



Development of the Maternal and Child Health Education Model in North Sulawesi Province

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Abstract

Maternal and child health is a global priority, with ongoing innovations in health education, including the use of information and communication technology. Studies have demonstrated that interoperable information systems can enhance the quality of health services while facilitating data integration for monitoring and evaluating the performance of health services, particularly in maternal and child health. This research is a descriptive qualitative study aimed at providing an overview of health service management. The findings revealed that the planning of maternal and child health programs is conducted in accordance with established policies, indicating that various efforts can be implemented to reduce maternal mortality rates. By 2022, North Sulawesi had successfully reduced its maternal mortality rate to 36 cases, which is below both the target of 40 cases and the national target of 228/100,000 live births. This achievement is attributed to the continuous optimization of health services, including infrastructure development, to ensure equitable access to quality healthcare for all local communities. The successful reduction of maternal mortality rates requires collaborative efforts from provincial health offices, districts/cities, hospitals, social services, public works offices, community and village empowerment offices, regional leaders, and the community itself.

Keywords: *Management; Maternal and Child Health; Public Health Education*

Introduction

In Indonesia, efforts to improve the health status of mothers and children are one of the priority programs. This is because maternal and child health issues continue to be a major problem in the field of healthcare. According to UNICEF, every three minutes, somewhere in Indonesia, a child under the age of five dies. Additionally, every hour, a woman dies due to childbirth or related causes (Sistiarani & Gamelia, 2012).

The high maternal mortality rate trend in Indonesia continues to persist until today. The number of maternal deaths recorded by the Family Health Program in the Ministry of Health increases every year. In 2021, there were 7,389 deaths in Indonesia, showing an increase compared to 4,627 deaths in 2020. The

number of maternal deaths in North Sulawesi Province in 2022 decreased compared to 2021, with 40 deaths caused by hemorrhage (10%), hypertension in pregnancy (19%), Heart-related issues (13%), infections (5%), abortion (3%), and others (34%).

According to the DHS data, the number of maternal deaths decreased during the period from 1994 to 2011. However, in 2012, the number of maternal deaths increased and decreased again in 2015. The number of maternal deaths in 2016 was 4,912, with hemorrhage (29.2%), hypertension (25.8%), and other causes (45%). In 2017, there were 4,167 maternal deaths, with hemorrhage (27.1%), hypertension (22.1%), and other causes (50.8%) (Ministry of Health, 2018).

Based on the data from the Health Office of North Sulawesi Province, it can be concluded that the coverage of first antenatal visits in 2022 has increased. The fourth antenatal visit among pregnant women in 2022 has also increased. The coverage of deliveries by healthcare facilities has increased in 2022, while the coverage of deliveries by non-healthcare facilities has increased compared to 2021. The coverage of neonatal care in 2022 has also shown improvement.

Occurrence of childbirth complications can be caused by risk factors during pregnancy. However, this cannot be the sole criterion for determining such occurrences, as complications during childbirth can also happen to pregnant women without risk factors. Therefore, midwives, as healthcare providers who have direct relationships with pregnant women in providing antenatal care, play a crucial role in managing risk prevention through screening to determine the level of risk according to the severity of those risk factors (Hidayah & Wahyuningsih, 2018 in (Muzayyana, 2020)).

High-risk pregnancy is one in which the life or health of the mother or fetus is in danger, with a higher risk of maternal mortality due to coincidental or unique pregnancy disorders (Rahayu & Rahmawati, 2022). Factors contributing to maternal death can generally be classified into direct causes and indirect causes. Direct causes of maternal death are factors related to complications of pregnancy, childbirth, and postpartum, such as hemorrhage, pre-eclampsia/eclampsia, infections, prolonged labor, and abortion. Indirect causes of maternal death are factors that exacerbate the condition of pregnant women, such as the "Four Too's" (too young, too old, too frequent childbirths, and too short birth intervals). According to Neieburg, besides the above-mentioned causes, the "Three Delays" of recognizing danger signs and making decisions, reaching healthcare facilities, and receiving emergency care can also worsen the mother's health status and complicate the management of pregnancy, childbirth, and postpartum emergencies (Noerpramana, 2013 in Muzayyana, 2020)).

Assessment of the implementation of maternal healthcare services can be done by looking at the coverage of the first visit and the Fourth Antenatal Visit for Pregnant Women. The percentage of coverage for the first visit in North Sulawesi Province in 2022 is 47.72%. Furthermore, the percentage of pregnant women who have received the fourth antenatal visit in North Sulawesi Province in 2022 is 87.05%. One of the reasons for the relatively low coverage of Antenatal Care (ANC) visits is that the community's awareness to seek healthcare services has not been fully established (North Sulawesi Health Office, 2022).

In the process of sustainable health development, one of the initiatives is the improvement of nutrition for newborn infants (Chen et al., 2016). Furthermore, efforts to improve the health of mothers and children must prioritize the fulfillment of their right to life. Ensuring the health of mothers and children requires the provision of appropriate healthcare services (Tahir & Harakan, 2018). Poverty is one of the challenges in achieving sustainable health development in many countries (Gumilar et al., 2019). When addressing health issues, the government must also consider influencing factors, and one of the most significant factors affecting public health is the economy, which strongly influences community health (Pinem, 2016). Efforts to provide healthcare services are crucial, but they should also strive for change and innovation. Government innovation in implementing sustainable health development should primarily focus on improving healthcare services to provide optimal care to the community (Tahir & Harakan, 2018).

According to WHO, efforts to improve the health status of mothers and children aim to reduce maternal and neonatal mortality rates. To accelerate the reduction of maternal and neonatal mortality, efforts are made to improve the quality of services and ensure the continuity of maternal health and referral services.

Indicators used to assess Maternal and Child Health programs include the first antenatal care visit (K1), coverage of the fourth antenatal care visit (K4), coverage of the Mother and Child Health book, early detection of high-risk pregnancies by healthcare providers, deliveries attended by healthcare providers, management of obstetric complications, postpartum care, neonatal care, management of neonatal complications, healthcare for toddlers, and suspicion of maternal and child deaths (Kemenkes, 2020).

Maternal Mortality Rate is an important indicator that reflects the level of health in a region. The target for North Sulawesi's Maternal Mortality Rate in 2022 is 40 per 100,000 live births, a decrease from 36 cases of maternal death. However, there was an increase in maternal deaths in 2021, with the target being 41 cases but increasing to 64 cases. In 2020, the target was 58 cases but increased to 230 per 100,000 live births, higher than the national rate of 189.

The fluctuation in maternal mortality rates is influenced by several factors, as seen in some districts that have been unable to reduce Maternal Mortality Rate. Although the rate is still below 183 per 100,000 population, there is a need for program synergy between the province and districts to prioritize efforts in reducing maternal mortality in districts with high numbers of deaths. The lack of maternal and neonatal referral facilities in hospitals and primary health centers, as well as the shortage of midwives and specialized obstetric personnel in districts, are among the reasons for the persistently high maternal mortality rate.

The leading causes of maternal deaths in North Sulawesi Province in 2022 were hemorrhage (26%), hypertension (19%), infection (5%), cardiac issues (13%), abortion (3%), and other causes (33%). The city of Manado had the highest number of maternal death cases, with 6 cases, followed by North Minahasa Regency with 5 cases. Minahasa Regency, South Minahasa Regency, and Bolaang Mongondow Regency each had 4 cases. Furthermore, Bolaang Mongondow Utara Regency, Southeast Minahasa Regency, and Bolaang Mongondow Selatan Regency had 3 cases each. The regions with the lowest maternal mortality rates were Bolaang Mongondow Timur Regency, Bitung City, Kepulauan Sangihe Regency, and Kepulauan Siau Tagulandang Biaro Regency, with 1 case each. The districts/cities in North Sulawesi where no maternal deaths were reported were Kepulauan Talaud Regency, Kotamobagu City, and Tomohon City. It is evident that the number of maternal, infant, and neonatal deaths in North Sulawesi fluctuates from year to year. Control and prevention efforts include early antenatal care, safe deliveries, and proper postnatal care. The leading causes of maternal deaths in 2022 were hemorrhage and other causes. In 2021, the causes of maternal deaths remained consistent with those of the previous year. The coverage of antenatal care services (first antenatal care visit and fourth antenatal care visit) in North Sulawesi Province fell short of the set targets in 2022 and 2021, with coverage rates of 90% and 85% respectively (RPJMN Directorate of Family Health Indicators 2020-2024).

Currently, maternal and neonatal mortality rates remain significant challenges in the field of reproductive health in Indonesia. According to Databoks, the causes of maternal deaths in Indonesia in 2021 included COVID-19 (2,289 deaths), hemorrhage (1,320 deaths), other causes (1,309 deaths), hypertension during pregnancy (1,077 deaths), cardiac issues (335 deaths), infection (207 deaths), metabolic disorders (80 deaths), circulatory system disorders (65 deaths), and abortion (14 deaths).

The maternal mortality rate in North Sulawesi in 2022 exceeded the established target. Based on the analysis obtained from descriptive data, the coverage of ANC (K6) is still relatively low. Several districts/cities, including Bolmong Regency, Kepulauan Talaud Regency, Minsel Regency, Mitra Regency, Boltim Regency, Bolsel Regency, Tomohon City, and Kotamobagu City, have ANC (K6)

coverage below 50%. Pregnant women who do not receive comprehensive ANC services are at risk of experiencing health complications, and even death. This is exacerbated by several districts/cities that have not conducted LILA measurements on pregnant women, such as Minahasa Regency (0%), Kepulauan Talaud Regency (0%), and Boltim Regency (0%). Indirectly, the number of maternal deaths is related to the prevalence of pregnant women experiencing malnutrition (KEK) that is not fully recorded. Pregnant women with malnutrition who do not receive interventions are at increased risk of maternal death. The second highest cause of maternal deaths in North Sulawesi in 2022 was hemorrhage, which is indirectly related to the low consumption of iron and folic acid supplements (TTD) in North Sulawesi in 2022 (65.95%), with 7 districts/cities still achieving 0% coverage of TTD consumption among pregnant women. Factors like these indirectly contribute significantly to the high number of maternal deaths in North Sulawesi.

Table 1 Analysis of maternal mortality in North Sulawesi Province in 2022

Wilayah	Jumlah Kematian Ibu	Ibu Hamil	Cakupan Kunjungan Antenatal (K4)		Persentase ibu hamil yang mendapatkan pemeriksaan kehamilan 6 kali (ANC 6x)		Ibu Hamil yang diukur LILA	Persentase ibu hamil Kurang Energi Kronik (KEK)		Ibu hamil Konsumsi TTD (*)	
			ABS	%	ABS	%		ABS	%	ABS	%
BOLAANG MONGONDOW	4	4,616	3,750	81.24%	1,012	21.9	11	1	9.09%	-	0.00%
MINAHASA	4	4,712	4,764	101.10%	4,091	86.8	-	-	0.00%	-	0.00%
KEPULAUAN SANGIHE	1	1,764	1,686	95.58%	1,104	62.5	667	134	20.09%	1,601	92.54%
KEPULAUAN TALAUD	0	1,541	877	56.91%	584	37.9	-	-	0.00%	-	0.00%
MINAHASA SELATAN	4	3,183	2,397	75.31%	1,513	47.5	83	11	13.25%	169	69.83%
MINAHASA UTARA	5	3,353	3,410	101.70%	2,191	65.3	625	20	3.20%	540	100.00%
MINAHASA TENGGARA	3	1,858	1,581	85.09%	761	40.9	29	3	10.34%	-	0.00%
BOLAANG MONGONDOW UTARA	3	1,537	1,216	79.12%	900	58.5	45	10	22.22%	21	91.30%
KEP. SIAU TAGULANDANG BIARO	1	894	747	83.56%	698	78.0	37	10	27.03%	9	19.57%
BOLAANG MONGONDOW TIMUR	1	1,262	796	63.07%	551	43.6	-	-	0.00%	-	0.00%
BOLAANG MONGONDOW SELATAN	3	1,498	1,066	71.16%	497	33.1	1,685	306	18.16%	94	9.02%
KOTA MANADO	6	6,593	6,457	97.94%	3,597	54.4	186	25	13.44%	-	0.00%
KOTA BITUNG	1	4,193	3,591	85.64%	2,463	58.7	21	6	28.57%	-	0.00%
KOTA TOMOHON	0	1,502	1,513	100.73%	130	8.6	29	1	3.45%	103	100.00%
KOTA KOTAMOBAGU	0	2,218	1,600	72.14%	963	43.4	31	3	9.68%	394	54.87%
TOTAL	36	40,724	35,451	87.05%	21,055	51.7	3,449	530	15.37%	2,931	65.95%

The design was originally intended to reduce the number of maternal and infant deaths according to the targets outlined in the RPJMD. In the planned program activities of the Health Department for 2016-2021, the focus of development implementation will be directed towards addressing the five leading causes of maternal deaths: hemorrhage, hypertension in pregnancy (HDK), infection, prolonged/difficult delivery, and abortion. Maternal deaths in North Sulawesi are still predominantly caused by three main factors: hemorrhage, hypertension in pregnancy (HDK), and infection. However, their proportions have changed, with hemorrhage and infection tending to decrease while the proportion of HDK has increased. Health studies estimate that out of the average pregnancies expected to occur in the next five years, around 20% will experience complications. Some of these complications can be life-threatening, but the majority can be prevented and managed if: 1) mothers seek immediate help from healthcare providers; 2) healthcare providers follow appropriate procedures, including the use of partographs to monitor labor progress and the implementation of active management of the third stage of labor (AMTSL) to prevent postpartum hemorrhage; 3) healthcare providers are able to identify complications early; 4) in case of complications, healthcare providers can provide first aid and stabilize the patient before referral; 5) effective referral process; 6) timely and appropriate services in hospitals.

The maternal and child mortality rates, as indicators of the success of Maternal and Child Health achievement, have been reported to decrease each year. However, in Indonesia itself, the target of MDGs

has not been achieved yet. Therefore, the government is making various efforts by utilizing the role of the community, both through families and health cadres. Through the General Guidelines for Healthy Indonesia Programs with a Family Approach and the Health Promotion Guidelines for Health Workers at Primary Health Centers issued by the Ministry of Health Indonesia, it is expected that targets related to maternal and child health can be achieved. Efforts to maintain and improve the health of mothers and children in Indonesia should address the four determinants of health: behavior, environment (including physical, social, cultural, political, economic, and other aspects), health services, and heredity. In other words, these efforts include interventions on behavioral factors, environmental factors, health service factors, and hereditary factors (Notoatmodjo, 2010). Maternal and child health is a crucial measure in creating a quality future generation of the nation, so health education in the field of maternal and child health needs to be implemented to improve public health and provide significant benefits and contributions to public health, especially for mothers and children. Based on the background described, this research aims to determine the development of a maternal and child health education model in North Sulawesi Province.

Literature Review

Health Education and Health Promotion

Health promotion, as part of the field of health sciences, has both an academic and artistic aspect. From an artistic perspective, health promotion practitioners support other health programs. This means that every health program, such as disease eradication, community nutrition improvement, environmental sanitation, maternal and child health, healthcare services programs, and so on, needs to be supported or assisted by health promotion or health education. In this context, health promotion involves not only raising awareness or increasing public knowledge about health but also efforts to facilitate behavioral changes. According to the World Health Organization (Notoatmodjo, 2010), health promotion is a process of empowering communities to maintain and improve their health. This means that health promotion is not only related to improving knowledge, attitudes, and health practices but also to improving or enhancing the environment (both physical and non-physical) to maintain and improve their health.

In this context, health promotion refers to health improvement, while the second understanding of health promotion is interpreted as marketing, disseminating, introducing, and selling health. Ultimately, health promotion is about marketing or selling health messages or health efforts so that the community accepts or adopts healthy behaviors or becomes familiar with those health messages, leading to the community willingly adopting healthy lifestyles. This second form of health promotion is essentially the same as health education because health education fundamentally aims to guide communities to behave in accordance with health values.

The shift from health education to health promotion is not unrelated to the history of health education practices in Indonesian public health, as well as global public health practices. In the past, health education practices, at least until the 1980s, overly emphasized changing community behavior. Health education practitioners worked hard to provide health information through various media and educational technologies to the public, hoping that they would adopt healthy lifestyles as expected. However, the changes in healthy behaviors were very slow, resulting in minimal impact on health improvement.

To avoid negative connotations, global health education experts, led by WHO in 1984, revitalized health education by using the term health promotion. The use of the term health promotion as a substitute for health education has implications for its boundaries or definitions. Previously, health education was understood more as a planned effort to change community behavior in accordance with health norms. Health promotion, however, not only seeks behavioral changes but also changes in the environment that facilitate those behavioral changes. Health promotion emphasizes enhancing the ability to live a healthy

life, not just engaging in healthy behaviors. It can be concluded that health education is a planned effort to change healthy lifestyle behaviors through the provision of health information and knowledge, enabling individuals to adopt healthy behaviors in their daily lives. Health promotion is an update of health education. Health promotion not only focuses on behavior but also considers the environment as a means of facilitating health education. Health promotion involves planned health education to shape healthy behaviors by enhancing knowledge and the physical environment that facilitates health education.

Maternal and Child Health Program

The Maternal and Child Health Services program is one of the basic healthcare programs. Maternal and child health services serve as benchmarks in the Minimum Service Standards (SPM) for the health sector and have 10 performance indicators, including (Ministry of Health, Republic of Indonesia, 2008):

1. Percentage of coverage for antenatal care visits for pregnant women.
2. Percentage of coverage for managed obstetric complications.
3. Percentage of coverage for deliveries assisted by competent healthcare professionals.
4. Percentage of coverage for postpartum care.
5. Percentage of coverage for managed complications in newborns.
6. Percentage of coverage for infant visits.
7. Percentage of coverage for Universal Child Immunization (UCI) in villages.
8. Percentage of coverage for services provided to children under five years of age.
9. Percentage of coverage for the provision of complementary feeding to children aged 6-24 months in poor families.
10. Percentage of coverage for managed low birth weight infants.

Research Methods

This research utilizes a descriptive qualitative method. The research site is located in the North Sulawesi Province, with a focus on the implementation of the maternal and child health education model development in North Sulawesi Province as a step towards supporting sustainable development and addressing the phenomena of maternal and infant mortality cases. To support the progress of this research, data sources are divided into two categories: primary data obtained from official reports and documents collected based on the research topics, and secondary data obtained from the North Sulawesi Provincial Health Office.

Results and Discussion

Maternal and Child Health Promotion Program Planning

The planning process is structured according to specific stages or cycles. These stages may vary depending on the type, objectives, and context of the planning. In general, planning can be divided into five stages, which include problem identification, goal setting, program planning and development, program implementation, and program evaluation (Azwar, 1996).

Performance accountability provides an overview of the achievement of goals and objectives of Government Agencies by using performance indicators as qualitative and quantitative measures that depict the level of accomplishment of established activities. The North Sulawesi Provincial Health Office, as one of the local government organizations, has carried out accountability for activities, programs, and policies in 2022. This aligns with the objective of health development, which aims to ensure a healthy living ability for the entire population.

Table 2 Performance Planning of Maternal and Child Health Promotion Program

National Medium-Term Development Plan (RPJMN) 2020-2024 indicators	RPJMN TARGETS 2020-2024				
	2020	2021	2022	2023	2024
Maternal mortality rate (MMR) (per 100,000 live births)	230 (MMR)	41 (Case)	40 (Case)	40 (Case)	-
Coverage of antenatal visits (percent)	80	85	90	92	95
Coverage of deliveries in health facilities (percent)	87	89	91	93	95
Number of districts/cities providing maternal and newborn health services	15	15	15	15	15
Number of districts/cities providing reproductive age health services	10	11	12	13	15

Source: North Sulawesi Provincial Health Office, 2022

Based on the data in Table 1, the Medium-Term Regional Development Plan (RPJMD) targets for North Sulawesi Province include indicators of maternal mortality, coverage of antenatal visits, coverage of childbirth in health facilities, the number of districts/cities that organize maternal and newborn health services, and the number of districts/cities that organize reproductive age health services. The target for the maternal mortality rate (per 100,000 live births) in 2022 is 40 cases, while the target for coverage of antenatal visits in 2022 is 90%. This target represents a 5% increase compared to 2021. The target for coverage of childbirth in health facilities in 2022 has increased by 2% compared to 2021, reaching 91%. The number of districts/cities providing maternal and newborn health services is 15 from 2020 to 2022, while the target for the number of districts/cities organizing reproductive age health services is to increase from 10 to 15 from 2020 to 2024.

The Maternal Mortality Rate refers to deaths during pregnancy within 42 days after the end of pregnancy caused by the pregnancy itself or its handling, excluding deaths caused by accidents or injuries. The main cause of maternal mortality is eclampsia or pregnancy poisoning, which can result in seizures, bleeding, and postpartum infection. Eclampsia is a serious condition experienced by pregnant women with preeclampsia, characterized by seizures. Immediate treatment is necessary as it poses a risk to both the mother and the baby. Eclampsia can occur when a pregnant woman has severe hypertension or preeclampsia, leading to seizures followed by a decrease in consciousness or a blank stare.

The success of maternal health programs can be assessed through the main indicator of the Maternal Mortality Rate. Maternal mortality, in this context, includes all deaths during pregnancy, childbirth, and the postpartum period caused by pregnancy, childbirth, or their management, but not due to other causes such as accidents or incidents. The maternal mortality rate is defined as the number of deaths within this scope per 100,000 live births. Apart from assessing maternal health programs, this indicator also helps evaluate the overall public health status by reflecting improvements in health services, including accessibility and quality.

Health promotion through the use of the 'KIA' or Maternal and Child Health (MCH) book is a government initiative aimed at supporting pregnant women in maintaining and improving their overall health. The goal is for women to attain a state of perfect health, encompassing physical, mental, and social well-being, enabling them to pursue their aspirations, meet their needs, and adapt to or overcome their environment.

The MCH book serves as an educational tool for health promotion. It is provided to pregnant women during their initial examination and can be studied at home. According to the Ministry of Health (2007), continuous learning is essential for individuals to enhance and maintain their lives, as learning can bring about changes, including changes in behavior. Reading is one of the ways to facilitate the learning process. Through reading, mothers can increase their understanding and knowledge about their

pregnancy.

Health promotion through the use of books has a positive impact on increasing the knowledge of pregnant women. Additionally, the MCH book offers benefits to health workers, such as record-keeping, monitoring, and referral capabilities. It serves as a communication and counseling tool and aids in early detection of maternal and child health issues (1). Knowledge gained through antenatal care plays a crucial role in shaping behavior, which serves as an intermediary outcome of health education. Furthermore, improved health behavior contributes to enhancing public health indicators, which are the ultimate outcomes of health education. According to Wibowo (2008), antenatal care is a planned program that includes observation, education, and medical treatment for pregnant women, ensuring a safe and satisfying pregnancy and childbirth process. The policy for antenatal care services mandates a minimum of four antenatal visits during pregnancy: one in the first trimester, one in the second trimester, and two in the third trimester.

Organizing the Maternal and Child Health Program

Organizing the maternal and child health program involves establishing an organizational structure and defining work procedures at various levels of service delivery, specifically within the Puskesmas. This structure combines the activities of the Puskesmas with the roles and responsibilities of the implementing personnel. The organizational structure of the Puskesmas determines task allocation and the interaction patterns among the staff (Sulaiman, 2021).

Two types of organizing need to be carried out. Firstly, organizing involves identifying individuals responsible for each activity and unit of the work area. In other words, tasks for all work programs and areas are distributed among the Puskesmas officers based on their capabilities. Secondly, organizing involves promoting cross-sectoral teamwork (Ministry of Health, 2004).

The North Sulawesi Provincial Health Office is fully committed to reducing maternal mortality and has implemented the following activities:

- a) Mapping and data collection of pregnant women, toddlers, and community-based nutritional status.
- b) Standardization of public services related to maternal and child health in Puskesmas, hospitals, and maternity clinics.
- c) Strengthening the referral system for maternal and neonatal care within the Puskesmas area and between districts/cities in North Sulawesi Province.
- d) Establishing policy synergy between the province and districts/municipalities.
- e) Program integration involving cross-program, cross-sector, cross-organizational, private sector, university, and community collaborations.
- f) Conducting village competitions to promote maternal and child health and Posyandu (Integrated Health Service Post) competitions.
- g) Providing coaching and mentoring to Puskesmas for integrated and regular program monitoring and evaluation.
- h) Enhancing the quality of maternal and child health promotion, focusing on campaigns for exclusive breastfeeding, early breastfeeding initiation, and raising awareness about family health.

Implementation of the Maternal and Child Health Program

The implementation (actuating) phase occurs after the organization has completed planning and organizing, establishing an organizational structure that includes personnel as implementers according to the needs of the unit or work unit created. Implementation activities involve directing, guiding, and communicating. Actuating is essentially an effort to transform planning into reality through various forms of direction and motivation, enabling each employee to carry out their activities optimally in alignment with their assigned roles, duties, and responsibilities (Nawawi, 2000 in Ramadhani & Basid, 2022)).

Table 3. District Program Indicator Data Period: February - December 2022

Region	Maternity Mother	PN		KF1		Complete KF		Vit A Postpartum(*)	
		ABS	%	ABS	%	ABS	%	ABS	%
		Bolaang Mongondow	4,406	3,750	85.11%	3,390	76.94%	3,389	76.92%
Minahasa	-	-	0.00%	-	0.00%	-	0.00%	-	0.00%
Sangihe Islands	1,684	1,610	95.61%	1,610	95.61%	1,610	95.61%	1,610	95.61%
Talaud Islands	1,471	1,338	90.96%	1,338	90.96%	1,338	90.96%	1,338	90.96%
South Minahasa	3,039	2,548	83.84%	2,591	85.26%	2,345	77.16%	2,594	85.36%
North Minahasa	3,200	2,996	93.63%	2,987	93.34%	2,502	78.19%	2,945	92.03%
Southeast Minahasa	1,773	1,541	86.91%	1,531	86.35%	801	45.18%	1,433	80.82%
North Bolaang Mongondow	1,467	1,319	89.91%	1,316	89.71%	1,294	88.21%	1,316	89.71%
Siau Tagulandang Biaro Islands	854	754	88.29%	759	88.88%	759	88.88%	759	88.88%
East Mongondow Bolaang	1,204	1,120	93.02%	1,115	92.61%	951	78.99%	1,113	92.44%
South Mongondow Bolaang	1,430	1,034	72.31%	1,145	80.07%	901	63.01%	1,143	79.93%
Manado City	6,294	6,294	100.00%	6,603	104.91%	6,112	97.11%	6,344	100.79%
Bitung City	4,003	3,375	84.31%	3,369	84.16%	2,846	71.10%	3,369	84.16%
Tomah City	1,433	1,468	102.44%	1,468	102.44%	1,468	102.44%	1,468	102.44%
Kotamobagu City	2,117	1,593	75.25%	1,593	75.25%	1,593	75.25%	1,593	75.25%
TOTAL	34,375	30,740	89.43%	30,815	89.64%	27,909	81.19%	30,415	88.48%

Source: North Sulawesi Provincial Health Office, 2022

The achievement of PN indicators from year to year demonstrates an upward trend. According to Table 2, the number of women giving birth in North Sulawesi Province from February to December 2022 was 34,375. The coverage of deliveries attended by health workers in North Sulawesi Province during that period reached 89.43%. The first postpartum visit (KF1), which should occur within 6 (six) hours to 2 (two) days after delivery, had a rate of 89.64%. Complete KF visits accounted for 81.19%, and the provision of Vitamin A to postpartum women was 88.48%. These figures indicate that the district/municipality programs in North Sulawesi Province, regarding maternal health, have generally achieved over 80% of the overall indicators, signifying a well-implemented program.

The North Sulawesi Provincial Health Office continues to make efforts, with special attention given to Remote Border and Islands (DTPK) areas, by placing emphasis on comprehensive monitoring. This approach aims to detect health risks in pregnant women early on and prevent them. The assessment of the implementation of maternal health services can be performed by examining the coverage of K1 and K4. K1 coverage represents the number of pregnant women who received initial antenatal care from health workers within one year, compared to the target number of pregnant women in a specific working area. On the other hand, K4 coverage refers to the number of pregnant women who received antenatal care according to the minimum standards within one year in a specific working area. These indicators reflect the accessibility of health services for pregnant women and the level of compliance of pregnant women in seeking care from health workers. These findings are further supported by the visits made by pregnant women to healthcare facilities, as shown in Table 4.

Table 4. Maternal visits

Wilayah	KI Murni		Ibu Hamil dengan 4T		K1 oleh dokter		K5 oleh dokter		KI USG oleh dokter		K5 USG oleh dokter		Ibu hamil Konsumsi TTD (*)		Ibu Hamil Kurang Energi Kronik (KEK) yang mendapatkan tambahan asupan gizi (*)		Ibu hamil memiliki Buku KIA	
	ABS	%	ABS	%	ABS	%	ABS	%	ABS	%	ABS	%	ABS	%	ABS	%	ABS	%
Bolaang Mongondow	2,384	51.65	288	12.08	1,430	30.98	1,012	21.92	1,430	30.98	1,012	21.92	-	0.00	-	0.00	4,129	89.45
Minahasa	-	0.00	-	0.00	-	0.00	-	0.00	-	0.00	-	0.00	-	0.00	-	0.00	-	0.00
Kepulauan Sangihe	849	48.13	168	19.79	849	48.13	849	48.13	849	48.13	849	48.13	1,601	92.54	144	89.44	1,746	98.98
Kepulauan Talaud	533	34.59	125	23.45	1,409	91.43	608	39.45	-	0.00	-	0.00	-	0.00	-	0.00	1,409	91.43
Minahasa Selatan	1,480	46.50	-	0.00	-	0.00	-	0.00	-	0.00	-	0.00	169	69.83	28	100.00	2,969	93.28
Minahasa Utara	1,525	45.48	497	32.59	-	0.00	-	0.00	-	0.00	-	0.00	540	100.00	39	100.00	7,868	234.66
Minahasa Tenggara	781	42.03	-	0.00	-	0.00	-	0.00	-	0.00	-	0.00	-	0.00	-	0.00	2,148	115.61
Bolaang Mongondow Utara	788	51.27	170	21.57	509	33.12	405	26.35	509	33.12	405	26.35	21	91.30	2	50.00	1,387	90.24
Kep. Siau Tagulandang Biaro	513	57.38	-	0.00	-	0.00	-	0.00	-	0.00	-	0.00	9	19.57	1	100.00	1,000	111.86
Bolaang Mongondow Timur	571	45.25	201	35.20	-	0.00	-	0.00	-	0.00	-	0.00	-	0.00	-	0.00	1,171	92.79
Bolaang Mongondow Selatan	631	42.12	164	25.99	894	59.68	368	24.57	894	59.68	368	24.57	94	9.02	11	73.33	861	57.48
Kota Manado	2,387	36.21	-	0.00	-	0.00	-	0.00	-	0.00	-	0.00	-	0.00	-	0.00	6,613	100.30
Kota Bitung	3,033	72.33	446	14.70	3,033	72.33	2,463	58.74	-	0.00	-	0.00	-	0.00	-	0.00	4,294	102.41
Kota Tomohon	1,040	69.24	194	18.65	865	57.59	1,270	84.55	865	57.59	1,270	84.55	103	100.00	1	100.00	1,560	103.86
Kota Kotamobagu	669	30.16	-	0.00	-	0.00	-	0.00	-	0.00	-	0.00	394	54.87	27	100.00	1,843	83.09
Total	17,184	47.72	2,253	13.11	8,989	24.96	6,975	19.37	4,547	12.63	3,904	10.84	2,931	65.95	253	91.67	38,998	108.29

Source: North Sulawesi Provincial Health Office, 2022

According to the report from the North Sulawesi Provincial Health Office in 2022, there is a comparison of the coverage of the first visit by pregnant women, which amounted to 17,184 (47.72%) of the national target of 100%, and the coverage of the fourth visit by pregnant women, which reached 35,451 (87.05%) of the target of 95%. This indicates that there is a gap in the coverage of the first and fourth visits by pregnant women and the percentage of childbirths assisted by health workers, as they have not reached the national target. One of the contributing factors to this situation is the low knowledge of mothers about their pregnancies, which leads to suboptimal ANC coverage. Many mothers lack comprehensive understanding of their pregnancy conditions and tend to be passive in seeking information from health workers. This can have an impact on mothers who rarely or never seek prenatal care, resulting in insufficient nutrition coverage during pregnancy, leading to maternal deaths due to pregnancy-related anemia, bleeding during childbirth, and the birth of low birth weight (LBW) babies. LBW is a major contributing factor to infant mortality, and the care of LBW babies requires extensive attention due to their vulnerability to health problems and potential risks of mortality. LBW infants are particularly susceptible to hypothermia and other physiological issues.

Additionally, there are factors that contribute to an increased maternal mortality rate, including giving birth at a young age (under 21 years old), giving birth at an advanced age (over 35 years old), having closely spaced pregnancies (less than 3 years apart), and having multiple children (more than 2). Maternal age is one of the factors that can lead to complications during pregnancy and childbirth. Therefore, maternal and child health education plays a crucial role in improving maternal and child health outcomes.

Maternal complications refer to conditions that pose a direct or indirect threat to the life of the mother and/or fetus during pregnancy, childbirth, and postpartum periods. Complications during childbirth often contribute to maternal mortality, and delays in managing labor are considered one of the contributing factors. Various factors are believed to be associated with the occurrence of these complications, including the mother's age, education, nutritional status, and economic status. Maternal age is particularly relevant, as both being too young (under 20 years old) or too old (over 35 years old) can

increase the risk of complications. The marital status of the mother also influences her psychological state during pregnancy and childbirth, as well as her adherence to regular prenatal examinations, which can impact the detection of complications in labor. This indicator assesses the ability of maternal and child health program management to provide professional health services to pregnant, delivering, and postpartum women with complications.

The low coverage of maternal health services can be attributed to the community's limited ability to detect risk factors and high-risk obstetric complications at an early stage. Currently, the detection of high-risk cases using the Puji Rochayati Score is more frequently observed in mothers with identified risks, and abnormalities are often discovered during the delivery process. This is due to inadequate attendance of antenatal care visits, particularly the fourth visit (ANC K4), which limits the time available for effective case management. Furthermore, the ongoing Covid-19 pandemic has affected the achievement of indicators related to the coverage of maternal health programs, maternity care, postpartum care, family planning, and other programs in districts and cities. As a result, the targets for these indicators have not been met.

One of the breakthrough efforts in reducing maternal mortality and infant mortality rate (IMR) in North Sulawesi is the Maternal and Child Safety Improvement Program. The program focuses on the involvement of families and communities in early detection efforts, minimizing health risks in pregnant women, and providing access to basic obstetric and neonatal emergency services at the primary healthcare level (Puskesmas) and comprehensive obstetric and neonatal emergency services in hospitals (PONEK). The program to improve maternal and child safety is implemented as part of the Desa Siaga initiative, which aims to assist families in planning for safe deliveries and enhancing their preparedness to recognize danger signs during pregnancy, childbirth, and the postpartum period, enabling them to take appropriate action.

To support the program to improve maternal safety, the Maternal Perinatal Audit (AMP) is conducted to assess the implementation and enhance the quality of maternal and newborn health services. This activity involves the discussion of maternal and newborn deaths at both the community level and healthcare facilities. The findings from the AMP study reveal obstacles faced in saving mothers during maternal and newborn emergencies and provide recommendations for interventions to improve the quality of maternal and newborn health services in the future.

In accordance with Government Regulation of the Republic of Indonesia Number 87 of 2014 concerning Population Development and Family Development, Family Planning, and Family Information Systems, the Family Planning (KB) program is a key strategy to reduce maternal mortality, particularly among mothers with 4T conditions: too young to give birth (under the age of 20), too frequent pregnancies, pregnancies with closely spaced intervals, and too old to give birth (over the age of 35). Additionally, the family planning program aims to enhance the quality of families, fostering a sense of security, peace, and optimism for a better future in achieving physical well-being and inner happiness.

Table 5 Health Services

Region	Public health center	Number of puskesmas providing reproductive health services to prospective brides (Kespro catin)		Number of puskesmas capable of providing postpartum family planning services (KBPP)		Number of districts/cities providing reproductive age health services		Percentage of puskesmas providing reproductive health services for prospective brides	
		ABS	%	ABS	%	ABS	%	ABS	%
Bolaang Mongondow	18	18	100	18	100	1	100	18	0
Minahasa	23	-	0	-	0	-	0	-	0
Sangihe Islands	17	17	100	17	100	1	100	17	0
Talaud Islands	21	-	0	21	100	-	0	-	0
South Minahasa	17	17	100	17	100	1	100	17	0
North Minahasa	11	11	100	11	100	1	100	11	0
Southeast Minahasa	13	13	100	13	100	1	100	13	0
North Bolaang Mongondow	12	12	100	12	100	1	100	12	0
Siau Tagulandang Biaro Islands	13	13	100	13	100	1	100	13	0
East Mongondow Bolaang	8	4	50	8	100	1	100	4	0
South Mongondow Bolaang	9	1	11.11	-	0	-	0	1	0.00 %
Manado City	16	16	100	16	100	1	100	16	0.00 %
Bitung City	9	-	0	-	0	-	0	-	0.00 %
Tomah City	7	7	100	-	0	-	0	7	0.00 %
Kotamobagu City	5	5	100	5	100	1	100	5	0.00 %
Total	199	134	67.34 %	151	75.88 %	10	66.67%	134	0.00 %

The Family Planning (KB) program is implemented, among other objectives, to regulate the number of births and promote birth spacing. The target of the family planning program is the Fertile Age Couple (PUS), with a specific focus on women of reproductive age (WUS) between 15 and 49 years old. According to the Republic of Indonesia Law Number 36 of 2009 concerning Health, the Government is obligated to ensure the availability of safe, high-quality, and affordable information facilities and reproductive health services to the community, including family planning. The health services provided in family planning aim to help couples of childbearing age regulate pregnancies and contribute to the birth of a healthy and well-prepared next generation. PUS can access contraceptive services at locations that offer family planning programs. Currently, these services are available nationwide.

Supervision and Evaluation of Maternal and Child Health Programs

Supervision is defined by Azwar (1988) as the process of assessing and correcting the performance of each employee to achieve the predetermined goals. It is a method used to measure the implementation of a program and guide it towards the achievement of set goals. The purpose of supervision is to evaluate work results, identify and address any deviations, and take critical actions if necessary. It is essential to conduct supervision to ensure that team members can effectively work together towards the organization's overall goals.

Evaluation is also defined as a process to determine the success or effectiveness of a program in achieving its predetermined goals (Azwar, 1996). Through evaluation, organizations can accomplish several objectives. The evaluation process helps identify undesirable deviations in program implementation and allows for necessary corrections to achieve the intended goals. This indicates that a series of planned activities lead to the supervision stage, where the results of the implemented activities are assessed. The findings from this stage serve as important feedback and guidance for future activities, aiming for even better outcomes and the realization of the actual goals (Muninjaya, 2004).

Considering other influencing factors, the utilization of the Maternal and Child Health Book has been found to be associated with improved maternal knowledge about the maternal health services being studied. To enhance knowledge, it is crucial for mothers to be aware of the handbook, read its contents, understand them easily, utilize it (for example, by carrying it when visiting a health facility or attending a health program), and receive health information from healthcare providers who use the handbook to provide such information.

Utilization of the Maternal and Child Health Book has both direct and indirect effects on maternal health service utilization. After controlling for other relevant influencing factors, this study demonstrates that mothers who utilize the Maternal and Child Health Book are more likely to directly utilize maternal health services. Furthermore, the book also indirectly influences maternal health service utilization by improving maternal knowledge. To enhance maternal health behaviors, it is important to ensure the proper use of the Maternal and Child Health Book, not only among targeted mothers.

Maternal literacy and paternal occupation were found to have a relatively lesser effect on key outcomes such as antenatal care utilization, TT immunization, skilled birth attendance, and family planning services. Maternal education and parity were identified as the strongest factors associated with these key outcomes. Maternal education showed a positive association with maternal knowledge of the safest birth attendants, antenatal care utilization, and skilled birth attendance utilization. Additionally, maternal education was linked to maternal knowledge of antenatal care immunization, which in turn positively influenced antenatal care immunization utilization. These findings align with previous studies that have demonstrated the close relationship between maternal education and various aspects of maternal knowledge and behavior (Fabian et al., 2005; Fujita et al., 2005; Nuraini & Parker, 2005).

Maternal education cannot be easily changed through brief health education programs aimed at improving maternal knowledge and behavior. In fact, maternal education influences maternal attendance at antenatal education sessions (Fabian et al., 2004; Spinelli et al., 2003), as well as the ability to comprehend and absorb information provided during these sessions (Fabian et al., 2005; Nuraini & Parker, 2005). These findings underscore the significance of considering maternal education when implementing health education programs. Low levels of maternal education hinder their understanding of the messages conveyed through health education materials and/or sessions, as well as their ability to follow the advice provided to them.

The findings of this study provide additional evidence to support health sector leaders who aim to ensure or promote adequate education for girls and women. Referring to the model proposed by Maine (1997), education is identified as one of the contextual determinants of maternal mortality. Other factors

include the status of women and the status of the family within the community, which are strongly influenced by the education level and economic status of women and families. Consistent with the results of previous studies (Atiyeh & El-Mohandes, 2005; Fujita et al., 2005), this study found that lower parity was associated with better maternal knowledge, such as understanding the minimum frequency of adequate antenatal care and the importance of TT immunization, as well as improved maternal health behaviors, including antenatal care utilization, TT immunization, and skilled birth attendance. It seems that mothers with higher parity are less aware of the specific healthcare needs during pregnancy. This finding suggests that when designing and providing maternal health services, including health education, healthcare providers should pay closer attention to the needs of mothers with higher parity (Atiyeh & El-Mohandes, 2005; Fabian et al., 2004; Spinelli et al., 2003).

Considering other influencing factors, the utilization of the MCH book was found to be associated with better maternal knowledge of the maternal health services studied. However, merely owning a copy of the MCH book was not linked to improved maternal knowledge. To enhance knowledge, it is essential for mothers to be aware of the handbook, read its contents, easily understand them, utilize it (evidenced by carrying it when visiting a health facility or attending a health program), and receive health information from healthcare providers who use the handbook to provide such information.

Utilization of the MCH book has both direct and indirect effects on maternal health service utilization. After accounting for other relevant influencing factors, this study demonstrates that mothers who utilize the MCH book are more likely to directly utilize maternal health services. However, it also indirectly affects maternal health service utilization by influencing maternal knowledge. Merely owning an MCH book has little impact on maternal health service utilization. To improve maternal health behaviors, MCH books should be properly utilized not only by the targeted mothers but also by their healthcare providers. Furthermore, multivariate modeling revealed that in most cases, the increase in maternal health service utilization was partially attributed to an increase in maternal knowledge. Therefore, the utilization of handbooks in the healthcare system should be designed and implemented in a manner that ensures increased maternal knowledge.

The findings of this study provide evidence supporting the use of MCH handbooks as a tool in maternal education, particularly in antenatal education. However, the effectiveness of MCH book utilization relies on appropriate content for the target community and the community's awareness of and concern for maternal and child health improvement. It is necessary to review and modify the content of the Indonesian MCH book to ensure its appropriateness for the target population. Special attention should be given to the presentation of messages, as approximately a quarter of mothers who had read at least some parts of the handbook expressed difficulty in understanding the content. MCH handbooks should incorporate engaging and easily understandable methods to convey the messages effectively.

The low rate of active utilization of MCH handbooks by mothers needs improvement. Both districts have high literacy rates, which are a prerequisite for mothers to read the handbook. However, this study reveals that literacy alone does not guarantee that mothers will read the entire handbook. Additionally, some mothers reported difficulties in understanding the content, raising concerns that even those who read the handbook may not acquire adequate knowledge. Special efforts should be made to ensure mothers understand the messages conveyed in the handbook. Utilizing the MCH handbook during health education sessions can be an effective approach to learn which messages and sections mothers comprehend or struggle with. The full benefits of MCH handbooks can only be achieved with the support of an effective healthcare delivery system (Nakamura, 2012), which should include an impactful health education program. Previous studies have demonstrated that health education can effectively enhance maternal knowledge (Ohnishi et al., 2005; Renkert & Nutbeam, 2001) and behavior (Pearson & Thurston, 2006; Turan & Say, 2003). Incorporating the MCH book into community-based health education sessions can promote communication between mothers and healthcare providers, enhancing the effectiveness of these activities.

Healthcare providers should utilize MCH books during health education sessions. Health authorities must ensure the availability of sufficient resources to review and modify the MCH book, as well as ensure its distribution. Adequate inputs should be available to provide relevant training for healthcare providers. Such training is crucial to promote the use of the MCH handbook during health education sessions and to ensure healthcare providers can effectively utilize the handbook, including its incorporation in these sessions. The Government of Indonesia, at the central, provincial, and district levels, should take proactive initiatives to engage all relevant stakeholders in supporting the appropriate and sustainable utilization of MCH handbooks.

Conclusion

Health promotion through the MCH book is a government effort aimed at empowering pregnant women to maintain and improve their own health in all aspects—physical, mental, and social. This enables them to achieve optimal health, fulfill their aspirations and needs, and adapt to their environment. The MCH book serves as a teaching aid and media tool for health promotion.

Interventions are provided to enhance the knowledge of pregnant women. Researchers offer personalized education, emphasizing the MCH book as a source of health information for pregnant women. They educate women on the necessary steps to maintain a healthy pregnancy and highlight how the MCH book facilitates communication between mothers and healthcare providers. Furthermore, researchers believe that using the MCH book also empowers the community, particularly families, to prioritize health and access high-quality healthcare services.

Efforts are also made to improve pregnant women's attitudes toward utilizing the MCH book. Individual education is provided to educate women on how to effectively use the book. This includes understanding the recommended actions during pregnancy, recognizing the MCH book as a crucial source of information for mothers and families, and emphasizing the importance of incorporating the MCH book into their routine. By utilizing the MCH book, healthcare workers can provide guidance on increasing the intake of essential nutrients for pregnant women. The level of knowledge among participants in health promotion activities greatly depends on the quantity and quality of the information they receive. The quality of information provided relates to its production and effectiveness in reaching the intended audience.

Furthermore, interventions are conducted to encourage pregnant women to take action and effectively utilize the MCH book. Individual education is offered to educate women on various aspects such as the significance of carrying the MCH book during healthcare visits, understanding its contents, and accessing relevant information. The MCH book covers essential topics including balanced nutrition menu patterns, rest patterns, daily hygiene care, physical activity during pregnancy, childbirth preparation, identification of danger signs and other potential issues during pregnancy, as well as early signs of labor. By acquiring this health information, mothers can enhance their knowledge and understanding, ensuring the consumption of a balanced nutritional menu to meet the needs of both themselves and their fetus throughout pregnancy. They can also prevent anemia, prepare for lactation, maintain cleanliness to prevent infection, and recognize the early signs of pregnancy complications. The MCH book serves as a valuable resource for early detection and prevention of pregnancy risks and other related problems.

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