

Neonatal Mortality Rate and Causes of Death in Sukabumi District, West Java Province

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Abstract—United Nations member agreed on a new framework, namely the Sustainable Development Goals (SDGs), one of the SDG's goal is to reduce neonatal deaths to 12 deaths per 1,000 births. The most common causes of neonatal deaths according to WHO are prematurity, asphyxia, and infection. Neonatal mortality rate in Indonesia is still quite high compared to Southeast Asian countries. Neonatal mortality rates in Indonesia was recorded 14 deaths per 1,000 live births in 2017, 17 deaths per 1,000 births in Java. In 2015, the number of neonatal deaths in Sukabumi District was still quite high in West Java. This study aims to determine the mortality rate and causes of neonatal deaths in Sukabumi District in 2013-2017. This research is a descriptive study and the subject was neonatal mortality data obtained from the Health Office of Sukabumi District, West Java. The results of the study in Sukabumi District, West Java showed that the neonatal mortality rate in 2013 was around 7.8 per 1,000 births, around 6.3 per 1,000 births in 2014, 5.3 per 1,000 births in 2015, 5.5 per 1,000 births in 2016, and around 4.3 per 1,000 births in 2017. The most common causes of neonatal death in 2013 to 2017 was asphyxia with an average of 29.8%, Low Birth Weight (LBW) 25.8%, congenital anomaly 12.8%, infection 4%, tetanus neonatorum 2%, and other diseases 25.6%. The neonatal mortality rate in Sukabumi District has decreased every year, this is in accordance with the SDG's goals, and the diagnosis of causes of neonatal deaths in Sukabumi District has not fully following the International Statistical Classification of Diseases and Related Health Problems 10th revision (ICD-10).

Keywords—neonatal mortality rate, cause of neonatal death, Sukabumi District

I. INTRODUCTION

The neonatal period begins at birth and ends after 28 days of age. WHO states that neonatal mortality is a death that occurs during the first 28 days of life. Neonatal mortality is divided into two, premature neonatal mortality that occurs

during the first seven days of life and late neonatal mortality that occurs after the seventh day to before the 28th day of life. 75% of neonatal mortality occurs in the first seven days of life (early neonatal death), including 25% to 45% happens in the first 24 hours after birth. The neonatal period is one of the biggest contributors to child mortality [1-3].

According to WHO, of the various causes of neonatal death in the world, there are three of the most common causes, namely prematurity, asphyxia, and infection [3,4]. The most common causes of neonatal death in Indonesia are prematurity (36.6%), asphyxia and birth trauma (21.6%), congenital anomalies (17.1%), sepsis (13%), others (5.4%). Various factors cause neonatal mortality in Indonesia, including socio-economic level, environmental quality, health care efforts, and others [3-7].

With the end of the Millennium Development Goals (MDG's) era, UN member countries agreed on a new framework for Sustainable Development Goals (SDGs) [8]. One of the SDG's goals that need attention is to reduce preventable mortality in infants and toddlers, and by 2030, all countries should reduce neonatal mortality to at least 12 deaths per 1,000 live births and deaths of children under 5 years of at least 25 deaths per 1,000 live births [8-11]. The world's new challenge is to reduce neonatal mortality because almost a portion of all deaths in children under 5 years of age occurs in the first month of life which is the most vulnerable period [11,12]. The neonatal mortality rate (IMR) in the world in 2017 was 19 per 1,000 live births, a decrease compared to the IMR in 2000, that is 30 per 1,000, and in 1990 that is 37 per 1,000 [1,8,9].

The neonatal mortality rate in Indonesia in 2017 was 14 deaths per 1,000 live births. As a comparison with countries in Southeast Asia, the neonatal mortality rate in Singapore is 1 death per 1000 live births, Malaysia 4 deaths per 1000 live

births, Brunei Darussalam 4 deaths per 1000 live births, Thailand 7 deaths per 1000 live births, Vietnam 11 deaths per 1000 live births, and Philippines 13 deaths per 1000 live births [9]. This shows that the IMR in Indonesia is still quite high compared to other Southeast Asian countries. The province with the largest contribution to neonatal mortality in Indonesia is North Maluku, which is around 37 deaths per 1,000 live births, and West Papua with 35 deaths per 1,000 live births. For the island of Java, the IMR in West Java is still quite high compared to other provinces, at 17 per 1,000 live births. The neonatal mortality rate in DKI Jakarta is 15 per 1,000 live births, and East Java is 14 per 1,000 live births [12,13].

Based on the West Java Health Profile in 2015, the number of neonatal deaths in Sukabumi District is still quite high when compared to other districts/cities in West Java. There were 257 neonatal deaths, followed by Garut Regency with 249 deaths, then Indramayu Regency with 226 deaths [14]. However, knowing the number of neonatal deaths, the neonatal mortality rate still cannot be determined due to the absence of the number of live births data. Based on the data already mentioned, it is known that neonatal mortality in Indonesia is still quite high, as is the case with West Java when compared to other provinces in Java Island, and in Sukabumi Regency, West Java Province, research on matters related to neonatal mortality has never been conducted. This is the reason researchers want to research neonatal mortality rates and causes of death in Sukabumi Regency, West Java Province in 2013–2017.

II. METHODS

The research subjects were neonatal mortality data obtained from the District Health Office of Sukabumi, West Java Province in 2013–2017. The data is based on reports from every health center and hospital in the Sukabumi Regency area. The research method used is descriptive by stating the neonatal mortality rate and describing the causes of neonatal death. This research was conducted in September–December 2018.

III. RESULTS AND DISCUSSION

Data on neonatal mortality is the result of calculating the number of neonatal deaths divided by the number of live births and expressed per 1,000 live births. AKN data in Sukabumi Regency, West Java Province in 2013–2017 can be seen in Table 1.

TABLE I. NEONATAL MORTALITY RATE IN SUKABUMI REGENCY, WEST JAVA PROVINCE, 2013–2017

| Year | Number of Neonatal Deaths | Number of Live Births | Neonatal Mortality Rates (per 1.000 live births) |
|------|---------------------------|-----------------------|--|
| 2013 | 390 | 49.911 | 7.8 |
| 2014 | 309 | 49.286 | 6.3 |
| 2015 | 257 | 48.423 | 5.3 |
| 2016 | 256 | 46.656 | 5.5 |
| 2017 | 201 | 46.872 | 4.3 |

Based on the research data, Sukabumi Regency has a low neonatal mortality rate compared to the average neonatal mortality rate in West Java, which is 17 deaths per 1,000 live births [13,15]. Based on the results of this study, there was a significant decrease from 2013 until 2015. This means the AKN in Sukabumi District has shown good results. This decrease can be due to the already good health services that have been carried out, such as health services for pregnant women who check their pregnancies so that complications for mothers and babies can be prevented or the risk is minimized and services for neonates that are following standards [16]. The ratio and distribution of health personnel in Sukabumi District are still less than what they should be. Although the ratio of health workers in Sukabumi District is still lacking, the handling of neonates with abnormalities or complications was still carried out properly. The increase in 2016 shows that several factors can increase the IMR. These factors can come from the condition of the mother during pregnancy and childbirth, the condition of the neonate that is difficult to handle, the treatment that is not carried out by professional health workers, and the long-distance to reach the referral place [16,17]. This can affect the handling of the neonate and cause death in neonates.

Diseases that cause the most neonatal deaths every year in Sukabumi include asphyxia with an average of 29.8%, Low Birth Weight (LBW) with 25.8%, congenital anomalies with 12.8%, infection with 4%, neonatal tetanus with 2%, and other diseases with 25.6%. The results of this study are similar to research conducted in India in 2010 which states that the diseases that cause the most neonatal deaths include prematurity and low birth weight, infection, asphyxia and birth trauma, congenital anomalies, diarrhea, and other diseases. Research conducted in Moewardi Hospital in Surakarta in 2013 also has a few similarities with this research, namely the most common causes of neonatal death are LBW, infection, and asphyxia [18]. The causes of neonatal death in this study indicate a difference with the research conducted by Sarimawar and Ning in 2012 with the cause Neonatal deaths aged 0–6 days are LBW, asphyxia, respiratory distress syndrome, and neonatal sepsis. The highest causes of death for neonates aged 7–28 days were pneumonia, neonatal sepsis, congenital anomalies, infectious and parasitic diseases.

Abdullah et al. study showed that there are several risk factors associated with neonatal mortality, such as complications at birth, neonatal health problems, lack of maternal knowledge about the dangers of neonates, low APGAR scores, maternal complications during pregnancy, unattended delivery by health workers, a history of complications in previous pregnancies, not initiating early breastfeeding, high-risk pregnancies, and the age of the mother at marriage [19]. In this case, some of these risk factors can be associated with neonatal mortality that occurs.

Neonatal mortality caused by LBW in 2013–2017 can be seen in Table 2.

TABLE II. CAUSES OF NEONATAL DEATH DUE TO LBW

| Year | Number (n) | Percentage (%) |
|------|------------|----------------|
| 2013 | 105 | 27 |
| 2014 | 90 | 29 |
| 2015 | 57 | 22 |
| 2016 | 69 | 27 |
| 2017 | 48 | 24 |

LBW is the most common cause of death among other neonates in Sukabumi. The International Statistical Classification of Diseases and Related Health Problems 10th revision (ICD-10) classifies LBW with code P07 [20]. There are two main causes of LBW, such as preterm birth and stunted fetal growth. These may be related to factors such as intrauterine infection, birth defects, hypertension in the mother during pregnancy, exposure to secondhand smoke, and weight gain during pregnancy. In 2012 in America, 11.55% of babies were born prematurely, 7.99% were born with LBW, less than 2% were born very preterm, and 1.42% were very low birth weight [21-23]. The number of neonatal deaths caused by LBW has decreased every year. This shows that there are improvements in routine antenatal care, good nutrition for mothers during pregnancy, appropriate weight gain during pregnancy, and appropriate handling of these neonates.

In a study conducted at Dr. Moewardi Hospital, Surakarta in 2013, the cause of neonatal death due to LBW was found to be 51%, including 87% with a bodyweight <2000 grams and 13% with a bodyweight of 2000-2500 grams. A study conducted in Sumberasih Public Health Center, Probolinggo, Central Java, stated that there was a relationship between birth weight and neonatal mortality. The results of the study indicated that LBW had a 13.542 times greater risk of causing death compared to normal birth weight.

Neonatal mortality caused by Asphyxia in 2013–2017 can be seen in Table 3.

TABLE III. CAUSES OF NEONATAL DEATH DUE TO ASPHYXIA

| Year | Number (n) | Percentage (%) |
|------|------------|----------------|
| 2013 | 101 | 26 |
| 2014 | 77 | 25 |
| 2015 | 69 | 27 |
| 2016 | 54 | 21 |
| 2017 | 101 | 50 |

There was an increase of up to 50% in 2017, indicating that there was a decrease in services in handling mothers during pregnancy and childbirth as well as services for the management of newborn asphyxia. This is because neonatal asphyxia is a medical problem associated with high-risk pregnancies. Maternal diseases that interfere with perfusion to the placenta (chronic hypertension, preeclampsia, diabetes mellitus) put the fetus at risk for hypoxia which causes asphyxia. Birth trauma caused by breech presentation, shoulder dystocia, cephalopelvic disproportion can also cause asphyxia. Compression of the umbilical cord and placental abruption can

also cause hypoxia and ischemia which can lead to asphyxia in the neonate [21]. Improper treatment of asphyxia leads to a re-increase of asphyxia as a cause of neonatal death.

Asphyxia is the most common cause of neonatal death after LBW. In a study conducted by Sarimawar and Ning in 2012 in 12 districts/cities in Indonesia, asphyxia was the third cause of neonatal death after Intra Uterine Fetal Death (IUFD) and LBW with a percentage of 17.3% [18].

Neonatal mortality caused by Congenital Anomalies in 2013–2017 can be seen in Table 4.

TABLE IV. CAUSES OF NEONATAL DEATH DUE TO CONGENITAL ANOMALIES

| Year | Number (n) | Percentage (%) |
|------|------------|----------------|
| 2013 | 47 | 12 |
| 2014 | 49 | 16 |
| 2015 | 26 | 10 |
| 2016 | 36 | 14 |
| 2017 | 24 | 12 |

A study at Dr. Soetomo Hospital in 2017 conducted by Djajakusli S et al. said that congenital anomalies were one of the causes of neonatal death, which was found to be 24 deaths or 23.8%. Diseases that included congenital anomalies in the study were gastrointestinal disease (ileal atresia, gastroschisis, laryngomalacia, esophageal, etc.) by 30.9%, congenital heart disease by 23.6%, neuromuscular disease (anencephaly, microcephaly, spina bifida) by 16.4%, and extremities diseases account for 10.9% of total neonatal deaths due to congenital anomalies [7]. Classification of congenital anomalies in ICD-10 is found in code Q00-Q99 and is divided according to anatomy such as the nervous system, facial area, circulatory system, and respiratory system [20]. Neonatal deaths caused by congenital anomalies have a relatively equal percentage each year. This study does not include any diseases that are classified as congenital anomalies because there are no available data that show more specific diagnoses.

Neonatal mortality caused by Infections in 2013–2017 can be seen in Table 5.

TABLE V. CAUSES OF NEONATAL DEATH DUE TO INFECTIONS

| Year | Number (n) | Percentage (%) |
|------|------------|----------------|
| 2013 | 35 | 9 |
| 2014 | 15 | 5 |
| 2015 | 5 | 2 |
| 2016 | 8 | 3 |
| 2017 | 2 | 1 |

A study at Dr. Soetomo Hospital in 2017 conducted by Djajakusli S et al. said that infection was one of the causes of neonatal death, including sepsis 53.5%, pneumonia 13.9%, and hepatitis 3% [24]. Neonatal deaths caused by infections in Sukabumi from 2013 until 2017 has decreased every year. This can be due to infection prevention in the form of vaccinations,

fast and precise handling by health workers. Data on causes of neonatal death caused by infection do not specify the diagnosis of the disease.

Neonatal mortality caused by Neonatal Tetanus in 2013–2017 can be seen in Table 6.

TABLE VI. CAUSES OF NEONATAL DEATH DUE TO NEONATAL TETANUS

| Year | Number (n) | Percentage (%) |
|------|------------|----------------|
| 2013 | 16 | 4 |
| 2014 | 6 | 2 |
| 2015 | 3 | 1 |
| 2016 | 5 | 2 |
| 2017 | 2 | 1 |

Neonatal mortality caused by neonatal tetanus has decreased every year, however, neonatal tetanus should no longer be the most common cause of neonatal death. Tetanus in neonates and their mothers can be prevented through Tetanus Toxoid (TT) immunization. This immunization program aims to prevent tetanus during childbirth when there is an injury to both the uterus and the umbilical cord. This is especially true of preventing tetanus in high-risk labor, that is when delivery is done with non-sterile instruments. This program must be achieved to reduce the incidence of neonatal tetanus. The coverage of TT immunization for pregnant women in Sukabumi in 2015 was around 85.30%, which shows that there are still pregnant women who do not participate in the program [16]. There is a need for further checks by the health department to find out whether pregnant women have implemented the program or not.

Neonatal mortality caused by other diseases and unknown reasons in 2013–2017 can be seen in Table 7.

TABLE VII. CAUSES OF NEONATAL DEATH DUE TO OTHER DISEASES

| Year | Number (n) | Percentage (%) |
|------|------------|----------------|
| 2013 | 86 | 22 |
| 2014 | 71 | 23 |
| 2015 | 98 | 38 |
| 2016 | 84 | 33 |
| 2017 | 24 | 12 |

Other diseases in this study could be diseases for which the diagnosis of the disease was not certain, diseases with no known cause, or data from the party diagnosing the death that did not include the cause of death. The data for other diseases is not specific to mention what diagnosis is included in it.

IV. CONCLUSION

Based on the results of research conducted by researchers, it can be concluded that neonatal mortality rate in Sukabumi Regency, West Java Province in 2013 was 7.8 per 1,000 live births, in 2014 it was 6.3 per 1,000 live births, in 2015 it was 5.3 per 1,000 live births, in 2016 it was 5.5 per 1,000 live births, and the year 2017 was 4.3 per 1,000 live births. The

most common cause of neonatal mortality in Sukabumi Regency, West Java Province in 2013–2017 was asphyxia with an average of 29.8%, Low Birth Weight (LBW) by 25.8%, congenital anomalies by 12.8%, infection by 4%, neonatal tetanus by 2%, and other diseases by 25.6%.

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