analysis

WHO Recommended Intervention and the explanation of the intervention as directly quoted from the WHO Recommendation[1]	Compliance with the WHO recommendation at various level			
	Medical School/University level	Government/non-government level		
		National level	Provincial level	District level
A. Education				
1. Get the "right" student. "Use targeted admission policies to enrol students with a rural background in education programmes for various health disciplines in order to increase the likelihood of graduates choosing to practise in rural areas."	Documents			
	KIIs			
2. Train students closer to rural communities. "Locate health professional schools, campuses, and family medicine residency programmes outside of capitals and other major cities as graduates of these schools and programmes are more likely to work in rural areas."	Documents			
	KIIs			
3. Bring students to rural communities. "Expose undergraduate students of various health disciplines to rural community experiences and clinical rotations as these can have a positive influence on attracting and recruiting health workers to rural areas."	Documents			
	KIIs			
4. Match curricula with rural health needs. "Revise undergraduate and postgraduate curricula to include rural health topics so as to enhance the competencies of health professionals working in rural areas, and thereby increase their job satisfaction and retention."	Documents			
	KIIs			
5. Facilitate professional development. "Design continuing education and professional development programmes that meet the needs of rural health workers and that are accessible from where they live and work, so as to support their retention."	Documents			
	KIIs			
B. Regulatory interventions				

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1. Create the conditions for rural health workers to do more. "Introduce and regulate enhanced scopes of practice in rural and remote areas to increase the potential for job satisfaction, thereby assisting recruitment and retention."	Documents
	KIIs
2. Train more health workers faster to meet rural health needs. "Introduce different types of health workers with appropriate training and regulation for rural practice in order to increase the number of health workers practising in rural and remote areas."	Documents
	KIIs
3. Make the most of compulsory service. "Ensure compulsory service requirements in rural and remote areas are accompanied with appropriate support and incentives so as to increase recruitment and subsequent retention of health professionals in these areas."	Documents
	KIIs
4. Tie education subsidies to mandatory placements. "Provide scholarships, bursaries or other education subsidies with enforceable agreements of return of service in rural or remote areas to increase recruitment of health workers in these areas."	Documents
	KIIs
C. Financial Incentives	
Make it worthwhile to move to a remote or rural area. "Use a combination of fiscally sustainable financial incentives, such as hardship allowances, grants for housing, free transportation, paid vacations, etc., sufficient enough to outweigh the opportunity costs associated with working in rural areas, as perceived by health workers, to improve rural retention."	Documents
	KIIs
D. Personal and professional support	
1. Pay attention to living conditions. "Improve living conditions for health workers and their families and invest in infrastructure and services (sanitation, electricity, telecommunications, schools, etc.), as these factors have a significant influence on a health worker's decision to locate to and remain in rural areas."	Documents
	KIIs
2. Ensure the workplace is up to an acceptable standard. "Provide a good and safe working environment, including appropriate equipment and supplies, supportive supervision and mentoring, in order to make these posts professionally attractive and thereby increase the recruitment and retention of health workers in remote and rural areas."	Documents
	KIIs

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3. Foster interaction between urban and rural health workers. "Identify and implement appropriate outreach activities to facilitate cooperation between health workers from better served areas and those in underserved areas, and, where feasible, use telehealth to provide additional support to health workers in remote and rural areas."	Documents
	KIIs
4. Design career ladders for rural health workers. "Develop and support career development programmes and provide senior posts in rural areas so that health workers can move up the career path as a result of experience, education and training, without necessarily leaving rural areas."	Documents
	KIIs
5. Facilitate knowledge exchange. "Support the development of professional networks, rural health professional associations, rural health journals, etc., in order to improve the morale and status of rural providers and reduce feelings of professional isolation."	Documents
	KIIs
6. Raise the profile of rural health workers. "Adopt public recognition measures such as rural health days, awards and titles at local, national and international levels to lift the profile of working in rural areas as these create the conditions to improve intrinsic motivation and thereby contribute to the retention of rural health workers."	Documents
	KIIs

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