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The Roles of Health Professionals in Saving the First 1000 Days of Children’s Life

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The Roles of Health Professionals in Saving the First 1000 Days of Children's Life

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134 hlm., 21 × 29,7 cm

FACTORS ASSOCIATED WITH THE INCIDENCE OF RESPIRATORY DISTRESS SYNDROME (RDS) IN NEONATES IN LUWUK REGIONAL HOSPITAL, CENTRAL SULAWESI

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ABSTRACT

**Background:** The infant mortality rate in Indonesia is still high, and 36.9% are caused by respiratory disorders. One of the causes is Respiratory Distress Syndrome (RDS), which reached 14%. RDS is a lung disorder that can cause severe neonatal mortality and the risk of respiratory complications, neurological and development of infants. The study aim to determine risk factors associated with the incidence of RDS in neonates.

**Methods:** The study was conducted from July until August 2013 in the Luwuk regional hospital Kabupaten Banggai, Central Sulawesi, Indonesia. The research design used was the case-control study. Sampling with purposive sampling technique to obtain the 83 neonates with RDS and 83 neonates not experience RDS. The study used secondary data. Bivariate analysis using Chi-square test with significance level α = 0.05 and multivariate analysis with logistic regression.

**Results:** The results of the bivariate analysis shows the relationship between gestational age and RDS in neonates (p = 0.055), birth weight and RDS in neonates (p = 0.046), antepartum haemorrhage and RDS in neonates (p = 0.135), type of childbirth and RDS in neonates (p = 0.003), neonatal asphyxia and RDS in neonates (p = 0.001), gender and RDS in neonates (p = 0.753), maternal DM and RDS in neonates (p = 0.367). Multivariate analysis was obtained with Exp (B) = 3.451 on variable type of child birth which is the largest.

**Conclusions:** There is a relationship between the birth weight, type of birth, and neonatal asphyxia with incidence of RDS in neonates. Health professionals should play a role in providing information about the RDS risk factors in pregnant women to reduce the morbidity and mortality of mothers and babies.
Factors Associated with the Incidence of Respiratory Distress Syndrome (RDS) in Neonates in Luwuk Regional Hospital, Central Sulawesi

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Abstract

Background: The infant mortality rate in Indonesia is still high, and 36.9% are caused by respiratory disorders. One of the causes is Respiratory Distress Syndrome (RDS), which reached 14%. RDS is a lung disorder that can cause severe neonatal mortality and the risk of respiratory complications, neurological and development of infants. The study aim to determine risk factors associated with the incidence of RDS in neonates.

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Conclusions: There is a relationship between the birth weight, type of birth, and neonatal asphyxia with incidence of RDS in neonates. Health professionals should play a role in providing information about the RDS risk factors in pregnant women to reduce the morbidity and mortality of mothers and babies.

Keywords: RDS, neonates, birth weight, type of childbirth, neonatal asphyxia
BACKGROUND

Respiratory distress syndrome (RDS) is a respiratory disease of the newborn caused by delays in development of lung maturity and lack of surfactant in the lungs (Wong, 2008). This disease still affects the majority of newborns so that it also affects infant morbidity and mortality. Based on data from the World Health Organization (WHO) the prevalence of respiratory disease in newborns reached 27.5% in 2009 and increased to 29.5% in 2010, mostly from respiratory disease was caused by neonatal asphyxia and RDS.

In developed countries like the United States, the disease still affects about 40,000 babies each year and cause 20% of infant mortality. RDS incidence is 60%-80% in premature infants, and only 5% incidence in infants mature. This is caused due to the premature babies have underdeveloped organs of the respiratory system and has not functioned perfectly while in the mature infants mostly caused by impaired placental blood circulation and often occur in women with diabetes mellitus due to hyperinsulinemia that can inhibit the production of surfactant in neonates (Tamad, Supriyanto, & Rosanti, 2011).

Indonesia Demographic Health Survey in 2012 showed that infant mortality is still at number 32 per 1,000 live births, and it happens in the first week of birth, most caused by disorders of the respiratory system, which reached 36.9%. One cause respiratory system disorders in infants are RDS, which reached 14%. Central Sulawesi province has a high incidence of RDS, reaching 319 cases in 2009 and increased to 403 cases in 2010. This was contributed by 78% for the disease in newborn infants aged 0-7 days. The infant mortality rate in the province of Central Sulawesi was still reaching 36 per 1,000 live births. Referring to the data in Central Sulawesi provincial health department, Banggai district became one of the places with the highest incidence of RDS. Of the 671 infants born in 2012, reaching 87 cases of RDS infants (CBS, 2013).

This disease is a serious clinical problem associated with high morbidity and mortality as well as maintenance costs. The large number of babies suffering from RDS, so early detection and early prevention can reduce the risk of incidence of RDS. This study aims to determine risk factors associated with the incidence of RDS in neonates.
METHODS

Location and Design Research
This research was conducted from July until August 2013 at General Hospital Luwuk Banggai. This study is a retrospective study, the design of the study is a case-control study. Data were collected using questionnaires filled out by medical records of patients.

Population and Sample
The population is all the infants were born and suffer from RDS in January-December 2012 and January-June, 2013 in General Hospital Luwuk Banggai. The sampling technique is purposive sampling method, where the entire population that met the inclusion criteria was the study sample.

Tools
This research data collection tool uses secondary data collection sheets were filled out based on medical records infants who were hospitalized during the study period.

Data analysis
The study used secondary data. Bivariate analysis using Chi-square test with significance level α=0.05 and multivariate analysis with logistic regression.

RESULT

Univariate analysis of demographic data that describe the characteristics of the respondents including maternal age, maternal education and maternal work can be seen in Table 1.

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;20</td>
<td>19</td>
<td>11.4</td>
</tr>
<tr>
<td>20-35</td>
<td>126</td>
<td>75.9</td>
</tr>
<tr>
<td>&gt;35</td>
<td>21</td>
<td>12.7</td>
</tr>
<tr>
<td>Job</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>49</td>
<td>29.5</td>
</tr>
<tr>
<td>No</td>
<td>117</td>
<td>70.5</td>
</tr>
<tr>
<td>Education</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low education</td>
<td>132</td>
<td>79.5</td>
</tr>
<tr>
<td>High education</td>
<td>34</td>
<td>20.5</td>
</tr>
<tr>
<td>Total</td>
<td>166</td>
<td>100</td>
</tr>
</tbody>
</table>

Bivariate analysis of gestational age, type of delivery, birth weight, antepartum haemorrhage, Apgar score, sex, and maternal diabetes to the incidence of RDS can be seen in Table 2.

<table>
<thead>
<tr>
<th>Factors</th>
<th>At Risk Yes</th>
<th>RDS</th>
<th>Total</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gestational age</td>
<td>Yes 18</td>
<td>10.8</td>
<td>8</td>
<td>4.8</td>
</tr>
<tr>
<td></td>
<td>No 65</td>
<td>39.2</td>
<td>75</td>
<td>45.2</td>
</tr>
<tr>
<td>Birth</td>
<td>Yes 21</td>
<td>12.7</td>
<td>10</td>
<td>6.0</td>
</tr>
<tr>
<td></td>
<td>No 62</td>
<td>37.3</td>
<td>73</td>
<td>44.0</td>
</tr>
<tr>
<td>Antepartum</td>
<td>Yes 17</td>
<td>10.2</td>
<td>9</td>
<td>5.4</td>
</tr>
<tr>
<td>Bleeding</td>
<td>No 66</td>
<td>39.8</td>
<td>74</td>
<td>44.6</td>
</tr>
<tr>
<td>Type of Labor</td>
<td>Yes 57</td>
<td>34.3</td>
<td>37</td>
<td>22.3</td>
</tr>
<tr>
<td></td>
<td>No 28</td>
<td>15.7</td>
<td>46</td>
<td>27.7</td>
</tr>
<tr>
<td>Asfiksia</td>
<td>Yes 12</td>
<td>7.2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Neonatorum</td>
<td>No 71</td>
<td>42.8</td>
<td>83</td>
<td>50</td>
</tr>
<tr>
<td>Sex</td>
<td>Yes 47</td>
<td>28.3</td>
<td>50</td>
<td>30.1</td>
</tr>
<tr>
<td></td>
<td>No 36</td>
<td>21.7</td>
<td>33</td>
<td>19.9</td>
</tr>
<tr>
<td>Maternal</td>
<td>Yes 4</td>
<td>2.4</td>
<td>1</td>
<td>0.6</td>
</tr>
<tr>
<td>DM</td>
<td>No 79</td>
<td>47.6</td>
<td>82</td>
<td>49.4</td>
</tr>
</tbody>
</table>
The results showed that (1) there was no significant association of gestational age and the incidence of RDS ($p = 0.055$); (2) there was a significant association of birth weight and the incidence of RDS ($p = 0.046$); (3) there was no significant association of antepartum hemorrhage and incidence of RDS ($p = 0.135$); (4) there is a significant relation with the occurrence of this type of labor RDS ($p = 0.003$); (5) there is a significant correlation of neonatal asphyxia and RDS incidence ($p = 0.001$); (6) there was no significant association of sex and the incidence of RDS ($p = 0.753$); (7) there is no significant relation of mothers with maternal diabetes and the incidence of RDS ($p = 0.367$).

**DISCUSSION**

The result showed that there was no correlation between the incidence of gestational age with RDS. Risk pregnancy is gestational age less than 37 weeks because lung function and surfactant is not fully developed, a new surfactant will function perfectly at more than 36 weeks gestation. According to research conducted by (Tamad, Supriyanto, & Rosanti 2011) incidence by 60-80% in infants less than 28 weeks, 15-30% in infants 32-36 weeks and 5% in infants less than 37 weeks. For the fetus is expected to be born prematurely or risk pregnancy, doctors usually give corticosteroid therapy for mother and induction (stimulation) to accelerate the birth of a baby. Gestational age is not the main cause of the incidence of RDS although gestational age can affect the maturation of organ function. Birth, the baby's birth weight and corticosteroid therapy in women who are at risk can be one of the factors that gestational age was not entirely the cause of the incident RDS.

The result showed that there was a relation between the incidence of RDS and birth weight. Baby's birth weight less than 2500 grams at birth can show how the process of development in the womb. Premature and dismature babies often have trouble breathing because the lungs are not yet mature, less production of surfactant, the alveoli are still small, thoracic wall that is still weak and impaired intrauterine growth. Babies born prematurely have a respiratory organ functions were still not perfect so that the baby will have difficulty breathing. While dismature birth, indicating that the fetus is impaired intrauterine growth so that at birth respiratory organs are not functioning perfectly.

The result showed that there was no correlation between the incidence of
antepartum haemorrhage with RDS. Antepartum hemorrhage can be caused by placenta previa, solutio placenta and vasa previa bleeding that can threaten the lives of both mother and fetus and increase deliveries indication to end an impact on preterm birth (Leveno, et al., 2009). Antepartum hemorrhage can lead to a decrease in hemoglobin concentration of pregnant women may cause fetal hypoxia. Because the release of the placenta may hamper the supply of oxygen and nutrients from the mother to the fetus which can cause intratetastine growth restriction, but if detected early disturbance in the placenta, it can be carried out preventive measures to reduce the risks to the mother and baby such as cesarean section action.

The result showed that there is a relation between the type of delivery with the incidence of RDS. Kind of risky childbirth labor means here is sectio cesarean. Sectio cesarean deliveries can cause complications in the mother and baby. Babies born by section cesarean usually becomes less active as a result of anesthesia and fast process of birth makes the baby has no time to adapt from uterus to the world. At the time of the baby through the birth canal, 1/3 of the liquid is squeezed out of the lungs but in infants in sectio cesarean do not experience it. As a result, the baby will have difficulty increasing respiration because the lungs are still filled with fluid and cause hypoxia in infants. If hypoxia happen, the alveoli would not developed because blood flow is reduced. Besides the effect of the birth canal also plays an important role in the incidence of RDS eg, mothers who have a narrow pelvis can cause long labor in the birth canal and make stress on the baby and cause hypoxemia and also mothers who experience bleeding during pregnancy can also cause hypoxemia in infants so that such above can cause alveoli lack of oxygen and blood supply, which in turn causes difficulty in breathing in infants.

Based on research data shows that there is a significant correlation between the incidence of neonatal asphyxia with RDS. The number of infants who are at risk and experiencing RDS was 7.2% while those not at risk and experiencing RDS by 42.8%. Asphyxia in infants can cause hypoxia and lowers blood oxygen levels, acidosis and atelectasis. The blood flow to the lungs is reduced and the surfactant formation is inhibited by type II pneumocytes cells that are very sensitive and reduced in infants with perinatal asphyxia in the period. Perinatal asphyxia in a baby indicated by Apgar score 0-3 in the 5th minute Apgar
assessment on the components depend on the maturity of the baby. Premature infants without asphyxia can only get low Apgar score. From research conducted by Casey, et al in 2001 showed that the risk of neonatal death-term infants with Apgar score 0-3 at minute 5 is 8 times more at risk compared with full-term babies umbilical artery pH <7. Risk factors may be seen in antepartum asphyxia and intrapartum. The risk factors for antepartum are maternal diabetes, gestational hypertension, chronic hypertension, fetal anemia, bleeding in the second trimester and into the third, maternal infection, and the age of the mother is at risk. While the risk factors for intrapartum are emergency section caesarea, birth with forceps or vacuum extraction, breech, preterm birth, obstructed labor, macrosomia, cord prolapse, solutio placentae, placenta previa and intrapartum bleeding. Babies born with Apgar score of 0-3 can experience the risk that RDS.

Based on the results that there is no significant relation between sex and the incidence of RDS. Although the hormone androgen in men can delay the occurrence of lung maturation, but this should not be the biggest cause of the occurrence of RDS.

Based on the results that there is no significant relation between the occurrence of gestational diabetic with RDS. Diabetes mellitus suffered by the mother may cause disruption of blood sugar and insulin fetus, but it does not become a risk factor that is very influential on RDS.

CONCLUSION
The research showed that (1) there is no correlation between the incidence of gestational age with RDS; (2) there is a relation between the incidence of birth weight with RDS (3) there is no correlation between the incidence of antepartum haemorrhage with RDS; (4) there is a relation between the type of delivery with the incidence of RDS; (5) there is a relation between the incidence of neonatal asphyxia with RDS; (6) there is no relation between sex with the incidence of RDS; (7) there is no correlation between the incidence of maternal diabetes mellitus with RDS.
REFERENCES


