Original Research

Indonesian Journal of Health Administration
(Jurnal Administrasi Kesehatan Indonesia)
p-ISSN 2303-3592, e-ISSN 2540-9301
10.20473/jaki.v10i2.2022.206-218

EXPLORATION OF DISTRICT-LEVEL INNOVATIONS TO ADDRESS MATERNAL AND NEONATAL MORTALITY IN INDONESIA

Eksplorasi Inovasi Tingkat Kabupaten untuk Mengatasi Kematian Ibu dan Neonatus di Indonesia

***Halimah[1], Edward Sutanto[1], Suparmi[2], Ario Baskoro[3], Nirwan Maulana[1], Nadhila Adani[1], Wahyu Puji Nugraheni[2], Djunaedi[4], Farida Aryani[5], Melyana Lumbantoruan[4], Trihono[1]**
[1]ThinkWell Institute, Indonesia
[2]National Research and Innovation Agency, Indonesia
[3]Directorate of Family Health, Ministry of Health Republic of Indonesia, Indonesia
[4]Health Policy and Development Agency, Ministry of Health Republic of Indonesia, Indonesia
[5]Directorate of Healthcare Facilities, Ministry of Health Republic of Indonesia, Indonesia
Correspondence*:
Address: Plaza Bank Index Level 11, Jl. M.H. Thamrin No. 57, Jakarta, Indonesia | e-mail: hmardani@thinkwell.global

Abstract

Background: The Indonesian maternal and neonatal mortality rates remain some of the highest in Southeast Asia.
Aims: This study aims to assess and compare district-level innovations that address maternal and neonatal mortality.
Methods: This was a qualitative study conducted via FGDs in eight selected districts in November 2021. Data obtained were analyzed using the WHO health system building blocks framework.
Results: The study found high variation in districts' innovations ranging from expansion of service for maternity waiting homes to periodical obstetrician visits at Puskesmas. A majority of districts use a local approach as the basis for innovation. Some innovations are modifications of the national program or initiated purely by District Health Offices, Puskesmas, and the community. Many interventions are based on multisectoral commitment, community participation, and targeting to strengthen health service delivery. Leadership and health financing also have an influence on the implementation of these innovations.
Conclusion: The multitude of innovations reflects a high variation in barriers to reducing maternal and neonatal mortality that need to be addressed at the district level. A routine forum to share districts' best practices is warranted. Additionally, family-based surveillance for neonatal danger signs, monitoring for pregnant women and neonates via WhatsApp, and zoning systems for referrals to healthcare facilities in larger districts are innovations identified in this study that have potential to be replicated in other districts or expanded nationally.

Keywords: district-level innovation, maternal and neonatal health, maternal mortality, neonatal mortality

Abstrak

Latar Belakang: *Angka kematian ibu dan neonatus di Indonesia masih menjadi salah satu yang tertinggi di kawasan Asia Tenggara.*
Tujuan: *Studi ini bertujuan untuk mengkaji dan membandingkan inovasi tingkat kabupaten yang menangani kematian ibu dan neonatus.*
Metode: *Studi kualitatif ini dilaksanakan melalui FGD di 8 kabupaten terpilih pada November 2021. Data yang didapatkan dianalisa sesuai dengan kerangka kerja* Health System Building Blocks *WHO.*
Hasil: *Penelitian ini menemukan variasi yang tinggi dalam inovasi masing-masing kabupaten/kota, mulai dari perluasan layanan di rumah tunggu bersalin hingga kunjungan dokter kandungan berkala di Puskesmas. Mayoritas kabupaten/kota menggunakan pendekatan spesifik lokal sebagai dasar inovasi. Beberapa inovasi murni diprakarsai oleh Dinas Kesehatan, Puskesmas, dan masyarakat, serta modifikasi program nasional. Banyak intervensi yang didasarkan pada komitmen multisektoral, partisipasi masyarakat, juga bertujuan untuk memperkuat pemberian layanan kesehatan. Kepemimpinan dan pembiayaan kesehatan juga berpengaruh dalam implementasi inovasi tersebut.*
Kesimpulan: *Banyaknya inovasi mencerminkan tingginya variasi dari hambatan dalam menurunkan angka kematian ibu dan bayi baru lahir yang perlu ditangani di tingkat kabupaten/kota. Forum rutin di mana kabupaten dapat berbagi praktik terbaik sangat diperlukan. Selain itu, surveilans tanda bahaya neonatal berbasis keluarga, pemantauan ibu hamil dan neonatus melalui WhatsApp, dan sistem zonasi rujukan ke fasilitas kesehatan di wilayah kabupaten yang besar merupakan inovasi yang diidentifikasi dalam studi ini yang memiliki berpotensi untuk direplikasi di kabupaten lain atau diperluas secara nasional.*

Kata kunci*: inovasi kabupaten, kematian ibu, kesehatan ibu dan bayi baru lahir, kematian bayi baru lahir*

Indonesian Journal of Health Administration (*Jurnal Administrasi Kesehatan Indonesia*)
p-ISSN 2303-3592, e-ISSN 2540-9301, Volume 10 No.2 2022, DOI: 10.20473/jaki.v10i2.2022.206-218
Received: 2022-05-30, Revised: 2022-09-02, Accepted: 2022-09-27, Published: 2022-12-05.
Published by Universitas Airlangga in collaboration with *Perhimpunan Sarjana dan Profesional Kesehatan Masyarakat Indonesia (Persakmi)*.

How to cite :
Halimah, H., Sutanto, E., Suparmi, S., Baskoro, A., Maulana, N., Adani, N., Nugraheni, W. P., Djunaedi, D., Aryani, F., Lumbantoruan, M. and Trihono, T. (2022) "Exploration of District-Level Innovations to Address Maternal and Neonatal Mortality in Indonesia", *Indonesian Journal of Health Administration*, 10(2). pp. 206–218. doi: 10.20473/jaki.v10i2.2022.206-218.

Indonesian Journal of Health Administration
(Jurnal Administrasi Kesehatan Indonesia)
p-ISSN 2303-3592, e-ISSN 2540-9301
10.20473/jaki.v10i2.2022.206-218

Introduction

Maternal and neonatal death remain a large issue in Indonesia. Indonesia has one of the highest maternal mortality ratios (MMR; 177 deaths per 100,000 live births) and neonatal mortality rates (NMR; 12.4 deaths per 1,000 live births) in the Southeast Asia region (World Health Organization, 2019, 2020, 2022). As there is less than a decade to achieve the target MMR (70 per 100,000 live births) and NMR (12 deaths per 1,000 live births) set in the Sustainable Development Goals (SDGs) (McArthur, Rasmussen and Yamey, 2018), it is important to accelerate the reduction of neonatal and, especially, maternal deaths in Indonesia to meet SDG targets.

The progress in the reduction of MMR has not been proportional when compared to the steady growth in the coverage of maternal services. The annual Indonesia health profile report documented increased maternal service performance from 2016 to 2019, including more antenatal care (ANC) visits, delivery in health care facilities, and delivery assisted by skilled birth attendants. (Kementerian Kesehatan RI, 2017, 2018, 2019, 2020, 2021). Several studies (CFW FPH UI and MCSP, 2018; USAID Jalin Project, 2019) found that the majority of maternal deaths occurred in health facilities, and the most common causes were obstetric hemorrhage and hypertension in pregnancy. This may indicate a low level of early detection during pregnancy and delays in hospital referrals. Similarly, although there has been a steady downward trend in the neonatal mortality rate (NMR), further reduction in NMR is needed so Indonesia can achieve its NMR SDG target. Prematurity and asphyxia are the most common causes of death, and about 70% of deaths happen in hospitals (USAID Jalin Project, 2019).

Most maternal deaths are concentrated in districts on Java and several districts on Kalimantan and Sumatra, while neonatal mortality is more dominant in districts on Java (ThinkWell Institute, 2022), which is in line with the number of people within a region as Java has the highest population. Thus, districts in Indonesia have different burdens when reducing maternal and neonatal mortality. For this reason, each district has its own health innovations tailored to local issues and needs. This is essential because, even if the central government has provided both regulatory and financing support, obstacles are still found in implementation at the subnational level, especially in the era of decentralization. In terms of the health sector, local governments are responsible for the provision of both physical and social health services for the community and the availability of health resources (Articles 15 and 16 of Law No. 36 on Health) (Harimurti, Prawira and Hort, 2017).

Districts are responsible for the Minimum Service Standards (MSS), which is one of the instruments in the implementation of performance-based budgeting which is monitored by the Ministry of Home Affairs (Kementerian Kesehatan RI, 2017). MSS in the health sector contains 12 indicators, including communicable disease-related indicators, non-communicable disease-related indicators, and maternal and neonatal health (MNH)-related indicators. Three MNH-related indicators in MSS are the provision of health services for pregnant women, mothers in labor, and newborns. All MSS indicators target 100% per year and districts must achieve this target. In other words, the central government evaluates each district based on the MSS indicators and considers allowing the transfer of funds to local governments in the following year, as well as providing regional incentive funds. Thus, the achievement of MSS is highly important for districts, and

Indonesian Journal of Health Administration
(Jurnal Administrasi Kesehatan Indonesia)
p-ISSN 2303-3592, e-ISSN 2540-9301
10.20473/jaki.v10i2.2022.206-218

districts should coordinate across sectors to achieve the MSS targets.

In order to achieve the MSS targets, district-level innovation is important. Innovative MNH interventions will need thorough implementation, evaluation, and scale-up strategies for their sustainable integration into health systems (Lunze *et al.*, 2015). Thus, districts need a study related to these innovations so that they can learn and replicate them. Yet, no studies have described and evaluated various district-level innovations that are currently being implemented to reduce maternal and neonatal mortality in Indonesia. This study aims to assess and compare district-level innovations that address maternal and neonatal mortality, identify potential barriers to the implementation of these innovations, and highlight innovations that can potentially be expanded nationally and replicated by other districts.

Method

This study used a qualitative approach for primary data collection through focus group discussions (FGDs). On October 14, 2021, in collaboration with the Directorate of Family Health and other units in the Ministry of Health (MOH), the ThinkWell Institute held a discussion forum as a pilot to assess MNH service program best practices in 14 districts. Afterwards, we carried out an in-depth qualitative study in eight selected districts (Bandar Lampung City, Grobogan Regency, Jayapura City, Jember Regency, Lombok Timur Regency, Manggarai Barat Regency, Palu City, and Sukabumi Regency). Seven out of eight districts were selected based on several criteria including the trend of maternal and/or neonatal death, coverage of MNH services, whether it is an MNH-locus district assigned by MOH, and geographic representativeness. We chose one of eight districts (Jember Regency) because its supply-side readiness was the most ideal based on the availability of four basic emergency obstetric and neonatal care (EmONC) Puskesmas and one comprehensive EmONC hospital (ThinkWell Institute, 2022), but its MMR and NMR remained high.

Four FGDs were conducted in each district in November 2021 for a total of 32. They included four groups of stakeholders: District Health Offices (DHO) and Social Security Management Body for Health, *Badan Penyelenggara Jaminan Sosial Kesehatan* (BPJSK) district offices; local agencies for development planning, district social affairs organizations, and local offices for population and civil registration; health care facilities including public primary health care (PHC), private PHC, midwife practices, and hospitals; and professional organizations including the local midwife association, *Ikatan Bidan Indonesia* (IBI), and local obstetrics and gynecology specialist association, *Perkumpulan Obstetri dan Ginekologi Indonesia* (POGI). For each stakeholder, we invited two individuals to attend the FGDs. Thus, 4 to 12 individuals participated in each FGD session depending on the group of stakeholders interviewed. All FGDs were recorded, and the results are summarized in a matrix containing several topics and their explanations from each district. We completed a cross-district analysis to cover the study objectives based on the following framework for analysis.

Framework for analysis

This study adapted a framework based on the MNH continuum of care framework and the World Health Organization (WHO) health system building blocks (McArthur *et al.*, 2018). District MNH innovations were analyzed by health services used in the program, health

Indonesian Journal of Health Administration
(Jurnal Administrasi Kesehatan Indonesia)
p-ISSN 2303-3592, e-ISSN 2540-9301
10.20473/jaki.v10i2.2022.206-218

workforce, health financing allocation for the program, leadership, government commitment to the program, and role and participation of community (Figure 1). The "medical products and technologies" building block is excluded as it is more appropriate for clinical intervention than programmatic intervention.

Results and discussion

In the eight districts sampled for this study, we found more than 20 innovations, both at the district level and subdistrict level. Based on their significance in the FGDs and discussions with MOH, we highlighted 11 major district-level innovations; a detailed explanation of each innovation can be seen in Table 1. We explored the innovations based on the WHO health system building blocks as explained below.

Health service delivery

We mapped the approach of each district by looking at the levels of health service (hospital, PHC, and community), the continuum of care across the maternity period (pre-pregnancy, pregnancy, delivery, and post-delivery), and the targets of the innovations carried out (pre-pregnancy women, pregnant and delivering women, women after delivery, and neonates). Table 1 identifies whether the innovations are comprehensive and meet the continuum of care.

Seven of the eight districts innovate at the PHC level, five districts at the community level, and four districts at the hospital level. Lombok Timur has innovation across all levels of health service. In terms of maternity stages, seven of the eight districts innovate at the pregnancy stage, four districts at the delivery stage, and five districts at the post-delivery stage. Lombok Timur, Manggarai Barat, and Sukabumi have innovations in all maternity stages. In terms of targets for innovations, all districts target pregnant women and women giving birth. Five districts target pregnant women, women who are giving birth, post-delivery women, and neonates, but none of the eight districts target pre-pregnancy women with their innovations.

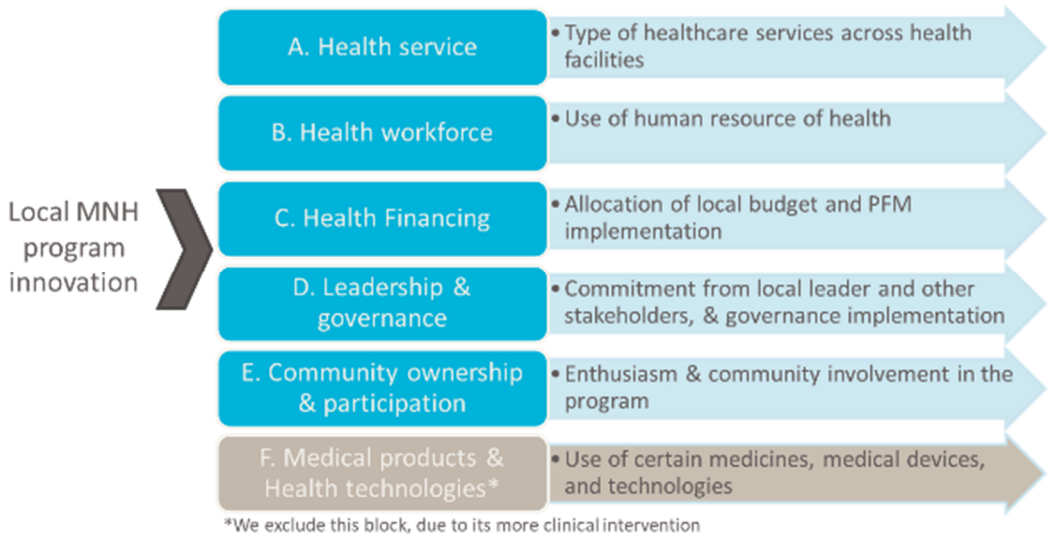

Figure 1. Framework for analysis

Indonesian Journal of Health Administration
(Jurnal Administrasi Kesehatan Indonesia)
p-ISSN 2303-3592, e-ISSN 2540-9301
10.20473/jaki.v10i2.2022.206-218

Table 1. District-level innovation and its mapping in health service delivery approaches

District	Innovation	Level of Health Services			Process stages				Target			
		Hospital	Primary Health Care	Community	Pre-pregnancy	During pregnancy	Delivery	Post-delivery	Pre-pregnancy women	Pregnant/ delivering women	Women after delivery	Neonatal
Bandar Lampung	Pregnant mother mentoring through WhatsApp (WA)		V	V		V				V		
Grobogan	District regulation forbidding delivery in private midwife practice		V				V			V		
Jember	a. Extending specialized access to Puskesmas (Gemar Jelita)	V	V			V		V		V	V	V
	b. Pregnant mother mentoring through WA	V	V			V		V		V	V	V
Sukabumi	Referral via WhatsApp using zoning system (SEJIWA)		V	V		V				V		
Lombok Timur	a. Improving referral process with multisectoral approach, (ACSIA)	V	V	V		V	V	V		V	V	V
	b. Family-based surveillance for neonatal danger sign		V	V				V				V
Palu City	Creation of multisectoral taskforce (Satgas K5)		V			V		V		V	V	
Manggarai Barat	a. Improved usage of maternity waiting homes, seven days antepartum and two days post-partum (7H2)			V		V	V	V		V	V	V
	b. Cultural community engagement to accelerate MNH decision-making process in the family (Lonto Leok)			V		V	V			V		
Jayapura City	Extending specialized access to primary health care	V	V			V	V	V		V	V	V

Several reviews have shown that integrating care throughout the lifecycle and building a comprehensive and responsive health system are urgently needed for effective MNH interventions (Kerber *et al.*, 2007; Hardee, Gay and Blanc, 2011). Yet, no district has innovations for the pre-pregnancy stage or targets pre-pregnancy women. This gap represents a loss of opportunity for comprehensive MNH programmatic intervention. The MNH continuum of care can be improved through a combination of well-defined polices and strategies to improve home care practices and health care services throughout the lifecycle, building on existing programs and packages (de Graft-Johnson *et al.*, 2006).

Indonesian Journal of Health Administration
(Jurnal Administrasi Kesehatan Indonesia)
p-ISSN 2303-3592, e-ISSN 2540-9301
10.20473/jaki.v10i2.2022.206-218

Lombok Timur has the most comprehensive innovation at all levels of service throughout the maternal period and targets pregnant women, delivering women, post-delivery women, and neonates, namely by improving the referral process with a multisectoral approach, *Aksi Cepat tanggap Sayang Ibu dan Anak* (ACSIA). In addition to DHOs, other government actors (such as police and military) are actively involved in this innovation which aims to encourage pregnant mothers with high-risk pregnancies to give birth in a health care facility. DHOs determine the targets of innovation by providing a list of all pregnant mothers within a village and providing a notice to high-risk pregnant mothers. In this case, the commitment of local leadership greatly affects the success of this innovation.

District innovations related to health service delivery are associated with improving access and service quality. Sukabumi District's innovation is to create a referral system through zoning which is Puskesmas in a certain catchment area would refer their patients to the hospital within their zone, and WhatsApp groups (called SEJIWA), due to its large geographic area and limited access to refer patient to hospitals. According to Sukabumi District's DHO, this innovation is considered successful because it reduces the waiting time for referrals within a zone from five to six hours to 30 minutes to one hour. In addition to increasing access to referral services, patients receive effective services that are suitable for their needs during the referral process. Studies from other developing countries, such as Nigeria, Malawi, and Tanzania, have consistently shown that referral delay is a main cause of service delay, which majorly contributes to maternal death (Mgawadere *et al.*, 2017; Nassoro *et al.*, 2020; Onah *et al.*, 2009). Distance to health care facilities is also recognized as a significant issue contributing to delay (Mgawadere *et al.*, 2017). Thus, innovations that improve access and reduce waiting times to referral services reduce maternal and neonatal mortality.

Several districts increased the quality of health services through strengthening MNH services with additional services from specialists. Jember District and Jayapura City developed a mentoring and consultation program for obstetric and gynecologic specialists in their respective Puskesmas. The rationale for implementing this innovation is the high MMR in Jember (second highest in East Java), while in Jayapura City the rationale is that there are many mothers who give birth via Cesarean section. In addition to increasing the capacity of doctors at Puskesmas, this program is useful for early detection of high-risk pregnancy so women can get timely and effective referral services. While each district is expected to have at least four EmONC Puskesmas, several studies have reported that Puskesmas' readiness to provide EmONC is still suboptimal with wide variety between regions (Handayani and Achadi, 2018; Mujiati, Lestary, and Laelasari, 2014). Yet, EmONC has been deemed essential in countries with high maternal and neonatal mortality (Otolorin *et al.*, 2015). Thus, there is a need for an innovation to address this issue, which may include extending specialized access to Puskesmas or introducing a scenario modelling tool as planning evidence in eastern Indonesia (Ngana and Karyawati, 2021).

Grobogan District limits the delivery services performed by private midwife practices for quality reasons. This policy was adopted by the DHO, since there is a national midwifery regulation (Law No. 4 of 2019) which contains the requirement for independent midwife practices to have qualified practice facilities and work in

Indonesian Journal of Health Administration
(Jurnal Administrasi Kesehatan Indonesia)
p-ISSN 2303-3592, e-ISSN 2540-9301
10.20473/jaki.v10i2.2022.206-218

groups (Undang-Undang Nomor 4 Tahun 2019 Tentang Kebidanan, 2019); however, this local policy reduces access to health services for those in remote areas who cannot access Puskesmas or hospitals and leads to resistance from independent midwife practices because they cannot provide delivery services. Currently this policy is being reviewed by related stakeholders including the local IBI.

Service delivery innovations are usually combined with elements from other building blocks such as innovative financing models, training of providers, and new technologies (Lunze *et al.*, 2015). The innovations carried out by districts must be supported by local government commitment, adequate health financing, and support from health workers and the community.

Health workforce

The districts we studied optimized their human resources for health (HRH) to run their innovative programs. Bandar Lampung assigns the HRH of the Puskesmas to assist young pregnant and lactating mothers through a WhatsApp group, as well as to monitor high-risk pregnant mothers. This is due to the large number of early marriages that occur in this area, so there are many young mothers who have low levels of maternal knowledge. Manggarai Barat also requires village midwives from Puskesmas to actively conduct home visits to pregnant mothers who are about to give birth (one week before the estimated delivery date) and accommodate their transportation to maternity waiting homes. To support their innovation in community-based MNH interventions, Manggarai Barat and Palu City also optimized Puskesmas personnel through continued engagement with respected local figures there. These innovations are examples of optimizing existing HRH capacity at Puskesmas.

In Jember and Jayapura City, extending specialized access to PHC allows Puskesmas HRH to learn from specialists as Puskesmas may consult specialists for mentorship in difficult cases. Specialists periodically visit Puskesmas outpatient clinics, where midwives, nurses, and general physicians (GPs) directly observe and assist clinical services provided by specialists; this is similar to on-the-job training.

Innovative health workforce approaches address the shortage in human resources by enhancing the knowledge, skills, and competencies of health personnel. In developing countries, many innovative workforce approaches involve novel training programs or approaches to improve the supply side of MNH and expand the scope of existing health worker cadres (Lunze *et al.*, 2015); however, respondents in FGDs conveyed that the current training programs for HRH are not optimal because of high costs, mis-targeting of participants selected to attend, and higher priority given to civil servants (at the cost of excluding private HRH).

Health financing

Various innovative financial programs aim to reduce financial barriers to care and improve coverage and usage of MNH services from either or both the supply side or demand side (Lunze *et al.*, 2015). In Indonesia, there are multiple funding sources for health, including central and local governments, in different types of funding systems and programs. Examples of funding sources are the national health insurance program, *Jaminan Kesehatan Nasional* (JKN); the physical and non-physical Special Allocation Fund, *Dana Alokasi Khusus* (DAK); block grants, *Dana Alokasi Umum* (DAU); and the deconcentration fund, *Dana Dekonsentrasi* (Stein and Dewi, 2020). Stein and Dewi (2020) found that the regulation of these

Indonesian Journal of Health Administration
(Jurnal Administrasi Kesehatan Indonesia)
p-ISSN 2303-3592, e-ISSN 2540-9301
10.20473/jaki.v10i2.2022.206-218

MNH funding flows presents various restrictions or earmarks on the use of funds. In other words, district governments must manage funding optimally by referring to funding guidelines.

On the demand side, even though utilization still needs to be optimized, all districts feel the benefits of JKN which covers the MNH package. Conditional Cash Transfer (CCT) in the Family Hope Program, *Program Keluarga Harapan* (PKH), in which one of the indicators is that pregnant women must use health services, also encourage community access to MNH services.

At the district level, innovations are closely related to the allocated budget. Bandar Lampung and Jayapura City provide special allocations from their local budgets for delivery services for people who do not have insurance. This means *Jaminan Persalinan* (Jampersal) is not used in these areas, neither for maternal services nor for waiting homes and transportation; however, Jampersal funds are important and useful for districts with low budget capacity or with many remote areas. Palu City maximizes all available funding sources, such as DAK for the MNH forum and Jampersal for waiting homes.

Local budget allocation for MNH programs tends to vary according to the needs of each district. For example, Jember uses the local funding to reimburse transportation costs for specialists; Manggarai Barat uses local funding for communication costs in the 7H2 program; and Palu City built incentives for Satgas K5 (a multisectoral taskforce) using provincial budget allocation to increase hospital HRH.

Several districts have policies for allocating village funds to MNH innovation. Grobogan and Jayapura City allocate village funds to mentoring activities and socialization of MNH in the community, while Lombok Timur allocates village funds for a family-based surveillance program, explained in the "Community ownership and participation" section. Village funds are a relatively new funding scheme implemented in 2015; their substantial amounts and relatively flexible mechanisms mean that they can be used according to local needs. District-level policies and monitoring at the Puskesmas or subdistrict levels are needed so that village officials actually allocate village funds to MNH programs.

Other specific funds are obtained by districts and allocated to MNH programs; for example, Jayapura City uses special autonomy funds (*Dana Otonomi Khusus*), and Manggarai Barat receives philanthropic or corporate social responsibility funds to contribute to maternity waiting homes.

Leadership and governance

Innovative leadership and governance initiatives related to the formation of partnerships and the formulation and implementation of national MNH policies are considered part of an enabling environment for MNH and address supply, demand, and quality issues (Lunze *et al.*, 2015).

Local regulation

At the district level, innovations are made and decided by DHOs in seven of the eight districts studied except Bandar Lampung. The Bandar Lampung DHO identified various obstacles at the Puskesmas level, so MNH programs are decided by each Puskesmas who create their own initiatives to address maternal and neonatal mortality. Most Puskesmas conduct pregnant mother mentoring through WhatsApp.

Each district-level innovation is regulated by the district government. This is not only essential as a legal framework in the program being implemented, but also

Indonesian Journal of Health Administration
(Jurnal Administrasi Kesehatan Indonesia)
p-ISSN 2303-3592, e-ISSN 2540-9301
10.20473/jaki.v10i2.2022.206-218

as the basis for funding allocation according to each program.

Partnership formation

Most innovations made by DHOs are cross-sectoral activities that involve other local offices (district social affairs organizations, local planning agencies, etc.), subdistrict offices, village administrators, police forces, military forces, religious figures, traditional figures, and elders to improve MNH conditions. DHOs believe that involving many stakeholders, especially those in the community, will increase the awareness of the importance of maternal and child health.

Several districts also engage with IBIs and POGIs when conducting their innovations. In Lombok Timur, the role of the IBI is to guide, supervise, and train private midwife practices, while in Grobogan there is a memorandum of understanding between DHOs and the IBI to maintain the quality of MNH services. Manggarai Barat and Jember collaborate with their POGIs to provide guidance and consultation in special emergency health centers. In Lombok Timur, there is also POGI emergency training for health workers in hospitals.

Community ownership and participation

Innovative approaches increasingly aim to strengthen community-based health mechanisms that improve links to and structures associated with primary health care. Innovative community ownership and participation approaches are complex, multifactorial interventions which often simultaneously address supply, demand, and quality issues (Lunze *et al.*, 2015).

Lombok Timur conducts family-based surveillance for neonatal danger signs in which the family monitors its newborn for 30 days and fills out a danger sign checklist. If there is a danger sign, the family is asked to immediately contact PHC personnel to seek further care. This innovation empowers families to take responsibility for their children's wellbeing and participate in active surveillance.

In Grobogan, the DHO empowers neighborhoods through the Village Alert program which reports pregnant women to PHCs, as well as helps contact health facilities when women are giving birth. Through this program, the village community is encouraged to look after other individuals, specifically pregnant women, and prepare a mode of transportation for pregnant women's referrals.

Scaling up district-level innovations

Table 2 provides the expansion potential for district-level innovations. Innovations can be replicated by other districts (marked +) or adopted into the national program (marked ++). Districts that have certain characteristics like large coverage areas, remote areas, or limited HRH personnel like specialists can replicate innovations from Sukabumi, Palu City, Jayapura City, Lombok Timur, and Manggarai Barat.

The programs for pregnant mother mentoring carried out in Bandar Lampung and Jember have the potential to be adopted at the national level because they are in line with the current national program (Pregnant Mother Class). Also, family-based surveillance for neonatal danger signs has been adopted by MOH.

Study limitations

There are several limitations in this study. Our study did not independently assess whether there was a reduction of maternal and neonatal mortality caused by district-level innovations. Instead, we relied on information provided by stakeholders at the district level. Moreover, innovation identified in this study is limited to districts that were selected as samples, hence there may be successful innovations in other Indonesian districts that we did not identify.

Indonesian Journal of Health Administration
(Jurnal Administrasi Kesehatan Indonesia)
p-ISSN 2303-3592, e-ISSN 2540-9301
10.20473/jaki.v10i2.2022.206-218

Table 2. Expansion potential for district-level innovations

	Name of Innovation	Expansion potential
Bandar Lampung City	Pregnant mother mentoring through WhatsApp	++ (Offline pregnant mother mentoring already exists in the form of the Pregnant Mother Class)
Grobogan District	District regulation forbidding delivery in private midwife practices	- (Pushback from IBI)
Jayapura City	Extending special access to Puskesmas	+ (Highly beneficial to districts with little specialized care)
Jember District	Extending specialized access to Puskesmas (*Gerakan Masyarakat Jember Peduli Ibu Hamil dan Balita: Gemar Jelita)*	+ (Highly beneficial to districts with little specialized care)
	Pregnant mother mentoring through WhatsApp	++ (Offline pregnant mother mentoring already exists in the form of the Pregnant Mother Class)
Lombok Timur District	Improving the referral process with a multisectoral approach, *Aksi Cepat tanggap Sayang Ibu dan Anak* (ACSIA)	+ (Highly beneficial in districts with commitments from multisectoral actors)
	Family-based surveillance for neonatal danger signs	++ (Has been replicated nationally)
Manggarai Barat District	Improved usage of maternity waiting homes seven days antepartum and two days post-partum (7H2)	+ (Highly beneficial in districts with remote access to health care facilities; these are a replication from similar innovations in Flores)
	Cultural community engagement to accelerate MNH decision-making process to the family (Lonto Leok)	- (Specific to local culture in Manggarai Barat)
Palu City	Creation of multisectoral taskforce (*Satgas* K5)	+ (Highly beneficial in districts with commitments from multisectoral actors)
Sukabumi District	Referral via WhatsApp using zoning system, *Sistem Jejaring Inovasi WA Grup Zonasi* (SEJIWA)	+ (Highly beneficial in districts with wide areas)

Conclusion

It is urgent that national and local governments make a concerted effort to reduce MMR and NMR. During our study, we observed high variation in district innovation which may reflect heterogeneity in district capacities and local barriers to reducing maternal and neonatal death. Several recommendations can potentially accelerate the reduction of maternal and neonatal mortality:

Health service (Comprehensive, continuum-of-care interventions in all parts of health services, processes, and targets).

Health workforce (A national HRH policy that allows civil servants to take part in competency improvement training, compulsory, and affordable midwifery trainings organized by IBI to ensure that all private midwives can attend training and improve service quality).

Indonesian Journal of Health Administration
(Jurnal Administrasi Kesehatan Indonesia)
p-ISSN 2303-3592, e-ISSN 2540-9301
10.20473/jaki.v10i2.2022.206-218

Health financing (Greater regulatory clarity and socialization of JKN benefits to those patients that it does and does not cover to contribute to regulatory conformity between local and central government).

Leadership and governance (A routine national forum for all districts and cities to share successful innovations in reducing MMR and NMR (benchmarking) as well as an adjustment of policy and goal setting at the district level during Covid-19).

Community ownership and participation (Involving village stakeholders, religious leaders, and community leaders in MNH program innovation to strengthen community participation).

This study also recommends several district-level innovations to be scaled up or replicated by other districts or the national government including family-based surveillance for neonatal danger signs (Lombok Timur), monitoring for pregnant women and neonates via WhatsApp (Jember, Bandar Lampung), and zoning systems for referrals to health care facilities in larger districts (Sukabumi).

Abbreviations

ACSIA: *Aksi Cepat tanggap Sayang Ibu dan Anak*; ANC: Antenatal Care; BPJSK: *Badan Penyelenggara Jaminan Sosial Kesehatan*; CCT: Conditional Cash Transfer; DAU: *Dana Alokasi Umum*; DHO: District Health Office; EmONC: Emergency Obstetric and Neonatal Care; FGD: Focus Group Discussion; GP: General Physician; HRH: Human Resources for Health; IBI: *Ikatan Bidan Indonesia*; Jampersal: *Jaminan Persalinan*; JKN: *Jaminan Kesehatan Nasional*; MMR: Maternal Mortality Rate; MNH: Maternal Neonatal Health; MOH: Ministry of Health; MSS: Minimum Service Standards; NMR: Neonatal Mortality Rate; PHC: Primary Health Care; PNC: Postnatal Care; POGI: *Perkumpulan Obstetri dan Ginekologi Indonesia*; SDG: Sustainable Development Goal; SEJIWA: *Sistem Jejaring Inovasi WA Grup Zonasi*; WA: WhatsApp; WHO: World Health Organization.

Declarations

Ethics Approval and Consent Participant

Respondents were addressed before the survey about the survey's objectives and purposes and gave verbal consent to participate in the study.

Conflict of Interest

The authors have no conflicts of interest to declare that are relevant to the content of this article.

Availability of Data and Materials

The data used for this study is available from the corresponding author upon reasonable request.

Funding Source

This work is funded by the Bill & Melinda Gates Foundation (Grant Number INV-007094) and implemented by ThinkWell Institute.

Authors' Contributions

HM and T conceptualized the study; T, S, and AB created the methodology; NM, NA, WN, D, F, MN, NKP, and T wrote, reviewed, and edited the manuscript; HM and ES wrote the original draft.

Acknowledgments

We would like to acknowledge the support of Harimat Hendrawan, Teti Tejayanti, Elfys Ferdynan, Muhammad Yusuf, Ackhmad Afflazir, Amalia Zulfah DHW, Khiswanda Ameliani, Wulan Sri Damayanti, Nurul Puspasari, Rahmi Purwakaningsih, and Aditya Bayu Sasmita from the Indonesian Ministry of Health during data collection. We thank Caroline Mohan for English language editing.

Indonesian Journal of Health Administration
(Jurnal Administrasi Kesehatan Indonesia)
p-ISSN 2303-3592, e-ISSN 2540-9301
10.20473/jaki.v10i2.2022.206-218

References

CFW FPH UI and MCSP (2018) *Summary Tables Banten II Study Result*. Available at: https://pdf.usaid.gov/pdf_docs/PA00TQB9.pdf (Accessed: May 10, 2022).

de Graft-Johnson, J. *et al.* (2006) *Opportunities for Africa's Newborns 23 The maternal, newborn, and child health continuum of care*. Available at: https://www.who.int/pmnch/media/publications/aonsectionII.pdf. (Accessed: March 13, 2022).

Handayani, D. and Achadi, A. (2018) "Analisis Implementasi Program Pelayanan Obstetri Neonatal Emergensi Dasar (PONED) di PUSKESMAS Mampu PONED Kota Depok Tahun 2017" *Jurnal Kebijakan Kesehatan Indonesia*, 7(2), p.57-63. doi: 10.22146/jkki.36405

Hardee, K., Gay, J. and Blanc, A.K. (2011) "Maternal morbidity: Neglected dimension of safe motherhood in the developing world" *Global Public Health*, 7(6), p.603-617. doi: 10.1080/17441692.2012.668919

Harimurti, P., Prawira, J. and Hort, K. (2017) *The Republic of Indonesia Health System Review Asia Pacific Observatory on Health Systems and Policies*, *Health Systems in Transition*.

Kementerian Kesehatan RI (2017) *Data dan Informasi Profil Kesehatan Indonesia 2016*, *Kementerian Kesehatan RI*. doi:10.11607/ijp.4244.

Kementerian Kesehatan RI (2018) *Profil Kesehatan Indonesia Tahun 2017*. Jakarta. Available at: http://www.depkes.go.id/resources/download/pusdatin/profil-kesehatan-indonesia/profil-kesehatan-indonesia-2017.pdf (Accessed: May 13, 2022).

Kementerian Kesehatan RI (2019) *Profil Kesehatan Indonesia 2018*. Available at: https://pusdatin.kemkes.go.id/resources/download/pusdatin/profil-kesehatan-indonesia/Data-dan-Informasi_Profil-Kesehatan-Indonesia-2018.pdf (Accessed: May 13, 2021).

Kementerian Kesehatan RI (2020) *Profil Kesehatan Indonesia 2019*. Available at: https://kemkes.go.id/downloads/resources/download/pusdatin/profil-kesehatan-indonesia/Profil-Kesehatan-Indonesia-2019.pdf (Accessed: May 13, 2021).

Kementerian Kesehatan RI (2021) *Profil Kesehatan Indonesia Tahun 2020*. Available at: https://www.kemkes.go.id/downloads/resources/download/pusdatin/profil-kesehatan-indonesia/Profil-Kesehatan-Indonesia-Tahun-2020.pdf (Accessed: May 13, 2021).

Kerber, J.K. *et al.* (2007) "Continuum of care for maternal, newborn, and child health: from slogan to service delivery" *The Lancet*, 370(9595), p.1358-1369. doi: 10.1016/S0140-6736(07)61578-5

Lunze, K. *et al.* (2015) "Innovative approaches for improving maternal and newborn health - A landscape analysis," *BMC Pregnancy and Childbirth*, 15(1), p. 337. doi:10.1186/s12884-015-0784-9.

McArthur, J.W., Rasmussen, K. and Yamey, G. (2018) "How many lives are at stake? Assessing 2030 sustainable development goal trajectories for maternal and child health," *BMJ* [Preprint]. doi:10.1136/bmj.k373.

Mgawadere, F. *et al.* (2017) "Factors associated with maternal mortality in Malawi: application of the three delays model" *BMC Pregnancy and Childbirth*, 17(219). doi: 10.1186/s12884-017-1406-5

Mujiati, Lestary, H., and Laelasari, E. (2014) "Kesiapan Puskesmas Poned (Pelayanan Obstetri Neonatal

Indonesian Journal of Health Administration
(Jurnal Administrasi Kesehatan Indonesia)
p-ISSN 2303-3592, e-ISSN 2540-9301
10.20473/jaki.v10i2.2022.206-218

Emergensi Dasar) di Lima Regional Indonesia" *Media Litbangkes,* 24(1), p.36-41. doi: 10.22435/mpk.v24i1.3485.36-41

Nassoro, M.M. *et al.* (2020) "Maternal Mortality in Dodoma Regional Referral Hospital, Tanzania" *International Journal of Reproductive Health,* 2020(9082179). doi: 10.1155/2020/9082179

Onah, H.E. *et al.* (2009) "Maternal mortality in health institutions with emergency obstetric care facilities in Enugu State, Nigeria" *Journal of Obstetrics and Gynaecology*, 25(6), p.569-574. doi: 10.1080/01443610500231484

Otolorin, E. *et al.* (2015) "Essential basic and emergency obstetric and newborn care: From education and training to service delivery and quality of care" *International Journal of Gynecology & Obstetrics*, 130(2015), p.46-43. doi: 10.1016/j.ijgo.2015.03.007

Ngana, F.R. and Karyawati, A.A.I.N.E. (2021). "Scenario modelling as planning evidence to improve access to emergency obstetric care in eastern Indonesia" *PLoS ONE* 16(6): e0251869. doi: 10.1371/journal.pone.0251869

Stein, D. and Dewi, S. (2020) *Multiple Funding Flows for Maternal and Neonatal Health Services in Indonesia: A Legal and Regulatory Review*. Washington DC. Available at: http://www.healthpolicyplus.com/ns/pubs/17401-17724_IndonesiaMNHLegalReviewBrief.pdf (Accessed: January 13, 2022).

ThinkWell Institute (2022) *Kajian Stratifikasi Kabupaten/Kota PONED & PONEK*.

USAID Jalin Project (2019) *Every Mother and Newborn Counts Study*. Available at: https://pdf.usaid.gov/pdf_docs/PA00X87N.pdf (Accessed: May 10, 2022).

World Health Organization (2019) *Maternal mortality Estimates by WHO region*, *Global Health Observatory data repository*. Available at: https://apps.who.int/gho/data/view.main.1370?lang=en (Accessed: May 10, 2022).

World Health Organization (2020) *Indonesia - SRMNCAH Factsheet December 2020*. Available at: https://apps.who.int/iris/bitstream/handle/10665/347430/Indonesia-eng.pdf? (Accessed: May 10, 2022).

World Health Organization (2022) *Neonatal deaths and mortality rate (0 to 27 days) South-East Asian region data by country*, *Global Health Observatory data repository*. Available at: https://apps.who.int/gho/data/view.main.CHILDMORTNEONATALSEARv?lang=en (Accessed: May 10, 2022).