Determinants of Neonatal Mortality in Indonesia

Nur Asiah[1], Yulia Setianingsih[1], Ahman Sya[2], Izza Suraya[1]

[1]*Faculty of Health Sciences, Universitas Muhammadiyah Prof. DR. HAMKA (UHAMKA), Jakarta, Indonesia*
[2]*Program Study Population and environmental education, Universitas Negeri Jakarta, Jakarta, Indonesia*

Keywords: Neonatal Mortality, Low Birth Weight, Antenatal Care, Parity.

Abstract: The results of the SDKI 2017 study show that the infant mortality rate aged 0-28 days was 15/1,000 live births, meaning that out of 67 babies, 1 infant died in the first month of life. This shows that the Infant Mortality Rate aged 0-28 days, although the number has decreased, the figure is still above the SDG's target of 12/1,000 live births. This study aims to determine the factors associated with infant mortality 0-28 days in Indonesia. This type of research is quantitative with a cross-sectional study design. The data source in this study is the SDKI 2017. The sample includes infants who meet the criteria for the last child and were born single. Data were analysed by Bivariate analysis with chi-square test. The sampling Method in this study uses total sampling. Bivariate results show variables related to infant mortality, namely mother's work status, Mother's age at delivery, and parity with P <0.05. Based on the results of the study, it is suggested that there is a need for increased vigilance and preparation for women of childbearing age starting from the preparation period for pregnancy to delivery.

1 INTRODUCTION

The Infant Mortality Rate (IMR) is an important indicator to determine health status in measuring the level of progress of a country in terms of services and development in the health sector. Based on dataSDKI from 2002-2003, 2007, and 2012, the Neonatal Mortality Rate (NMR) is 20/1000 livebirths, 19/1,000 live births, and 19/1000 live births (SDKI, 2017). These data show that the infant mortality rate did not show a significant decrease. The data shows that the neonatal mortality rate has decreased by 15/1,000 live birth, but this figure has not been able to reach the SDG's target of 12/1,000 live births.

One of the goals of the SDGs is to ensure a healthy life and promote well-being for all people of all ages as stated in point 3 of the SDGs. In these goals, there are 13 targets, one of which is ending preventable infant and under-five mortality, by trying to reduce the Neonatal Mortality Rate (NMR) to at least 12/1,000 live births and the under-five mortality rate of 25/1,000 live births by 2030 (Ministry of Health, 2015).

Globally, neonatal mortality accounts for 47% of all under-five deaths. Several previous studies on neonatal and perinatal mortality show that the factors associated with neonatal mortality were low birth weight (Abdullah, Naiem, & Mahmud, 2012), pregnancy complications (Suraya, 2017), birth spacing (Simbolon, 2012), maternal age (Titaley, Christiana R; Dibley, Michael J; Roberts, Kingsley Christine L; Hall, John, 2008), maternal education (Mahcepat, et al, 2011), birth attendant (Noorhalimah, 2015), antenatal visits (Tyas & Notobroto, 2014), antenatal care (Yani, 2013), parity (Sugiharto, et al, 2010), place of delivery (Suraya, et al, 2017).

Some of the obstacles in efforts to reduce the Infant Mortality Rate (IMR) are the poor quality of antenatal, delivery, and postnatal health services (UNICEF, 2012). Based on the description of the problems above, the researchers conducted a study on Determinants of Neonatal Death in Indonesia.

2 METHODS

This type of research is quantitative analysis using a cross-sectional design. The data used is the SDKI 2017 data, which was conducted from 24 July to 30 September 2017 and throughout Indonesia covering 34 provinces. The population in this study were all live births of the last child of women aged 15-49 years who were ever married, in the period 2013-2017 in Indonesia based on SDKI 2017 sample.Selection of

samples from cleaning data Women aged 15-49 years with ever-married status who successfully interviewed and gave birth to their last child (live birth) in the period 2013 – 2017 as many as 10,238 samples. The sampling method in this study is total sampling, where all members of the population are sampled.

Bivariate analysis was carried out using the chi-square statistical test to test the research hypothesis, namely the relationship between the independent variable and the research dependent variable, namely infant mortality.

3 RESULTS

The univariate analysis in this study included descriptive analysis of data on neonatal mortality, maternal education level, maternal employment status, maternal age at delivery, and parity.

3.1 Univariate Analysis

Table 1: Recapitulation of univariate test of neonatal mortality in Indonesia 2013-2017.

Variable	Categoric	n	%
Neonatal Death	Yes	108	1.1
	No	10,130	98.9
Mothers Education Level	Low	3,190	31.2
	High	7,048	68.8
Mother's Work Status	Worked	5,023	49.1
	Didn't Work	5,215	50.9
Mother's Age at Delivery	At-Risk (<20 or >35 years)	2,616	25.6
	No-Risk (20-35)	7,622	74.4
Parity	At-Risk (>3)	2,519	24.6
	No-Risk (1-3)	7,719	75.4

3.2 Bivariate Analysis

Table 2. Recapitulation of Bivariate analysis of neonatal mortality in Indonesia 2013-2017.

Variable	PR (95% CI)	Pvalue	Results
Mothers education level	1.300 (0.881-1.916)	0.185	No Significant Relationship
Mother's workstatus	1.631 (1.110-2.397)	0.012	Significant Relationship
Mother's Age atdelivery	1.927 (1.315-2.826)	0.001	Significant Relationship
Parity	1.875 (1.275-2.759)	0.001	Significant Relationship

3.2.1 Education

Respondents with a low level of maternal education experienced more neonatal deaths, namely 1.3% than respondents with a high level of maternal education, namely 1.0%. The results of the Chi-Square test showed that there was no relationship between maternal education level and neonatal mortality (P-value = 0.185). The results of the calculation of the Prevalence Ratio (PR) show a value of 1.3 (95% CI: 0.881-1.916), meaning that respondents with a low level of maternal education have a 1.3 times chance of experiencing neonatal death than respondents with a high level of maternal education.

3.2.2 Mother's Work Status

Respondents with working mothers experienced more neonatal deaths, namely 1.3% than mothers who did not work, namely 0.8%. The results of the Chi-Square test show that there was a relationship between maternal work status and neonatal mortality (P-value = 0.012). The results of the Prevalence Ratio (PR) calculation show a value of 1.631 (95% CI: 1.110-2.397), meaning that respondents with working mothers have a 1.613 times chance of experiencing neonatal death than respondents with mothers who do not work.

3.2.3 Mother's Age at Delivery

Maternal age at risk of giving birth (<20 or >35 years) experienced more neonatal deaths, namely 1.6% compared to the age of mother at risk of giving birth (20-35 years) which was 0.9%. The results of the Chi-Square test showed that there was a relationship between maternal age at delivery and neonatal mortality (P-value = 0.001). The results of the calculation of the Prevalence Ratio (PR) showed a value of 1.927 (95% CI: 1.315-2.826) maternal age at risk (<20 or >35 years) 1.9 times experienced neonatal death than respondents with maternal age at delivery, not at risk (20 -35 years old).

3.2.4 Parity

Respondents with parity at risk (1 or 4 times) experienced more neonatal deaths, namely 1.6% than respondents with parity at no risk (2 – 3 times)which was 0.9%. The results of the Chi-Square test showed that there was a relationship between maternal age at delivery and neonatal mortality (P- value = 0.001). The results of the Prevalence Ratio (PR) calculation show a value of 1.875 (95% CI: 1.275-2.759),

meaning that respondents with parity at risk (1 or 4 times) have a 1.875 times chance of experiencing neonatal death than respondents with parity at risk (2 – 3 times).

4 DISCUSSION

Mosley and Chen's theory explains that mortality and child survival is influenced by sociodemographic factors but are not able to directly affect child survival, but require direct intermediaries called proxy variables. The proxy variables consist of maternal factors, environmental factors, malnutrition, accidents, and personal illness control.

4.1 Education of Mothers with Neonatal Mortality

Based on the results of the study, there were more mothers with higher education (68.8%) than mothers with lower education (31.2%).

Bivariate analysis using the Chi-Square test obtained a P-value of 0.185, which means that there is no significant relationship between maternal education level and neonatal mortality. With a Prevalence Ratio (PR) value of 1.300 (95% CI: 0.881 – 1.916) this means that mothers with low education are 1.3 times more likely to experience neonatal death than mothers with higher education.

These results are in line with research conducted by Sari and Syarif, (2016), Simbolon (2012), and research conducted by Raharni (2011) which also states that there is no significant difference between reducing infant mortality.

Education is an effort to improve abilities and develop a personality for life so that they can make household decisions so that they can face various problems including health problems to reduce the risk of infant and toddler mortality. The level of maternal education is closely related to the level of understanding of health care, hygiene, the need for prenatal care. (Septiana Dwi Susanti Aisyan et al, 2010).

4.2 Mothers Work Status with Neonatal Mortality

The results of the univariate test show that there were more working mothers (50.9%) than mothers who did not work (49.1%).

The results of bivariate analysis using the Chi-Square test obtained a P-value of 0.012, meaning that there is a significant relationship between maternal employment status and neonatal mortality. With a Prevalence Ratio (PR) value of 1.631 (95% CI 1.110-2.397), this means that working mothers are 1.6 times more likely to experience neonatal death compared to mothers who do not work.

This result is in line with the results of a study conducted by Suparmi et al (2016) which shows that children of working mothers had an 81% higher risk of neonatal death when compared to neonatal death at non-working mothers.

Working mothers tend to have less rest, less time to take care of themselves, imbalance in eating, work stress, tension due to fatigue. The severity of the mother's work will affect the condition of the body and ultimately affect the health status of the mother which affects infant mortality. (Khomsan, 2010).

4.3 Mother's Age at Delivery with Neonatal Death

The results of the bivariate analysis using the Chi-Square test obtained a P-value of 0.001 which means that there is a relationship between maternal age at delivery and neonatal mortality. The results of the Prevalence Ratio calculation obtained a value of 1.927 (95% CI 1.315 – 2.826) indicating that mothers who gave birth at an age at risk had a 1.9 times chance of experiencing neonatal death than mothers who gave birth at an age, not at risk.

This is reinforced by research conducted by Masitoh, et al (2014), Suparmi, etc (2016), and Sari & Syarif (2016) showing that there is a significant relationship between maternal age and neonatal mortality.

Maternal age at delivery is one of the risk factors for neonatal death. At the age that is considered safe, namely 20-35 years, the mother is more physically and psychologically prepared so that the risk of pregnancy and childbirth disorders is relatively very low. At the age of the mother less than 20 years, the risk of infant mortality is higher because the mother has not finished experiencing growth and development. The pelvis and uterus are immature so there is a risk of jamming in the birth canal resulting in prolonged labor and other disorders. The risk of recurrence increases when the mother's age is above 35 years, due to a decrease in maternal health and the process of changing reproductive organs (Simbolon, 2012).

Education is an effort to improve abilities and develop a personality for life so that they can make household decisions so that they can face various problems including health problems to reduce the risk of infant and toddler mortality. The level of maternal

education is closely related to the level of understanding of health care, hygiene, the need for prenatal care. (Septiana Dwi Susanti Aisyan et al, 2010).

4.4 Parity with Neonatal Mortality

Univariate results show that mothers with paritywere not at risk (75.4%) more than mothers with parity at risk (24.6%).

The results of the bivariate analysis show a significant relationship between parity and neonatal mortality. Mothers with parity at risk are 1.875 times more likely to experience neonatal death than mothers with parity at risk. This is also reinforced by previous research conducted by Masitoh, et al (2014), Maheasy, et al (2011), Kurniawan and Melaniani (2018) showing a relationship between parity and infant mortality (P-value 0.000). Motherswho have given birth to more than two children are 0.09 times more likely to experience infant death insubsequent births than mothers who have given birthto a second child or less than two children. A positive relationship with death status makes the higher the parity value or the more children born, the higher the risk of the mother giving birth to a dead baby. Parity is a variable that has a relationship withinfant mortality.

Health problems in pregnant women and childbirth appear in mothers with parity at risk, namely giving birth to more than 2 children. It is can make the uterine broken and lead to abnormalities in the mother's womb. This has an impact on the condition of the location of the fetus or placenta in the mother which can interfere with fetal growth. Disruption of fetal growth in the mother's womb makes the mother give birth to an unhealthy baby (Wiknjosastro, 2007).

5 CONCLUSION

Mothers with low education are more likely to experience neonatal deaths than mothers with higher education. Mothers who work experience more neonatal deaths than mothers who do not work. Mothers who gave birth at the age of <20 and >35 experienced more neonatal deaths than mothers who gave birth at the age of 20-35. Mothers with parity at risk had more chances of experiencing neonatal deaths than mothers with non-risk parity. To reduce the neonatal mortality rate, it is necessary to conduct education or health promotion by related parties to prospective mothers, especially teenagers, so that they get married at the right age and plan their pregnancy at an age that is not at risk. Women of

childbearing age are also advised to plan the number of children they have. For working mothers who are pregnant, pay attention to the type and workload they do.

REFERENCES

Abdullah, A. Z., Naiem, M. F., & Mahmud, N. U. (2012). Faktor Resiko Kematian Neonatal Dini di Rumah Sakit Bersalin. *Jurnal Kesehatan Masyarakat Nasional*, Vol. 6 No. 6, 283 - 288.

Kemenkes R.I. (2015). *Kesehatan Dalam Kerangka Sustainable Development Goals (SDGs).* Jakarta: Kementerian Kesehatan RI.

Masitoh, S., EVK, T., & Karningsih. (2014).Asfiksia Faktor Dominan Penyebab Kematian Neonatal. *Jurnal Ilmu dan Teknologi Kesehatan*, Vol. 1 No. 2, 163 - 168. Mekonnen, Y. (2013). Neonatal Mortality inEthiopia: Trends and Determinants. *BMC Public Health*.

Noorhalimah. (2015). Faktor-Faktor yang Berhubungan dengan Kematian Neonatal di Kabupaten Tapin. *Jurnal Publikasi Kesehatan Masyarakat Idonesia*, Vol. 2 No. 2, 64 - 71.

Raharni, Isakh, B. M., & Diana, I. (2011). Profil Kematian Neonatal Berdasarkan Sosio Demografi dan Kondisi Ibu saat Hamil diIndonesia. *Buletin Penelitian Sistem Kesehatan*, Vol 14 no 4, 391 - 398.

Sari, T. W., & Syarif, S. (2016). HubunganPrematuritas dengan kematian Neonatal diIndonesia Tahun 2010 (Analisis DataRiskesdas 2010). *Jurnal Epidemiologi Kesehatan Indonesia*, Vol 1 no 1, 9 - 14.

SDKI. (2017). *Survei Demografi dan Kesehatan Indonesia 2017.* Indonesia: Badan Kependudukan dan Keluarga Berencana Indonesia.

Sugiharto, M., & Kusumawati, L. (2010, Oktober 4). Analisis Perbedaan antar Paritas Ibu. *Buletin Penelitian Sistem Kesehatan*, pp. 321-325.

Suraya, Izza. (2017). Determinan Kematian Neonatal Pada Bayi Lahir Rendah di Indonesia (Analisis Data SDKI 2002-2003 dan 2007). *ARKESMAS*, Vol. 2 No.1, 126-134.

Titaley, Christiana R; Dibley, Michael J; Roberts, Kingsley Christine L; Hall, John. (2008). Determinants of Neonatal Mortality in Indonesia. *BMC Public Health*, 8:232, 1-15.

Tyas, S. C., & Notobroto, H. B. (2014). Analisis Hubungan Kunjungan Neonatal, Asfiksia dan BBLR dengan Kematian Neonatal. *Jurnal Biometrika dan Kependudukan*, Vol. 3, 168-174.

UNICEF. (2012). *Ringkasan Kajian Kesehatan Ibu & Anak.* Indonesia: UNICEF Indonesia.

World Health Organization. (2006). *Neonatal and Perinatal Mortality.* Prancis: WHO.

Wiknjosastro,H. 2007. Ilmu Kebidanan. Jakarta: Yayasan Bina Pustaka

Yani, D. F., & Duarsa, A. B. (2013). Pelayanan Kesehatan Ibu dan Kematian Neonatal. *Jurnal Kesehatan MAsyarakat Nasional*.