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Analysis Determinants of Neonatal Death in Indonesia (2017 IDHS Data Analysis)

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ABSTRACT

The results of the Indonesian Health Demographic Survey show that AKN in Indonesia reached 15 per 1000 live births in 2017, this figure still has not reached the SDGs target of less than 12 per 1000 live births. The samples in this study were all samples of the 2017 IDHS that met the criteria totaling 79,710 samples. The results univariate analysis found that the proportion of infants experiencing neonatal death was 2.83%. In the bivariate analysis, it was found that the related variables were ANC (p 0.000 and OR = 3.91), place of delivery (p 0.000 and OR = 2.07), LBW (p 0.000 and OR = 4.20), low maternal education (p 0.000 and OR = 2.95), consuming iron (p 0.000 and OR = 3.61). It is hoped that health workers in Indonesia can invite pregnant women to do complete antenatal care, in order to avoid risk factors for neonatal death.

Keywords: determinants, IDHS 2017, neonatal death

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BACKGROUND

Neonates are newborns up to 28 days of age. Babies up to the age of one month are the age group that has the highest risk of health problems and various health problems can arise (Kemenkes RI, 2017). Neonatal deaths are not only tragedies for families but are indicators of severe health system failure, especially since many of these tragic deaths are preventable (Ahmed & Fullerton, 2019). The era of the Millennium Development Goals (MDGs) has ended in 2015, all countries in the world have agreed to a new framework, namely The Sustainable Development Goals (SDGs) in which there is one agreed target to reduce the neonatal mortality rate to less than 12 per 1000 births. life (Bappenas, 2016).

According to research conducted by Nasrun (2020) the causes of neonatal death include: maternal age; pregnancy complications; and antenatal care. Other studies also mention several causes of neonatal death, namely low birth weight (LBW), multiple births, sex of the baby and other neonatal factors, birth attendants, place of delivery, pregnancy complications, complications during delivery, maternal age, maternal knowledge, and gravida. (Abdullah et al., 2016; Mafticha, 2016).

Globally in 2017, the neonatal mortality rate was 18 deaths per 1000 live births, an estimate during the same period as many as 2.5 million children died in the first month of life (Unicef, 2019). The World Health Organization (WHO) says 47% of under-five deaths are neonatal deaths (WHO, 2018). In developing countries most (up to 99%) of neonatal deaths occur (WHO, 2011). The results of the Indonesian Health Demographic Survey show a decline in AKN in Indonesia, from 32 per 1000 live births in 1991 to 15 per 1000 live births in 2017 (IDHS, 2017). However, this figure is still far from other Southeast Asian countries such as Singapore 0.53 deaths per 1000 live births, Malaysia 4.61 deaths per 1000 live births, and Brunei Darussalam 6 deaths per 1000 live births (UN IGME, 2020).

The high neonatal mortality rate is one of the evidences of the poor quality of health services for mothers and newborns. Thus, a focused and evidence-based approach can be used as an effort to reduce the neonatal mortality rate in Indonesia. Therefore, it is necessary to know the main key of the problems that cause neonatal mortality (BAPPENAS, 2010; Wahyu Dwi et al., 2010).

METHODS

This study is an analysis of secondary data from the 2017 IDHS (Indonesian Health Demographic Survey). The cross-sectional research design is a type of observational research design in which in this cross-sectional study the researcher measures the outcome and exposure of study participants at the same time (Setia, 2016).

This research is located in 34 provinces throughout Indonesia, carried out from 24 July to 30 September 2017. The secondary data was reprocessed by researchers with several different variables in 2020. The population in this study is the entire 2017 IDHS sample with a sample of 83,650 women aged 15-49 years who have been married. The sample in this study is the entire sample of the 2017 IDHS as many as 79,710 with female respondents aged 15-49 years who have been married and gave birth live in the last 5 (five) years prior to the survey meeting the criteria. Inclusion criteria were infants who died 0 – 28 days, infants who were born alive, weighed at birth, and underwent antenatal examinations, while the exclusion criteria were documented data that were not fully available according to the study variables.

RESULTS

Univariate Analysis

Table 1. Frequency Distribution of Neonatal Death

No	Neonatal Death	Freuency	%
1	Existence	77,391	97.17

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2	Neonatal Death	2,319	2.83
ANC			
1	Complete	12,665	16.57
2	Not Complete	67,045	83.43
Baby Gender			
1	Female	38,37	48.57
2	Male	41,34	51.43
Place of Labour			
1	Health Facility	9,767	13.63
2	Non Health Facility	69,943	86.37
Baby Birth Weight			
1	Normal	78,618	98.61
2	Low Birth Weight	1,092	1.39
Mother Age			
1	Low Risk	30,589	36.68
2	High Risl	49,121	63.32
Level Education Mother			
1	Advance	6,804	7.67
2	Intermediet	34,146	40.69
3	Basic	38,76	51.64
Birth Interval			
1	Low Risk	68,563	88.23
2	High Risk	11,147	11.77
Parity			
1	Low Risk	66,152	85.14
2	High Risk	13,558	14.86
Consuming Iron			
1	Yes	11,062	14.24
2	No	68,648	85.76
TT Immunization			
1	Yes	51,875	64.62
2	No	27,835	35.38

Source: Secondary Data IDHS 2017 (Processed in 2021)

Based on the table above, the results of univariate analysis explain that infants experiencing neonatal death in Indonesia have a percentage of 2.83% (2,319), respondents who did not complete antenatal care at 83.84%, male infants were 51.43% higher than infants who are female, respondents who give birth in non-health facilities are 86.37%, babies with low birth weight are 1.39%, respondents who have a high risk age are 63.32%, respondents who have secondary education are 40.69% and respondents who have education 51.64%, respondents with a high risk of birth spacing by 11.77%, respondents with a high risk parity rate of 14.86%, respondents who did not take iron supplements by 85.76%, respondents who did TT immunization by 35.38%.

Bivariate Analysis

Table 2. Determinants of Neonatal Death in Indonesia

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Determinants	Neonatal Death				Total		OR	CI 95%	P-Value
	Existence		Neonatal Death						
	n	%	n	%	n	%			
ANC									
Complete	12,544	99.16	121	0.84	12,665	100			
Not Complete	64,847	96.78	2,198	3.22	67,045	100	3.91	2.99 - 5.11	0.000
Baby Gender									
Female	37,446	97.64	924	2.36	38,37	100			
Male	39,945	96.73	1,395	3.27	41,34	100	1.39	1.21 - 1.60	0.000
Place of delivery									
Health Facility	9,602	98.51	165	1.49	9,767	100			
Non Health Facility	67,789	96.96	2,154	3.04	69,943	100	2.07	1.60 - 2.68	0.000
Baby Birth Weight									
Normal	76,384	97.28	2,234	2.72	78,618	100			
Low Birth Weight	1,007	89.49	85	10.51	1,092	100	4.20	2.85 - 6.19	0.000
Baby Gender									
Female	29,819	97.64	770	2.36	30,589	100			
Male	47,572	96.91	1,549	3.09	49,121	100	1.31	1.12 - 1.52	0.000
Level Education Mother									
Advance	6,708	98.72	96	1.28	6,804	100			
Intermediet	33,381	98	765	2	34,146	100	1.56	1.05 - 2.33	0.028
Basic	37,302	96.29	1,458	3.71	38,760	100	2.95	2.01 - 4.34	0.000
Birth Interval									
Low Risk	66,803	97.45	1,760	2.55	68,563	100			
High Risk	10,588	95.08	559	4.92	11,147	100	1.98	1.67 - 2.34	0.000
Parity									
Low Risk	64,307	97.25	1,845	2.75	66,152	100			
High Risk	13,084	96.75	474	3.25	13,558	100	1.18	1.01 - 1.39	0.037
Consuming Iron									
Yes	10,952	99.11	110	0.89	11,062	100			

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Determinants	Neonatal Death				Total		OR	CI 95%	P-Value
	Existence		Neonatal Death						
	n	%	n	%	n	%			
No	66,439	96.85	2,209	3.15	68,648	100	3.61	2.72 - 4.79	0.000
TT Immunization									
Yes	50,55	97.64	1,325	2.36	51,875	100			
No	26,841	96.32	994	3.68	27,835	100	1.41	1.29 - 1.53	0.000

Source: Secondary Data IDHS 2017 (Processed in 2021)

Based on the table above, it is explained that respondents who did complete ANC visits and babies did not die had a higher proportion (99.16%) than respondents who did not complete ANC visits and babies did not die (96.78%). Meanwhile, the proportion of respondents who did not complete ANC visits and infants experienced neonatal death was (3.22%) and respondents who did complete ANC visits and infants experienced neonatal mortality was (0.84%). The results of statistical tests obtained p value = 0.000 indicating that there is a relationship between ANC visits and neonatal mortality and an OR value = 3.91 which means that respondents who do not complete ANC have a risk of experiencing neonatal death by 3.9 times greater than respondents who complete ANC.

Then it was explained that the proportion of female infants and infants who did not die (97.64%) was greater than that of male infants and infants who did not die (96.73%). Meanwhile, the proportion of male infants and infants experiencing neonatal death was (3.27%) greater than that of female infants and infants experiencing neonatal death (2.36%). The results of the statistical test obtained p value = 0.000 which means that there is a relationship between the sex of the baby and neonatal death, and the OR = 1.39 value, which means that male infants have a 1.39 times greater risk of experiencing neonatal death than male infants. with a baby girl.

The proportion of respondents who gave birth in health facilities and babies who did not die (98.51%) was greater than those who gave birth in non-health facilities and babies who did not die (96.96%). Meanwhile, respondents who gave birth in non-health facilities and infants experienced neonatal death had a greater proportion (3.04%) compared to respondents who gave birth in health facilities and infants experienced neonatal death (1.49%). The results of the statistical test obtained p value = 0.000 which means that there is a relationship between place of delivery and neonatal death and an OR value = 2.07 which means that respondents who give birth in non-health facilities have a 2.07 times greater chance of experiencing neonatal death compared to respondents who give birth in non-health facilities. medical facility.

The proportion of infants who did not experience LBW and infants who did not die was greater (97.28%) compared to infants who had LBW and infants who did not die (89.49%). Meanwhile, infants with LBW and infants experiencing neonatal death were greater (10.51 %) than infants who did not experience LBW and experienced neonatal death (2.72%). The results of statistical tests obtained p value = 0.000, which means that there is a relationship between LBW and neonatal mortality and an OR value = 4.20, which means that infants with LBW have a 4.20 times greater chance of experiencing neonatal death compared to infants who are not LBW.

The proportion of maternal age at delivery with low risk and infant not dying was greater (97.64%) compared to maternal age at delivery with high risk and infant not dying

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(96.91%). Meanwhile, the maternal age at delivery with high risk and the infant experiencing neonatal mortality was greater (3.09%) than the maternal age at delivery with low risk (2.36%). The results of statistical tests obtained p value = 0.000, which means that there is a relationship between maternal age and neonatal mortality and an OR value = 1.31, which means that mothers whose age is at high risk have a 1.31 times greater chance of experiencing neonatal death compared to mothers whose age is at low risk.

The proportion of mother's education in the Advance category and the baby does not die (98.72%), is higher than the mother's education in the Intermediet category (98%) and the mother's education in the Basic category (96.29%). Meanwhile, the proportion of maternal education in the Basic category and infants experiencing neonatal death (3.71%) is greater than the maternal education in the Intermediet category (2%) and maternal education in the advance category (1.28%). The results of statistical tests show that there is a significant relationship between maternal education in the Intermediet category and neonatal mortality, the p value = 0.028 and the OR = 1.56 value, which means that mothers who have Intermediet education have a 1.56 times greater chance of experiencing neonatal mortality compared to mothers. who have a advance category of education, similarly there is a significant relationship between maternal education in the basic category and neonatal mortality, the p value = 0.000 and the OR = 2.95 value, which means that mothers who have basic education have a 2.95 times greater chance of experiencing neonatal death higher than mothers who have a advance category of education.

The proportion of birth spacing with low risk and infants who did not die was (97.45%) greater than the distance between births with high risk and infants who did not die (95.08%). Meanwhile, the proportion of birth spacing with high risk and infants experiencing neonatal death was (4.92%) greater than the proportion of spacing with low risk and infants experiencing neonatal death (2.55%). The results of statistical tests show that there is a significant relationship between birth spacing and neonatal mortality, p value = 0.000 and OR = 1.98, which means that birth spacing with high risk has a 1.98 times greater chance of experiencing neonatal death than birth spacing with low risk.

The proportion of parity with low risk and infants who did not die was (97.25%) greater than parity with high risk (96.75%). Meanwhile, the proportion of parity with high risk and infants experiencing neonatal death was (3.25%) greater than the proportion of parity with low risk and infants experiencing neonatal death (2.75%). The results of statistical tests showed that there was a significant relationship between parity and neonatal death, p value = 0.037 and OR = 1.18, which means that parity with high risk has a 1.18 times greater chance of experiencing neonatal death than parity with low risk.

The proportion of respondents who consumed iron and infants did not die was greater (99.11%) than respondents who did not consume iron and infants did not die (96.75%). Meanwhile, respondents who did not consume iron and infants experienced greater neonatal mortality (3.15%) than respondents who consumed iron and infants experienced neonatal deaths (0.89%). Statistical test results obtained p value = 0.000 which means that there is a relationship between consuming iron and neonatal mortality and the OR value = 3.61 which means that respondents who do not consume iron have a 3.61 times greater chance of experiencing neonatal death compared to respondents who consume iron.

The proportion of respondents who did TT immunization and the baby did not die was greater (97.64%) than respondents who did not immunize TT (96.32%). Meanwhile, respondents who did not immunize TT and infants experienced greater neonatal mortality (3.68%) compared to respondents who did TT immunization (2.36%). Statistical test results obtained p value = 0.000, which means that there is a relationship between TT immunization and neonatal mortality and an OR value = 1.41, which means that respondents who do not

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immunize TT have a 1.41 times greater chance of experiencing neonatal death than respondents who do TT immunization.

DISCUSSION

Relationship of Antenatal Care with Neonatal Death

Antenatal Care visit variable in the bivariate test found that there was a relationship with a p value of 0.000 on neonatal mortality with an OR = 3.91, which means that respondents who did not complete ANC had a 3.9 times greater risk of experiencing neonatal death than respondents who completed ANC.

This is in line with the research conducted by Saputro et al. (2021) the results obtained p value = 0.029, which means that there is a relationship between completeness of ANC visits with neonatal mortality and OR = 3.6, which means that pregnant women who do not perform ANC have a 3.6 times greater risk of experiencing neonatal death compared to those who do ANC. research conducted by Saputro et al. (2021) the results obtained p value = 0.029, which means that there is a relationship between completeness of ANC visits and neonatal mortality. The results of the multivariate analysis conducted by Puspitasari & Martini (2017) obtained a p value of 0.039, which means that there is a relationship between completeness of ANC and neonatal mortality. In the research of Abdullah et al. (2012) also found that there was a relationship between ANC and neonatal stability (p value 0.000) and the OR obtained was OR = 7.33, which means that pregnant women who did not perform ANC had a 7 times greater risk of experiencing neonatal death compared to those who did ANC. Not in line with research conducted by Muharram et al. (2017) that there is no relationship between ANC and neonatal mortality with a p value of 0.402. Research conducted by Raharni et al. (2011) obtained a p value of 0.683, which means that there is no relationship between completeness of ANC and neonatal mortality.

According to the researcher's assumption that antenatal care can reduce health problems during pregnancy because it checks the health status of the mother and fetus so that it can reduce neonatal mortality, if pregnant women do not perform ANC then problems during pregnancy cannot be prevented quickly and can cause death. neonates.

Relationship of Baby Gender with Neonatal Death

On the sex variable of the baby, it shows that male infants experience more neonatal deaths (3.27%) compared to female infants. The results of the bivariate statistical test showed that there was a relationship with a p value of 0.604 between the sex of the baby on neonatal mortality with an OR = 1.39, which means that male babies have a risk of experiencing neonatal death.

In line with the research conducted by Muharram et al. (2017) that there is a relationship between infant sex and neonatal mortality (p value 0.018). The research of Moura et al. (2014) also showed that male infants had a 2 times greater risk of experiencing neonatal death. In contrast to the research conducted by Kusumawati et al. (2019), a p value of 1,000 was obtained, which means that there is no relationship between the sex of the baby and neonatal mortality, but the value of OR = 1, which means that male infants have a 1 times greater risk of experiencing neonatal death compared to infants. female. Research from Musooko et al. (2014) also from Uganda found that there was no relationship between infant sex and neonatal mortality.

According to the researcher's assumption that according to the results of the study, male infants are more susceptible to neonatal death than female infants, as seen from the higher percentage value.

Relationship of Place of Delivery with Neonatal Death

The variable place of delivery in the bivariate test obtained a p-value of 0.000, meaning that there is a relationship between place of delivery and neonatal mortality and OR = 2.07,

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which means that place of delivery in a non-health facility has a 2.07 times greater chance of causing neonatal death compared to health facilities.

In line with research conducted by Mafticha (2016), it was found that there was a relationship between place of delivery and neonatal mortality with a p value of 0.070. Research by Sari & Syarif (2016) also found that there was a relationship between the place of delivery and neonatal mortality (p value 0.019). In contrast to the research conducted by Mogi & Anggraeni (2021), the p value was 0.354, which means that there is no relationship between the place of delivery and infant mortality. Previous research from Widayanti & Wijayanti (2018) also found that there was no relationship between place of delivery and neonatal mortality with a p value of 1,000. Pangaribuan & Lolong (2015) also said that there was no relationship between residence and neonatal mortality (p value 0.451).

According to the researcher's assumption, mothers who give birth in non-health facilities can experience neonatal death which is caused when problems during childbirth cannot be handled quickly due to the lack of sterile equipment and the ability to handle these problems.

Relationship of Birth Weight with Neonatal Death

This is in line with research conducted by Toressy et al. (2020) it was found that there was a relationship between LBW and neonatal mortality (p value 0.000). Oktarina & Fajar's (2017) got an OR value = 29.42, which means that babies who have LBW have a 29 times greater risk of experiencing neonatal death than those who are not LBW. In contrast to research conducted by (Mogi & Anggraeni, 2021) that there is no relationship between birth weight and neonatal mortality with a p value of 0.587. According to the assumptions of researchers, LBW has an influence on experiencing neonatal death due to abnormal physical babies so that babies cannot survive.

Relationship of Mother Age with Neonatal Death

It shows that mothers who are in the high risk category experience more neonatal deaths (3.09%) compared to those in the low risk category. In this study, mothers aged under 20 years and above 35 years were categorized as high risk and 20-35 years in the low risk category. The results of the bivariate statistical test showed that there was a relationship with a p value of 0.000 between maternal age and neonatal mortality with an OR = 1.31, which means that the age of the mother in the high risk category has a 1.31 times greater risk of experiencing neonatal death than the age of 20-35 years.

This is in line with research conducted by Toressy et al. (2020) the results showed that there was a relationship between maternal age and neonatal mortality (p value 0.001). Then, the OR value = 2,957, which means that mothers who give birth at a vulnerable age have a 2.9 times greater risk of experiencing neonatal death compared to those in the low risk category (Oktarina & Fajar, 2017). This is different from the research conducted by Raharni et al. (2011) found that there is no relationship between maternal age and neonatal mortality with a p value of 0.699. Previous research from Mogi & Anggraeni (2021) also explained that there was no relationship between maternal age and neonatal mortality with a p value of 0.602. The same thing was found by Pangaribuan & Lolong (2015) that there was no relationship between maternal age and neonatal mortality (p value 0.120).

According to the assumptions of the researchers, maternal age under 20 years is still not ready to experience pregnancy, then mothers aged 35 years also have a risk of experiencing neonatal death because at that age the mother's condition is not prime anymore, but maternal age has no relationship with neonatal mortality because during childbirth still have other risks such as pregnancy complications.

Relationship of Mother Education Level with Neonatal Death

The variable of maternal education in the basic category in the bivariate test shows a P value of 0.000, meaning that there is a relationship between basic maternal education and

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neonatal mortality, as well as maternal education in the Intermediet category also has a relationship with neonatal mortality (p value 0.028).

Research conducted by (Fitri et al., 2017) by comparing Indonesia (2012 data), the Philippines (2013 data) and Cambodia (2014 data) using Demographic Health Survey (DHS) data obtained the results that maternal education was categorized as not attending school. in Indonesia has a relationship with infant mortality p value 0.001, while in the Philippines (p value 0.549) and Cambodia (p value 0.646) it is not related. The Elementary school category was also associated with a p-value of 0.002, the same as the Philippines (p-value 0.002), while Cambodia was not related (p-value 0.482). Then the junior high/high school category also had a significant relationship with p value 0.034, while the Philippines (p value 0.205) and Cambodia (p value 0.346) had no relationship to infant mortality. Not in line with research conducted by (Raharni et al., 2011) found that there is no relationship between maternal education and neonatal mortality with a p value of 0.392. The percentage in the case group with higher education is 59.6%, this value is lower than the percentage in the control group, which is 85.1%. The results of statistical tests with chi-square showed a p value of 0.006, meaning that there was a relationship between maternal education and neonatal mortality.

The researcher assumes that mother's education is the most basic factor in decision making. The higher the education of the mother, the more able to make decisions that health services during pregnancy can be prevented as early as possible for the mother and fetus.

Relationship of Birth Interval with Neonatal Death

Birth spacing is the distance in months from previous births, with a low risk category of 24 months. In the results of the bivariate statistical test, a p value of 0.000 was obtained, which means that there is a relationship between birth spacing and neonatal mortality.

Research conducted by Fitri et al. (2017) by comparing Indonesia (2012 data), the Philippines (2013 data) and Cambodia (2014 data) using the Demographic Health Survey (DHS) data, the results show that the largest infant mortality comes from Indonesia (2.7%), then Cambodia (2.6%) and the lowest is the Philippines (2.1%). Then the largest birth spacing <18 months was in the Philippines (10.7%) compared to Indonesia (4.4%) and Cambodia (5.1%). For birth spacing between 18 to 23 months, the highest also came from the Philippines (14.8%), followed by Cambodia (8.1%) and Indonesia (6.1%). When compared with birth spacing > 18 months, birth spacing < 18 months has a risk of 2.86 and 3.58 times for infant mortality in Indonesia and Cambodia. In the Philippines, birth spacing of 18 - 23 months has the greatest risk of infant mortality, namely 2.59 times compared to birth spacing > 24 months and the risk of infant death from birth spacing < 18 months itself is smaller (OR = 1.47: 95% CI 0.38 - 5.68). In this study, it can be seen that the shorter the birth spacing, the greater the risk of infant mortality. This is not in line with research conducted by (Raharni et al., 2011) which found that there was no relationship between birth spacing and neonatal mortality with a p value of 1,000. Then the research conducted by Kurniawan & Melaniani (2018) using the 2012 IDHS data in East Java obtained a birth spacing of less than 4 years experiencing more infant deaths than a birth spacing of more than 4 years parity.

The researcher's assumption is therefore that mothers are expected to be able to delay pregnancy or provide optimal birth spacing (at least 24 months) after the previous birth because pregnant women need good physical conditions, good psychological conditions and a good environment.

Relationship of Parity with Neonatal Death

It shows that the proportion of parity with the number of births of 3 children and experiencing neonatal death is 3.25%. From the results of the bivariate analysis, the p value was 0.037. This means that there is a parity relationship with neonatal mortality and the OR = 1.18, meaning that parity with high risk has a 1.18 times chance of experiencing neonatal death compared to parity with low risk.

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In the study of Sugiharto & Kusumawati (2010) by conducting the Mann-Whitney test, it was proven that mothers with primigravida parity had differences with third parity and grandegravida (≥4). While the second parity was not different from the primigravida parity for infant mortality. Research conducted by Kurniawan & Melaniani (2019) using data from the 2012 IDHS in East Java obtained research results showing parity is related to mortality status. A positive relationship with mortality status makes the higher the parity value or the more children born, the higher the risk of mothers giving birth to stillbirths. Parity as a variable that has the strongest relationship with infant mortality. However, research from (Rofiqoch et al., 2016) in Banjarnegara Regency found that parity was not associated with infant mortality. This is in line with the research conducted by Toressy et al. (2020) obtained a p value of 0.006, which means that there is a relationship between parity and neonatal mortality. Oktarina & Fajar's (2017) also obtained an OR value of 6,143 which means that mothers who gave birth to more than 3 children had a 6 times greater risk of experiencing neonatal death than those who gave birth to less than 3 children.

Researchers assume that mothers who give birth to children more than 3 times have a risk of experiencing neonatal death because it affects their physical condition and can no longer be able to give birth.

Relationship of Iron Consumtion with Neonatal Death

The variable consuming iron shows that the proportion of respondents who do not consume iron and experience neonatal death is 3.15%. From the results of bivariate analysis obtained p value 0.000 This means that there is a relationship between iron consumption and neonatal mortality.

According to WHO, 40% of maternal deaths in countries based on the National Journal of Health Sciences (JNIK) in 2019 have developed related to anemia in pregnancy and are mostly caused by iron deficiency and acute bleeding, not infrequently the two interact with each other. Delivery outcomes in pregnant women with iron deficiency anemia are 12-28% fetal mortality, 30% perinatal mortality, and 7-10% neonatal mortality. Then research from (Abdullah et al., 2012) found that there was a significant relationship between iron supplement consumption and neonatal mortality. Research from Perveen & Soomro (2016) stated that the incidence of anemia in pregnant women increased the risk of 1.64 times greater giving birth to babies who experienced perinatal death compared to pregnant women who were not anemic (OR 1.64 and p 0.05) and research from Azizah & Handayani (2017) found that there was a relationship between maternal anemia status and neonatal mortality, namely, anemic mothers had a 3.2 times risk of neonatal death compared to mothers who were not anemic.

According to the researcher's assumption, consuming iron can reduce the incidence of anemia and reduce neonatal mortality.

Relationship of TT Immunization with Neonatal Death

The TT immunization variable in the bivariate test obtained a p value of 0.000, meaning that there is a relationship between TT immunization and neonatal mortality.

According to Abdullah et al. (2012) TT immunization is expected to reduce the infection rate so that babies born are healthy. Pregnant women with a history of TT immunization < 2 times have a 19.2 times greater risk of experiencing early neonatal death in babies born than pregnant women with a history of TT immunization 2 times and statistically significantly related. Research from Yunus (2008) showed that TT immunization of pregnant women with an OR value of 2.5 is a risk factor and affects the incidence of neonatal death. Then a study conducted in India in February 2012, almost 50% in India had experienced a decrease in maternal and neonatal tetanus (MNT). This progress is due to the increasing use of the Tetanus Toxoid (TT) vaccine in immunization programs. One way to achieve the elimination of Neonatal Tetanus (TN) in India is by routinely immunizing Tetanus Toxoid (TT). Besides India, other countries are recommended to strengthen the coverage of Tetanus

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Toxoid (TT) immunization so that the lives of mothers and babies can be saved (Verma & Khanna, 2012). Researchers assume that by immunizing Tetanus Toxoid (TT) to avoid infection in infants so as to save the lives of babies and mothers.

CONCLUSION

It that the proportion of neonatal deaths in Indonesia based on the 2017 IDHS data is 2.83%. Based on the results of the bivariate test, the variables related to neonatal mortality were ANC visits, baby's gender, place of delivery, low birth weight, maternal age, mother's education, birth spacing, parity, iron consumption, TT immunization, and birth attendant with p value < 0.05.

1. To reduce the neonatal mortality rate, it is necessary to develop clear policies and steps from the center to the regions based on evidence-based, such as deliveries assisted by skilled health workers, the need to develop partnerships between traditional birth attendants and midwives to assist deliveries outside health facilities, and ensure access to medical facility.
2. It is necessary to develop an effective referral system.
3. It is hoped that health workers in Indonesia can invite pregnant women to do complete antenatal care, in order to avoid risk factors for neonatal death.

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