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Analysis of the Availability of Iron Supplement Tablets (TTD) and Tetanus-Diphtheria (Td) Vaccines for Maternal Services at the East Seram District Health Office in 2023

Punira Kilwalaga[1], Numlil Khaira Rusdi[2], Muhamad Syaripuddin[3]
[1]Universitas Muhammadiyah Prof. DR. Hamka Jakarta, Upie_kilwalaga@yahoo.co.id
[2]Universitas Muhammadiyah Prof. DR. Hamka Jakarta
[3]Universitas Muhammadiyah Prof. DR. Hamka Jakarta

Corresponding Author: Upie_kilwalaga@yahoo.co.id[1]

Abstract: Analysis of the Availability of Iron-Folic Acid (IFA) Tablets and Tetanus-Diphtheria (TD) Vaccines for Maternal Health Services at the East Seram District Health Office in 2023 Objective: This study aims to assess the availability of Iron-Folic Acid (IFA) tablets and Tetanus-Diphtheria (TD) vaccines for maternal health services, identify the causes of unavailability, and evaluate the supply mechanism to ensure effective and efficient management. Methods: The study employed a document review approach, analyzing the 2023 Government Agency Performance Report (LKIP), Regulation of the Minister of Health No. 4 of 2019, stock opname reports, stock cards, and handover documents (BAST) for drugs and vaccines. In-depth interviews were conducted with four key informants: the pharmaceutical sub-coordinator, the program drug manager, the maternal and child health (MCH) program manager, and the head of the pharmaceutical installation. Results: The availability of IFA tablets and TD vaccines was insufficient to meet maternal service needs, with shortages of 98,880 IFA tablets (33.33%) and 30 vials of TD vaccine (10%). The main causes of unavailability included expired drugs, stockouts due to delayed provincial distribution, and inaccuracies in the supply planning mechanism. Conclusion: The study concludes that the availability of IFA tablets and TD vaccines for maternal health services at the East Seram District Health Office in 2023 was inadequate, highlighting the need for improved supply management and planning to meet service targets.

Keyword: Iron-Folic Acid (IFA) tablets, Tetanus-Diphtheria (TD) vaccine, maternal health services, Minimum Service Standards (SPM), supply chain management

INTRODUCTION

Minimum Service Standards (SPM) in the health sector are regulations regarding the type and quality of basic services that are mandatory government responsibilities and that every citizen is entitled to receive at a minimum (Ministry of Health, 2019). Local governments are required to fulfill the quality of each type of basic service outlined in the health SPM. The performance achievement of local governments in meeting the quality of each type of basic service in health SPM must reach 100% (Rajagukguk et al., 2022).

The implementation of Minimum Service Standards (SPM) has two functions: to facilitate local governments in providing appropriate public services to the community, and as an instrument for the public to monitor government performance in health sector public services. SPM also serves as a tool to strengthen the implementation of Performance-Based Budgeting. Law Number 23 of 2014 mandates local governments to prioritize regional expenditures to fund mandatory government affairs related to basic services as defined in the SPM. The allocation of Special Allocation Funds (DAK) to regions is based on regional needs to achieve SPM targets.

Based on the 2022 Government Agency Performance Report (LKIP) of the East Seram District Health Office, the achievement of the Minimum Service Standards (SPM) indicators was as follows: 56% for pregnant women, 39% for maternal health services, 49% for newborn health services, 43% for toddler health services, 93% for basic school-age health services, 25% for productive-age health services, 92% for elderly health services, 2% for hypertension patients, 32% for diabetes mellitus patients, 54% for severe mental disorder patients, 53% for tuberculosis patients, and 77% for individuals at risk of HIV infection (East Seram District Health Office, 2022).

In 2023, several SPM indicators experienced a decline, including elderly health services (18%), pregnant women's health services (25%), maternal health services (22%), newborn health services (26%), basic school-age health services (58%), tuberculosis patient health services (45%), and health services for individuals at risk of HIV infection (32%) (East Seram District Health Office, 2023). The achievement of the SPM indicator for pregnant women's health services decreased by more than 50%. The low achievement of health SPM indicators, particularly in maternal health services in East Seram District, requires attention. As stated in the Ministry of Health Regulation No. 43 of 2016 concerning minimum service standards in the health sector, SPM is a performance measure for health service delivery by districts/cities in providing basic services (Silondae et al., 2021). Failure to meet SPM indicators indicates that the community has not yet received standardized health services in terms of quality and quantity, leaving health problems uncontrolled and putting additional burden on future services.

Indonesia still faces low public health status, including high maternal and infant mortality rates and many unmet maternal and child health (MCH) service indicators. The Maternal Mortality Rate (MMR) in Indonesia is 305 per 100,000 live births, and the infant mortality rate is 24 per 1,000 live births. Efforts to improve maternal and child health to reduce MMR and infant mortality rate (IMR) are part of the Sustainable Development Goals (SDGs) to be achieved by 2030 and are a priority in Indonesia's health development (Budijanto, 2020). Accelerated reduction of MMR and IMR requires ensuring that every mother has access to quality health services, including antenatal and maternal health services at health facilities, postnatal care for mother and child, specialized care and referrals in case of complications, and family planning services including postpartum family planning (Santoso & Sebong, 2020).

The 2023 Indonesia Health Survey (SKI) reported that 27.7% of pregnant women in Indonesia experienced anemia. By age group, the highest prevalence of anemia was among pregnant women aged 35–44 (39.6%), followed by those aged 25–34 (31.4%). Anemia in pregnant women increases the risk of preterm birth, maternal and infant mortality, and infectious diseases. Iron-deficiency anemia can affect fetal and infant growth and development during and after pregnancy. In East Seram District, Maluku Province, there were 706 cases of anemia among pregnant women in 2023, with six maternal deaths, ranking third highest in Maluku Province. To prevent anemia, each pregnant woman is expected to receive at least 90 Iron-Folic Acid (IFA) tablets during pregnancy.

The coverage of IFA tablets for pregnant women in Indonesia in 2023 was 88.5%, up from 86.2% in 2022. In Maluku Province, coverage was 67.3%, while in East Seram District it was 44.15% (Ministry of Health, 2023). Tetanus infection is a leading cause of maternal and infant mortality, often resulting from unsafe delivery practices or preexisting wounds. To

control tetanus infection, which is a risk factor for maternal and infant death, and to provide additional protection against diphtheria, the Tetanus-Diphtheria (Td) immunization program is implemented for women of childbearing age (WCA). Ministry of Health Regulation No. 12 of 2017 mandates WCA, particularly pregnant women, as a target population for routine immunization.

To ensure the quality of maternal health services under SPM, pharmacists and health workers must plan adequately according to the standard number of vaccines and IFA tablets required. Based on standards for quantity and quality, each pregnant woman should receive 1 vial of TD vaccine per 10 target pregnant women and 90 IFA tablets, administered one per day during pregnancy starting as early as possible and continuing through the postpartum period (Ministry of Health, 2018). The unavailability of IFA tablets and TD vaccines directly affects maternal services, making it difficult to achieve maternal health program targets. Therefore, a detailed analysis is needed to identify the causes of IFA and TD vaccine shortages and to evaluate their supply mechanisms to ensure optimal services for pregnant women.

METHOD

This study employed a descriptive method conducted at the East Seram District Health Office, Maluku Province, with the aim of portraying the availability of Iron-Folic Acid (IFA) tablets and Tetanus-Diphtheria (TD) vaccines for maternal health services, as well as analyzing the factors causing their unavailability. The descriptive method is a research approach intended to systematically, factually, and accurately describe a phenomenon, including the facts and relationships between the phenomena under study (Limbong & Agustina, 2023).

The research approach used a cross-sectional design combining qualitative and quantitative methods. The qualitative approach was used to explore the factors behind the unavailability of IFA tablets and TD vaccines through in-depth interviews, observations, and document reviews, while the quantitative approach was employed to calculate the availability levels of IFA tablets and TD vaccines in relation to the Minimum Service Standards (SPM) targets. Informants were selected using purposive sampling, involving four key informants: the head of pharmaceuticals, the program drug manager, the maternal and child health (MCH) program coordinator, and the head of the pharmaceutical installation. Data analysis was conducted using content analysis with source and method triangulation to ensure data validity. The data collection process was carried out over three months, utilizing secondary data such as drug and vaccine inventory reports, Handover Reports (BAST), stock cards, and the Program Drug Requirement Plan (ROP) documents to obtain a comprehensive overview of the IFA tablet and TD vaccine supply management system at the East Seram District Health Office.

RESULTS AND DISCUSSION

This refers to the extent to which Iron-Folic Acid (IFA) tablets and Tetanus-Diphtheria (TD) vaccines are adequately supplied and accessible to pregnant women through maternal health services. Ensuring their availability is critical for preventing anemia, protecting against tetanus infections, and supporting the overall health and safety of both mothers and their unborn children. The measurement of availability considers factors such as stock levels, timely distribution, proper storage, and adherence to established health service standards.

Table 1. Data on the Analysis of Iron-Folic Acid (IFA) Tablet Requirements and Availability in 2023

Medicine Name	Requirement (90 tablets × 3,296 people)	Month	Initial Stock (tablets)	Incoming (tablets)	Outgoing (tablets)	Remaining (tablets)	Date Received	Expiry Date
IFA Tablets (TTD)	296,640	Jan	794,700	-	17,200	777,500	1 Sep 2022	Jun 2023
		Feb	777,500	-	30,000	747,500	-	-
		Mar	747,500	-	36,000	711,500	-	-
		Apr	711,500	-	26,400	685,100	-	-
		May	685,100	-	40,000	645,100	-	-
		Jun	645,100	-	-	-	-	-
		Jul	-	-	-	-	-	-
		Aug	-	-	-	-	-	-
		Sep	-	-	-	-	-	-
		Oct	-	510,000	50,000	460,000	3 Oct 2023	Feb 2024
		Nov	460,000	-	230,000	230,000	-	-
		Dec	230,000	-	120,000	110,000	-	-

Table 2. Data on the Analysis of Tetanus-Diphtheria (TD) Vaccine Requirements and Availability in 2023

Medicine Name	Requirement (1 vial/10 × 3,296 people)	Month	Initial Stock (vials)	Incoming (vials)	Outgoing (vials)	Remaining (vials)	Date Received	Expiry Date
TD Vaccine	330	Jan	-	-	-	-	-	-
		Feb	-	-	-	-	-	-
		Mar	-	300	60	240	18 Mar 2023	Apr 2024
		Apr	240	-	30	210	-	-
		May	210	-	35	175	-	-
		Jun	175	-	40	135	-	-
		Jul	135	-	30	105	-	-
		Aug	105	-	30	75	-	-
		Sep	75	-	30	45	-	-
		Oct	45	-	22	23	3 Oct 2023	Feb 2024
		Nov	23	-	23	-	-	-
		Dec	-	-	-	-	-	-

Table 3. Data on the Analysis of the Adequacy Level of Iron-Folic Acid (IFA) Tablets and Tetanus-Diphtheria (TD) Vaccines in 2023

No	Medicine/Vaccine	Unit	Required Quantity	Available Quantity	Expired Quantity	Shortage Quantity	Shortage Percentage
1	IFA Tablets (TTD)	Tablet	296,640	794,700	645,100	98,880	33.33%
2	TD Vaccine (TD)	Vial	330	300	-	30	10%

Based on the data, the target number of pregnant women in East Seram District in 2023 was 3,296. The total need for Iron Supplement Tablets (TTD) was 296,640 tablets. At the beginning of the year, 794,700 tablets were available; however, most of this stock expired in June 2023. These initial supplies were from leftover stock received on September 1, 2021. A new delivery of 510,000 tablets arrived in October 2023, but due to the expiration and delayed supply, there was a TTD shortage for four months, from July to October, leaving a total shortfall of 98,880 tablets, or 33.33%. For Tetanus-Diphtheria (TD) vaccines, one vial is sufficient for ten pregnant women, resulting in a total requirement of 330 vials for the year. Stock shortages occurred in January and February, with a new supply of 300 vials arriving in March. This supply lasted only until November, causing another shortage in December, totaling a deficit of 30 vials, or 10%.

Interviews with program staff confirmed these challenges. Officers reported that TTD stock often ran out due to expiration, deliveries from the province were delayed, and expiration dates of newly delivered tablets were very close, sometimes less than a year. Despite planning based on the Program Drug Requirement Plan (ROP), discrepancies between planned and actual distribution, combined with stock shortages at the provincial level, led to ongoing gaps in availability throughout the year. Several factors contributed to the unavailability of TTD and TD vaccines. First, a significant portion of TTD, amounting to 645,100 tablets (6,451 boxes), expired, resulting in an economic loss of approximately Rp 155,363,641, which represents 81.2% of the allocated budget for TTD procurement. Second, stock shortages occurred for both TTD and TD vaccines, with TTD unavailable from June to September and TD vaccines unavailable in January, February, and December. Third, inaccurate planning by program managers at the district health office, who assumed that leftover stock from the previous year would suffice, failed to account for mid-year expirations, exacerbating shortages.

The supply of TTD and TD vaccines is managed through the e-Monev application, which allows pharmacy officers to input target numbers and remaining stock from the previous year. The provincial health office verifies the data before approving the required quantities. TTD is distributed through a dropping system, while TD vaccines are supplied upon request from the district health office. This system is designed to improve efficiency and minimize calculation errors, although delays and mismanagement still caused gaps in service delivery.

Discussion

Socio-demographic Characteristics of the Subjects

Iron Supplement Tablets (TTD) and Tetanus-Diphtheria (TD) vaccines are two essential components of maternal health services. TTD plays a critical role in preventing anemia, which impacts both maternal and fetal health, while TD vaccines prevent tetanus infections that are dangerous for both mothers and newborns. Both are important indicators for achieving the Minimum Service Standards (SPM) in maternal health. Ensuring their availability requires effective drug management, encompassing selection, procurement, distribution, and efficient use (Aisah et al., 2020).

Availability of Iron Supplement Tablets

The study found that among 3,296 pregnant women, the annual need for TTD was 296,640 tablets, with an initial stock of 794,700 tablets. However, most of the stock expired in June 2023, resulting in shortages from June to September. Delays in distribution from the Provincial Health Office further exacerbated the situation. Documents such as Handover Reports (BAST), stock cards, and stock opname reports revealed discrepancies between available stock and actual field needs.

Impact of TTD Shortages on SPM

The four month unavailability of TTD reduced the coverage of iron supplementation among pregnant women and potentially lowered the achievement of SPM indicators. Drug shortages have been shown to negatively affect service quality and healthcare practices (Caulder et al., 2015). Anemia due to insufficient TTD increases the risk of low birth weight by up to nine times compared to non-anemic mothers (Suhartati et al., 2017).

Regulations and Obligations for TTD Provision

The provision of TTD is regulated under the Indonesian Ministry of Health Regulation No. 97 of 2014, Article 12 Paragraph 4, which emphasizes integrated antenatal care, including a minimum provision of 90 iron tablets during pregnancy (Margirizki & Sumarmi, 2019). Consequently, the continuity of TTD supply is a mandatory component of maternal health services.

Availability of Tetanus-Diphtheria Vaccines

TD vaccine requirements are calculated based on the number of target pregnant women and the vial usage ratio. The stock shortages in January and February indicate weaknesses in provincial distribution systems. A new supply of 300 vials arrived in March, covering only 90% of the annual demand. Another shortage occurred in December, highlighting the lack of buffer stock and inadequate distribution planning.

Impact of TD Vaccine Shortages

Vaccine shortages reduce immunization coverage among pregnant women and increase the risk of maternal and neonatal tetanus. Each year, more than 1.5 million children die from preventable diseases through immunization (Rodrigues & Plotkin, 2020). Stable vaccine availability is crucial for achieving tetanus elimination targets and maintaining routine immunization services (Nielsen et al., 2014).

Factors Contributing to TTD and TD Unavailability

Several factors contribute to the unavailability of these drugs, including inaccurate planning, errors in calculating requirements, and logistical challenges. Research by Kanja et al. (2021) reported that 55% of shortages were due to transportation problems, 50% due to misplanning, and 34% due to limited knowledge in vaccine ordering processes. These factors were also observed in East Seram District.

Expired Stock Issues

TTD expiration occurred due to procurement without consideration of product shelf life. The initial stock of 794,700 tablets exceeded annual needs, but over half could not be used due to expiration in June 2023. This reflects weak coordination between the District and Provincial Health Offices and the failure to implement the First Expired, First Out (FEFO) principle in drug management.

Stock Shortages and Distribution Barriers

Shortages of TTD and TD disrupted the healthcare supply chain. Inaccurate distribution schedules from the province caused health facilities to run out of stock. Susyanty et al. (2014) highlighted that delays in vaccine distribution from central to regional levels are a primary factor in reduced immunization coverage. A health logistics information system capable of real-time stock monitoring is essential.

Budget Constraints in Distribution

Limited operational funds at the district level further hinder stock collection from the province. Logistics distribution from the Provincial Health Office to the district is often constrained by the unavailability of allocated transport budgets. Ideally, distribution should occur quarterly to ensure continuous stock availability during routine maternal health services.

Planning and Procurement

Inaccurate needs planning results in budget waste and mid-year stock shortages. Procurement should consider expiration dates, monthly demand, and distribution projections. Sukmawaty (2019) emphasized that drug requirement planning must be based on actual service data to ensure that the types and quantities of drugs meet the needs of primary healthcare facilities.

Mechanisms for Supplying TTD and TD

The supply of TTD and TD is managed through the e-Monev system, which enhances data efficiency, calculation accuracy, and distribution transparency. However, the system's effectiveness still depends on the quality of field data and monitoring. The dropping system for TTD often results in stock surplus, whereas the written request system for TD vaccines is considered more efficient, although discrepancies between requested and actual distributed quantities still occur. Implementing an integrated supply chain management system is essential to ensure consistent availability of maternal health logistics.

CONCLUSION

The availability of Iron Supplement Tablets (TTD) and Tetanus-Diphtheria (TD) vaccines for maternal health services was not fully met. There was a shortage of 98,880 TTD tablets, or 33.33%, and 30 vials of TD vaccine, or 10%. Several factors contributed to this unavailability, including expiration issues, stock shortages due to delayed distribution, and errors in planning the required quantities of TTD and TD vaccines. The provision of Iron Supplement Tablets (TTD) and Tetanus-Diphtheria (TD) vaccines is managed through the e-Monev application system. Procurement is carried out by the central government, then delivered to the provincial health office, and from the province to the district. Distribution to districts uses a dropping system for TTD, while TD vaccines are supplied upon request from the district health office based on actual needs. Recommendations from this study include providing buffer stock to anticipate potential distribution delays, creating an integrated expiration tracking system through the application, strengthening coordination between the central government and provincial health offices to accelerate stock delivery, and ensuring district-level distribution funding so that districts are not entirely dependent on the provincial distribution schedule.

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