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Anemia as a risk factor of postpartum hemorrhage at dr. R. Soedjono Hospital, Selong, East Lombok

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ABSTRACT

Background and purpose: Globally, maternal mortality rate due to labor complications remains high, with postpartum hemorrhage as the most common cause. Studies on the risk factors of postpartum hemorrhage have been widely published, however, its association with maternal anemia is inconsistent. This study aims to explore anemia as a risk factor for postpartum hemorrhage.

Methods: A case control study was carried out with 69 women who experienced postpartum hemorrhage as cases and 207 women who had given birth but did not experience hemorrhage as controls. Cases and controls were taken from medical records at the dr. R. Soedjono Hospital, Selong, East Lombok District, West Nusa Tenggara. Cases were selected by systematic random sampling from 147 mothers who experienced postpartum hemorrhage during 2017. Controls were selected in the same way from 2,855 mothers who did not experience postpartum hemorrhage. Cases and controls were matched for birth weight of infants and maternal employment. Data were obtained by medical record extraction in May 2018 consisting of information on hemorrhage at the dr. R. Soedjono Hospital, Selong, occurring within 24 hours after delivery. Deaths due to postpartum hemorrhage mostly occur within 24 hours after delivery. Postpartum hemorrhage at the dr. R. Soedjono Hospital, Selong, in 2017 was reported to be 5.5%, 5.0% and 3.0%, respectively.

Background and purpose:

Method:

Results:

INTRODUCTION

Maternal mortality ratio (MMR) in Indonesia in 2007 was reported to be 228 per 100,000 live births, and in 2012 amounted to 359 per 100,000 live births. Globally, the direct causes of maternal death during pregnancy and childbirth were bleeding, infection after childbirth, preeclampsia/eclampsia, complications during labor and unsafe abortion. The most common direct cause is postpartum hemorrhage which defined as bleeding >500 ml after vaginal delivery or 1000 ml after caesarian delivery. Bleeding can occur during the first 24 hours after delivery (primary post-partum hemorrhage) or >24 hours to 6 weeks (secondary post-partum hemorrhage).

In Indonesia, direct causes of maternal mortality are postpartum hemorrhage (30.3%), hypertension during pregnancy (27.1%), infection (7.3%), prolonged labor (1.8%), and abortion (1.6%). Deaths due to postpartum hemorrhage mostly occur within 24 hours after delivery. Postpartum hemorrhage at the dr. R. Soedjono Hospital, Selong, East Lombok District in 2015, 2016, 2017 was reported to be 5.5%, 5.0% and 3.0%, respectively.

Previous studies have shown that risk factors for postpartum hemorrhage included anemia, maternal age during pregnancy, parity, gestational age, type and length of labor. Those studies showed inconsistent results on the association of anemia, maternal age during pregnancy, parity and length of labor with postpartum hemorrhage. The purpose of this study was to determine anemia as a risk factor for postpartum hemorrhage.

METHODS

A case control study was carried out among 276 pregnant women consisted of 69 women who experienced postpartum hemorrhage as cases and 207 women who had given birth but did not experience hemorrhage as controls (1:3). Number of samples was determined with the significance level of 95%, power of 80%, proportion of anemia among women without postpartum hemorrhage.
Table 1  Characteristics of cases and controls

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Cases n (%)</th>
<th>Controls n (%)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Birth weight of infants</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>≥2500 gr</td>
<td>62 (89.86)</td>
<td>190 (91.79)</td>
<td>0.62</td>
</tr>
<tr>
<td>&lt;2500 gr</td>
<td>7 (10.14)</td>
<td>17 (8.21)</td>
<td></td>
</tr>
<tr>
<td>Maternal employment</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Housewives</td>
<td>55 (79.71)</td>
<td>159 (76.81)</td>
<td>0.81</td>
</tr>
<tr>
<td>Entrepreneur</td>
<td>5 (7.25)</td>
<td>12 (5.80)</td>
<td></td>
</tr>
<tr>
<td>Farmer</td>
<td>5 (7.25)</td>
<td>21 (10.14)</td>
<td></td>
</tr>
<tr>
<td>Teacher</td>
<td>1 (1.45)</td>
<td>8 (3.86)</td>
<td></td>
</tr>
<tr>
<td>Laborer</td>
<td>1 (1.45)</td>
<td>3 (1.45)</td>
<td></td>
</tr>
<tr>
<td>Student</td>
<td>1 (1.45)</td>
<td>1 (0.48)</td>
<td></td>
</tr>
<tr>
<td>Others</td>
<td>2 (2.90)</td>
<td>6 (2.90)</td>
<td></td>
</tr>
</tbody>
</table>

Table 2  Crude OR of variables associated with postpartum hemorrhage

<table>
<thead>
<tr>
<th>Variables</th>
<th>Cases n (%)</th>
<th>Controls n (%)</th>
<th>Crude OR</th>
<th>95% CI</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 child or ≥4 children</td>
<td>31 (44.93)</td>
<td>109 (52.66)</td>
<td>0.73</td>
<td>0.40-1.31</td>
<td>0.27</td>
</tr>
<tr>
<td>2-3 children</td>
<td>38 (55.07)</td>
<td>98 (47.34)</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Age at pregnancy</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;20 or &gt;35 years</td>
<td>26 (37.68)</td>
<td>50 (24.15)</td>
<td>1.89</td>
<td>1.01-3.52</td>
<td>0.03</td>
</tr>
<tr>
<td>20-35 years</td>
<td>43 (62.32)</td>
<td>157 (75.85)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type of delivery</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Caesarean or oxytocin drip</td>
<td>3 (4.35)</td>
<td>98 (47.34)</td>
<td>0.05</td>
<td>0.01-0.16</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Spontaneous</td>
<td>66 (95.65)</td>
<td>109 (52.66)</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Term of pregnancy</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>&lt;37 weeks</td>
<td>2 (2.90)</td>
<td>4 (1.93)</td>
<td>1.51</td>
<td>0.13-10.84</td>
<td>0.63</td>
</tr>
<tr>
<td>≥37 weeks</td>
<td>67 (97.10)</td>
<td>203 (98.07)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Birth spacing</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>&lt;2 or &gt;5 years</td>
<td>36 (75.0)</td>
<td>60 (47.62)</td>
<td>3.3</td>
<td>1.50-7.58</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>2-5 years</td>
<td>12 (25.0)</td>
<td>66 (52.38)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Length of labour</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>&gt;12 hours</td>
<td>30 (43.48)</td>
<td>98 (47.34)</td>
<td>0.85</td>
<td>0.47-1.53</td>
<td>0.58</td>
</tr>
<tr>
<td>≤12 hours</td>
<td>39 (56.52)</td>
<td>109 (52.66)</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Hb concentration</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Hb&lt;11 gr/dL</td>
<td>152 (73.43)</td>
<td>51 (73.91)</td>
<td>0.95</td>
<td>1.47-7.53</td>
<td>0.76</td>
</tr>
<tr>
<td>Hb≥11 gr/dL</td>
<td>55 (26.57)</td>
<td>18 (26.06)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hb concentration</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hb≤10 gr/dL</td>
<td>54 (78.26)</td>
<td>43 (20.77)</td>
<td>13.73</td>
<td>6.78-28.52</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Hb&gt;10 gr/dL</td>
<td>15 (21.74)</td>
<td>164 (79.23)</td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

NB: Birth spacing analysed only for women reporting parity ≥2

This study shows that anemia during pregnancy with Hb concentration ≤10 g/dL increased the risk of postpartum hemorrhage. However, Hb concentration of <11 g/dL was not found to be a significant risk factor for postpartum hemorrhage in this study. Anemia with Hb concentration ≤10 g/dL was also found to be a risk factor of postpartum hemorrhage in several other studies.7,13 A case-control study conducted among women who gave
birth in a hospital in Norway showed that anemia with Hb concentration ≤9 gr/dL increased the risk of postpartum hemorrhage by 4.27 times. World Health Organization determined Hb concentration of <11 gr/dL as anemia in pregnant women, with Hb concentration of 10-10.9 gr/dL determined as mild anemia, Hb of 7-9.9 gr/dL as moderate anemia and Hb<7.0 gr/dL as severe anemia. Our study and some other studies indicated that anemia is a risk factor of postpartum hemorrhage particularly among mothers experiencing anemia from mild to severe levels.

Our study also found that the type of delivery, particularly delivery with caesarean section or oxytocin drip, can reduce the risk of postpartum hemorrhage. This may be due to the fact that most cases in our study were referred to the hospital due to delivery complications including hemorrhage, while the controls were mostly patients who gave birth at the hospital and when there was a problem during delivery then caesarean section or oxytocin drip was conducted. These make caesarean section and oxytocin drip appear to reduce the risk of postpartum hemorrhage in this study. This result is contrary to the results of a study conducted in Norway which found that delivery by caesarean section and induced labor was a risk factor for postpartum haemorrhage. Case definition in our study did not limit the severity of postpartum hemorrhage, while the study conducted in Norway only used cases with severe hemorrhage. In addition, it is likely due to the different cases and controls selection.

Limitations in our study include the use of hospital data as the source of cases and controls, also the inclusion of referral patients with hemorrhage. Thus the cases and controls in this study do not represent cases and controls in the population. In addition, the information used in this study was only sourced from hospital medical records so that the variables studied are very limited and highly dependent on the accuracy of the data obtained in the medical records. This study was also carried out only in one hospital in one district so that the results of this study could not be generalized to a wider area or population.

CONCLUSION

Risk factor for postpartum hemorrhage is anemia during pregnancy with Hb level ≤10 g/dl but it is not significantly associated with Hb level <11 g/dl. Delivery by caesarean section and/or oxytocin drip was found to reduce the risk of postpartum hemorrhage. While parity, maternal age, gestational age, birth spacing and length of labor were not found to be risk factors for postpartum hemorrhage. The implication of this study include the need to improve efforts to prevent and overcome anemia in women before pregnancy and during pregnancy.

ACKNOWLEDGEMENT

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REFERENCES


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