

RESEARCH ARTICLE

THE READINESS OF PRIMARY HEALTH CENTERS (PUSKESMAS) TO PROVIDE MATERNAL AND NEONATAL HEALTH SERVICES IN WEST BANGKA, INDONESIA

Azmul A. Irfan^{1*}, Christian Ezra Kestito², Amalia Sainsiana³, Ananda Hadist Wahyudi¹
Lyliani Khairunnisa⁴, Fathia Azzahra⁵

¹ Orthopedic Department, Faculty of Medicine UIN Syarif Hidayatullah Jakarta, Indonesia.

² General Practitioner, Tempilang Primary Health Care West Bangka, Indonesia.

³ Clinical Skill Unit Department, Faculty of Medicine UIN Syarif Hidayatullah Jakarta, Indonesia.

⁴ General Practitioner, Mentok Primary Health Care West Bangka, Indonesia.

⁵ Obstetrics and Gynecology Department, Faculty of Medicine, Sriwijaya University, Indonesia.

*Corresponding Author : azmulasmarirfan@gmail.com

ABSTRACT

Background: Maternal and neonatal mortality remain a pressing public health concern in Indonesia, particularly in rural districts such as West Bangka. The district maternal mortality rate (MMR) has risen steadily, reaching 212.44 per 100,000 live births in 2022, while the neonatal mortality rate (NMR) has climbed from 3.7 to 7.89 per 1,000 live births between 2018 and 2022. This study evaluates the availability and readiness of Primary Health Centers (Puskesmas) in West Bangka to deliver maternal and newborn health services. The aims of this research is to assess the service availability and readiness of all eight Puskesmas in West Bangka Regency using the WHO Service Availability and Readiness Assessment (WHO-SARA) instrument.

Methods: A facility-based cross-sectional study was conducted between July and August 2024 across all eight Puskesmas in West Bangka. Data were collected through structured interviews with key health personnel and direct observation guided by the WHO-SARA framework. Readiness was assessed across two service areas (antenatal care (ANC) and obstetric-neonatal care) and within each service area, evaluated across four readiness domains: staff training and clinical guidelines, equipment and supplies,

diagnostic capacity, and essential medicines and commodities. For obstetric and neonatal care, a fifth domain covering basic emergency obstetric and neonatal care capacity was additionally assessed.

Results: The mean overall readiness score across all Puskesmas was 86.0 (range: 62.0-92.1). Seven of 8 Puskesmas (87.5%) achieved scores above the 75-point threshold, qualifying as “optimal.” Puskesmas Mentok achieved the highest overall score (92.1), while Puskesmas Puput was the sole suboptimal facility (62.0), largely owing to deficiencies in staff training and basic obstetric and newborn care (42.9). Key gaps identified across facilities included the absence of manual vacuum extractors (0%) and limited availability of intermittent preventive treatment for malaria in pregnancy (IPTp) protocols (37.5%) and trained IPTp staff (12.5%).

Conclusions: Most Puskesmas in West Bangka demonstrate adequate readiness for maternal and newborn health services. However, Puskesmas Puput requires urgent targeted intervention. System-wide gaps in IPTp capacity, obstetric equipment, and staff training represent priority areas for policy action and resource allocation.

Keywords: Maternal and neonatal services, primary health care, Puskesmas, WHO-SARA, facility assessment

INTRODUCTION

The maternal mortality rate (MMR) and infant mortality rate (IMR) are more than just statistics, they are fundamental reflections of a nation's healthcare efficacy. In Indonesia, however, these figures represent a persistent challenge, making the prioritization of maternal and child health a non-negotiable pillar of national health development. Globally, the World Health Organization

estimated roughly 295,000 maternal deaths in 2020.¹ Within the ASEAN context, the disparity is stark: Myanmar recorded the highest MMR at 282 deaths per 100,000 live births, while Singapore achieved a rate of zero.² Indonesia sits at a troubling middle ground; its 2020 MMR of 189 significantly outpaces neighbors like Malaysia, Thailand, and Vietnam. Perhaps more concerning is the recent domestic trajectory. National data indicate a sharp climb in absolute fatalities between 2022 and 2023, with maternal deaths rising from 4,005 to 4,129 and neonatal deaths

surging from 20,882 to nearly 30,000.³

At the district level, West Bangka has experienced a similar upward trajectory in its MMR. After recording 185.23 per 100,000 live births in 2018, the figures climbed to 208.71 per 100,000 live births in 2021 and reached 212.44 per 100,000 live births in 2022.⁴ Strategies designed to accelerate the reduction of the MMR focus on guaranteeing that every mother has access to high-quality maternal health services. These critical interventions include delivery assistance by trained health personnel at dedicated health service facilities, comprehensive postpartum care for mothers and babies, specialized care and referral in cases of complications, and access to comprehensive family planning services, with particular emphasis on postpartum family planning. The NMR in West Bangka has shown upward trend. From 3.7 per 1,000 live births in 2018, it increased to 5.19 per 1,000 live births in 2019, and continued climbing to 5.66 and 7.89 per 1,000 live births in 2021 and 2022, respectively.⁴

The Regulation of the Minister of Health of the Republic of Indonesia Number 25 of 2014 concerning Child Health Efforts mandates that every child possesses the fundamental right to survive, grow, and develop, alongside the right to protection against violence and discrimination. Fulfilling these rights requires the implementation of integrated, comprehensive, and sustainable child health initiatives. At their core, these efforts aim to guarantee survival by reducing mortality across the most vulnerable stages: the neonatal, infant, and toddler periods.⁵

The persistently high frequency of maternal deaths in specific regions underscores deep-seated inequalities in healthcare access and a persistent socioeconomic divide between urban and rural populations. Studies in similar low and middle-income country settings have consistently linked disparities in maternal outcomes to facility-level gaps in equipment availability, trained personnel, and clinical protocols.^{6,7} In response, the Ministry of Health has focused on bolstering the capacity of healthcare facilities to manage obstetric complications. Within this framework, Puskesmas serve as the frontline, these government-owned centers are tasked with the early detection of potential disorders in pregnant women, shifting the focus toward preventive-promotive efforts and active community empowerment.

This study evaluates the availability and readiness of all Puskesmas across West Bangka to provide maternal and newborn health services. Using the WHO Service Availability and Readiness Assessment (WHO-SARA) instrument, we aimed to map the current state of service readiness, resource allocation, and the availability of trained personnel, providing a clear, data-driven profile of the health service landscape in these rural primary care facilities.

METHODS

Study Design and Settings

This study utilized a facility-based cross-sectional design conducted in West Bangka Regency, located in the western region of Bangka Island. The regency covers an area of 2,862.6 km², with a total population of 206,937 people based on local statistical data from 2022.⁴ Data collection was conducted between July and August 2024.

Population and Sample

West Bangka Regency comprises 6 sub-districts served by 8 Puskesmas. Most sub-districts have one Puskesmas, with the exception of Simpang Teritip and Parittiga, each of which is served by two. A total sampling approach was employed. Enrolling all eight Puskesmas in the regency. In Indonesia, Puskesmas provide basic, comprehensive, and integrated health services for the entire population within their designated service areas, and represent the only primary health care facility under direct government administration. Of the 8 Puskesmas, 3 hold Pelayanan Obstetri Neonatal Emergensi Dasar (PONED) status, which authorizes them to perform a broader range of emergency obstetric and neonatal interventions. This designation is relevant to the interpretation of capability gaps in obstetric and newborn care.⁸

Data Collection

Data were collected from all eight Puskesmas from July to August 2024 using two complementary methods. First, structured interviews were conducted with competent informants at each facility, including the person in charge of the delivery program, the person in charge of the non-communicable disease program, the inventory manager, the head of the pharmacy department, and the head of administration. One informant per designated role per Puskesmas was purposively selected based on their direct responsibility for the relevant program area. All interviews were conducted by research team members ensuring consistent data collection across sites.

Second, direct observation was performed using the WHO-SARA checklist, which had been reviewed and contextually adapted to align with Indonesian national policies and the Ministry of Health's regulatory standards, including Permenkes No. 21 Tahun 2021.^{9,10} Observations were independently cross-checked against interview responses. Any discrepancies between interview data and direct observation were resolved through re-verification with facility staff on the same visit day.

The WHO-SARA framework guided the readiness assessment. Readiness was assessed across two service areas (antenatal care (ANC) and obstetric-neonatal care) and within each service area, evaluated across four service

readiness domains: staff training and clinical guidelines, equipment and supplies, diagnostic capacity, and essential medicines and commodities. For obstetric and neonatal care, a fifth domain covering basic emergency obstetric and neonatal care capacity was additionally assessed.¹⁰

Study Variables

Service availability was structured into two categories: antenatal care (ANC) services, and obstetric-neonatal care services. Each category was assessed across four core domains: (1) staff and guidelines, (2) equipment and supplies, (3) diagnostic tests, and (4) medicines and commodities. For obstetric and neonatal care, a fifth domain was added to capture basic obstetric and newborn care capacity.¹⁰

The assessment of ANC services began with the staff and guidelines domain, which examined the availability of official ANC guidelines and intermittent preventive treatment in pregnancy (IPTp) protocols, as well as whether personnel had received specialized training in both ANC and IPTp within the previous two years.¹⁰ It is noted that IPTp is part of the global WHO-SARA instrument and was retained in this assessment given that West Bangka recorded 48 malaria cases in 2023, classifying it as a high-endemic area in the national malaria stratification framework.¹¹ In terms of equipment and supplies, the study assessed essential clinical tools including tape measures, fetal Dopplers, and blood pressure apparatus. The diagnostic test domain focused on the capacity to perform urine dipstick protein tests and to evaluate haemoglobin levels. The medicines and commodities domain confirmed the availability of iron and folic acid tablets, tetanus toxoid vaccines, and malaria drugs designated for maternal health.¹⁰

Obstetric and neonatal care was assessed across five distinct domains. The staff and guidelines domain examined the availability of clinical protocols for delivery care and whether personnel had received formal training within the preceding two years. Equipment and supplies assessment encompassed emergency transport, sterilization equipment, examination lights, and complete delivery packs, alongside suction units, neonatal bags and masks, delivery beds, partographs, gloves, and infant weighing scales. It should be noted that certain equipment items, including assisted vaginal delivery instruments, manual vacuum extractors, and D&C kits, are required specifically in PONE-designated facilities per Kemenkes 2022 standards.¹² Their absence in non-PONE facilities is therefore not necessarily an absolute gap, but rather a reflection of the tiered authorization structure within Indonesia's referral system.¹² The diagnostic test domain assessed the consistent use of the partograph for labour management. The medicines and commodities domain evaluated for antibiotic eye ointment for newborns, injectable uterotonics, injectable antibiotics,

magnesium sulphate, skin disinfectants, and intravenous solutions with infusion sets. The basic obstetric and newborn care domain assessed the facility's capacity to perform parenteral administration of antibiotics, oxytocin, and anticonvulsants, as well as assisted vaginal delivery, manual removal of the placenta, manual removal of retained products of conception, and neonatal resuscitation.

Data Analysis

Data were analyzed following the WHO-SARA scoring methodology. Each item within a domain carries equal weight. Domain scores were calculated by summing the number of available items, dividing by the total items in the domain, and multiplying by 100. The overall readiness score for each facility was then derived by averaging the domain scores, yielding a composite score ranging from 0 to 100. A higher score indicates greater readiness to deliver maternal and newborn health services. A readiness threshold of 75 was applied as a pragmatic operational cutoff, consistent with the approach used in previous WHO-SARA-based facility assessments in comparable settings.¹⁰ Facilities scoring at or above 75 were classified as "optimal," while those below were classified as "suboptimal." The application of this cutoff is acknowledged as a limitation, as it represents a pragmatic benchmark rather than a universally validated threshold. Descriptive analysis was performed using SPSS version 29.

ETHICAL APPROVAL

This study received administrative clearance from the West Bangka Regency Health Office (No. 800/1175/DINKES/2024). As the study was conducted within a government-owned public health facility system and involved no interventional procedures, formal ethics committee review was not mandated under the applicable national regulatory framework. Nonetheless, all informants were given a complete verbal explanation of the study's objectives, procedures, and their right to decline participation without consequence before any data were collected. Verbal consent was employed because the facility-based observational nature of the study posed minimal risk to participants, and because written consent documentation was not required under the institutional clearance protocol. The confidentiality of individual facility data was maintained throughout the analysis and reporting process.

RESULTS

Table 1 presents the general characteristics of the 8 Puskesmas included in this study. The catchment populations and household counts varied substantially across facilities, ranging from 2,721 households serving 8,163 people in Kundi to 17,858 households and 54,685 people in Mentok. The total number of maternal patients

followed a similar pattern, with Mentok recording the highest caseload (941 patients) and Kundi the lowest (145 patients). Midwife staffing levels also varied considerably, from 12 midwives in both Kundi and Puput to 46 in Kelapa, a disparity that likely reflects differences in catchment population size and local service demand. Three of the eight Puskesmas held PONED (Pelayanan Obstetri Neonatal Emergensi Dasar) designation.

Community engagement with ANC services was remarkably high across the district. First-trimester (K1) visit rates reached or exceeded 100% in most facilities, though

Kundi and Tempilang reported slightly lower uptake. Performance remained strong through the K4 and K6 visits, although a notable drop-off was observed at Sekar Biru, where K4 completion fell to 76.4%. Normal delivery rates reached or exceeded facility capacity in several centers, peaking at 106% in Kelapa. Postnatal visit rates closely mirrored delivery figures, indicating a consistent continuum of care across most of the district. First and complete postnatal visit rates remained high, suggesting reliable follow-up practices.

Table 1. General Characteristics of the 8 Puskesmas in West Bangka Regency, 2024

General information	Mentok	Simpang Teritip	Kundi	Jebus	Puput	Sekar Biru	Kelapa	Tempilang
Puskesmas characteristics, n								
Number of Household in the working area	17,858	7,202	2,721	7,369	7,634	4,031	11,244	9,536
Number of people living in the area	54,685	21,605	8,163	23,374	23,195	13,218	35,606	29,364
Total of maternal in working area	941	427	145	330	395	259	574	477
Number of midwife per Puskesmas	23	29	12	31	12	24	46	26
Puskesmas utilization, n(%)								
ANC visits								
T1	933 (99.1)	427 (100)	144 (99.3)	340(103)	395 (100)	259 (100)	556 (97)	485 (102)
T4	886 (94.1)	423 (99)	132 (91)	324 (98.1)	372 (94.1)	198 (76.4)	494 (86)	421 (88.2)
T6	820 (87.1)	423 (99)	132 (91)	319 (97)	368 (93.1)	183 (71)	464 (81)	378 (79.2)
Normal deliver in Puskesmas	834 (94.2)	396 (96.3)	111 (96)	334 (105)	368 (97.3)	238 (96)	555 (106)	455 (98.4)
Postnatal visit								
First Postnatal visit	835 (94.3)	402 (98)	113 (97.4)	335 (105)	368 (97.3)	241 (97)	560 (106.4)	455 (98.4)
Complete Postnatal visit	834 (94.2)	400 (97.3)	112 (97)	335 (105)	363 (96)	238 (96)	556 (106)	455 (98.4)

PONED: Pelayanan Obstetri Neonatal Emergensi Dasar (Basic Emergency Obstetric and Neonatal Care service designation).

The availability of clinical guidelines and training status across the eight Puskesmas. Seven of eight facilities (87.5%) met the criteria for both operational guidelines and trained personnel for ANC and delivery care. While all 8 Puskesmas (100%) had official ANC guidelines in place, only 5 of 8 (62.5%) had staff who had received ANC-specific

training within the previous two years. Readiness for intermittent preventive treatment for malaria in pregnancy (IPTp) was considerably weaker, IPTp protocols were available in only 3 of 8 centers (37.5%), and only 1 of 8 centers (12.5%) had staff who had received specific IPTp training within the last two years.

Table 2. Antenatal Care Readiness in Puskesmas

Readiness Tracer Items	n (%)
Antenatal care service	
Staff and guidelines	
Guidelines on ANC	7 (87.5)
Staff trained in ANC	8 (100)
IPTp guidelines	3 (37.5)
Staff trained in ANC in the last two years	5 (62.5)
Staff trained in IPTp in the last two years	1 (12.5)

Readiness Tracer Items	n (%)
Equipment and supplies	
Blood pressure apparatus (manual digital / manual sphygmomanometer with stethoscope)	8 (100)
Fetal Doppler	8 (100)
Tape measure	8 (100)
Diagnostic test	
Haemoglobinometer	8 (100)
Urine dipstick protein	8 (100)
Medicine and commodities	
Iron tablets	8 (100)
Folic acid tablets	8 (100)
Tetanus toxoid vaccine	8 (100)
Malaria drug for maternal	6 (75.0)

The availability of essential equipment, diagnostic tools, and medicines was assessed across the eight Puskesmas. Infrastructure for basic monitoring was universally present: all 8 facilities were equipped with blood pressure apparatus, fetal Dopplers, and tape measures. Diagnostic capabilities were equally strong, with all centers able to perform haemoglobin and urine protein assessments. All facilities were also fully stocked with iron and folic acid tablets and tetanus toxoid vaccines. However, malaria drugs designated for maternal use were available in only 6 of 8 centers (75%).

For obstetric care, all eight Puskesmas had emergency transport and complete delivery packs. Gaps were evident in sterilization equipment and suction apparatus, both available

in 6 of 8 centers (75%). The manual vacuum extractor was completely absent across all facilities (0%), and only 1 of 8 centers (12.5%) had a vacuum aspirator or D&C kit. Neonatal bags and masks, delivery beds, partographs, and gloves were each present in 7 of 8 facilities (87.5%), while infant weighing scales were universally available. The partograph, used for monitoring labour progress, was available in 7 of 8 centers (87.5%).

The medicines and commodities readiness for obstetric and neonatal care was strong, all eight Puskesmas were fully stocked with antibiotic eye ointment for newborns, injectable uterotonics, injectable antibiotics, magnesium sulphate, skin disinfectants, and intravenous solutions with infusion sets.

Table 3. Obstetric and Neonatal Care Readiness in Puskesmas

Readiness Tracer Items	n (%)
Obstetric and neonatal care	
Staff and guidelines	
Guideline in deliver care	7 (87.5)
Staff trained in deliver care in the last two year	7 (87.5)
Equipment and Supplies	
Emergency transport	8 (100)
Sterilisation equipment	6 (75.0)
Examination light	7 (87.5)
Delivery pack	8 (100)
Suction apparatus	6 (75.0)
Manual vacuum extractor	0 (0.0)
Vacuum aspirator or D&C kit	1 (12.5)
Neonatal bag and mask	7 (87.5)
Delivery bed	7 (87.5)
Partograph	7 (87.5)
Gloves	7 (87.5)
Infant weighting scale	8 (100)

Readiness Tracer Items	n (%)
Diagnostic test	
Monitoring and management of labour using partograph	7 (87.5)
Medicine and commodities	
Antibiotic eye ointment for newborn	8 (100)
Injectable uterotonic	8 (100)
Injectable antibiotic	8 (100)
Magnesium sulphate (injectable)	8 (100)
Skin disinfectant	8 (100)
Intravenous solution with infusion set	8 (100)
Basic obstetric and neonatal managements	
Parental administration of antibiotic	7 (87.5)
Parental administration of oxytocin	8 (100)
Parental administration of anticonvulsants	8 (100)
Assisted vaginal delivery	7 (87.5)
Manual removal of placenta	0 (00.0)
Manual removal of retained products of conception	1 (12.5)
Neonatal resuscitation	7 (87.5)

Figure 1 presents the domain-specific and overall readiness scores for each Puskesmas. The mean overall readiness score across all eight facilities was 86.0. Seven of eight Puskesmas (87.5%) achieved scores at or above the 75-point threshold, qualifying as “optimal.”

Puskesmas Mentok achieved the highest overall score (92.1), with particularly strong performance in medicines and commodities (100), diagnostic tests (100), and basic obstetric and newborn care (85.7). Simpang Teritip also

performed well, achieving an overall score of 88.3. The six remaining optimal facilities scored between 82.4 and 89.8.

In contrast, Puskesmas Puput was the sole suboptimal facility with an overall score of 62.0. This substantially lower score was driven primarily by deficiencies in staff training and guidelines (42.9) and basic obstetric and newborn care (42.9), alongside below-average equipment and supplies availability (58.3).

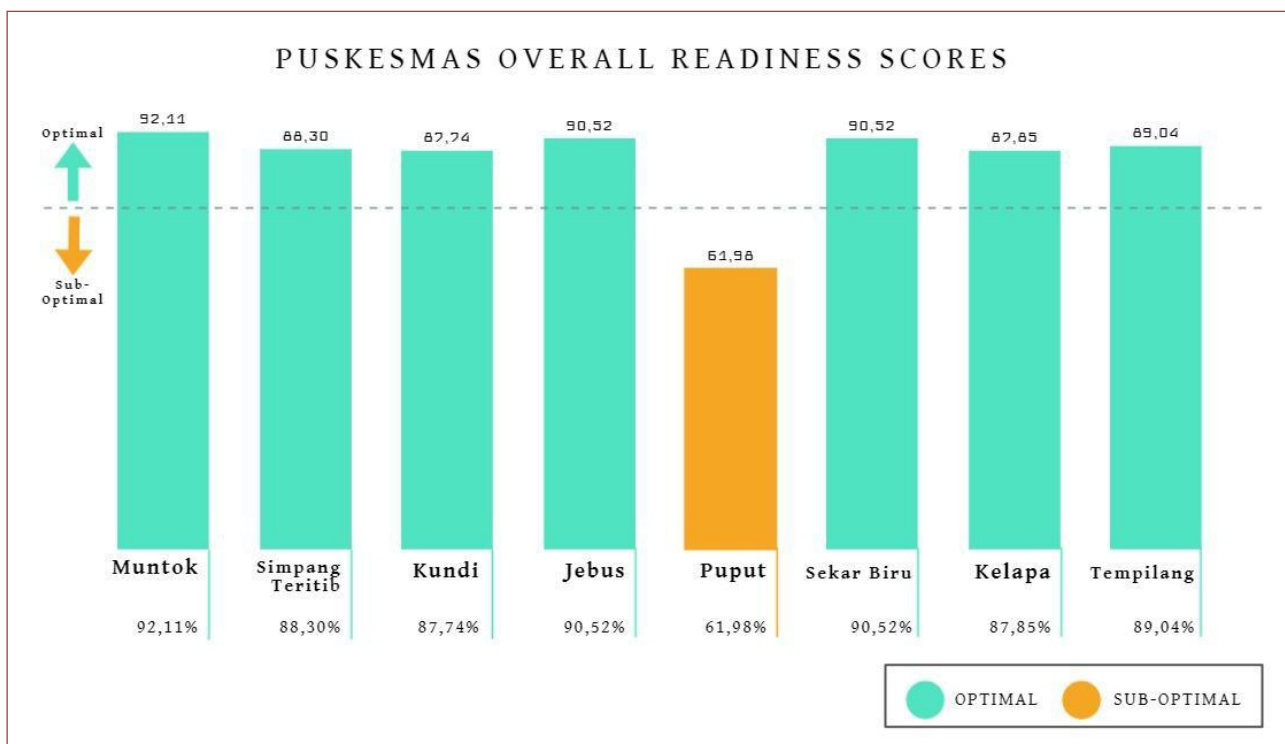


Figure 1. Overall Readiness Scores by Puskesmas

DISCUSSION

Maternal and neonatal mortality rates are more than just clinical metrics, they are definitive benchmarks of a nation's healthcare quality. In Indonesia, these figures remain a pressing concern, with the country currently recording the fourth-highest MMR in Southeast Asia at 173 per 100,000 live births, trailing only Timor-Leste, Cambodia, and Myanmar. The neonatal mortality rate is equally troubling, ranking third in the region at 9.3 deaths per 1,000 live births.¹ This national crisis is mirrored locally in West Bangka, where the MMR has shown a persistent, gradual climb over the past five years.²

To confront these statistics, Indonesia has anchored its strategy in a primary healthcare-led model, with Puskesmas serving as the system's bedrock. These facilities are not intended to stand alone; they are supported by an integrated referral network spanning village-level units, district hospitals, and national-tier institutions. As the frontline of maternal and newborn care, the Puskesmas is central to the delivery of routine ANC, management of uncomplicated deliveries, and coordination of timely hospital referrals when complications arise.⁹

The assessment of health care service readiness in this study revealed a mean overall score of 86.0 across all Puskesmas. Puskesmas Mentok achieved the highest overall score of 92.1. While the majority of Puskesmas in West Bangka demonstrated optimal readiness for maternal and newborn health care services, Puskesmas Puput remained suboptimal with an overall score of 62.0. This lower performance was largely attributable to inadequate staff training and guidelines, as well as poor readiness in basic obstetric and newborn care, where its domain score fell to 42.9. Several review studies in Indonesia have documented the most common barriers to maternal and newborn health care services. Geographic distance between the Puskesmas and referral hospitals in rural areas represents a significant challenge, contributing to disparities in service access and outcomes during pregnancy and childbirth.⁶ Poor infrastructure and limited resources, including inadequate staff training, outdated protocols, and absent clinical guidelines, have also been identified as consistent barriers to adequate maternal and newborn care.⁷

Antenatal Care Readiness in Puskesmas

The assessment of ANC readiness demonstrated that most facilities had a high level of readiness across several service areas. All eight Puskesmas had official ANC guidelines in place, indicating a strong institutional foundation. However, only 5 of 8 facilities (62.5%) had staff who had received ANC-specific training within the previous two years, highlighting room for improvement in ensuring that all personnel are current with evolving evidence-based

practices.

These findings are consistent with prior evidence from similar settings. Analyses of healthcare worker distribution in Puskesmas have underscored the importance of maintaining adequate staffing and training for comprehensive maternal and newborn care delivery. A study on ANC coverage in rural Rwanda demonstrated that staff capability and community participation are both critical determinants of adequate antenatal visit completion, emphasizing the need for ongoing health education and community engagement to sustain visit rates.¹³ Similarly, research on the continuity of maternal health services in Indonesia has highlighted the pivotal role of ANC and skilled birth attendants in reducing maternal and neonatal mortality.¹⁴ Within Indonesian primary care settings, Puskesmas are required to maintain structured documentation through the "Buku KIA" (Maternal and Child Health Book) to systematically capture the health progress of all pregnant women under their care, ensuring continuity of clinical information across visits and providers.^{15,16}

With regard to malaria prevention, West Bangka recorded 48 cases of malaria in 2023, a figure that classifies the region as high-endemic under national stratification criteria. Malaria infection during pregnancy carries severe risks for both the mother and the fetus, including systemic disease, preterm birth, anaemia, and neonatal death.¹⁷ According to the National Action Plan for Acceleration of Malaria Elimination (NAP AME) 2020-2026, malaria screening in endemic areas must be prioritized from the first antenatal visit (K1), and should include blood testing, immediate treatment for confirmed cases, and the distribution of insecticide-treated bed nets.^{11,20}

Against this epidemiological backdrop, the facility-level gaps in IPTp readiness are a significant concern. IPTp protocols were available in only 3 of 8 Puskesmas (37.5%), and only 1 of 8 centers (12.5%) employed staff who had received specific IPTp training within the preceding two years. These persistent resource deficits create a clear bottleneck that limits the quality of malaria prevention as a component of maternal health care in West Bangka.

In contrast, the availability of basic ANC equipment and diagnostic tools was uniformly strong. All 8 Puskesmas were equipped with blood pressure apparatus, fetal Dopplers, and tape measures. Haemoglobin and urine protein testing capacity was universal. While iron and folic acid tablets and tetanus vaccines were fully stocked across all facilities, malaria drugs designated for maternal use were absent in 2 of 8 centers (25%). These commodities form the logistical backbone of the 10 essential standards of antenatal care in Indonesia, which include vital sign monitoring, tetanus immunization, and blood screening for haemoglobin, malaria, and protein, as well as "triple

elimination” screening for HIV, syphilis, and Hepatitis B.¹⁸ The consistent availability of these items across most facilities is encouraging, though the absence of malaria drugs in a quarter of facilities in a high-endemic area remains a gap that warrants attention.

Basic Maternal and Newborn Care Readiness in Puskesmas

To strengthen emergency obstetric care at the primary care level and reduce maternal mortality at the district level, the Ministry of Health of the Republic of Indonesia introduced PONE (Pelayanan Obstetri Neonatal Emergensi Dasar) through Peraturan Menteri Kesehatan Nomor 21 Tahun 2021 concerning the Organization of Health Services Before Pregnancy, During Pregnancy, Childbirth, and After Delivery, as well as Contraceptive and Sexual Health Services.⁹ This regulation provides the updated and currently binding framework for emergency obstetric and neonatal care at the primary health care level, replacing earlier guidelines. PONE-designated Puskesmas are required to be equipped with a complete set of maternal and child health examination tools, an obstetrics and gynaecology kit, a maternal and neonatal emergency kit, and a postnatal care kit, as further elaborated in the Technical Guidance for Physical Health Sector Special Allocation Funds.^{8,19}

Against this regulatory backdrop, challenges remain in meeting the equipment requirements for obstetric and neonatal care across West Bangka's Puskesmas. The most critical gap identified was the complete absence of manual vacuum extractors in all facilities (0%), and the availability of a vacuum aspirator or D&C kit in only 1 of 8 centers (12.5%). Sterilization equipment and suction apparatus were each available in 6 of 8 facilities (75%). It is important to contextualize these findings: under the PONE framework established by Permenkes No. 21 Tahun 2021 and the DAK Fisik Technical Guidance, certain advanced obstetric equipment and procedures, including assisted vaginal delivery instruments, are mandated specifically in PONE-designated Puskesmas.^{9,19} Interpreting the absence of these items as an unconditional gap in non-PONE facilities would therefore be an overstatement. Rather, the findings point to the importance of ensuring that the 3 PONE-designated facilities in West Bangka are fully equipped per their designated scope, while supporting non-PONE facilities in managing and appropriately referring cases that exceed their authorization.

Significant shortcomings were also identified in the capacity to perform assisted vaginal deliveries and manual removal of the placenta and retained products of conception. These are life-saving interventions in obstetric emergencies; however, their provision within Puskesmas is regulated: assisted vaginal delivery does not fall within the scope of PONE authority, while the management of retained

placenta is bounded by the diagnostic and procedural capacity of available personnel. Manual removal of the placenta should ideally be performed at PONE-designated Puskesmas.⁸ While this regulatory tiering exists for patient safety and quality assurance reasons, it also means that robust and timely referral pathways must be reliably functioning to ensure that women with complications receive appropriate definitive care without delay.

On a more positive note, the readiness of medicines and commodities for obstetric and neonatal care was strong across the district. All eight Puskesmas were fully stocked with antibiotic eye ointment for newborns, injectable uterotonics, injectable antibiotics, magnesium sulphate, skin disinfectants, and intravenous solutions with infusion sets. This suggests that pharmaceutical supply chains in West Bangka are functioning effectively and capable of meeting the core pharmaceutical demands of maternal and neonatal care, even in the most remote facilities.

Implications for Policy and Practice

Peraturan Menteri Kesehatan Nomor 21 Tahun 2021 provides the national regulatory framework for the provision of maternal and newborn health services at all levels of the Indonesian health system. However, the translation of these standards into operational reality at the facility level, particularly in rural and geographically dispersed districts like West Bangka, demands more than regulatory issuance; it requires active, sustained multi-level implementation support.⁹

The findings of this study carry several concrete policy and programmatic implications. First, annual or biennial staff training programs for ANC and, particularly, IPTp should be institutionalized as a standard component of the district health office's capacity-building plan. Second, clinical guidelines and standard operating procedures at all Puskesmas should be audited and updated on a regular schedule, with a dedicated mechanism for disseminating national updates to facility level. Third, the procurement of missing essential equipment, particularly for PONE-designated Puskesmas, should be elevated as a priority in district health budget planning, drawing on the Physical DAK (Dana Alokasi Khusus) funding mechanism.¹⁸ Fourth, emergency obstetric referral drills should be conducted regularly across all facilities, with particular attention to non-PONE Puskesmas, to ensure that staff can manage and stabilize complications while coordinating rapid transfers. Fifth, supervisory visits by the district health office should be scheduled at regular intervals to monitor compliance and provide mentorship.

Puskesmas Puput warrants particular and urgent attention. Its suboptimal score was not incidental but reflected systematic weaknesses across staffing, guidelines, and basic obstetric care capacity, areas that are directly

amenable to intervention through targeted training, guideline deployment, and facility mentorship. A focused improvement plan for Puput, with clear performance indicators and a monitoring timeline, is recommended as an immediate priority for the West Bangka Regency Health Office.

Strength and Limitations

This study is among the first to systematically evaluate the availability and readiness of Puskesmas for maternal and newborn health services in the West Bangka context, using a validated international instrument adapted to Indonesian national policies. The use of a total sampling strategy, enrolling all eight Puskesmas in the regency, eliminates sampling bias and ensures complete coverage of the district-level primary care landscape. The triangulation of structured interview data with direct observation enhances the reliability of the findings.

Nevertheless, this study has several notable limitations. First, restricted time and resources meant that data collection was confined exclusively to government-run primary health centers. Private institutions that also deliver maternal and neonatal health services within the district were not assessed, which may limit the completeness of the district-level picture. Second, the cross-sectional design captures a single point in time and cannot provide longitudinal evidence regarding the sustained availability and preparedness of these facilities over time. Third, the 75-point readiness threshold applied in this study represents a pragmatic operational benchmark rather than a universally validated cutoff, which should be considered when interpreting the classification of facilities as optimal or suboptimal. Finally, the findings are specific to eight Puskesmas in one rural district, while they may be relevant to similar rural settings in Indonesia, they should not be generalized as representative of the entire national primary health care system.

CONCLUSION

Primary health care plays a critical role in Indonesia's maternal and neonatal health outcomes. As the first point of contact for pregnant women, Puskesmas must maintain optimal readiness in both service availability and the capacity to deliver evidence-based maternal and newborn care. This study found that 7 of 8 Puskesmas achieved overall readiness scores above the optimal threshold. Puskesmas Puput was the sole exception, driven primarily by significant deficiencies in staff training and guidelines and in basic obstetric and newborn care capacity.

Across the district, staff training and clinical guideline availability emerged as the most influential determinants of readiness scores, underscoring the necessity of regularized,

structured staff development programs and timely guideline updates. Six of 8 Puskesmas scored below 75% in the basic obstetric and newborn care domain, reflecting urgency in strengthening operational capacity for high-risk pregnancy management, particularly in non-PONED facilities where clear referral protocols are essential. Equipment and supply gaps, particularly in obstetric instrumentation, also contributed meaningfully to score variation.

Addressing these gaps requires coordinated engagement from multiple stakeholders. Collaboration between Puskesmas personnel, the West Bangka Regency Health Office, and the Ministry of Health, guided by the regulatory framework of Permenkes No. 21 Tahun 2021, is essential to drive sustainable improvements in the overall readiness of primary care facilities to serve mothers and newborns across the district.

CONFLICT OF INTEREST

The authors have no affiliation or involvement in any organization or entity with any financial interests such as educational grants, participation in speaker's bureaus, memberships, employment, consulting, or other equity interests), or non-financial interests such as personal or professional relationships, affiliations, knowledge or beliefs in the subject matter or material discussed in this study.

ACKNOWLEDGMENTS

The authors would like to thank the City Health Office of West Bangka and for their permission to conduct the study, all of the Head of Puskesmas in the West Bangka region and all informants involved in the data collection.

FUNDING SOURCES

This study received no specific financial support from any sponsor or funder.

REFERENCES

1. WHO, UNICEF, UNFPA, World Bank Group, UNDESA/Population Division. Trends in maternal mortality 2000 to 2020 [Internet]. [Updated 2023 February 23; cited 2024 August 30]. Available from: <https://www.who.int/publications/i/item/9789240068759>.
2. ASEAN Secretariat. ASEAN Statistical Yearbook. Jakarta: ASEAN Secretariat; December 2021.
3. Kementerian Kesehatan RI. Survei Kesehatan Indonesia Tahun 2023. Jakarta: Badan Kebijakan Pembangunan Kesehatan; 2023.
4. Dinas Kesehatan Kabupaten Bangka Barat. Profil Kesehatan Kabupaten Bangka Barat Tahun 2022. Bangka: Dinas Kesehatan Kabupaten Bangka Barat; 2022.

5. Kementerian Kesehatan RI. Peraturan Menteri Kesehatan Republik Indonesia Nomor 25 Tahun 2014 Tentang Upaya Kesehatan Anak. Jakarta: Kementerian Kesehatan RI; 2014.
6. Cameron L, Suarez DC, Cornwell K. Understanding the determinants of maternal mortality: An observational study using the Indonesian Population Census. *PloS ONE*. 2019 Jun 3;14(6):e0217386.
7. Mahmood MA, Hendaro H, Laksana MAC, Damayanti HE, Suhargono MH, Pranadyan R, et al. Health system and quality of care factors contributing to maternal deaths in East Java, Indonesia. *PLoS ONE*. 2021 Feb 26;16(2):e0247911.
8. Kementerian Kesehatan RI. Pedoman Penyelenggaraan Puskesmas Mampu PONED. Jakarta: Kementerian Kesehatan RI; 2013.
9. Kementerian Kesehatan RI. Peraturan Menteri Kesehatan Republik Indonesia Nomor 21 Tahun 2021 Tentang Penyelenggaraan Pelayanan Kesehatan Masa Sebelum Hamil, Masa Hamil, Persalinan, dan Masa Sesudah Melahirkan, Pelayanan Kontrasepsi, dan Pelayanan Kesehatan Seksual. Jakarta: Kementerian Kesehatan RI; 2021.
10. World Health Organization. WHO Service Availability and Readiness Assessment (SARA): An Annual Facility Survey Reference Manual, Version 2.2. Geneva: World Health Organization; 2015.
11. Kementerian Kesehatan RI. National Strategic Plan for Malaria Elimination (NAP AME) 2020-2026 [Internet]. Jakarta: Kementerian Kesehatan RI; [updated 2023 May 29; cited 2024 Aug 22]. Available from: https://malaria.kemkes.go.id/sites/default/files/2024_08/National%20Strategic%20Plan%20Revision_Malaria_29%20Mei%202023.pdf.
12. Kementerian Kesehatan RI. Petunjuk Operasional Penggunaan Dana Alokasi Khusus Fisik Bidang Kesehatan Tahun Anggaran 2022 [Internet]. [Updated 2022 Jul 29; cited 2024 Aug 22]. Available from: https://yankes.kemkes.go.id/unduh/fileunduh_1659339617_268841.pdf.
13. Dusingizimana T, Ramilan T, Weber JL, Iversen PO, Mugabowindekwe M, Ahishakiye J, et al. Predictors for achieving adequate antenatal care visits during pregnancy: A cross-sectional study in rural northwest Rwanda. *BMC Pregnancy and Childbirth*. 2023 Jan 26;23(1). doi:10.1186/s12884-023-05384-0.
14. Herinawati H, Iksaruddin I, Murtiyarini I, Nst AF. Pentingnya Antenatal Care (ANC) di Fasilitas Pelayanan Kesehatan oleh Tenaga Kesehatan di Desa Penyengat Olak Kecamatan Jambi Luar Kota Kabupaten Muaro Jambi. *Jurnal Abdidas*. 2021 Jan 25;2(1):11–15. doi:10.31004/abdidas.v2i1.187.
15. Rokom. Ayo tingkatkan Pemanfaatan Buku KIA Untuk Pantau Kesehatan Ibu Dan Anak [Internet]. 2018 [cited 2024 Aug 30]. Available from: <https://sehatnegeriku.kemkes.go.id/baca/umum/20180919/0627969/ayotingkatkan-pemanfaatan-buku-kia-pantau-kesehatan-ibu-dananak/>.
16. Kementerian Kesehatan RI. Buku Kesehatan Ibu dan Anak (Buku KIA). Jakarta: Kementerian Kesehatan RI; 2024.
17. Bauserman M, Conroy AL, North K, Patterson J, Bose C, Meshnick S. An overview of malaria in pregnancy. *Semin Perinatol*. 2019;43(5):282-290. doi:10.1053/j.semperi.2019.03.018.
18. Rohmawati N, Agusfar AZ, Amelia D, Restianingrum M, Damayanti R, Mudjiati I, et al. Pedoman Pelayanan Antenatal Terpadu. Ketiga. Jakarta: Kementerian Kesehatan RI; 2020.
19. Kementerian Kesehatan RI. Petunjuk Operasional Penggunaan Dana Alokasi Khusus Fisik Bidang Kesehatan Tahun Anggaran 2022 [Internet]. [Updated 2022 Jul 29; cited 2024 Aug 22]. Available from: https://yankes.kemkes.go.id/unduh/fileunduh_1659339617_268841.pdf.
20. Kementerian Kesehatan RI. National Strategic Plan for Malaria Elimination (NAP AME) 2020–2026 [Internet]. Jakarta: Kementerian Kesehatan RI; [updated 2023 May 29; cited 2024 Aug 22]. Available from: https://malaria.kemkes.go.id/sites/default/files/2024_08/National%20Strategic%20Plan%20Revision_Malaria_29%20Mei%202023.pdf.