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Maternal and neonatal referral system in rural North Lampung: a qualitative study of referral system readiness

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Abstract

A reliable referral system is the key to handling emergency cases, for this reason, it is necessary to conduct an in-depth study of the description of the referral system that is in force and implemented in North Lampung, considering that most maternal deaths are caused by cases that require fast and integrated treatment. The aim of the research is to provide an overview of the readiness of the maternal neonatal referral system in terms of four aspects: i) infrastructure, ii) human resources readiness, iii) community readiness, and iv) policy readiness. The research is using qualitative analysis. Data collection uses in-depth interviews, documentation studies, observations, and Focus Group Discussions (FGDs). The Maternal Mortality Rate (MMR) is impacted by the quality of maternal and neonatal services, including handling pregnancy complications. The percentage of rural North Lampung who gained coverage for focusing on pregnancy issues throughout 2021 was a miserable 52.66%. Rural North Lampung's pregnancy-related issues procedures do not adhere to the operational guidelines for maternal-neonatal referral procedures. The fundamental reference, Educate Basic Emergency Neonatal Obstetric (BEmONC), is no longer in operation, as is Comprehensive Emergency Neonatal Obstetric Services (CEmONC). The readiness of all stakeholders for the neonatal and maternal referral system needs to be improved, including the readiness of infrastructure, human resources, and family-community readiness, and needs to be supported by regional government policies.

Introduction

Saving mothers and children in maternal and neonatal emergencies is about punctuality and the correct procedures. It tends to reduce maternal and neonatal mortality rates. About 216,000 maternal deaths occurred in 2015.[1] These were caused by i) maternal bleeding (44,200 deaths), ii) abortion complications (43,700 deaths), iii) maternal hypertensive disorders (29,300 deaths), iv) maternal sepsis and other infections (23,800 deaths), and v) obstructed labor (18,800 deaths).[2] Most cases appear in Sub-Saharan Africa (62%) and South Asia (24%), making up 86% of maternal mortality worldwide.[3]

According to the Indonesian Health Demographic Survey in 2012, the Maternal Mortality Rate (MMR) was more likely to be high at 359 maternal deaths per 100,000 live births. Sustainable Development Goals (SDG) call for a reduction in the global MMR to less than 70 per 100 000 by 2030, and no country should have an MMR greater than 140 per 100,000.[4] In such situations, the number in Indonesia was 305 maternal deaths per 100,000 births, which has not reached the specified target of 183 per 100,000 in 2024.[5] Even more, the MMR was 183 maternal deaths per 100,000 births in 2022. Instead, the circumstances are diminishing compared to Malaysia, with an MMR of 20 maternal deaths per 100,000 births.

In this context, maternal death cases in Lampung Province in 2019 increased from 102 maternal deaths to 110 maternal deaths. The most prominent causes for these were bleeding (38.26%), hypertension (20.86%), (1.74%), blood disorders (7.82%), metabolic disorders (0.87%), and others (30.43%).[6] Based on these symptoms, the MMR in North Lampung grew from 2017 to 2021. There were eight maternal deaths (2017), nine maternal deaths (2018), ten maternal deaths (2019), ten maternal deaths (2020), and twelve maternal deaths (2021), most likely due to bleeding during the postpartum period.

Despite maternal complications that entail emergency response time, various countries have guidelines for handling maternal emergencies. Therefore, the requirement is to focus on reducing maternal mortality. For this reason, Indonesia conforms to policy initiatives on the

decision letter (Ministry of Health decree number 604/Menkes/SK/VII/2008) about guidelines for maternal neonatal services in hospitals, handling emergencies from essential to complex. By way of reference, the Pocket Book of Maternal Health Services in Health and Referral Facilities. Many books assess maternal emergencies. For instance, Guidelines for the Implementation of Comprehensive Emergency Neonatal Obstetric Services (CEmONC) and Educate Basic Emergency Neonatal Obstetric (BEmONC) in Community Health Services (CHS)[7] onward. This study adopted a refinement of procedures for maternal and neonatal services.

Several countries concluded that the patient transfer system is critical. A literature study in some highly ranked journals conducted by Murray & Pearson describes that the referral system has been deemed a part of the component of the health system together with maternity referral. Those attain a tracker for health care system analysis.[8] Descriptive research conducted to assess the causes and factors leading to maternal deaths in Unnao District, Uttar Pradesh, and India through Maternal Death Review (MDR) explained that accepted inter-facility transfer and time rate of referral were the main factors of maternal mortality.[9]

Initiatives have been accomplished to reduce maternal mortality. These consist of existing initiatives named Labor Insurance, BEmONC, and CEmONC. Furthermore, the initiative named SijariEMAS was introduced to accelerate the referral process between midwives, community health centres, and referral hospitals, which focuses on three main objectives: i) improving quality emergency obstetric services and new-born care at affiliated hospitals and health centres; ii) increasing the efficiency and effectiveness of the referral system between community health centres and hospitals; and iii) increasing accountability through local government and community involvement, through interventions to improve clinical governance to ensure quality and strengthen referral systems.[10]

A qualitative study in 2019 explained that obstacles to maternal emergency precautions were most likely to occur after work hours. For instance, blood transfusion complicated procedures, an inadequate facility, and an unsynchronised referral system between BEmONC and CEmONC. In addition, the communication between departments (Midwife-PONED-PONEK-PMI-reserialise OBGIN) is ineffective. Furthermore, the interview results from the Focus Group Discussion (FGD) were mostly from midwives who tended to state that CEmONC was not ready to give medical treatment to patients. On the other hand, the hospital nurse or midwives claimed that the referred patient was in a weak condition as a means of not receiving sufficient medical care. For this reason, the doctor of the OBGIN specialist revealed that the blood request procedure was complicated and took time, and the patient needed a quick blood transfusion.[11]

The conclusion stated that a quality referral system with fast help is critical to saving mothers and their babies. Executing a quality referral system is expected to reduce maternal and neonatal mortality. Nonetheless, an excellent act of assistance involves the readiness of all parties as a means of infrastructure, human resources, finance, and rural, especially the family. A valid referral system is expounded on how to handle emergency cases pre-eminently. For this reason, conducting an in-depth study on how to evoke the current referral system in rural North Lampung is necessary. Indeed, the root causes of maternal mortality in many cases entail an integrated medical treatment.

The research aims to obtain how to describe the readiness of the maternal and neonatal referral system in terms of four aspects: i) infrastructure, ii) human resources, iii) rural, and iv) health service. The research applied access theory to optimise the result. A theoretical framework in this research is the access theory of health services, which is said to achieve equity if health services are distributed according to geography, socioeconomics, and community needs; conversely, if health services have not been distributed well. According to geography,

socioeconomics, and community needs, it can be called equity service access. As is known, efforts to achieve equity can be completed by applying an access theory approach. Access as a tool for measuring the equity of health services can be seen through i) potential access process indicators, namely population characteristics, ii) potential access structural indicators, namely health service system characteristics, iii) access fundamental objective indicators (realised access objective indicators), namely the utilisation of health services, and iv) real access subjective indicators (realised access subjective indicators), namely the utilisation of consumer satisfaction, where all of these components are influenced by health policy.[12,13]

Materials and Methods

The research uses qualitative analysis. Data collection uses in-depth interviews, documentation studies, observations, and FGDs. The in-depth interviews were held in the rural North Lampung health facility along with the head of the public health centre, BEmONC team, the obstetrics gynecology doctor specialist, and the families who experienced maternal-neonatal mortality. Documentation studies were accomplished on the maternal-neonatal mortality summary, North Lampung neonatal maternal audit, mother-child health book, and the referral paper of the community health centre. Observations were executed at BEmONC while the FGD was carried out with eight participants consisting of a head of health services (1 person), a head of a community health center (1 person), doctors (2 people), midwives (2 people) and nurses (2 people). Research procedures consisted of i) in-depth interviews with five families with maternal-neonatal mortality, ii) in-depth interviews with the head of Public Health, North Lampung Health Office, and staff also take documentation paper of maternal-neonatal mortality, iii) observations at eight BEmONC facilities in North Lampung, iv) interviews with the head of the community health centre and the BEmONC team, v) data validation accomplished through interviews with families with maternal and neonatal mortality, vi)

further validation follow-through interviews with doctors of obstetrics and gynaecology who handle many maternal-neonatal emergency cases.

The type above of research adopts a qualitative approach to field research, ensuring rigorous interviewing methods, documentation studies, observations, and FGD are implemented to collect field data that accurately conveys authentic circumstances. Comprehensive conversations have occurred involving the obstetrics gynaecology doctor, the head of the PONED team, the head of Health Services at the North Lampung Health Service, and the head of the community health centre. Documentation studies on maternal-neonatal death data, maternal-child health book, North Lampung neonatal maternal audit, and documentation referral at the community health centre have been implemented targeting families with maternal-neonatal death incidents. Observations were carried out at PONED facilities. The selection of family samples/participants was done using the purposive sampling method combined with the snowball sampling technique. To be eligible to participate, a family must: i) have experienced the demise of a mother or newborn and ii) be open to an in-depth interview. Seven participants were intended to be interviewed for this study; however, only five agreed to be interviewed, one declined, and one failed to attend due to a relocation to another home. After the information accumulated exceeded saturation, an adequate number of participants was deemed sufficient.

Data analysis

The research team completed the data analysis procedure in phases: i) condensed details from interview transcripts into findings using common words, phrases, and sentences; every code was assigned, factoring for the participant's name, the data source, and several interviews; ii) doing probing, make small notes on data that still raises questions, then ask the data source again to deepen the meaning of the information provided; iii) assemble comparable data.

Similar data is compiled into one conclusion to assist researchers in deciding whether the data obtained is comprehensive or reflects triangulated data, nor whether the data is deemed sufficient. Equivalent data from various sources, including interviews with participants (head of public health, head of community health center, families of patients who died, OBGIN doctor), field notes (observation results at PONED facilities), documentation from records at the community health center and Mother's KIA Book, combined into one statement of findings; iv) selecting categorisation, meaning the final phase of the analysis after the researcher looks at an assortment of findings and the interrelationships between the evidence, is accomplished by the researcher applying categorisation after similar data is gained. An interpretation code serves with this empirical unity by ensuring that words, phrases, and sentences are accurately categorised as variations of relevant details. Figure 1 shows a framework of the research coding model path.

Results

Maternal mortality in rural North Lampung

Based on a documentation study at the North Lampung Health Service, the maternal mortality rates in 2022 are shown in Table 1.

Based on Table 1, it seems that most maternal deaths in rural North Lampung happened during postpartum and childbirth. Hence, the actual number of deaths registered in hospitals. The results of interviews with the public center hospital explained that several deaths were not recorded. For instance, those of mothers who died in provincial hospitals with referral and maternal deaths, not in health facilities.

Table 2 implies that most maternal deaths happen between 20 and 34 years old. Nonetheless, the possibility of maternal mortality within the age of over 34 years is high. By way of reference, the highest likelihood of success in giving birth is under 30 years old.

Table 3 explains that the unaverred cause of maternal mortality for the past six years was haemorrhages. In addition, hypertension is more likely to be high.

Qualitative analysis of referral readiness

Infrastructures

BEmONC is due to the basic level of maternal and neonatal service. North Lampung has 8 BEmONC with inpatient facilities. When medical treatment attempts to run in all BEmONC, only one BEmONC executes the function by giving medical treatment. Despite the BEmONC assignment, a referral could have been managed better. BEmONC assignment is more likely to be a place for midwifery care services. Since 2019, seven BEmONC (starting the COVID-19 pandemic) have been Malfunctioning. In this context, the results of the observation approach to facilities availability at BEmONC are only 30-40%. Most BEmONCs do not have an adequate emergency facility for medicine, oxygen, suction, *etc*. Furthermore, the only transportation is an ambulance utilised for all emergency cases at the community health centre.

Human resources

The results of interviews with the head of the community health centre and the BEmONC team stated that the policy concerning collaboration between a doctor, a midwife, and a nurse is inappropriate. In addition, the public health service has not been providing training over the past five years. Furthermore, the Data validation approach from the health service conveys that there was no Maternal Neonatal emergency training during the previous three years. Training expenses are typically covered; however, the budget allocated for continuous health education is limited. Officers must understand referral and emergency handling processes at the BEmONC level, according to interviews conducted with various BEmONC teams (nurses) at numerous community health centres regarding their understanding of referral protocols. The

results of the FGD with IBI management participants, midwives from hospitals and health centres, who assert that many midwives in villages lack the skills and expertise necessary to manage maternal and newborn emergencies, support the statement effectively. Despite the risks, they frequently behave recklessly when giving birth by themselves.

For instance, in one case of maternal mortality, it was discovered during the labor that the birth was breech; the midwife who had a clinical license was not at the clinic, so a substitute midwife was assigned who did not have a license to practice. The midwife decided to refer the patient when the baby's body was out, and the baby's head was still inside. In such conditions, the patient is referred to the hospital. as explained by one of the responsible midwives: "So the story is that the one who helped was her assistant, a freshly graduated midwife named X. She had a lack of experiences and discovered a case of breech birth. Now, the body was out, but the head was stuck and could not get out. After that, the patient was sent to Y Hospital."

Antenatal care and deficient book records for pregnant women are factors that start maternal mortality. The midwife disclosed that in one of the situations, the birth attendant was unaware that the expectant mother was breech. In fact, according to the midwife at integrated health centres (*Posyandu*), she had examined the pregnant woman and detected that there was a case of breech position. However, after checking medical records, no notes explained the inspection results scientifically. A report by one of the community health centre's midwives, "At *Posyandu* yesterday, I was the one who examined the mother (deceased); she was breech. However, when I looked through the MCH book, I could not find any documentation indicating the pregnancy test result was breech."

The following are the specific human resources that are employed for overseeing emergencies in phases.

The village midwife

The preparedness of village midwives to deal with unexpected circumstances needs to be improved. Reports from community health center midwives, the health service, and most village midwives state that they have not received maternal emergency training in the last five years, and there have been no updates on this issue in a while. The results of interviews with community health center officers (coordinating midwives) in cases of maternal mortality were that assistance was provided by new midwives who had yet to be trained in ordinary childbirth care or Midwifery Update (MU) as a requirement for independent midwifery practice.

Basic Emergency Neonatal Obstetric

BEmONC staff consists of one doctor, one midwife, and one nurse; they must have been certified in BEmONC training. The results of interviews with 5 heads of community health centres in rural North Lampung mentioned that only one community health centre had BEmONC staff (doctors and midwives). In contrast, the BEmONC team still had a certification that needed to be completed at the other community health centres. The health service also suggested holding training to deal with this issue. Nevertheless, each time a budget proposal was made, it was consistently turned down for unjustifiable reasons.

Comprehensive Emergency Obstetric Neonatal Care

According to data from the Health Department, three hospitals provide CEmONC. Not all hospitals had been trained to receive referrals for maternal neonatal emergency patients, according to the findings of interviews with BEmONC midwives. As stated by one of the midwives who had referred a patient to CEmONC: "Although we do not have to convey him to the hospital, we are the ones who manage it; the staff is untrained; the patient already appears weaker; and rather than receiving immediate assistance, she is left on her own to survive."

Based upon the six deaths in 2022, because they were transferred to a hospital in an unstable situation, five of them encountered maternal mortality. The alertness of CEmONC staff is also an obstacle in treating patients. It does not seem viable to provide medical care for maternal-neonatal emergency patients who are assigned to referral hospitals owing to inadequate facilities and restricted blood supply.

In addition, one case of maternal mortality due to bleeding indicated that blood readiness in handling bleeding cases was an obstacle. Furthermore, the procedure for obtaining blood is complicated, especially the cross-reaction examination procedure between the donor's blood sample and the patient's blood sample, which takes 1-2 hours and triggers delays in treatment. The family claimed: "When my sister was about to give birth, everything was fine, but when the baby was born, suddenly blood pooled under the mother's back; we were not ready for blood, so our sister was immediately taken to *Handayani* Hospital. Therefore, we got blood at the Indonesia Red Cross (IRC) using a long procedure; unfortunately, our younger sister had already passed away."

IRC explained that an array of tests is required before making blood transfusions, taking one to two hours. The patient will be exposed to risk if the procedure is not concluded.

Rural community

Family readiness enables a glimpse into rural community preparedness through the maternal-neonatal referral system. Based on interviews with families who experienced maternal mortality, a significant number of mothers passed away due to families postponing decisions for affordability reasons. Families tend to insist that the birth process only be assisted by a midwife, as explained by one of the members (husband): "We do not have the money, and we will have to pay more once we are recommended. We let the midwife handle it, and we can still assist."

Even in urgent circumstances, mothers commonly disagree with being referred to more professional medical services, and families are typically reluctant to oblige.

The readiness of the maternal and neonatal referral system has been built at the village community level; several community health centres visited stated that at the village level, a referral network had been established, and the village ambulance was prepared to refer patients to health facilities. Village leaders, community health clinics, and midwives have coordinated in several rural North Lampung villages. Most of their obligations in an emergency embrace setting up a transportation system. Engaging the family in referral decisions before a referral occurs is crucial, yet the medical field discovers that both partners rarely like to be incorporated throughout pregnancy and giving birth. One of the community health centre midwives explained: "Fathers have not always been eager to accompany their wives in lessons. Therefore, it is challenging to extend a call to them to get involved. Once those men accompany them—mostly husbands are waiting outside—it is difficult to get those gentlemen to think differently."

Public health official

It became clear from interviews with the Public Health Division's staff and the head of Public Health that a unique strategy was required to address maternal crises at the health service level, despite the Obstetric Complications Services program, which includes handling maternal and neonatal emergencies. The North Lampung health profile shows that the trend in coverage for the treatment of obstetric complications in the last five years (2017-2021) has fluctuated up and down. The highest coverage was in 2019, and the lowest was in 2021; the average coverage for 2021 is still shallow, namely 52.66%.

Regarding guidelines or Standard Operating Procedures (SOPs) for managing and referring instances of maternal and neonatal emergencies, the health service has no rules or regulations. Governor policies number 2 of 2018 and number 22 of 2019, which are about technical

instructions for leveraging maternity guarantee funds in North Lampung Regency, govern childbirth assurance as a financial source. Nevertheless, there are unlikely to be any assurances of childbirth by 2021.

Coherency referral

Based on interactions with families, village leaders, midwives, health centres, hospitals, and health services undertaken at each public health care system level, the referral procedure applied in many instances for newborns and their mothers is as follows.

According to Figure 2, independent midwives' practice refers maternal-neonatal emergency patients immediately to the hospital, skipping the BEmONC community health centre. The nearest medical facility is referred to, although it does not provide BEmONC services.

Discussion

Causes of maternal mortality

The primary cause of death, according to research analysing the maternal mortality database from 2017 to 2022, was labor proceedings. The most frequent causes are bleeding and hypertension, so the government is preparing programs to reduce the MMR. Nevertheless, many government-initiated programs have not resulted in the most beneficial outcomes. Between 2003 and 2009, the World Health Organization (WHO) reported that more than half of maternal mortalities worldwide were caused by bleeding, hypertensive disorders, and sepsis, and more than a quarter of deaths were due to indirect causes.[14] Research in two countries, namely Indonesia and Burkina Faso, which examined 104 families who experienced maternal death in Indonesia and 74 families from Burkina Faso, the result was that more than two-thirds of respondents reported delays in seeking, achieving, and receiving medical care. In addition,

family members share details about their emergency experiences, which shed light on a culturally derived system of causes, explanations, and behaviours.

It is crucial to expand access to basic emergency obstetric and neonatal services. Fifty-five low- and lower-middle-income countries explain ninety percent of maternal mortality worldwide. These nations have broadened family planning initiatives and enhanced neonatal medical treatment from 68% to 90%. Additional funding is likely necessary for this suggested project.[15]

Readiness of referral system

The BEmONC facility in Indonesia provides initial treatment throughout the referral system for mothers and newborns. Hence, it will be sent to higher referral hospitals and CEmONC. Several healthcare facilities must set up BEmONC and CEmONC facilities with the best possible infrastructure and staffing levels. According to several studies on BEmONC and CEmONC implementation in Indonesia, those initiatives could have been executed with greater effectiveness by considering policy readiness, human resources, infrastructure, finances, and the planning, organising, implementation, evaluation, and feedback procedures.[16,17]

The adequacy of initiatives by governments aimed at solving this issue is not the primary factor driving the high rates of maternal mortality in an array of nations. A substantial amount of the organising and planning was completed in various countries. Nonetheless, the planned initiative will have less of an impact on reducing maternal mortality throughout its implementation because it will require more monitoring, evaluation, and follow-up.[18-20] MMR in Indonesia has declined over the past five years, although it is still significantly lower than the goal of 183 per 100,000 births in 2024. Indonesia remains ranked as having the highest maternal mortality rate in Southeast Asia when compared with comparable nations. Furthermore, Indonesia aims for MMR to be fewer than 70 per 100,000 births by 2030. For

this reason, the SDG call for an annual reduction of 11.6% - an uncommonly attained rank on a national level.[21]

Maternal and neonatal emergency referrals can be entailed if adequate policies, human resources, infrastructure, and sufficient finances are empowered. Findings from the North Lampung Health Service's head of Public Health interviews revealed there are no SOPs or guides for reference at the health service, and no local government regulations enable a system for improving maternal and neonatal emergencies. Research in Ghana showed that 39% of mothers who died or nearly died gave birth in locations that were unable to provide essential emergency services.[22] Likewise, research conducted in Southwest Cameroon evaluated the implementation of obstetric and neonatal services; in theory, maternal and neonatal deaths would be reduced with maternal and neonatal emergency services. Though these resources are entirely operational in Southwest Cameroon, their implementation is unlikely to decrease the maternal mortality rate since the provision of services must be linked with their level of quality.[23] This circumstance is also prevalent in Tanzania, where medical facilities frequently are not ready or accessible for managing BEmONC. To decrease Tanzania's mortality rates, regular quality assurance and auditing of maternal mortality is necessary.[24]

Handling obstetric difficulties involves the community and family taking on a critical role. The study's findings indicate that the pace at which referrals are made depends on the husband's decision-making throughout an emergency. In this instance, partners' commitment to antenatal care is insufficient, and families are typically cautious when referring patients. Most husbands in developing countries often need more knowledge about reproductive health than their female partners.[25] In addition, husbands also control decision-making regarding the time and conditions of sexual relations, family size, and decisions regarding health care service options. This phenomenon has a significant negative impact on maternal and neonatal health. Research conducted in the Tanzanian highlands explained that knowledge about birth readiness and

readiness to face complications among husbands was shallow, even though 81.3% had heard about this.[26] Those factors will undoubtedly hinder timely access to maternal emergency services.

The findings in this study define that the referral flow for maternal-neonatal emergency patients is accomplished from independent practice midwives directly to the hospital without going through the PONED community health centre. Referrals are also made to the nearest hospital, even though it does not provide PONEK services. This circumstance is occurring in Sudan. A pregnant woman encounters a variety of difficult obstacles before arriving at an appropriate medical facility after selecting emergency obstetrical treatment. Of the four pathway patterns to CEmONC, three were associated with high maternal mortality rates with many factors, such as i) late referral, ii) zig-zag referral, and iii) double referral. Mothers who choose a non-functioning BEmONC facility and go straight to the CEmONC facility immediately (the fourth pathway pattern) are most likely to survive.[27]

Conclusions

The MMR is impacted by the quality of maternal and neonatal services, including handling pregnancy complications. The percentage of rural North Lampung who gained coverage for focusing on pregnancy issues throughout 2021 was a miserable 52.66%. Rural North Lampung's pregnancy-related issues procedures do not adhere to the operational guidelines for maternal-neonatal referral procedures. The fundamental reference, BEmONC, is no longer in operation, as is CEmONC. The readiness of all stakeholders for the neonatal maternal referral system needs to be improved, including the readiness of infrastructure, human resources, and family-community readiness, and needs to be supported by regional government policies.

Suggestions

Regional governments need to emphasise enhancing midwives' and nurses' knowledge. Additionally, improving BEmONC and CEmONC facilities, as well as preparing reference regulations regarding the referral system for both private practice sectors, doctors, nurses, and midwives need to complete their skills, knowledge, and communication between health facilities and within health facilities better through continuous education and training. Broad education about the involvement of husbands, families, and communities is also critical. Lastly, innovative methods such as electronic messaging applications must also be used for effective communication and documentation.

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Table 1. Maternal mortality by condition.

Condition of death	2017	2018	2019	2020	2021	2022
Pregnancy	3	0	1	unidentified	0	2
Labor	2	8	4		6	2
Postpartum	3	1	5		6	1

Table 2. Maternal mortality by age.

Age	2017	2018	2019	2020	2021	2022
<20	0	0	0	2	0	2
20-34	6	6	10	6	6	2
>34	2	3	0	2	6	1

Table 3. Maternal mortality by causes.

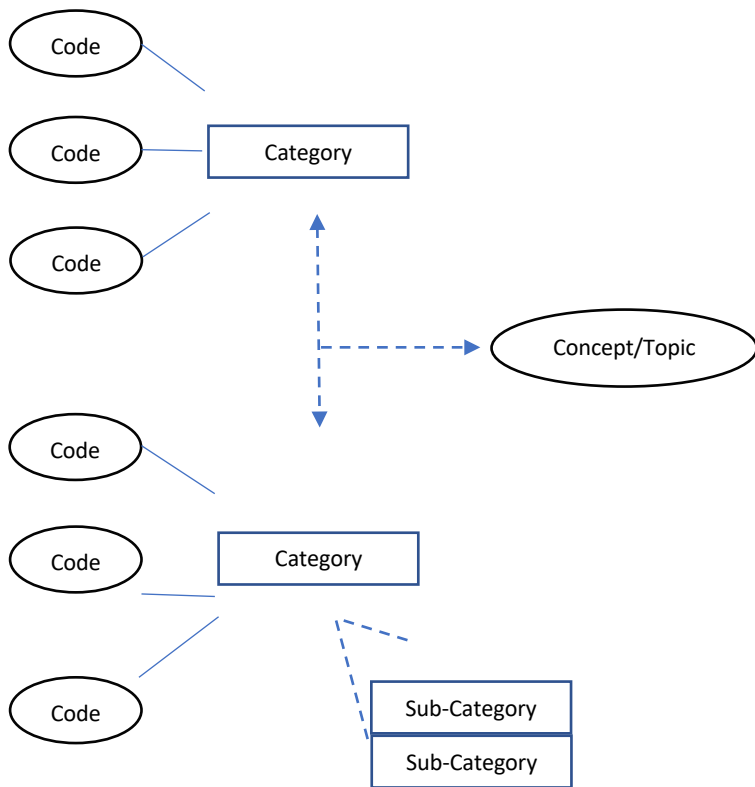| Cause of death	2017	2018	2019	2020	2021	2022
Haemorrhage	0	7	5	3	1	3
Hypertension	6	1	5	1	4	0
Other causes	2	1	0	6	7	2
Total	**8**	**9**	**10**	**10**	**12**	**5**

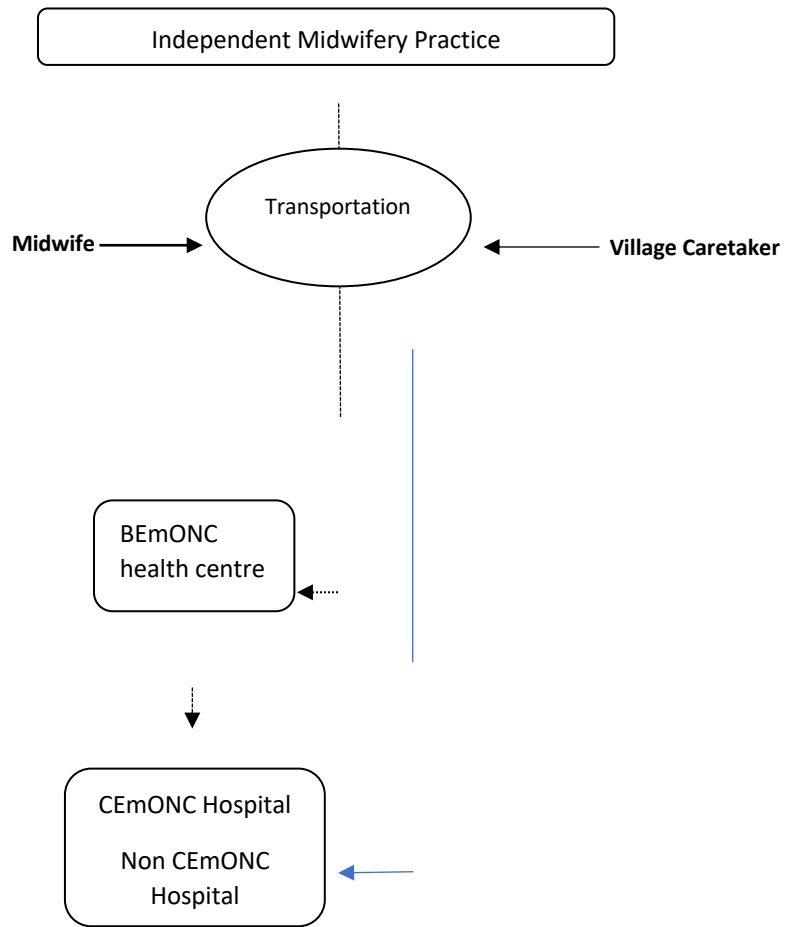**Figure 1.** Framework of the research coding model path.

Figure 2. Flowchart referral system in rural North Lampung.

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