Classification of Neonatal Mortality Risk Factors

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Abstract

Background: The efforts to reduce neonatal mortality were not optimal as targeted by MDGS's 2015. The number revealed, seen from the mortality rate of neonatal, is still quite high. This study aims to determine and to classify the risk factors of neonatal mortality in Situbondo district based on neonatal factors, maternal factors, and health care factors. **Method:** a retrospective descriptive research with survey research design and secondary data was used. The population of this study were neonates who died at RSUD Dr. Abdoer Rahem Situbondo period 2015-2016 in total sampling according to inclusion and exclusion criteria. The number of samples that fulfilled the inclusion and exclusion criteria was 50 people. **Result:** The results showed that of 50 neonatal mortality consisted of 46 (92%) early neonatal mortality and 4 (8%) late neonatal mortality. Neonatal mortality were most common in neonates of male sex, low body weight, premature, and asphyxia. Based on maternal factors, neonatal mortality occurs in mothers of <20 and> 35 years of age, primary education, housewives, less family income, less or more nutritional status, abdominal massage history, incomplete ANC, women with no previous birth (nulliparous) and deliver normally. **Conclusion:** Factors affecting neonatal mortality are classified into three components, namely neonatal factors, maternal factors and health service factors.

Keywords: *risk factors, neonatal mortality, classification, maternal, health service.*

Introduction

Neonatal mortality constitute 2/3 of infant deaths.[1,2] Based on the results of the 2012 Indonesian Demographic and Health Survey (IDHS), the Neonatal Mortality Rate (NMR) was 19 per 1,000 live births.[3]

Neonatal mortality is perinatal disorders as a result of high-risk pregnancies such as asphyxia, low birth weight babies, and birth trauma. The degree of neonatal health itself is also closely related to the health of the mother during pregnancy, knowledge of the mother and family about the importance of antenatal care delivery and new-born care and the availability of health facilities. [4] Factors affecting infant safety include age, parity and birth spacing. In addition, many factors influence it, among others, mothers rarely check the content to health facilities, pregnant at a young age, distance that is too close, pregnant at old age, lack of nutrition for mothers and infants, food consumed by unclean mothers, sanitation facilities and inadequate hygiene.[5]

In 2014, the number of infant mortality in Situbondo was higher (53.06 per 1,000 live births) than the total infant mortality in East Java province. This figure was not insignificant and requires serious treatment from the local health service system to overcome the incident.[6]

Method

This study aims to analyse the description of classification of neonatal mortality risk factors. Retrospective descriptive using primary data from interview surveys and secondary data, namely medical records was used in this study.

Sample, Research Instrument and Data Analysis

The research samples were neonates who died in Dr. Abdoer Rahem Situbondo District Hospital starting from January 2015 to December 2016. The instrument checklist included the recorder condition of patients who experienced neonatal mortality in secondary data or medical records and confirmation of data using structured questionnaires. The data collected was analysed based

on the formulation of the research problem using the Microsoft Excel 2013 program.

Result

Neonate Factor (Table 1)

Male neonates mortality were had higher percentage (56%) than women. Neonatal birth weight in the moderate or normal birth weight group was 20 neonates, while 60% were outside the normal group either in the group of underweight or more. The highest gestational age was in the preterm group with 35 neonates and the lowest was in the serotines/postdate group with 1 neonate. The most common cause of neonatal mortality was asphyxia with a percentage of 32%. The majority of neonates were in the age category of early neonatal mortality with a percentage of 92% neonates.

Maternal Factors (Table 2)

It is known that the age of most mothers was in the high risk group of 27 mothers, the highest level of education of mothers was elementary school with a percentage of 40% mothers. Mother's work was a housewife with a percentage of 60% mothers, family income was less by 52% families, mothers with normal nutritional status was as much as 38%, while mothers with less nutritional status and more was as much as 62%.

History of consumption of herbal medicine was about 16% mothers. History of abdominal massage during pregnancy was 72% mothers, mothers who did antenatal examinations <4 times were 54% mothers, most were nulliparous with a percentage of 52% mothers. The majority of parturition process was spontaneous (80%). The most complications of parturition was premature rupture of membranes as many as 7 mothers and there were 29 mothers who did not experience childbirth complications.

About 90% of mothers do not experience medical problems during pregnancy. Meanwhile, the most obstetric problems experienced by mothers were anaemia by 12%, mothers.

Health Service Factor (Table 3)

The most neonatal childbirth places were in the Hospital of Dr. Abdoer Rahem as many as 19 neonates and the least in primary care (Polindes/Poskesdes) was 1 neonate. Distance of home to the place of delivery was the most in the close group as much as 80%.

Table 1: Distribution of neonatal mortality factors on neonates

	Frequents	**Percentages (%)**
Sexuality		
- Male	28	56
- Female	22	44
New-born Body Weight		
- Extremely low	8	16
- Very low	10	20
- Low	10	20
- Normal	20	40
- macrosomia	2	4
Gestation's Age		
- Premature	35	70
- Term	14	28
- Serotinus/postdate	1	2

Cont... **Table 1: Distribution of neonatal mortality factors on neonates**

Cause of mortality		
- *Hyaline Membrane Disease*	5	10
- *Asphyxia*	16	32
- Respiratory Distress	1	2
- Asphyxia Meconium	8	16
- Sepsis	4	8
- Anencephaly	1	2
- Respiratory Failure	8	16
- Meningitis	1	2
- Multiple congenital anomaly	1	2
- Cerebral Oedema	1	2
- Gastroschisis	1	2
- Milk Aspiration	1	2
- Encephalitis	1	2
- Neonatal seizure	1	2
Neonates Mortality Age		
- Early	46	92
- Along	4	8

Table 2: Distribution of neonatal mortality factors on mothers

	Percentages (%)
Mother's Age	
- Risky (<20 and >35)	54
- Normal (20-35)	46
Educational	
- Un-graduated primary school	4
- Primary school	40
- Junior School	18
- High School	20
- Vocational	6
- University	12
Occupation	
- Teacher	8
- Fisher	2
- Merchant	8
- Honorary Employee	6
- Housemaid	2
- Farmer	14
- Housewife	60
Family Income	
- Under standard	52
- Standard	48

Cont.... **Table 2: Distribution of neonatal mortality factors on mothers**

Nutrition Status	
- Under (≤18.5)	30
- Normal (18.5-25)	38
- Over (>25)	32
Herb Consumption	
- Positive	16
- Negative	84
Abdominal Massage	
- Yes	72
- No	28
Frequency of antenatal care visits	
- <4 times	54
- ≥4 times	46
Parity	
- Nulliparous	52
- Prim parous	26
- Multiparous	22
Parturition	
- Vagina birth	80
- Caesarean section	18
- Extraction Version	2
Complication of parturition	
- Long period	12
- Placenta Previa	6
- Umbilical cord twist	2
- Premature rupture of membranes	14
- Others	8
- None	58
Medical problem of Mother	
- Hypertension	4
- Kidney	2
- Others	4
- None	90
Obstetric Problem	
- Anaemia	12
- Hypertension	4
- None	84

Table 3: Distribution of neonatal mortality factors on health facilities

	Frequent	Percentages (%)
Parturition Location		
- Home	4	8
- Primary care in districts	3	6
- Primary care in Village	1	2
- Midwife	14	28
- General Hospital	19	38
- Other Hospitals	9	18
Distance between home and healthcare facilities		
- Near (<10 kilometres)	40	80
- Average (10-100 kilometres)	10	20
- Far (>100 kilometres)	0	0

Discussion

More neonates are male than female with a ratio of 1.2: 1. Biological factors involved with an increased risk of neonatal death in male infants are delayed immune system maturity which increases the risk of infectious diseases,[7] also results in high respiratory diseases[8] and congenital malformations of the urogenital system in male infants.[9]

Neonates with lower birth weight are more likely to die, as many as 56%. Low birth weight is universally recognized as a major risk factor for major neonatal mortality. It is known in other studies that 52% of neonates who die have a birth weight <500 grams.[10]

The most gestational age was in the range of 28-36 weeks or preterm gestational age (70%). The risk of infection and sepsis increases in premature births which will result in mortality if proper medical care is not sought as early as possible.[11] The most common cause of mortality was asphyxia (32%). Asphyxia is a condition in when a new-born baby or shortly after birth is the failure to start and continue breathing spontaneously and regularly.[12]

The age range of 0-7 days or often referred to as early neonatal mortality was 92%. The risk of neonatal mortality has increased during the early days of their lives.[13, 14] The high risk of neonatal mortality occurs in mothers under the age of 20 years and more than 35 years. This period is the safest for giving birth because the reproductive organs have developed perfectly.[15, 16]

This study was found that 62% of neonatal mortality occur in mothers with low education levels. This shows that mothers with low education pay less attention to the conditions of pregnancy and childbirth.[17, 18] The majority of mothers were 60% housewives. The dominance of housewives as maternal occupation can be related to factors that influence neonatal mortality due to low income families is not tended to spend their income for health care costs.[11, 19,20-22]

Neonatal mortality occurred in mothers with under and over nutritional status (62%). The nutritional status of the mother before and during pregnancy greatly affects the growth of the fetus. Babies born with low weight and premature are generally less able to reduce new environmental stresses which can cause stunted growth and development and can even interfere with their survival.[23-29]

There were 16% of respondents who consume herbal medicine during pregnancy. Mothers who during pregnancy consume herbal medicine have 7 times the risk of giving birth to asphyxia babies compared to mothers who did not consume herbal medicine during pregnancy. This is due to the deposition of medicinal material in the amniotic fluid which causes the amniotic fluid to become turbid so that the baby's hypoxia and respiratory tract will be disturbed.[30]

It was found that the majority of respondents (72%) had a history of doing abdominal massage during pregnancy which is usually done in trimester 3 or after 7 months of gestation.[31] In the abdomen there is direct contact with the fetus in the womb which can affect the position of the fetus into abnormal, the umbilical cord can be wrapped around so that the compression occurs in the umbilical cord blood vessels, consequently the blood

supply containing oxygen and nutrients is reduced, and the fetus experiences hypoxia.

Neonatal mortality occurred at parity 0 and more than 3 times (54%). At parity 0, the birth canal has not been tested besides that the mother has not been trained in fetal care efforts. Similarly, parity of more than 3, because in labour can cause a risk that is damage to blood vessels in the uterine wall which will affect the circulation of nutrients to the fetus.[18 32]

It was found that 80% of neonates were born spontaneously or normally through the vagina.[33, 34] This is because the normal parturition process without tools has a high percentage of asphyxia birth events (89.2%), whereas in parturition section caesarean total incidence of asphyxia was 4.8%.[16, 35] Parturition complications such as antepartum haemorrhage, malpresentation, eclampsia, prematurity, and premature rupture of membranes increase the risk of neonatal mortality 8-fold.[36]

Neonatal mortality occurred in women who do not experience problems during parturition because the majority of respondents (62%) were referral patients from other health facilities so there may be incomplete information received by the hospital from the referral letter.

Conclusion

Factors affecting neonatal mortality are classified into three components, namely neonatal factors, maternal factors and health service factors.

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