Effective Strategy to Reduce Infant Mortality Rates through Neonatal Death Rate (NDR)

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Abstract. Infant Mortality Rate (IMR) is an important indicator of a country's level of social welfare and public health status. The target of the Sustainable Development Goals (SDGS) in 2030 is to end with the aim of reducing neonatal mortality to 12 per 1000 live births. The results of the calculation of neonatal mortality rates at RSUD dr. Soeroto Ngawi exceed the SDGS tolerance limit of 32 per 1000 live births. The purpose of the study was to analyze strategies to reduce the Neonatal Death Rate (NDR) by classifying it based on age characteristics, birth weight and diagnosis of cause of death. The type of research is descriptive quantitative, which will describe the neonatal mortality rate with a retrospective study approach. Total sampling technique with a sample of 47 medical record documents of newborn patients aged 0-28 days. The neonatal mortality rate obtained results of 48 per 1000 live births for 1 year. The proportion of neonatal mortality with the highest in age characteristics is 0-7 days of age, which is 39 (82.97%) cases, normal weight (2,500-4,000 grams) there are 17 (36.17%) cases, and the diagnosis of the cause of death there are 30 (63.84%) cases caused by Low Birth Weight (LBW). It can be concluded based on the characteristics of the main cause of NDR, namely LBW which occurs in premature and dysmastur babies. Strategies that can be carried out are routine antenatal care examinations, screening of newborns, basic emergency obstetric neonatal services, provision of hypno breastfeeding therapy and mother kangaroo mother care, provision of exclusive breastfeeding.
Keywords: Neonatal Death Rate, Infant Death Rate

I. BACKGROUND

Health development in Indonesia is directed to improve the health level and quality of human resources, this can be seen from efforts to increase life expectancy, reduce the Maternal Mortality Rate (MMR) and Infant Mortality Rate (IMR), improve family welfare, increase work productivity and increase public awareness to behave healthily [1] Infant Mortality Rate (IMR) is an important indicator for the level of public welfare of a country and the health status of the community. Metadata Sustainable Development Goals (SDGS) on the third goal on Health and Welfare, where one of the indicators is reducing the Neonatal Mortality Rate to 12 per 1000 live births [2]

The neonatal period is a critical period for babies, because babies experience a transition period from inside the womb to outside the womb. This allows threats from both individuals and the environment that can cause problems related to the baby's life, thus becoming a neonatal emergency. Newborns experience life-threatening dangers during the birthing process. Dangers such as death in babies can occur even with the help of complete medical equipment [3].

One of the important factors in efforts to reduce neonatal mortality is the provision of good quality neonatal health services to the community, which basically emphasizes cost-effective neonatal health services, namely assistance in childbirth by health workers, handling complications in neonates, as well as preventing unwanted pregnancies and handling abortion complications [1]. Early neonatal death is the death of a baby aged 0 to <7 days. Infant deaths worldwide are estimated at 11 million each year, 60% of infant deaths occur during the neonatal period and 40% of neonatal deaths occur in the first week of life [4].

Factors related to neonatal mortality consist of four, namely: maternal factors which include maternal age, maternal education, employment, nutritional status, anemia status, antenatal care visits, type of delivery, pregnancy spacing, parity, gestational age and maternal health status; infant factors which include the condition of the baby at birth and accompanying complications such as gender, jaundice, congenital abnormalities, sepsis, low birth weight (LBW), asphyxia, respiratory disorders, and others; health service factors consist of birth attendants, place of delivery, and referral systems, geoFigureical or environmental factors which include distance to health facilities and access to transportation facilities in reaching health facilities, and others [5]

Neonatal Mortality Rate Data in 2021 at Soeroto Ngawi Hospital reached 32 per 1000 births. This figure exceeds the tolerance limit set by SDGs, so a strategy is needed to reduce the incidence. The purpose of this study is to analyze strategies to reduce the Neonatal Death Rate (NDR) based on age characteristics, baby weight and diagnosis of cause of death. The benefits of this study are expected to be a strategy to reduce the Neonatal Death Rate (NDR) so that the Government can achieve the target of the Sustainable Development Goals (SDGS).

II. METHOD

The type of research is quantitative descriptive with a retrospective study approach by collecting data on neonatal mortality rates in 2022. This study was conducted in February 2023 at the dr. Soeroto Ngawi Regional Hospital. Total sampling technique with a sample of 47 medical record documents of newborn patients aged 0-28 days. The research instrument used observation guidelines in the form of observation tables classified based on age characteristics, birth weight and diagnosis of cause of death. The study also used interview guidelines to explore information about the causes of newborn deaths. Data collection was carried out by studying medical record document documentation and open interviews.

III. RESULTS AND DISCUSSION

Neonatal mortality is death that occurs during the first twenty-eight days of life after a baby is born. Neonatal mortality itself is divided into two, namely early neonatal mortality (0-7 days) and late neonatal mortality (8-28 days) [6]

The neonatal mortality rate is obtained from the recapitulation of reports from SIMRS Medify. Neonatal mortality data is calculated using the formula for the number of deaths of babies aged 0-28 days in one period divided by the number of births (alive + dead) times 1000. The following is the calculation of the Neonatal Mortality Rate at Dr. Soeroto Hospital in 2022:
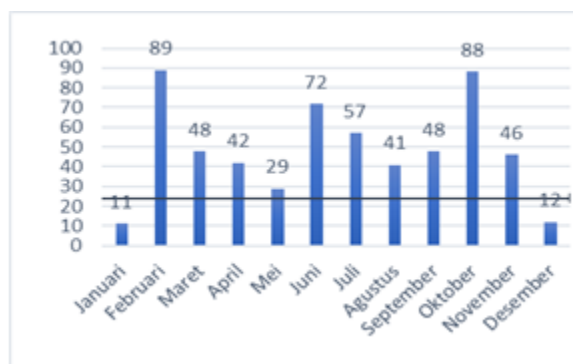

Figure 1. Neonatal mortality rate in 2022.

Based on diagram 1, it is known that the highest Neonatal Mortality Rate is in February and the lowest in January, so that the figure obtained is 48 per 1000 live births for 1 year.

The results of the interview stated that the mortality rate increased because many babies were born with low birth weight, premature babies, lack of nutrition in the womb, and congenital abnormalities such as heart disease caused many cases of infant death. This can be done by providing education to pregnant women about fulfilling nutrition, improving facilities and training given to midwives and nurses for special treatment given to babies with low birth weight in order to reduce the mortality rate caused by LBW. Mortality rate reporting is done every month to the hospital management, which will then be processed into quarterly, semester and annual reports, but there is still a need for data equipment in the recapitulation of infant mortality reports, namely by adding items on birth weight and also diagnosis of cause of death. So that the suppression of infant mortality caused by low birth weight can be carried out optimally. During this study, periodic mortality audits have been carried out at the end of each year, but efforts to reduce infant mortality have not been implemented optimally.

Effective strategies carried out to reduce neonatal mortality in this study classify neonatal mortality data with 3 characteristics, namely age, baby weight and diagnosis of the cause of the disease. Here are the data:
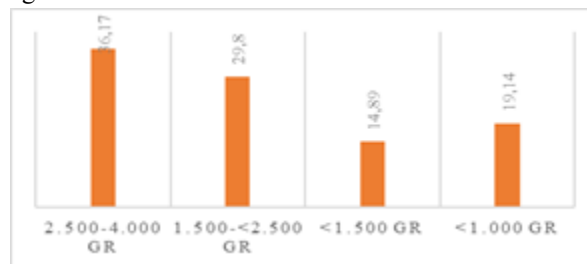
1.Mortality Data by Age
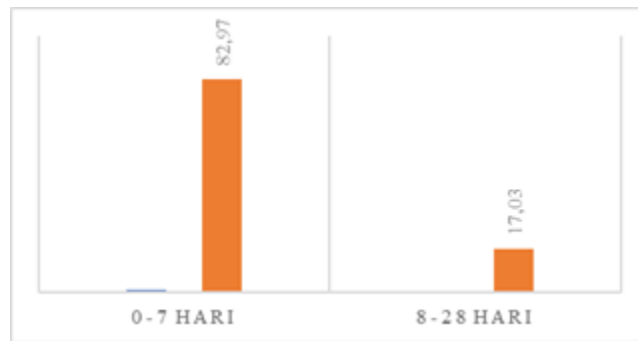
Figure 2. Neonatal Mortality Data by Age

Based on Figure 2 of 47 cases of death, the cause of high mortality is in the early neonatal period (age 0-7 days) there are 82.9% or 39 cases in line with [3] which explains that the early neonatal period is an emergency period because the baby experiences a transition and adaptation period after delivery. This is also relevant to [7] which states that the death of babies 0-7 days is more because the community, especially pregnant women who basically understand the importance of pregnancy checks and nutritional fulfillment is good, but the socio-economic behavior is not good because the community prioritizes basic needs rather than nutritional fulfillment and fetal examinations.

2. Mortality data based on birth weight

Figure 3. Neonatal Mortality Data Based on Birth Weight

Based on Figure 3, out of 47 cases of infant mortality, the highest was in the birth weight of 2,500-4,000 grams with a percentage of 36.17% or 17 cases of death. Deaths caused by birth weight below normal weight (2,500-4,000 grams) or babies born weighing less than 2,500 grams, there were 30 cases of death. This shows that babies born with low birth weight have a high risk of death.

This is relevant to research [8], [9], [10] which explains that babies born under 1,000 grams will experience a high risk of neonatal death, this is because it is related to the growth and maturation of organs that are not yet perfect, as a result LBW often experiences complications that result in death. Babies born with low birth weight will experience growth and developmental disorders and brain function decline. In LBW, the baby's weight loss can occur at any time, because there is usually a problem with the provision of breast milk (ASI). As a result of the baby not being able to suckle breast milk or being unable to suckle, the baby suffers from infection or has a congenital disorder.

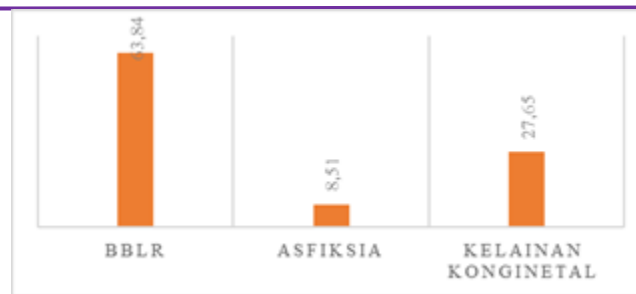3. Mortality data based on Cause of Death Diagnosis

Figure 4. Neonatal Mortality Data Based on Diagnosis of Cause of Death

Based on Figure 4, the diagnosis that causes neonatal death is babies with low birth weight with 30 cases (63.84%). In the study, Low Birth Weight Babies (LBW) were the main diagnosis that caused neonatal death, babies with low birth weight will experience respiratory failure due to lungs that have not fully developed. Babies born with low birth weight are 9 times more at risk of death compared to babies born normally. LBW contributes greatly to infant mortality during the neonatal period because they experience less than perfect lung growth and development, less coordinated cough, sucking and swallowing reflexes and weak respiratory muscles. This causes difficulty breathing and results in asphyxia [11] [12]

Diagram 2 to 4 can be concluded based on the characteristics of age, birth weight and diagnosis of the cause of the disease occurring in babies with Low Birth Weight (LBW) which occurs in Premature and Dysmature babies. The largest contributor to mortality is LBW or preterm neonates where neonates with a gestational age of <37 weeks and have a weight that is in accordance with the gestational age [13]

Based on the results of research and observation, babies with low birth weight contribute greatly to death, because the organs are not yet fully developed. Babies born with low birth weight occur due to lack of nutrition, in research [9] it is stated that the nutritional status of pregnant women is classified as Chronic Energy Deficiency (CED) before the gestational age reaches 16 weeks must be followed up by addressing their nutritional status because they are at risk of giving birth to LBW.

Strategies that can be done to control Neonatal Mortality Rates can be done with several steps:
a. Antenatal Care Examination

The quantity and quality of pregnancy examinations or antenatal care have an impact on the incidence of LBW [14][15]. The purpose of antenatal care is not only aimed at the mother but also at the fetus to reduce the risk of premature, maintain fetal health during pregnancy, low birth weight[15]. Quantitative examinations are carried out at least 6 times during the pregnancy period and in terms of quality meet 10T and ultrasound services [16].
b. Screening in Newborns

The purpose of screening is to detect early intervention for optimal baby growth. Screening can be done with hearing and vision of premature babies [13].
c. Basic Emergency Obstetric Neonatal Services (PONED)

PONED is a form of government program in an effort to reduce the Maternal Mortality Rate (MMR) and Infant Mortality Rate (AKB). Services are provided to overcome neonatal and obstetric emergencies in fetuses, pregnant women, childbirth, postpartum and life-threatening complications [13].
d. Hypno Breastfeeding Therapy and Kangaroo Mother Care

Hypno Breastfeeding can be done independently or accompanied by a practitioner. The method is done by doing relaxation therapy and hypnosis of the mother to increase breast milk production. Kangaroo Mother Care is a method carried out through direct skin-to-skin contact between mother and baby by placing the baby on the mother's chest. The purpose of this therapy is to increase breast milk production and increase the weight of babies with LBW [17].
e. Exclusive Breast Milk (ASI)

Exclusive breastfeeding is the provision of breast milk without any additional food to infants aged 0-6 months. Breast milk plays a major role in reducing the incidence of infant mortality because breast milk contains the best nutrients, enzymes, anti-infections, immunological content and hormones [18] . The application of exclusive breastfeeding to LBW infants will maximize the increase in weight of LBW infants, maintain growth and adequate nutrition [17].

IV. CONCLUSIONS AND SUGGESTIONS

Neonatal mortality rate is 48 per 1000 live births with the highest proportion of age characteristics at the age of 0-7 days, namely 39 cases of death, birth weight is at normal weight (2,500-4,000 grams) there are 17 cases of death, and the diagnosis of the cause of death there are 30 cases of death caused by Low Birth Weight Babies (LBW).

Strategies that can be attempted to reduce mortality rates and control LBW can be done with several efforts, namely by carrying out antenatal care examinations, screening of newborns, basic emergency obstetric neonatal services, hypno breastfeeding therapy and kangaroo mother care and Exclusive breastfeeding.

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V. ACKNOWLEDGMENT

REFERENCES

[1] Ministry of Health of the Republic of Indonesia, *Profile of Indonesia's Health 2021*, 2022.

[2] M. Hoelman, B. Parhusip, S. Eko, S. Bahagijo, and H. Santono, *SDGs Guide for Local Governments (Cities and Regencies) and Local Stakeholders*, no. November, 2015.

[3] D. Dina, S. Wahyuni, R. Fitria, et al., "Emergency Situations," p. 162, 2022.

[4] A. Wati and R. Susanti, "Determinants of Neonatal Mortality in East Kalimantan Using Moran's I and Local Indicators of Spatial Association," *J. Kesehat. Masy. Mulawarman*, pp. 1–9, 2022.

[5] I. Azizah, O. Kasmini, and Handayani, "Neonatal Mortality in Grobogan Regency," *HIGEIA (J. Public Health Res. Dev.)*, vol. 1, no. 4, pp. 72–85, Oct. 2017.

[6] World Health Organization, *Neonatal and Perinatal Mortality: Country, Regional, and Global Estimates*, 2006.

[7] Maiti and Bidinger, "Phenomenological Study of Neonatal Mortality in Tlogowungu Health Center Area, Tlogowungu Subdistrict, Pati Regency," *J. Keperawatan dan Kesehatan Masy. Cendekia Utama*, vol. 2, no. 4, p. 25, 2016.

[8] Suryanti, "Analysis of Neonatal Mortality in Batam City," *J. Dunia Kesmas*, vol. 7, pp. 122–126, 2018.

[9] A. Kusumawardani and S. Handayani, "Maternal Characteristics and Risk Factors for Infant Mortality in Banjarnegara Regency," *J. Promosi Kesehat. Indones.*, vol. 13, no. 2, p. 168, 2018. doi: 10.14710/jpki.13.2.168-178.

[10] N. Hasanah, H. Lestari, and Rasma, "Analysis of Risk Factors: Gender of the Baby, LBW, Premature Delivery, Premature Rupture of Membranes, and Delivery Procedures with Neonatal Sepsis Incidence at Bahteramas Hospital, Southeast Sulawesi Province, 2016," *J. Ilm. Mhs. Kesehat. Masy.*, pp. 1–17, 2016.

[11] I. B. Wiadnyana, I. W. Bikin Suryawan, and A. M. Sucipta, "Relationship Between Low Birth Weight Babies and Neonatal Asphyxia at Wangaya Regional General Hospital, Denpasar City," *Intisari Sains Medis*, vol. 9, no. 2, pp. 95–99, 2018. doi: 10.15562/ism.v9i2.167.

[12] K. D. Jayanti, E. Wasis, R. F. Nurkhalim, et al., "Description and Trends of Infant Mortality Rates in 2014–2018 at Hospital X, Kediri Regency," *Promot. J.*, vol. 10, no. 1, pp. 38–45, 2020. [Online]. Available: https://www.jurnal.unismuhpalu.ac.id/index.php/PJKM/article/view/1117

[13] U. R. Rohmawan, Katmini, E. Kartiningrum, and D. H. Syurandhari, *Policy Strategies to Reduce Infant Mortality Rates*, vol. 7, no. 2, 2023.

[14] S. Husein, "The Effect of Antenatal Care on the Incidence of Low Birth Weight (LBW)," *J. Biometrika dan Kependud.*, vol. 3, no. 2, pp. 160–167, 2014.

[15] I. Inpresari and W. E. Pertiwi, "Determinants of Low Birth Weight Incidence," *J. Kesehat. Reproduksi*, vol. 7, no. 3, p. 141, 2021. doi: 10.22146/jkr.50967.

[16] Ministry of Health of the Republic of Indonesia, *Regulation of the Minister of Health of the Republic of Indonesia Number 6 of 2024 on Technical Standards for Meeting Minimum Health Service Standards*, pp. 1–130, 2024.

[17] M. S. I. N. Ringgi, Y. D. Pora, and Y. M. H. Keytimu, "Provision of Hypno-Breastfeeding Therapy and Kangaroo Mother

Care (KMC) as Quick Recovery Strategies for Low Birth Weight Babies," *Sebatik*, vol. 26, no. 1, pp. 217–222, 2022. doi: 10.46984/sebatik.v25i2.1505.

[18] G. S. Sitepu, R. Oppusunggu, and S. F. Pasaribu, "Literature Study: The Effect of Exclusive Breastfeeding and Low Birth Weight (LBW) on Stunting in Toddlers," *J. Ilm. Kedokt. dan Kesehat.*, vol. 2, no. 3, pp. 247–260, 2023. doi: 10.55606/klinik.v2i3.2157.