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Overview of Emergency Case Management Capability at PONED Puskesmas X

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Abstract

X Health Center UPTD, which is located in an urban area, is categorized as a Non-Inpatient Health Center with the capability of Basic Emergency Neonatal Obstetric Services (PONED) and 24 hours Emergency Services. This study aims to evaluate the ability to handle maternal and neonatal emergencies at PONED UPTD X Health Center. This research uses qualitative methods by conducting in-depth interviews with health workers (1 Doctor, 1 Midwife, 1 Nurse and 1 patient) and direct observation of infrastructure. The research was conducted from May to June 2024. The results of the study show that in PONED facilities there are still limitations in resuscitation equipment and certain drugs. Only 13.6% of the support team has attended PONED training. Limited staff of doctors and laboratory analysts hampers 24-hour service. Although there has been an increase in deliveries and a decrease in referrals, some cases should be treated without referral. There is an important role of social support and collaboration in improving services. There is a need to increase the number of trained health workers, continuous training, provision of medical equipment and medicines and increased collaboration with referral facilities.

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INTRODUCTION

Ensuring a healthy life and improving the well-being of mothers and infants remain top priorities, with accelerated efforts to reduce maternal and infant mortality rates. The World Health Organization (WHO) has set a target to reduce the Maternal Mortality Ratio (MMR) to 70 per 100,000 live births and the Infant Mortality Rate (IMR) to 12 per 1,000 live births as part of the Sustainable Development Goals (SDGs), which are expected to be achieved by 2030 (1). According to the 2012 Indonesian Demographic and Health Survey (SDKI), Indonesia's MMR increased from 228 to 359 per 100,000 live births but later declined to 305 per 100,000 live births in 2015. In 2023, there were 4,482 maternal deaths, while the IMR remained relatively high at 34 per 1,000 live births (2).

West Java Province recorded the highest number of maternal deaths, with 792 cases, while in Depok City, there were 29 maternal deaths in 2023 (a ratio of 66.40 per 100,000 live births) and 157 infant deaths (a ratio of 3.59 per 1,000 live births) (Dinkes Kota Depok, 2023). At UPTD Puskesmas X, one maternal death and five infant deaths were recorded. It is estimated that 15% of pregnancies and deliveries experience complications, with 25% of neonatal complications, some of which can be life-threatening. The leading causes of maternal mortality include non-obstetric complications (27.5%), hypertensive disorders of pregnancy (23.6%), and obstetric hemorrhage (23.5%). Meanwhile, the primary causes of infant mortality are neonatal infections (36%), prematurity/low birth weight (27%), and asphyxia (23%) (Dinkes Kota Depok, 2023).

Primary Health Centers (Puskesmas) with Basic Emergency Obstetric and Neonatal Care (PONED) capabilities serve as the frontline in managing emergency cases and represent a key intervention in reducing maternal and infant mortality rates. These Puskesmas are capable of providing independent emergency obstetric and neonatal care, serving as referral centers for surrounding healthcare facilities, and are supported by hospitals with Comprehensive Emergency Obstetric and Neonatal Care (PONEK) to ensure efficient and effective service delivery (3).

According to the Mayor of Depok's Decree No. 440/253/Kpts/Dinkes/Huk/2022 concerning the classification and service capabilities of public health centers in Depok City, UPTD Puskesmas X is categorized as a Non-Inpatient Puskesmas with PONED capabilities and 24-hour emergency services.

The 2022 PONED report from UPTD Puskesmas X recorded a total of 120 PONED patient visits, consisting of 79 uncomplicated deliveries, 41 cases of complicated pregnancies and deliveries referred to hospitals, and 76 infants without complications. In 2023, the total number of PONED patient visits increased to 141, with 104 uncomplicated deliveries, 37 cases of complicated pregnancies and deliveries referred to hospitals, and 102 infants without complications. The referred maternal cases included conditions such as breech presentation, history of cesarean section (SC), premature rupture of membranes (PROM), oligohydramnios, postmaturity, and others. The referred neonatal cases included pathological jaundice, low birth weight & asphyxia, and tachypnea (Puskesmas X, 2023).

Given the significant number of emergency maternal and neonatal referral cases that should be manageable at the Puskesmas level, the researcher seeks to obtain an in-depth understanding of the capacity of PONED at UPTD Puskesmas X in handling maternal and neonatal emergencies.

METHODS

This study employed a qualitative approach by conducting in-depth interviews with selected informants. The research is carried out at PONED UPTD Puskesmas X from May to June 2024. To ensure data validity, triangulation is conducted by interviewing a team of healthcare professionals, consisting of one doctor (D1), one midwife (MD1), one nurse (N1), and one patient (P1). Additionally, the study includes direct observations of the facilities and infrastructure at the Puskesmas.

The collected data is then compiled, analyzed thematically, and interpreted to obtain a clear understanding of the studied conditions. This process is conducted meticulously to ensure that the research findings are reliable and provide in-depth insights into the situation at PONED UPTD Puskesmas X.

RESULTS AND DISCUSSION

Input

The UPTD Puskesmas X is located in District X and serves four urban villages with a population of approximately 97,400 people. As a primary healthcare facility, this Puskesmas prioritizes promotive and preventive efforts (4). The Head of the Puskesmas' policy on PONED implementation establishes the implementing and referral team, which consists of a person in charge, a core coordinating team, a supporting team, a health education team, and a non-health team. Collaboration with referral health facilities has been well established, except for referrals of infants requiring Neonatal Intensive Care Unit (NICU) care due to limited space in hospitals, as expressed by one informant:

"Actually, the cooperation with the hospital has been going well so far. However, there are situations where infants cannot be referred to the hospital because the NICU space is also limited; there are no available places." (D1)

The PONED facility includes one delivery room with two gynecological beds, one postpartum inpatient room with two beds, a linen room, an administrative room, and a waiting area. However, the maternity care service facilities in this center still require several improvements. Currently, the maternity inpatient room is combined with the obstetric procedure room, whereas according to standards, these two rooms should be separate. Additionally, the spacing between beds in the maternity care room is too narrow, meaning the room does not meet the required space standards. A dedicated neonatal procedure room is also not yet available. In the postpartum care room, several deficiencies remain, such as the absence of a bathroom. This is because the postpartum care room is still combined with the obstetric procedure room. Moreover, an on-call room for doctors, midwives, and PONED nurses has not yet been provided, and staff members are currently using a small room that is not in proper condition. A minor surgery room is also unavailable. Furthermore, resuscitation management equipment remains incomplete, and a basic vacuum extraction device is also not yet available. These conditions are supported by the statement of one informant:

"The facilities are available, but there are still some limitations. For example, resuscitation equipment is still incomplete, and we do not have a vacuum device. Some medications are also unavailable, making it difficult when we need them, but they are not there." (N1)

At the time this study was conducted, Puskesmas X had not yet acquired essential medical equipment such as a neonatal resuscitation device (Neopuff), cardiotocography (CTG), a manual vacuum aspirator, an abortion curettage set, a syringe pump, a three-way stopcock, and an acute respiratory infections (ARI) timer. This situation contrasts with the ideal standard, which requires all emergency obstetric and neonatal care (PONED) facilities to have complete medical equipment. While these tools can be proposed for procurement, the process requires time and depends on the availability of Puskesmas funding. Additionally, equipment procurement is usually prioritized based on the most urgent needs of the Puskesmas.

Due to the absence of medical equipment such as a manual vacuum aspirator and an abortion curettage set, patients requiring these procedures must be referred to a higher-level facility. Furthermore, the availability of trained doctors for PONED services remains very limited, with only one trained doctor working on a shifting basis. This situation results in emergency cases, such as abortion-related emergencies that should be manageable at the PONED facility, being left unhandled if the trained doctor is not on duty.

The healthcare workforce at Puskesmas X consists of 8 doctors, 11 midwives, 8 nurses, 3 laboratory staff, 5 pharmacy staff, and 1 nutritionist. Although doctors, midwives, and nurses are part of the PONED team, they are not exclusively assigned to PONED services. Instead, they are also responsible for administrative tasks, general outpatient services, emergency care (IGD), maternal and child health services (KIA-KB), and various community health efforts (UKM), such as Posyandu, Posbindu, and other outreach programs. This situation results in a high workload, as healthcare workers are burdened with multiple responsibilities. The additional tasks assigned to these workers may affect the optimal delivery of PONED services at the Puskesmas.

The availability of support staff at Puskesmas X, particularly in the pharmacy sector, is adequate, with five personnel. However, the number of laboratory staff remains insufficient, as there are only three individuals, one of whom also serves as the Puskesmas treasurer. This limitation affects laboratory service hours, which are restricted to weekdays until 4:00 PM, with no availability for 24-hour services or operations on holidays. The shortage of laboratory personnel poses a significant challenge in supporting healthcare services, particularly for PONED, which ideally requires access to laboratory examinations at any time.

To optimize PONED services, Puskesmas should strengthen its team by assigning doctors, midwives, and nurses exclusively to PONED duties without additional responsibilities in other units. Furthermore, increasing the number of dedicated laboratory personnel would ensure that laboratory services operate around the clock, thereby enhancing the overall quality of emergency maternal and neonatal care.

"We do have a trained team, but it is still very limited. The trained team consists of one doctor, one midwife, and one nurse. While PONED operates 24-hour services, laboratory services are only available until 4:00 PM due to the limited number of laboratory personnel" (MD1)

In terms of quality, personnel have at least a D3 Health qualification, work experience of 1-5 years, and clinical training certification, although only 13.6% of personnel are trained in PONED. Health financing consists of operational service budgets, primary UKM program budgets (Non-Physical DAK), and service and support program budgets from BLUD.

Process

PONED services at UPTD Puskesmas X are conducted according to standard operating procedures (SOP) by doctors, midwives, and nurses. Childbirth assistance and maternal and neonatal emergency case management are carried out by a team consisting of doctors, midwives, and nurses. As expressed by an informant:

"We always strive to work according to the established SOPs. In handling cases, we must collaborate among doctors, midwives, and nurses." (N1)

Referral consultation and maternal case management have been running smoothly with obstetricians. However, neonatal case consultations with pediatricians have not been optimal, as stated by an informant:

"Coordination for maternal cases has been smooth so far, but coordination with pediatricians is still not optimal." (D1)

The collaboration established by Puskesmas X with external parties includes an ultrasound (USG) service partnership with an obstetrics and gynecology specialist (Sp.OG), scheduled every Monday and Thursday. Additionally, obstetric case consultations have been conducted with several Sp.OG specialists. The Depok City Health Office previously issued a decree (SK) appointing one Sp.OG specialist as a mentor for Puskesmas X. However, the mentoring process has not been fully optimized, as the specialist has limited availability due to commitments at other hospitals. As a result, obstetric case consultations are not exclusively handled by the designated mentor. Moreover, the consultations often result in direct referral recommendations rather than initial intervention guidance or efforts to optimize PONED management before referral.

In neonatal cases, collaboration with pediatric specialists (Sp.A) remains highly limited. To date, no Sp.A has been specifically assigned to support Puskesmas X, making access to consultations and referrals for neonatal emergency cases suboptimal. The situation is further exacerbated by the limited availability of NICU facilities in referral hospitals, which are frequently at full capacity. Additionally, the referral process often encounters administrative challenges, particularly for patients lacking health insurance (BPJS), official identification such as an ID card (KTP) or family card (KK), or those residing outside Depok, making them ineligible for financial assistance under the Universal Health Coverage (UHC) program.

Through the existing collaborations, it is hoped that Puskesmas X can enhance its PONED services and continue to strengthen partnerships, particularly with stakeholders whose involvement has not yet been fully optimized.

Output

Puskesmas performance evaluation is conducted monthly. Reports on PONED patient visits show a 7.9% increase, with delivery rates rising from 65.8% in 2022 to 75.7% in 2023.

"Of course, we feel happy when patients are satisfied with the services we provide. It also motivates us to continue doing our best." (N1)

Referral data decreased from 44 cases in 2022 to 39 cases in 2023, although some cases could have been managed at the primary emergency service level.

"If we look at the data, there has indeed been a decrease in referrals compared to the previous year. Some cases could actually be handled here without requiring a referral." (D1)

In general, several obstetric and neonatal cases can be managed at Puskesmas X without the need for referral, particularly mild to moderate cases such as normal deliveries, mild anemia during pregnancy, mild pregnancy-induced hypertension, and neonatal cases that are stable but require observation and basic care. However, in practice, some cases are still referred despite being potentially manageable at PONED due to limitations in infrastructure, facilities, and clinical authority.

In obstetric cases, the most frequently referred condition is premature rupture of membranes (PROM). Technically, this condition can still be managed at the Puskesmas through antibiotic administration, monitoring of maternal and fetal conditions, and preparation for delivery. However, due to limited availability of medications and the absence of a cardiotocography (CTG) device for fetal heart rate monitoring, the management process becomes suboptimal. Additionally, the lack of full clinical authority granted by the Sp.OG to PONED personnel for monitoring and early intervention further contributes to frequent referrals, as the recommended course of action is almost always hospital referral.

Similarly, in neonatal cases, a common example is neonatal jaundice. This condition is always referred to a hospital because Puskesmas X does not have the necessary facilities for bilirubin level testing, which is crucial for determining the severity of the condition and appropriate treatment. Furthermore, other neonatal cases that could potentially be managed at PONED are often still referred due to the lack of routine consultation access with Sp.A. As a result, PONED personnel lack clinical guidance for making decisions regarding neonatal care at the primary healthcare level.

Healthcare services must be continuously monitored to ensure service quality (5). The patient satisfaction survey regarding PONED services has received generally positive and satisfactory reviews on Google Review. As of the time this study was conducted, a total of 611 individuals had provided reviews on Google Review, with an overall rating of 4.3. Patient satisfaction is a key indicator of service quality. The satisfaction survey at Puskesmas X showed positive results, although there is still room for improvement. As an informant stated:

"Regarding services at the Puskesmas, I am actually satisfied with the services provided. However, sometimes I feel the waiting time is a bit long. Well, understandably, there are several people, so we have to wait our turn." (P1)

The waiting time for services at the Puskesmas falls under the dimension of responsiveness. Although patients express overall satisfaction, the length of waiting time remains a common concern. To address this issue, the Puskesmas should optimize the queueing system, implement scheduled appointments, increase staffing during peak hours, and regularly evaluate waiting times to ensure faster and more efficient service delivery.

Patient' perceptions of reliability, responsiveness, assurance, empathy, and tangible evidence significantly influence their willingness to return for services (6). Therefore, it is recommended to conduct regular patient satisfaction surveys and use the results for service improvements, focusing on enhancing communication, response speed, and the empathetic attitude of healthcare workers.

Reports on PONED patient visits indicate a 7.9% increase, with delivery rates rising from 65.8% in 2022 to 75.7% in 2023. Referral data decreased from 44 cases in 2022 to 39 cases in 2023. However, some cases should have been managed at the primary emergency service level. Thus, regular monthly evaluations should be conducted to monitor service improvements or declines. Utilizing patient satisfaction survey results and other statistical data to identify areas for improvement and implement necessary changes is essential. Additionally, it is crucial to enhance coordination with obstetricians and pediatricians for more effective emergency case management and establish closer collaboration with referral hospitals, particularly in providing NICU space.

Human Resources and Training

The Ministry of Health of the Republic of Indonesia provides PONED with the expectation of delivering 24-hour services supported by trained personnel, adequate medical equipment, and necessary transportation (7). However, interviews revealed several challenges, particularly regarding human resources. Puskesmas X is still experiencing a shortage of doctors and laboratory analysts. Currently, only one doctor has received specialized training. Additionally, there are three laboratory analysts at Puskesmas X, but one of them also serves as the Puskesmas treasurer. As a result, laboratory services cannot be provided 24 hours a day or on holidays.

A total of 86.4% of supporting staff have not yet attended PONED training. Health workers play a crucial role as key figures in implementing the PONED program (8). Health centers with adequate human resources and continuous training are better equipped to handle maternal and neonatal emergencies (9).

The core PONED team consists of one general practitioner, one midwife with at least a diploma (D3), and one nurse with at least a diploma (D3), all of whom must be available 24/7. The supporting team includes additional general practitioners, D3 nurses, D3 midwives, laboratory analysts, and administrative staff, who also receive training alongside the core team. Additionally, a health promotion team is responsible for interpersonal communication, counseling, and partnerships within the service area. The non-health support team includes kitchen staff, laundry personnel, night guards, cleaning service workers, and ambulance drivers. One informant noted:

"PONED training is essential, but not all of us have participated yet. Because many have not attended training, we sometimes struggle when handling multiple cases simultaneously." (MD1)

Only 13.6% of the support team has participated in PONED training, consisting of one doctor, one midwife, and one nurse. The limited number of trained personnel is primarily due to the high cost of training. Providing PONED services requires adequate resources that meet qualification and competency standards. Research by Sofyana (2014) (10) emphasizes the importance of continuous training to improve PONED service quality. Ongoing training ensures that all team members acquire the necessary skills to handle emergencies. Therefore, it is recommended to allocate specific funds

for training and establish partnerships with training institutions to reduce costs. Increasing the number of doctors and laboratory analysts is essential to meet the 24-hour service demand. With improved human resources and adequate training, Puskesmas X is expected to deliver effective and high-quality 24-hour services, as an informant stated:

"Hopefully, more staff will have the opportunity to participate in training. Having more trained personnel will significantly help." (D1)

Moreover, developing training programs that include emergency case simulations is crucial. These simulations allow healthcare workers to practice in realistic scenarios, improving their readiness and response to actual emergencies. Training involving simulations enhances healthcare workers' understanding of emergency procedures, enables them to identify and correct errors, and improves team coordination.

Facilities and Infrastructure

An organization cannot achieve its objectives without adequate facilities and infrastructure (11). To ensure optimal PONED services at Puskesmas X, essential facilities must be available, particularly for maternal and neonatal patients. These facilities include delivery rooms, recovery rooms, sterilization rooms, and newborn care units. The newborn care unit should have direct access to the nurse's station and be equipped with baby cribs, sinks, and linen rooms. Well-equipped and well-maintained facilities are crucial for supporting optimal services, as noted by an informant:

"The newborn care unit should be close to the nurse's station so that supervision is easier." (MD1)

Adequate facilities ensure seamless service delivery. Every stage of childbirth and postpartum recovery will proceed smoothly if supported by complete infrastructure, as stated by another informant:

"If the facilities are inadequate, our work is limited. If the facilities are complete, our tasks become much easier. Patients will also be satisfied when they receive services that meet standards." (D1)

Puskesmas must regularly inventory medical equipment to ensure functionality and replace outdated equipment by requesting budget allocations for necessary updates.

Medical Equipment and Medications

Providing PONED services requires appropriate medical equipment and medications. Availability of operative beds, gynecological beds, standard resuscitation equipment, Neopuff/Mixsafe, and oxygen must comply with guidelines. Similarly, the supply of medications must follow national guidelines, including misoprostol and oxytocin for postpartum hemorrhage management and prophylactic antibiotics such as ampicillin and metronidazole. As one informant stated:

"All equipment must always be available, especially in emergencies. If the equipment is complete, services will be optimal; otherwise, they will be compromised." (MD1)

Healthcare services cannot function effectively without medical equipment (12). Adequate provision of medical equipment and medications is essential for optimal PONED services, as highlighted by another informant:

"Essential medications such as oxytocin and antibiotics must always be available. They are crucial in emergencies." (D1)

Ensuring the availability of essential medicines is a fundamental healthcare requirement. Effective service delivery relies on the constant availability of medications (13). PONED funds must be managed transparently and accountably, with allocations directed toward necessary medical equipment and medications.

Social Support

Research by Pattianakotta (2012) (14) indicates that social support is a crucial factor influencing the effectiveness and efficiency of maternal and neonatal emergency care systems. Support from family, colleagues, and leadership significantly impacts service quality. The study found that healthcare workers who feel supported by their peers are more confident and competent in handling emergency cases, as one informant stated:

"Receiving support from colleagues and leadership boosts our confidence and motivation. It also strengthens teamwork." (N1)

Support plays a vital role in managing stress in emergency medical situations. Feeling supported helps individuals remain calm, feel valued, and gain confidence (15). Another informant expressed:

"Sometimes we feel pressured, especially in emergency medical situations. Having support strengthens and helps us all." (MD1)

To implement effective social support at Puskesmas X, several strategies can be employed, including training on the importance of social support in healthcare, forming regular discussion groups, encouraging open and transparent communication, and developing a reward system for outstanding emergency and referral case management.
By optimizing and improving the overall system, Puskesmas X can enhance maternal and neonatal emergency services, contributing significantly to reducing maternal and infant mortality rates in line with the Sustainable Development Goals (SDGs) and PONED service standards.

Limitations of Service Authority

With trained human resources and the optimization of available facilities at Puskesmas X, several maternal and neonatal cases can be managed by the PONED team, as stated by an informant:

"Maternal cases such as hemorrhage, early pregnancy complications, pregnancy-induced hypertension, and obstructed labor can be handled by our team. We must always be prepared to face emergency situations." (MD1)

"Certain cases that cannot be managed at the Puskesmas will be referred for further treatment at the hospital." (D1)

Human resources play a crucial role in achieving shared goals, as demonstrated through knowledge, skills, competencies, and appropriate professional behavior (16). With adequate human resource fulfillment, maternal and neonatal cases such as early pregnancy bleeding, postpartum hemorrhage, hypertension during pregnancy, obstructed labor, premature rupture of membranes, sepsis, puerperal infection, neonatal asphyxia, respiratory distress in newborns, low birth weight, hypothermia, hypoglycemia, jaundice, seizures, and neonatal infections can be managed at the Puskesmas.

Collaborative Approach

A collaborative approach is a process in which various stakeholders work together to find solutions to existing challenges. At Puskesmas X, collaboration with referral hospitals is essential for patient referrals and professional development. Healthcare personnel at Puskesmas X receive guidance and undergo internships at PONEK hospitals to enhance their clinical skills. As one informant stated:

"We have participated in internships at PONEK hospitals, where we received guidance and learned many things to improve our ability to provide PONED services." (MD1)

Maintaining strong relationships with obstetricians and pediatric specialists is crucial for consultations and ensuring safe and accurate medical interventions. This optimization improves the quality of maternal and neonatal emergency services and contributes to reducing maternal and infant mortality rates. Another informant shared:

"Since our human resources are limited, we frequently consult with specialists. In emergency situations, we require additional information, which is why collaboration with specialists is necessary." (D1)

Research by (10) highlights that an effective referral system is critical to the success of PONED services. The completeness of referral documentation—including comprehensive medical information and required documents—as well as the timeliness of referrals significantly impact patient outcomes. At Puskesmas X, ensuring the completeness of referral packages and improving referral timeliness are key priorities to enhance referral effectiveness. An informant emphasized:

"We continuously strive to ensure that patients receive their rights, including the right to referral services." (N1)

Effective communication between Puskesmas X and referral hospitals ensures that patients requiring advanced care are referred quickly and efficiently. Feedback from referral hospitals regarding referred patients is crucial for evaluating and improving services at Puskesmas X. Regular evaluations and structured feedback help identify weaknesses in the referral system and develop improvement strategies. Continuous training for healthcare personnel at Puskesmas X conducted internally and in collaboration with training institutions is essential to ensure preparedness for emergency situations. These training programs cover clinical skills, medical equipment usage, and effective referral procedures. Ongoing training enhances the competency of healthcare personnel in managing maternal and neonatal emergencies (10).

CONCLUSION

The evaluation of maternal and neonatal emergency case management at PONED UPTD Puskesmas X is conducted in a planned and systematic manner to obtain an overview of the existing conditions. Based on this evaluation, it can be concluded that the availability of human resources remains insufficient. The number of doctors and laboratory

analysts remains insufficient. While PONED services operate 24 hours, they are still constrained by doctors' shift schedules. Additionally, laboratory services are not yet available 24 hours due to the limited number of laboratory analysts. PONED training is inadequate, with 86.4% of the supporting service team having not attended PONED training or maternal and neonatal emergency training due to the high cost of such programs. Clinical mentoring or internships at PONEK hospitals have not been implemented regularly and sustainably. The available facilities and infrastructure are inadequate, as several medical devices need to be updated, such as neopuff/mixsafe and essential medications such as misoprostol and prophylactic antibiotics. There is no existing collaboration regarding the availability of obstetric and pediatric specialist consultants (as responsible parties) who can be contacted for emergency case management.

The recommendations for Puskesmas X include recruiting additional staff to meet human resource needs, providing opportunities and allocating funds for training, seminars, or workshops on maternal and neonatal emergency care for employees, submitting requests to the Health Office to facilitate guidance from hospitals to Puskesmas, and establishing collaboration with professional organizations such as Indonesian Society of Obstetrics and Gynecology (POGI) and Indonesian Pediatric Society (IDAI) for consultation. Additionally, budgeting for the procurement of medical equipment, essential drugs, and consumables, or submitting requests to the Health Office to facilitate the fulfillment of necessary facilities and infrastructure.

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