International Journal of Science and Research (IJSR)
ISSN: 2319-7064
ResearchGate Impact Factor (2018): 0.28 | SJIF (2019): 7.583

# Characteristics of Risk Factor for Obstetric Emergency Cases Referred to Sanglah General Hospital

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**Abstract:** ***Introduction: The maternal mortality rate reflects the interaction of various aspects of maternal care, including bedside clinical care, health care and referral systems. Bali Province was among the region with the lowest MMR in Indonesia. Although various effort has been put, annual reduction of MMR has not been significant, partly due to the high proportion of obstetric emergency cases. This study was conducted to describe the risk factors associated with obstetric emergency referral cases received in Sanglah General Hospital based on an approach developed by Poedji Rochjati. Methods: A descriptive study conducted using secondary data derived from medical records of referred cases received in the obstetric emergency triage in Sanglah General Hospital on January 1st to December 31st, 2018. The data will be analyzed according to the classification of risk factors proposed by Poedji Rochjati. Results: There were 375 referred cases. Cases with risk factors for potential obstetric emergency (Category I) were 55,2%, with maternal age > 35 years is the dominant risk factor (20.5%). Cases with an immediate obstetric threat (Category II) comprised 38.1%, mostly with comorbid disease (23.7%). Cases with an ongoing obstetric emergency (Category III) account for 35.2%, most cases of severe preeclampsia/eclampsia (29.9%). Referred cases were mostly high-risk pregnancies (43.2%), followed by a very high-risk pregnancy (29.9%). The other causes of referral were preterm labour (4.7%) and premature rupture of membranes (PROM) both at preterm (7.4%) and term pregnancy (5.9%). There were 37 cases referred after delivery or cesarean section due to severe preeclampsia/eclampsia (1.9%) and antepartum haemorrhage (7.5%). Average response time for assessment and treatment of those cases were 7.0 ± 2.3 minutes, with a range of 2-12 minutes. Conclusion: The major risk factors for obstetric emergency cases referred to our tertiary level hospital were mother aged > 35 years, comorbid disease, and severe preeclampsia.***

**Keywords:** Poedji Rochjati, obstetric emergency, Bali

## 1. Introduction

The maternal mortality rate (MMR) is still the primary indicator of health care quality. The MMR reflect the interaction of various aspects in maternal care, including bedside clinical care, to health care systems and referral systems. The maternal mortality rate in Indonesia was among the highest in ASEAN countries. Nevertheless, the results of the Indonesia Demographic Health Survey showed that the MMR in Indonesia continues to decline.[1] Bali Province was among the region with the lowest MMR in Indonesia. The MMR still remains below the national average and below the national target of 100 per 100,000 live births during the past five years. Although various effort has been put over the years, an annual reduction of MMR has not been significant.[2] MMR reduction was not as targeted mainly due to still high proportion of maternal morbidity and mortality related to obstetric emergency.[1]

An obstetric emergency is a sudden, unexpected life-threatening situation that requiring immediate treatment to prevent morbidity and mortality during pregnancy, labour and the postpartum period. These cases if not promptly treated or exhibit delays, it will result in the morbidity or even death of the mother and the fetus.[3] Maternal and perinatal Morbidity related to an obstetric emergency often associated with the delay. Too late to recognize the danger signs, delayed deciding to seek help, too late to get transport to proper health care facilities, and late to get help at the referral facility were the main obstacles.[4]

Application of pre-hospital risk assessment and efforts to optimize response times in referral hospitals can be made to overcome the delays. One approach to asses the risk in pregnancy is a risk classification by Poedji Rochjati which popular among Indonesian obstetrician. Rochjati divided pregnancy based on a set of risk factor into three groups, pregnancy with a potential for obstetric emergency (Category I), presence of immediate obstetric threat/emergency (Categori II), and the presence/ongoing life-threatening obstetric emergency (Categori III).[5,6] All of these three groups have different management and resources, thus referrals requirement.

Sanglah General Hospital as the tertiary referral hospital for Bali and Nusa Tenggara plays a vital role in the management of complex disease, including maternal problem. Evaluation and improvement of quality care require information about the pattern of obstetric emergency that handled in Sanglah General Hospital. Such information can be used in planning for allocation of funds, facilities, human resources, and protocols to improve the readiness of Sanglah Hospital as well as improve response time in dealing with an obstetric emergency. In order to fulfil these goals, this study was conducted to describe the risk factors associated with referral of obstetric emergency in Sanglah General Hospital based on an approach developed by Poedji Rochjati.

## 2. Method

This study was a descriptive study using data derived from medical records and obstetric cases registry in obstetric emergency triage Sanglah Hospital from January 1st to

December 31st, 2018. Inclusion criteria were referred cases which underwent either vaginal delivery or Caesarian section delivery in Sanglah General Hospital because of pregnancy with underlying conditions at risk of complication or due to ongoing complication during and after delivery. Patients with incomplete medical records due to various reason were excluded from the study.

Patients sociodemographics and clinical data will be analyzed according to the classification of risk factors proposed by Poedji Rochjati.[5,6] Data collected from medical records including maternal age, gestational age, obstetric status, number and fetal orientation, the referral indication, the age of the last child, history of previous pregnancy and labour, history of medical illness before and during pregnancy. All of those parameters will be transformed into a score. Determining the risk of pregnancy is based on an assessment of their risk factors for complications during labour. These factors were then given a score of 2, 4 and 8 each if fall within the category of risk namely potential risk of obstetric emergency (Category I), immediate risk of obstetric emergency (Category II), and presence/ongoing life-threatening obstetric emergency (Category III), respectively. The entire score for each patient is accumulated and will be used to determine the level of risk during labour and delivery into low-risk pregnancy (LRP) with a total score of 2, high-risk pregnancy (HRP), and very high risk of pregnancy (VHRP).

The data obtained from the study were analyzed descriptively. The numerical variable will be displayed according to the data distribution. If the data are normally distributed, then the data will be presented with a mean ± standard deviation, if the data were not normally distributed, then it will be presented as median (minimum-maximum values). Categorical data will be denoted by the frequency or percentage. Data analysis was conducted with SPSS version 25.

## 3. Results

There were 1022 live births from January 1st 2018 until December 31st 2018 in Sanglah General Hospital. The number of referred patients were 375 patients (36.7%). The average response time those cases were 7.0 ± 2.3 minutes, with a range of 2-12 minutes. The characteristic of the patients was shown in Table 1.

**Table 1:** Characteristics of Obstetrics Patients Referred to Sanglah General Hospital

| Case Characteristics | Frequency | Percentage |
|---|---|---|
| Age Mothers (n = 375) | | |
| <20 years | 25 | 6.7% |
| 20-34 years | 273 | 72.8% |
| ≥35 years | 77 | 20.5% |
| Referral (n = 375) | | |
| In-utero | 338 | 90.1% |
| Post-partum | 31 | 8.3% |
| Post-SC | 6 | 1.6% |
| Parity (n = 338) | | |
| Nullipara | 141 | 41.7% |
| Primiparas | 103 | 30.5% |
| Multiparas | 93 | 27.5% |
| Grandemultipara | 1 | 0.3% |
| Gravida (n = 338) | | |
| Primigravidas | 129 | 38.2% |
| Multigravida | 209 | 61.8% |
| Age Pregnancy (n = 338) | | |
| Preterm | 163 | 48.2 |
| Term | 172 | 50.9 |
| Posterm | 3 | 0.9 |
| Fetus (n = 338) | | |
| Singlet | 328 | 97% |
| Duplet | 9 | 2.7% |
| Triplet | 1 | 0.3% |
| Presentation/lie (singlets, n = 328) | | |
| Head | 308 | 94% |
| Breech | 19 | 5.7% |
| Transverse lie | 1 | 0.3% |

The average age of mothers was 28.6 ± 6.6 years, with the youngest and the oldest were 16 and 47 years old, respectively. Approximately 20.5% of the patients were aged ≥35 years, 6.7% were aged less than 20 years, and there was a 16-year-old mother. Most of the cases, the fetus was still in-utero (90.1%), singleton pregnancy (97%) and with head presentation (94%). Regarding the parity and the number of pregnancies, women with nulliparity and primigravidae have the highest percentage. Differences between the primi-gravida (129 patients) and nullipara (141 patients) were derived from 12 patients who referred in her second pregnancy with a history of abortion in the first pregnancy.

**Table 2:** Frequency Distribution by Risk Factors

| Risk Factors | Frequency | Percentage |
|---|---|---|
| **(Category I)** | | |
| Too young, pregnant ≤ 16 years | 1 | 0.3% |
| Too old, pregnant ≥ 35 years | 77 | 20.5% |
| Old secondary Primi | 13 | 3.5% |
| Too soon pregnant again (<2 years) | 17 | 4.5% |
| Too many, children ≥ 4 | 6 | 1.6% |
| Previous abortion | 52 | 13.9% |
| History of caesarean section | 41 | 10.9% |
| **(Category II)** | | |
| Underlying disease/comorbid | 89 | 23.7 |
| Mild preeclampsia | 11 | 3% |
| Twin (2 or more) | 10 | 2.9% |
| Polyhydramnios | 3 | 0.9 |
| The fetus died the uterus | 7 | 2.1 |
| Post-term pregnancy | 3 | 0.9% |
| Breech position | 19 | 5.6% |
| Transverse lie | 1 | 0.2% |
| **(Category III)** | | |
| Antepartum haemorrhage | 20 | 5.3% |
| Severe preeclampsia / eclampsia | 112 | 29.9% |

Many patients had multiple risk factors. In the cases with categori I, leading risk factor was maternal age greater than or equal to 35 years (20.5%). In categori II, comorbid illnesses were the predominant risk factors. The medical comorbidities in this study were anaemia (25.8%), HIV infection (9.0%), hepatitis B (7.9%), heart disease (7.9%), asthma (7.9%) and diabetes mellitus (6.7%). On the other hand, severe preeclampsia and eclampsia is the most common risk factor both within categori III and among all the cases.

In this study, the obstetric referral cases were mainly high-risk pregnancies (HRP) which accounted for 146 cases (43.2%), followed by 101 cases (29.9%) of very high-risk pregnancies (VHRP), and the remaining 91 cases (26.8%) were low-risk pregnancies (KRR).

Some cases were referred due to indication other than proposed by Poedji Rochjati. Premature labour cases account for 16 cases (4.7%). The remaining were premature rupture of membranes (PROM) account for 45 cases (13.3%) which comprised of premature rupture of membranes in preterm pregnancies (PPROM) 25 cases (7.4%) and the rest 20 cases (5.9%) were PROM in term pregnancy.

It is essential to mention that there were 37 cases of referrals of mothers after vaginal delivery and cesarean section. Generally, the cause is a severe preeclampsia/eclampsia (7 cases, 1.9%) and postpartum haemorrhage (28 cases, 7.5%). Among the cases of post-partum haemorrhage, 4 cases were the cases were uterine atony, 9 cases of birth canal laceration and 15 cases of retained placenta. In addition, there were two patients referred to due to comorbid medical illness.

## 4. Discussion

The most common indication for referral was cases with risk factors of potential obstetric emergency with the highest frequency of risk factors are mothers aged > 35 years (20.5%) and the least was the case of mothers aged less than 16 years (0.3%). These findings concur with those of Diflayser et al., which pregnant women aged ≥35 years of age occupying a dominant proportion among 28.9% of women with potential obstetric emergency risk factors. Regarding the number of young-aged pregnancy, they found the same proportion as this research (0.3%).[7]

The number of pregnant women aged ≥ 35 years in this study is still quite high. Similar patterns were also found in other parts of Indonesia. The study by Purba et al. And Senewa et al., also found the number of pregnant women aged ≥ 35 years around 26.4%, and 21.2%, respectively.[8,9] Among the 77 cases of a mother aged ≥ 35 years old, there were 7 (9.1%) primigravidae, primiparity were 18 (23.4%), 39 (50.6%) had had two children, 10 (13%) three children, and 3 (3.9%) who had had ≥ 4 children. Based on this, there are several theory that might explain the high number of pregnant women at the time of women who already had two children, namely the failure of contraception, desire a particular gender (usually male) or marriage with the second husband. Limitations of the data in this study are mainly related to social factors which limit the ability to answer those question further. In general, the factors causing the high number of pregnant women aged ≥ 35 years old have not been studied extensively in Indonesia. The other interesting point to catch is about the relatively large proportion of referred patients with the previous history of abortion which account for 52 (13.9%). This amount is quite significant, thus deserve further study.

Among the patients with immediate threat, the highest risk factors found were women with comorbid illness or pregnancy with medical disorders. The high rates of the comorbid disease may be related to the high number of women with aged ≥ 35 years, where this pattern is expected to be increased in this decade in the majority of the developing worlds.[10] Women whose pregnant at age ≥35 years old have a higher risk of complications related to pregnancy, as well as medical consequences of the disease itself. As mentioned by numerous previous study, pregnant women aged 35-40 years had a higher risk for gestational diabetes, placenta previa, breech fetus, assisted delivery, such as with a vacuum or forceps, caesarean section whether elective or emergency, postpartum haemorrhage, preterm, the low birth weight babies and infants died at birth.[11,12] Moreover, women aged over 40 years even have a higher risk for complications mentioned above.[11-13] The presence of medical comorbidities in pregnancy may also increase the risk of preterm premature rupture of the membrane thus posed a threat of premature labor.[14] Patients with comorbid require more strict monitoring during the delivery process as well as the need of more specialized health care resources.[15,16] Perhaps this was the reason for referral to the department of obstetrics at Sanglah General hospital which is the national referral centre, where it is expected to deliver obstetric service and resources comprehensively.

In this study, severe preeclampsia/eclampsia was a risk factor with the highest frequency among others. Severe preeclampsia/eclampsia was also the highest risk factor for cases with ongoing life-threatening obstetric emergency on a study conducted by Diflayzer et al.[7] This is in line with a study by Laili et al., which also found that severe preeclampsia/eclampsia was the most common risk factors (76.6%).[17] Research in the other parts of Indonesia (Semarang) in 2013 also points out that severe preeclampsia/eclampsia was higher than the antepartum bleeding.[18] Preeclampsia and eclampsia are major contributors to deaths among mothers and newborns in developing countries. Impact of preeclampsia and eclampsia is estimated to account for 10-15% of the direct cause of maternal death and nearly a quarter of stillbirth and newborn deaths, many of which can be prevented with better obstetric care.[19] One possible cause was undiagnosed or untreated cases of preeclampsia in low- and middle-income countries. This is related to the accessibility of the health care system during pregnancy, inadequate screening programs, or late treatment because of the delay in deciding to seek care, afford transportation, and even delays in receiving the necessary care in referral hospital.[20]

Obstetric emergency cases such as antepartum haemorrhage and severe preeclampsia/eclampsia require a means of advanced healthcare facilities such as treatment in the intensive care unit (ICU) and evaluation by expert or consultants in Fetomaternal medicine.

Patients with emergency termination of pregnancy due to severe preeclampsia/ eclampsia and patients with an antepartum haemorrhage suffered hypovolemic shock, or consumptive coagulopathy require intensive care. Antepartum haemorrhage and severe preeclampsia/

eclampsia is also the risk factor for preterm delivery and induced labour, in which the fetus is not fully prepared for life outside the uterus.[21] These condition result in baby whose born preterm, low birth weight, IUGR, and with a low Apgar score thus likely need comprehensive perinatal care in the Neonatal ICU.[22] These might be the other reason for the referral decision was made straight to the hospital with a better resource.

In addition to analyzing risk factors of referral cases, studies have also documented the response time in handling the case. Response time is an essential part of obstetric emergency services. Indonesian Minister of Health Regulation (Bill No. 1051/Menkes/SK/XI/2008) concerning the implementation of protocols for a comprehensive obstetric and neonatal emergency in the tertiary-level hospital, determined that the response time for assessing those cases in the ER is less than 10 minutes. Shall the indication required it, proper treatment should be delivered in the delivery room less than 30 minutes, operating rooms less than 30 minutes and transfusion services less than 1 hour. The average response time to emergency obstetrics patient of referrals cases in Sanglah General Hospital was 7.0 ± 2.3 minutes, with a range of 2-12 minutes. Thus, the response time still meets the national standard.

## 5. Conclusion

During a year period, the number of patients referred to Sanglah General Hospital due to an obstetric emergency was 375 patients. This study found that the major category of risk factors was factor that has potential for obstetric emergency (55.2%), followed by condition with ongoing life-threatening obstetric emergency (35.2%) and pose an immediate threat (38.1%). Referral cases were mostly high-risk pregnancies (43.2%) and followed by very high-risk pregnancies (29.9%).

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