Bidang ilmu : Kesehatan Masyarakat

DETERMINANTS OF NEONATAL SURVIVAL IN INDONESIA: ANALYSIS OF IDHS DATA

Fathinah Ranggauni Hardy
Public Health Program, Faculty of Health Sciences,
Universitas Pembangunan Nasional Veteran Jakarta
E-Mail : fathinahranggauni@upnvj.ac.id

ABSTRACT

We assessed the effect of Indonesia's national health insurance programme (*Jaminan Kesehatan Nasional* (*JKN*)) on effective coverage for maternal and child health across geographical regions and population groups. We used four waves of the Indonesia Demographic and Health Survey from 2017, The population in this study is the total number of children born to the 2017 IDHS survey respondents in Indonesia 11.965 JKN introduction was associated with variables are statistically related to neonatal survival, namely ANC, parity, multiple births, maternal occupation, maternal education, paternal education, age at delivery and wealth index because they have HR values above 1 and p-values <0.05. We did not find any significant level increase in ANC service contact or caesarean section. Interestingly, increases in ANC service contact and crude coverage, and safe delivery crude coverage were larger among the poorest compared with the most affluent. No statistically significant associations were found between JKN introduction and neonatal and neonatal mortality (p>0.05) in the first 3 years following implementation. Expansion of social health insurance led to substantial improvements in quality of care for maternal health services but not in child mortality. Concerted efforts are required to equitably improve service quality and child mortality across the population in Indonesia.

Keywords: Neonatal, National Health Insurance, Survival,

Corresponding Author: fathinahranggauni@upnvj.ac.id

INTRODUCTION

The newborn mortality rate (neonatal) is the number of deaths that occur before the baby is one month old (28 days) per 1000 live births in a given year. The mortality rate in Indonesia is still higher than other developing countries such as Vietnam, Thailand, the Philippines and Sri Lanka, but it is still below Bangladesh, Nepal, Laos and India (Sukamti & Riono, 2015), so the neonatal mortality rate is still the main focus of the problem. health in Indonesia. Based on the results of the 2012 IDHS, the neonatal mortality rate was reduced sharply from 68 per 1,000 live births in the 1987-1991 period to 32 per 1,000 live births in

the 2008-2012 period (Central Bureau of Statistics, 2013).

Reducing neonatal and under-five mortality is the third target of the Sustainable Development Goals (SDGs), namely ensuring a healthy life and increasing the welfare of all people of all ages. Where the target of the SDGs in 2030 is to reduce the neonatal mortality rate by at least 12 per 1,000 live births and the under-five mortality rate by 25 per 1,000 live births (Central Bureau of Statistics, 2013).

Based on trends from the results of the Indonesian Demographic and Health Survey, the neonatal mortality rate from year to year (1991 to 2017) has decreased by 15 per 1000 live births (IDHS, 2013). 55.8% of neonatal deaths were in the neonatal period, around 78.5% of which occurred at the age of 0-6 days. However, this figure has not yet reached the government's target. The government's target in reducing the Neonatal Mortality Rate is to reduce it to 10 per 1000 live births in 2024 (Central Bureau of Statistics, 2013).

The National Health Insurance Program (JKN) which started in January 2014 took over responsibility for mother and child services for all women participating in JKN. Women who do not yet have insurance that are not covered by the JKN or Jamkesda (Regional Health Insurance) schemes no longer benefit from financing schemes specific to maternal and child health. In this context, the Jampersal program restarted in 2017 through Minister of Health Regulation (Permenkes) number 61 of 2017 (Ministry of Health, 2017). The National Health Insurance Program also covers neonatal services to prevent neonatal deaths.

Neonatal services must be adequate in an effort to reduce neonatal mortality. The efforts made are useful for reducing neonatal mortality caused by low birth weight babies, hypothermia, asphyxia, postnatal infections such as neonatal tetanus, and sepsis (Ministry of Health of the Republic of Indonesia, 2013). Most neonatal deaths that occur after birth are usually caused by preventable and treatable diseases that are inexpensive, doable, easy to perform and effective. In addition, WHO in 2014 reported that Tetanus Toxoid immunization interventions in pregnant women can reduce neonatal mortality by 33% to 58% (WHO, 2014).

Neonatal service efforts are very important because the neonatal period (0-28 days) is a period when babies are very vulnerable to diseases that can affect the baby's survival in the future. Newborn babies get sick very easily because they are physically still having difficulty adapting to the new environment around them (outside the womb) (Ministry of Health, 2017). The neonatal period is also a dangerous period, both physically and psychologically. This period is physically very dangerous because it is difficult for babies to adjust to the radically important changes in a very new and different environment. This is evidenced by the high neonatal mortality rate.

METHOD

This research is an observational analytic research. secondary data is used, namely the 2017 SDKI data which aims to analyze factors related to Neonatal Survival with the National Health Insurance (JKN) in Indonesia. The collection of quantitative data in this

study was carried out according to the place and time of implementation of the 2017 IDHS, namely in all regions of Indonesia.

We used four waves of the Indonesia Demographic and Health Survey from 2017, The population in this study is the total number of children born to the 2017 IDHS survey respondents in Indonesia. The research sample is part of the number and characteristics possessed by the population. The sample in this study used the last child born 2014 as many as 11.965.

Multivariable analysis is an analysis that connects several independent variables together with one dependent variable. Multivariable analysis in this study used Survival Analysis for the effect of JKN use on neonatal survival and the cox regression model. applied to analyze the effect of JKN use on neonatal survival. First, we applied the model to estimate the predicted probability of insurance by JKN with the outcome of neonatal survival with a series of observable covariates namely wealth index, residence, mother's education, mother's occupation, father's education, Low Birth Weight, multiple births, breastfeeding, age at delivery, parity. Second, using the command to match JKN participants and non-JKN participants based on the propensity score. To ensure that the distribution of propensity scores is similar for women insured by JKN and not insured by JKN, we evaluated the use of JKN PBI for pregnancy check-ups, delivery services, postpartum maternal health services, and newborn health services that would affect neonatal survival. Third, a stratified analysis was conducted to assess the impact of JKN on neonatal survival.

RESULTS AND DISCUSSION

The results show that individuals who use health insurance actually have higher baby death odds compared to individuals who do not have health insurance. Although it looks contrainitive, this finding can be explained with several possible factors. One possible explanation is that individuals who use health insurance may have limited access to quality health services. Factors such as low quality health services, delays in medical services, or lack of access to adequate medical facilities can affect the health and welfare of neonatals. In addition, this contraintive result may also reflect a broader socioeconomic problem. For example, groups that have health insurance may face higher economic pressure or have a lower level of education, which in turn can affect their health care behavior and lifestyle. This may lead to the use of health insurance as a complex indicator and deeper than just access to medical care. From Figure 1, it is known that the probability of neonatal survival without JKN is lower than the group that has (98.97% vs. 99.05%). Until the 28th day of treatment, there were 98.97% of live births that were able to survive. While babies with JKN were able to survive by 99.05%. However, the logrank test in table 5.5 shows a result of 0.659. This figure is greater than alpha 0.05, meaning that statistically the probability of survival between the two groups is not different.

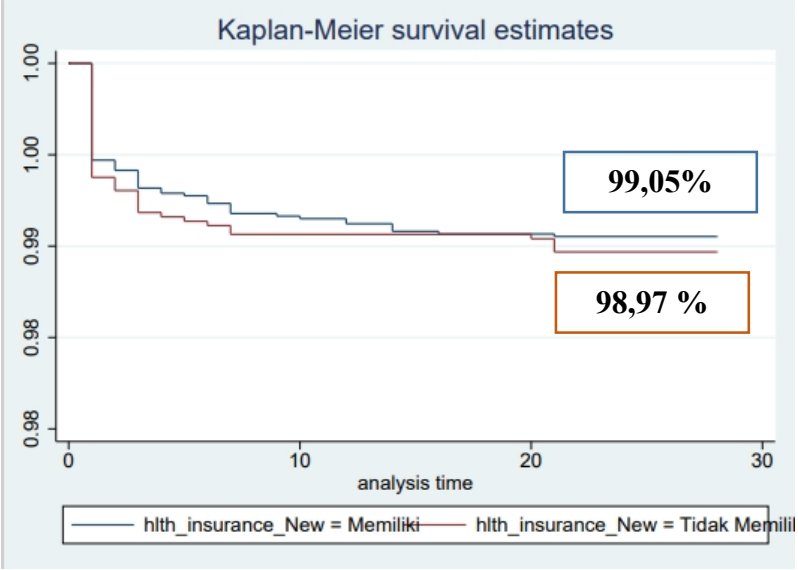

Figure 1 Kaplan Meier Graph of Neonatal Survival Probability Based on JKN Ownership

From Figure 2, it is known that the probability of neonatal survival that does not utilize JKN is lower compared to the group that has (98.99% vs. 99.18%). Until the 28th day of treatment, there were 98.99% of live births in the group that did not utilize JKN who were able to survive. While babies who utilized JKN were able to survive by 99.18%. However, the logrank test in table 5.7 shows a result of 0.436. This figure is greater than alpha 0.05, meaning that statistically the probability of survival between the two groups is not different.

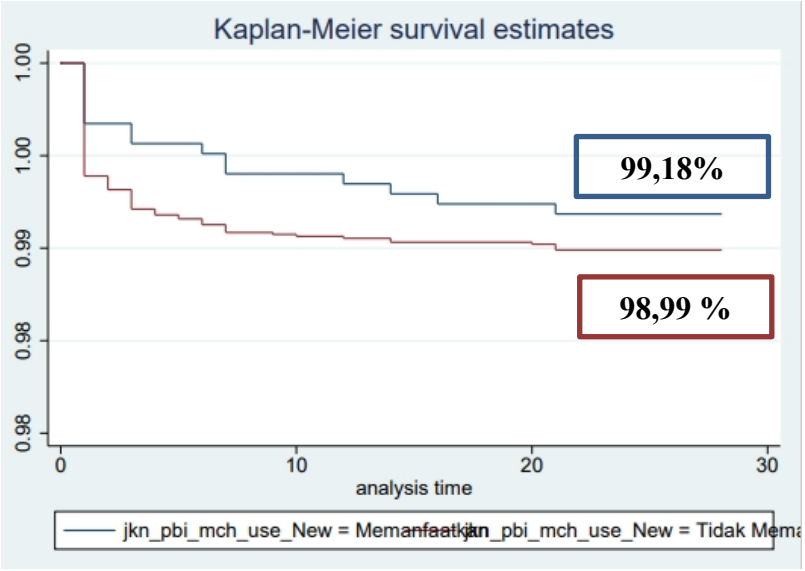

Figure 2 Kaplan Meier Graph of Neonatal Survival Probability Based on JKN Utilization

Based on table 1 above, it is found that the neonatal mortality rate per 100,000 person-days

in the group with JKN is smaller than the group without JKN, which is 37 compared to 34. Every 100,000 person-days of observation, 37 neonatal deaths were found in neonatals without JKN. While in neonatals with JKN there were 34 deaths.

Table 1 Mortality Rate and Survival Probability Based on JKN Ownership

Variable	***Event***	***Time at Risk* (Day)**	***Mortality Rate* per 100.000 Person-Day**	**Probability Cumulative Survival (%)**	**Median Survival**	***Log Rank Test***
Don't Have JKN	43	199356	37	98,97 (98,61-99,23)	-	0,659
Have JKN	68	115659	34	99,05 (98,80-99,25)	-	

Based on table 2 above, it is found that the neonatal mortality rate per 100,000 person time in the group that utilizes JKN is smaller compared to the group that does not have JKN, which is 29 to 36. Every 100,000 person-days of observation, 36 neonatal deaths were found in neonatals who did not utilize JKN. While in neonatals who utilized JKN, there were 29 deaths.

Table 2 Mortality Rate and Survival Probability Based on JKN Utilization

Variabel	***Event***	***Time at Risk* (Hari)**	***Mortality Rate* per 100.000 Person-Day**	**Probability Cumulative Survival (%)**	**Median Survival**	***Log Rank Test***
Not Utilizing JKN	96	263820	36	98,99 (98,77-99,17)	-	0,436
Utilizing JKN	15	51195	29	99,18 (98,65-99,51)	-	

Based on the table 3 above, of the 13 covariate variables analyzed, 9 variables are statistically related to neonatal survival, namely ANC, parity, multiple births, BBLR , maternal occupation, maternal education, paternal education, age at delivery and wealth index because they have HR values above 1 and p-values <0.05.

Table 3 Relationship of Covariate Variables with Neonatal Survival

Variable		Neonatal Survival		HR (*Crude*)	95% CI	*p value*
		Event	Sensor			
Mother's Age at Childbirth	>35 Years	32 (1,83%)	1718 (37,5%)	2,26	1,49-3,44	<0,0001*
	<20 Years	8 (0,98%)	812 (99,02%)	1,21	0,58-2,51	0,614
	20-35 Years	71 (0,81%)	8706 (98,17%)	reff		
Wealth Index	Very Poor	38 (1,30%)	2879 (98,70%)	1,82	0,98-3,37	0,111
	Poor	16 (0,70%)	2264 (99,30%)	0,98	0,48-2,01	0,958
	Middle	18 (0,84%)	2120 (99,16%)	1,18	0,58-2,37	0,646
	Rich	25 (1,22%)	2030 (98,78%)	1,70	0,88-2,27	0,05*
	Very Rich	14 (0,72%)	1943 (99,28%)	reff		
Mother's Education	No School	3 (2,33%)	126 (97,67%)	3,29	0,95-11,36	0,06
	Elementary School	36 (1,33%)	2662 (98,67%)	1,88	1,02-3,43	0,04*
	Junior High School	22 (0,84%)	2583 (99,16%)	1,18	0,62-2,29	0,606
	High School	35 (0,92%)	3769 (99,08%)	1,29	0,71-2,37	0,401
	University	15 (0,71%)	2096 (99,29%)	reff		
Father's Education	No school	16 (1,67%)	942 (98,33%)	2,69	1,49-3,44	0,01*
	Primary	46 (1,00%)	4545 (99,00%)	1,61	0,58-2,51	0,153
	Secondary	38 (0,94%)	3988 (99,06%)	1,52	0,58-2,51	0,220
	Higher	11 (0,62%)	1761 (99,38%)	reff		
Type of Residence	Rural	58 (1,02%)	5623 (98,98%)	1,09	0,75-1,58	0,645
	Urban	53 (0,94%)	5613 (99,06%)	reff		
Mother's Job	Not Working	40 (0,71%)	5601 (99,29%)	0,57	0,39-0,85	0,004*
	Working	71 (1,24%)	5635 (98,76%)	reff		
Low birth weight	Yes	48 (3,23%)	1436 (96,77%)	5,11	3,51-7,44	<0,0001*
	No	63	9800	reff		

Variable		Neonatal Survival		HR (*Crude*)	95% CI	*p value*
		Event (0,64%)	Sensor (99,36%)			
Multiple Birth	Yes	7 (8,33%)	77 (91,67%)	9,21	4,28-19,80	<0,0001*
	No	104 (0,92%)	11.159 (99,08%)		reff	
Paritas	>1	33 (1,54%)	2110 (98,46%)	1,82	1,21-2,73	0,004*
	1	78 (0,85%)	9126 (99,15%)		reff	
Maternity Place	Non Health Facilities	33 (1,28%)	2544 (98,72%)	1,44	0,96-2,16	0,079
	Health Facilities	78 (0,89%)	8692 (99,11%)		reff	
Type of Delivery	*Caesar*	21 (1,03%)	2023 (98,97%)	1,06	0,66-1,71	0,804
	Normal	90 (0,97%)	9213 (99,03%)		reff	
Antenatal Care	Incomplete	25 (2,02%)	1214 (97,98%)	2,38	1,52-3,71	<0,0001*
	Complete	86 (0,85%)	10.022 (99,15%)		reff	
Birth Assistant	not a health worker	79 (1,06%)	7392 (98,94%)	1,28	0,85-1,93	0,236
	health workers (Doctor, Midwife)	32 (0,83%)	3844 (99,17%)		reff	

Based on the results of the interaction test in the multivariate analysis, it was found that the JKN ownership variable interacted with the maternal education variable because the p-value of the lrtest was below 0.05. Maternal education can modify the magnitude of the risk between JKN ownership and neonatal survival so that the risks concluded are 9, namely:

a. Risk when the mother has a university education but does not have JKN
b. Risk when the mother has a high school education but has JKN
c. Risk when the mother has a junior high school education but has JKN
d. Risk when the mother has an elementary school education but has JKN
e. Risk when the mother has no school education but has JKN
f. Risk when the mother has a high school education but does not have JKN
g. Risk when the mother has a junior high school education but does not have JKN
h. Risk when the mother has an elementary school education but does not have JKN
i. Risk when the mother has no school education but does not have JKN

Table 4 Multivariate Analysis Table of The Relationship between JKN Ownership and Neonatal Survival

Variable	*p-value*	Explanation
JKN Ownership * Wealth Index	0,952	Not interacting
JKN Ownership * Residence	0,253	Not interacting
JKN Ownership * Mother's Education	0,027	Interacting
JKN Ownership * Place of Delivery	0,684	Not interacting
JKN Ownership * Age at Delivery	0,376	Not interacting
JKN Ownership * Type of Delivery	0,093	Not interacting
JKN Ownership * Father's Education	0,589	Not interacting
JKN Ownership * Birth Attendant	0,687	Not interacting
JKN Ownership * JKN Utilization	-	Not interacting
JKN Ownership * Parity	0,902	Not interacting
JKN Ownership * ANC	0,499	Not interacting
JKN Ownership * Multiple Births	0,305	Not interacting
JKN Ownership * Mother's Occupation	0,152	Not interacting
JKN Ownership * LBW	0,467	Not interacting

Based on the results of the interaction test in the multivariate analysis, it was found that the JKN utilization variable interacted with the type of residence variable because the p-value of the lrtest was below 0.05. The type of mother's residence can modify the magnitude of the risk between JKN utilization and neonatal survival. In addition, the PH assumption test obtained a time intersection on two days of observation so that the risks that will be concluded are 6, namely:

a. Risk when someone does not utilize JKN but lives in an urban area before 2 days
b. Risk when someone does not utilize JKN but lives in an urban area after 2 days
c. Risk when someone utilizes JKN but lives in a rural area before 2 days
d. Risk when someone utilizes JKN but lives in a rural area after 2 days
e. Risk when someone does not utilize JKN and lives in a rural area. before 2 days
f. Risk when someone does not utilize JKN and lives in a rural area. after 2 days

Table 5 Multivariate Analysis Table of The Relationship between JKN Utilization and Neonatal Survival

Variable	p-Value	Explanation
JKN Utilization * Wealth Index	0.1067	Not interacting
JKN Utilization * Residence	0.0385*	Interacting
JKN Utilization * Mother's Education	0.914	Not interacting
JKN Utilization * Place of Delivery	0.504	Not interacting
JKN Utilization * Age at Delivery	0.353	Not interacting

JKN Utilization * Type of Delivery	0.772	Not interacting
JKN Utilization * Father's Education	0.580	Not interacting
JKN Utilization * Birth Attendant	0.848	Not interacting
JKN Utilization * JKN Ownership	Restriction	Not interacting
JKN Utilization * Parity	0.439	Not interacting
JKN Utilization * ANC	0.106	Not interacting
JKN Utilization * Multiple Births	Restriction	Not interacting
JKN Utilization * Mother's Occupation	0.081	Not interacting
JKN Utilization * LBW	0.334	Not interacting

Since several decades, the Government of Indonesia has implemented several key policies and programs as an effort to expand public access to Maternal Neonatal Health (MNH) health services. Starting with the Safe Motherhood Initiative in the late 1980s, the Government of Indonesia focused on increasing access to MNH services in rural areas through the village midwife (BDD) program. From January 2011 to January 2014, the Government of Indonesia also implemented the first iteration of the Maternity Guarantee Program (Jampersal) which provides antenatal, delivery and postnatal services for women who do not have health insurance. Jampersal services also include referrals if complications occur and care for newborns up to 28 days of age.

This program was discontinued to coincide with the start of the National Health Insurance (JKN) in 2014. The Jampersal program is known to have succeeded in increasing the coverage of deliveries by health personnel at health facilities, especially in areas that previously had low coverage; while in urban areas where access to health facilities is relatively easy, the impact of the Jampersal program is not too large.

A study conducted by Achadi, et al in 2014 found that the coverage of deliveries at health facilities in Garut Regency, which was previously low, increased by 2.4 times with Jampersal, while in Depok City there was no significant effect. In Garut, the increase in the number of deliveries at health facilities due to Jampersal was mainly seen in women with low levels of education, those from the lowest wealth quintile, and women in rural areas. The experience gained from the Jampersal I program indicates that initiatives that focus on the supply side with the aim of reducing financial barriers to accessing services can influence service utilization. The question now is whether programs that focus on the beneficiary side such as health insurance can sustain and/or enhance the progress made in the field of maternal and child health, and whether there are still gaps in policy that still need to be considered (Achadi et al, 2014).

The results of this study revealed that individuals who do not have health insurance have lower neonatal death odds around 1.8% (AOR = 0.982; 95% CI 0.972-0.991) when compared to individuals who have health insurance. The findings of this study indicate an attractive relationship between health insurance and the risk of neonatal mortality under the age of one year [22]. The results show that individuals who use health insurance actually have higher baby death odds compared to individuals who do not have health insurance.

Although it looks contrainitive, this finding can be explained with several possible factors. One possible explanation is that individuals who use health insurance may have limited access to quality health services. Factors such as low quality health services, delays in medical services, or lack of access to adequate medical facilities can affect the health and welfare of neonatals. In addition, this contraintive result may also reflect a broader socioeconomic problem. For example, groups that have health insurance may face higher economic pressure or have a lower level of education, which in turn can affect their health care behavior and lifestyle. This may lead to the use of health insurance as a complex indicator and deeper than just access to medical care.

This study indicates that mothers who experienced the first birth in the age group 10-14 years, 15-19 years, 20-24 years, 25-29 years, and 30-34 years each has a higher baby death odds by 1,262 times (AOR = 1,262; 95% CI 0.041-0,180), 1,253 times (AOR = 1,253; 95% CI 0.064-0.221), and 1,236 times (AOR = 1,236; 95% CI 0.081-0.275) compared to mothers who gave birth in the age group of more than 35 years. Interesting findings show that mothers who experience the first birth in various age ranges, such as 10-14 years, 15-19 years, 20-24 years, 25-29 years, and 30-34 years, have higher baby death odds than mothers who gave birth in the age group of more than 35 years. This is in line with research [6], [14], [18] which indicates that the age of the mother during childbirth plays an important role in the risk of neonatal death. This discovery is in line with literature that has highlighted a higher health risk in mothers who are pregnant at an age that is too young or too old. Previous studies have shown that pregnant mothers at too young age have a higher risk of pregnancy complications, such as anemia, malnutrition, and birth premature. These factors can contribute to higher neonatal mortality rates because babies born prematurely or with low body weight have a greater risk of serious health problems. On the other hand, mothers who are pregnant at too old age can also face higher health risks, such as chronic diseases or medical complications that are more common in further age [23]. Pregnancy at an older age can also be associated with an increased risk of premature birth and baby birth with low body weight, which in turn can increase the risk of neonatal death.

In a group of mothers who did not experience birth in a year, there was an increase in baby death odds by 11,626 times (AOR = 0.620; 95% CI 0.395-0.975) for cases of neonatal death under the age of one year compared to mothers who gave birth twice a year. Mothers who do not experience birth within one year, there is a significant increase in the risk of neonatal death under the age of one year [6], [15].

One reason is the effect of previous experience. Mothers who have experienced a previous birth process may have better knowledge and experience in caring for babies, recognizing danger signs, and overcoming baby's health problems. This experience can allow mothers to respond to the baby's health needs more quickly and effectively, which in turn can reduce the risk of neonatal death. In this context, it may be noted that mothers who do not experience birth in a year may face certain challenges or conditions that affect their ability to care for and maintain the baby well.

In the context of marital status, parents who have never been in a marriage

relationship have lower baby death odds of 31.2% (AOR = 0.688; 95% CI 0.108-0.515) when compared to parents who no longer live with a partner. Meanwhile, parents who have the status of marriage have a higher baby death odds of 1.148 times (AOR = 0.283; 95% CI 0.113-0.708) compared to parents who are never married. Similar findings can be seen in parents who are widowed or widows, with higher baby death odds by 1,152 times (AOR = 1,152;95% CI 1,032 - 1,286) compared to parents who are never married. The same findings also apply to divorced parents, where the baby's death odds are higher by 1,132 times (AOR = 1,132; 95% CI 1,008 - 1,272) compared to parents who are never married.

In the context of marriage relations, the results showed a significant link between the marital status of parents and the risk of neonatal death under the age of one year [21]. Parents who are never married have a lower risk of neonatal death than parents who no longer live with a partner. However, what is interesting, parents who have the status of marriage have a higher risk of neonatal death, compared to parents who are never married. These findings may reflect the existence of complexity in marriage relations, where factors such as economic pressure, interactions between partners, or psychosocial factors may affect the welfare and care of neonatals.

The results of the study also found that similar findings apply to parents who are widowed or widows. Parents in this status have a higher risk of neonatal death compared to parents who are never married. This might be explained by the challenges faced by single parents, both in terms of social, economic, and care for neonatals.

Similarly, similar findings are also found in divorced parents. Divorced parents have a higher risk of neonatal death compared to parents who are never married. Factors related to the divorce process, such as psychosocial stress or changes in family dynamics, may play a role in influencing the risk of neonatal death in this group. Overall, this finding highlights the complexity of the relationship between marital status and the risk of neonatal death. Social, economic, and psychosocial factors in the context of marital status may have a diverse impact on the welfare and care of neonatals, which need to be considered in an effort to reduce the risk of neonatal death in this population. This finding illustrates that social support and stable relationships can have a positive impact on the welfare of mothers and neonatals [20].

Mothers who do not work also have lower neonatal death odds around 1.8% (AOR = 0.982; 95% CI 0.973-0,993) compared to mothers who work. In addition to health insurance, the status of maternal employment is also proven to be a factor that influences neonatal death [23]. This may reflect a greater role than mothers who do not work in providing intensive care to their babies, because they have more time that can be allocated to care for and maintain the health of the baby. They can give more intense attention to baby care, presenting important factors in monitoring and handling any changes in the health condition of the baby's health.

On the other hand, mothers who work may face additional challenges. They must set the time and commitment between work and baby care, which can be a complicated task. In some cases, time constraints or health care accessibility may affect their ability to respond to

the health needs of the baby optimally. In this situation, effective coordination and support from the work environment and the family can play an important role in helping mothers who work to provide good care to their children, and this is an area that can be a focus for improvement in an effort to reduce the risk of neonatal death.

In the context of maternal education, the results of the study indicate that various levels of maternal education have an influence on the risk of neonatal death. Mothers who do not take formal education have an odds of neonatal deaths around 1,147 times (AOR = 1,147; 95% CI 1,103 - 1,192) higher than mothers who study up to university levels. Likewise, mothers with basic education (SD) have an odds of neonatal deaths are around 1,092 times (AOR = 1,092; 95% CI 1,063-1,122) for cases of neonatal death under the age of one year, when compared to mothers who study up to levels up to level University. Meanwhile, mothers with junior secondary education (SMP) have an odds of neonatal mortality higher around 1,050 times (AOR = 1,050; 95% CI 1,022-1,080) compared to mothers who study up to University levels. Likewise, mothers with secondary secondary education (SMA) show that baby death odds are around 1,025 times (AOR = 1,025; 95% CI 1,003-1,047) compared to mothers who study up to Div/University levels. This confirms the important role of mother's education in maintaining the welfare of newborns.

Mother's education level also plays an important role in determining the risk of neonatal death. The results show that the higher the level of maternal education, the lower the risk of neonatal death. Mothers who have higher education tend to have better knowledge and awareness about baby health, as well as the ability to follow the right health practices [22]. Mother's education also has a positive impact on the application of a healthy lifestyle in the family and the possibility of getting better access to health information. In addition, educated mothers tend to be more aware of nutrients, the use of contraception to regulate birth spacing, and awareness of diseases and care during childhood [18].

When referring to the age of the head of the family, in the age group 15-24 years, the head of the family has a lower neonatal mortality odds of 28.7% (AOR = 0.713; 95% CI 0.654 - 0.777) when compared to family heads aged 65 years and over . Conversely, the head of the family in the age group 25-44 years has a higher baby death odds, which is 1,075 times (AOR = 1,075; 95% CI 1,055 - 1,096), when compared to the head of the family more than 65 years old. Likewise, the head of the head of the family in the age range of 45-64 years showed that the higher baby death odds of 1,020 times (AOR = 1,020; 95% CI 1,005-1,035) compared to the group of heads of family aged 65 years and over.

The results showed an interesting pattern related to the age of the head of the family and its impact on the risk of neonatal death. In the age group 15-24 years, the head of the family has a lower baby death odds, showing protection against the welfare of the baby. This may be associated with factors such as relatively good health at a young age, greater access to health information, and may also be stronger social support in this age group.

However, when the head of the family is in the age group 25-44 years, findings show an increased risk of neonatal death. This can be caused by various factors such as greater responsibility for families and work, as well as possible exposure to higher pressure and

stress. These factors may affect the ability of the head of the family to give adequate attention and care for the baby, which in turn can have a negative impact on the health of the baby. Meanwhile, in the age group 45-64 years, there is still an increased risk of neonatal death, although not as big as the age group 25-44 years.

This can reflect health challenges that may be faced by older age groups, such as decreased physical function, chronic conditions, and increased risk of medical complications. Overall, this finding shows that the age of the head of the family has a complex relationship with the risk of neonatal death. Factors such as health, responsibility, and pressure in various age groups can affect the ability of the head of the family in providing optimal care for neonatals. Therefore, there needs to be special attention to the support and health services provided to certain age groups to reduce the risk of neonatal death in Indonesia.

In connection with the birth order of the baby, the findings show that babies born as the first child have an odds of neonatal deaths of 1,171 (AOR = 1,171; 95% CI 1,117 - 1,227) times higher than babies born as seventh or more children in birth order. Likewise, babies who are in the second or third birth order have higher baby death odds, around 1,056 times (AOR = 1,056; 95% CI 1,009-1,105), compared to neonatals who are the seventh or more children in the birth order. The last finding shows that birth order is also a factor associated with the risk of neonatal death [6]. This indicates that the first child has a higher level of risk because they are born by couples who are not yet economically stable and less experienced in caring for children. In addition, many of the first children were born prematurely and had lower weight, so they were very vulnerable to health and death risks [27], [28].

Therefore, this shows that it is important for policy makers and health workers to give special attention to mothers who are the first time giving birth. Given that these children are born by young women, it is necessary to develop better antenatal and prenatal facilities, which can help mothers who first give birth who may not be fully prepared to face the role of a mother. In addition, these mothers may lack adequate knowledge about postpartum care and difficulty in accessing institutional medical services [29]. Previous studies have also associated the risk of neonatal mortality with birth order, with several studies showing that babies born in lower birth order tend to have a higher risk of death.

CONCLUSION

Based on research that has been done, the following conclusions are obtained. Factors that affect neonatal under the age of one year based on data from IDHS. In this context, the age of the mother when first giving birth, the number of births in the past year, the existence of health insurance, mother's work status, marital status, maternal education level, head of the head of the family, and the order of births.

SUGGESTION

The findings of this study indicate that the influence of these factors on neonatal mortality under one year does not only originate from the individual level, but is also influenced by community factors, which in this case are provinces in Indonesia.

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