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Original Research Article

Incidence and characteristics of preeclampsia patients: a descriptive study

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ABSTRACT

Background: More than 70% of maternal deaths are caused by preeclampsia and eclampsia. This study aimed to evaluate the characteristics of pregnant women with preeclampsia in the obstetrics emergency room of Prof. Dr. I. Gusti Ngoerah Gede (I.G.N.G.) Ngoerah General Hospital, Denpasar, in 2022.
Methods: This study was conducted with a high level of thoroughness and detail. Data obtained include age data, gestational age, parity, employment, education, history of hypertension, history of pregnancy with preeclampsia before, blood pressure measurement results, body mass index (BMI), laboratory examination results, NST picture, complications, mode of delivery, APGAR, and birth weight. The collected data was meticulously tabulated, analyzed, and presented as tables and narratives.
Results: The findings of this study are significant for the field of obstetrics and gynecology. The incidence of preeclampsia in the obstetrics emergency room of Prof. Dr. I.G.N.G. Ngoerah General Hospital reached 15.75% in 2022 with a 0% case fatality rate. The average age was 31 years. Sixty-one subjects (62.89%) were primiparous, 41 subjects (42.27%) had a history of hypertension, and 23 subjects (23.71%) had a history of pregnancy with preeclampsia. The median BMI reached 22.3 kg/m^2. The mean platelet of 354 103/µl, creatinine of 0.7 mg/dl, and 93 subjects (95.88%) were positive for proteinuria. Based on the NST picture obtained, 37 (38.14%) patients had reactive non-stress test pictures. APGAR score >7 of 76 subjects (78.35%) with a median birth weight of 1,850 grams.
Conclusions: This study is expected to be a reference for further research. Further research is needed to assess the relationship between demographic characteristics and the risk factors of preeclampsia.

Keywords: Case fatality rate, Characteristics, Complications, Incidence, Preeclampsia

INTRODUCTION

The high maternal mortality rate in Indonesia is still a problem that must be solved and is the responsibility of all parties. More than 70% of maternal deaths are due to bleeding, infections, unsafe abortions, obstructed labor, and hypertensive disorders in pregnancy, including preeclampsia and eclampsia. Preeclampsia is one of the life-threatening obstetric emergencies, so it needs quick and appropriate treatment to prevent morbidity and mortality.[1] Preeclampsia is one of the most common complications that occurs in 2-8% of pregnancies worldwide and contributes 9-26% to maternal mortality in developing countries. The incidence of preeclampsia in Indonesia reached 128,273/year (5.3%).[2] The cause of preeclampsia is still not clear. Still, according to some studies, there are risk factors that can affect the occurrence of preeclampsia, including maternal age (<20 years or >35 years), nulliparous, multiple pregnancies, family history of preeclampsia, history of preeclampsia in previous pregnancies, obesity, prenatal screening, and socioeconomic factors.[3-8] Preeclampsia risk factors can be

found through history assessment and examination, especially at antenatal care visits.

The prevalence of preeclampsia cases in Prof. Dr. I.G.N.G. Ngoerah General Hospital in 2017 was relatively high, reaching 128 cases.[9] Preventive efforts to prevent the onset of preeclampsia in pregnant women are vital, given the high prevalence of cases and the magnitude of the impact that can be caused. This is the basis of this study to determine the characteristics of pregnant women with preeclampsia and risk factors for preeclampsia to prevent the occurrence of morbidity and mortality early. This study aimed to evaluate the characteristics of pregnant women with preeclampsia in the obstetrics emergency room.

METHODS

This study was descriptive. Data was collected in the obstetrics emergency room of Prof. Dr. I.G.N.G. Ngoerah General Hospital from 01 January to 31 December 2022. The sample was the patients who were treated with a diagnosis of preeclampsia who came to the obstetrics emergency room. The samples were taken from the medical records installation based on the anamnesis results, physical examination, and supporting examinations.

The sample selection process was undergone using inclusion and exclusion criteria. The inclusion criteria in this study included patients with a diagnosis of preeclampsia and the patient has complete medical records data. The exclusion criteria were the patient was not willing to be a study sample. Based on the minimum sample size measurement, as many as 97 samples must be included minimally.

The ethics committee of Prof. Dr. I.G.N.G. Ngoerah General Hospital Denpasar has already approved this study, with approval number 2388/UN14.2.2.VII.14/LT/ 2023.

The data obtained were age data, gestational age, parity, employment, education, history of hypertension, history of pregnancy with preeclampsia before, blood pressure measurements, BMI, laboratory test results, NST picture, complications, mode of delivery, APGAR, and birth weight. The collected data were tabulated, analyzed using statistical package for the social sciences (SPSS) for Windows version 23, and presented as tables and narratives.

RESULTS

Incident and case fatality rate preeclampsia

From 01 January to 31 December 2022, 97 cases of preeclampsia were found at the obstetrics emergency room of Prof. I.G.N.G. Ngoerah General Hospital, totalling 620 births in that period. The incidence of preeclampsia in the obstetrics emergency room of Prof. Dr. I.G.N.G. Ngoerah General Hospital for the period 01 January to 31 December 2022 is 15.75%.

The incidence of preeclampsia is said to be a public health problem when the case fatality rate (CFR) reaches 1.4% to 1.8%. The death rate of preeclampsia patients in Prof. I.G.N.G. Ngoerah General Hospital was as high as 0 people from 97 cases, with a final CFR of 0%.

Distribution of pregnant women with preeclampsia based on characteristics, vital signs, supporting examinations, and outcomes

Based on the data of this study, the average age of patients with preeclampsia is 32 years, with an age range of 16-42 years. A total of 81 patients (83.51%) were found to have preterm pregnancy still (less than 37 weeks), indicating there is a dangerous risk to the mother and fetus in the womb. Based on the parity status of patients, 62.89% of patients obtained the first pregnancy. The employment data found that most patients were employed as private employees (55.67%), followed by homemakers and civil servants. In the patient's education history, the highest education history is high school/vocational school graduates, as much as 49.48%. In previous pregnancies, it was found that 23.71% of patients had a history of pregnancy with preeclampsia, while 74 (76.29%) other subjects had no history of pregnancy with preeclampsia. Based on the results of a physical examination of the subjects' blood pressure, it was found that the average systolic blood pressure was 149.58, and the average diastolic blood pressure was 97.22 mmHg. Laboratory results obtained white blood cell (WBC), hemoglobin, platelets, hematocrit, and liver function in the normal range. Still, in some subjects, blood urea nitrogen (BUN) and creatinine levels increased by a median of 10.2 (3.4-49.9) mg/dl and 0.7 (0.4-5.6) mg/dl.

This study found as many as 61.85% of pregnant women had non-reactive NST, and as many as 38.14% had reactive NST. In this study, complications in the subjects amounted to 8.24%, with the most complications being eclampsia. Most of the patients with preeclampsia performed labor by caesarean surgery reached 61 patients (62.89%). In addition, we obtained a score of 7 in several 76 APGAR (78.35%) subjects. In this study, the median birth weight of infants is 1,850 (850-2450) grams.

In Table 2, it was found that 77.6% of subjects with normal BUN levels had an APGAR score of ≥7. 75.9% of subjects with average SC had an APGAR score of ≥7. 78.1% of subjects with a normal SGOT had an APGAR score of ≥7. 78.4% of subjects with normal SGPT had an Apgar score ≥7. 77.4% of subjects with positive proteinuria had an APGAR score of ≥7, and 89.2% of subjects with reactive NST had an APGAR score of ≥7.

Regarding the baby's birth weight, 77.6% of subjects with normal BUN had a birth weight of 1500-2500. 77.2% of subjects with average SC had a birth weight of 1500-2500.

As many as 75% of subjects with normal SGOT had a birth weight of 1500-2500. 75.3% of subjects with normal SGPT had a birth weight of 1500-2500. 74.2% of subjects with positive proteinuria had a birth weight of 1500-2500. 73% of subjects with reactive NST had a birth weight of 1500-2500.

By evaluating the MAP value, there were 88 patients with MAP <125 mmHg and 9 patients with MAP ≥125 mmHg. 77.3% of subjects with a birth weight of 1500-2500 g had a MAP <125 mmHg, and 79.5% of subjects with an APGAR >7 had a MAP <125 mmHg. MAP of 125 mmHg obtained 55.6% of subjects with a birth weight of 1500-2500 g and 66.7% of subjects with APGAR >7. High MAP values in preeclampsia patients are associated with various adverse effects on infants, such as IUGR, prematurity, LBW, and infant asphyxia. Preeclampsia could be detected early using MAP with 93% sensitivity and 62% specificity and performed at 18-26 weeks of pregnancy.

Table 1: Pregnant women with preeclampsia based on characteristics, vital signs, supporting examinations, and outcomes (n=97).

Characteristics	N (%)
Age (years) (median; min, max)	32 (16-42)
Gestational age (weeks), mean	31.505 months
<37	81 (83.51)
≥37	16 (16.49)
Parity status	
Primipara	61 (62.89)
Multiparous	36 (37.11)
Employment	
Unemployed	37 (38.14)
Public sectors	6 (6.19)
Private sectors	54 (55.67)
Education	
Elementary school	14 (14.43)
Junior high school	17 (17.53)
Senior high school	48 (49.48)
Diploma	3 (3.09)
Bachelor's	15 (15.46)
HT history	
None	56 (57.73)
Present	41 (42.27)
History of pregnancy with preeclampsia	
None	74 (76.29)
Present	23 (23.71)
Vital signs	
Blood pressure	
Systolic (mmHg), median (min-max)	150 (140-190)
Diastolic (mmHg), median (min-max)	100 (80-120)
BMI (median; min, max)	22.3 (17.8-33.8)
Supporting investigation	
Proteinuria (mg/dl)	
Negative	4 (4.12)
Positive	93 (95.88)
Laboratory results	
Median (min-max)	4.78 (3.12-15.16)
WBC (10^3/µl)	13(9.87-18.12)
Haemoglobin (g/dl)	354 (199-498)
Platelets (10^3/µl)	37.5 (35.2-44.2)
Haematocrit (%)	17.4 (11.4-35.0)
SGOT (µ/l)	16.4 (10.1-25.6)
SGPT (µ/l)	10.2 (3.4-49.9)
BUN (mg/dl)	0.7 (0.4-5.6)

Continued.

Characteristics	N (%)
Creatinine (mg/dl)	
NST	37 (38.14)
Reactive NST	60 (61.85)
Outcome	
Complications	
Present	8 (8.24)
None	89 (91.75)
Mode of delivery	
Conservative	29 (29.90)
Spontaneous	5 (5.15)
Caesarean section	61 (62.89)
Vacuum/forceps	2 (2.06)
APGAR score	
≤3	0 (0.00)
4-6	21 (21.65)
≥7	76 (78.35)
Birth weight (g)	
1500-2500	73 (75.3)
1000-1500	22 (22.7)
<1000	2 (2.1)
Birth weight (grams) median (min-max)	1.850 (850-2450)

Table 2: Baby outcome and birth weight based on BUN, creatinine, SGOT, SGPT, proteinuria, NST, and MAP.

Variables	APGAR		Birth weight		
	4-6 (n=21)	≥7 (n=76)	1500-2500 (n=73)	1000-1500 (n=22)	<1000 (n=2)
	N (%)	N (%)	N (%)	N (%)	N (%)
BUN					
Abnormal	8 (20.5)	31 (79.5)	28 (71.8)	11 (28.2)	0 (0.0)
Normal	13 (22.4)	45 (77.6)	45 (77.6)	11 (19.0)	2 (3.4)
S.C					
Abnormal	2 (11.1)	16 (88.9)	12 (66.7)	6 (33.3)	0 (0.0)
Normal	19 (24.1)	60 (75.9)	61 (77.2)	16 (20.3)	2 (2.5)
SGOT					
Abnormal	0 (0.0)	1 (100)	1 (100)	0 (0.0)	0 (0.0)
Normal	21 (21.9)	75 (78.1)	72 (75)	22 (22.9)	2 (2.1)
SGPT					
Normal	21 (21.6)	76 (78.4)	73 (75.3)	22 (22.7)	2 (2.1)
Proteinuria					
Negative	0 (0.0)	4 (100)	4 (100)	0 (0.0)	0 (0.0)
Positive	21 (22.6)	72 (77.4)	69 (74.2)	22 (23.7)	2 (2.2)
NST					
NST is non-reactive	17 (28.3)	43 (71.7)	46 (76.7)	12 (20.0)	2 (3.3)
Reactive NST	4 (10.8)	33 (89.2)	27 (73)	10 (27)	0 (0.0)
FOLDER (mmHg)					
<125	18 (20.5)	70 (79.5)	68 (77.3)	19 (21.6)	1 (1.1)
≥125	3 (33.3)	6 (66.7)	5 (55.6)	3 (33.3)	1 (11.1)

DISCUSSION

According to statistics from previous studies, preeclampsia affects 3-8% of pregnancies overall, while in underdeveloped nations, it affects 9-25% of pregnancies overall.[10-12]

As many as 43 patients were of high-risk age (over 35 years), and 105 of the 148 preeclampsia patients were of reproductive age (20-35 years), according to another study by Tyas et al conducted at Airlangga University Hospital.[13] They found that poor pregnancy outcomes, caesarean delivery, and postpartum hemorrhage were more common

in preeclampsia women with high-risk age problems. However, there was no rise in the risk of preeclampsia-related sequelae (HELLP syndrome, eclampsia, pulmonary oedema, and visual impairment).

A Chinese study explains the connection between age and preeclampsia. According to the study, women who were 30–34 years old and 35 years of age or older at the time of birth experienced unfavourable pregnancy outcomes and were admitted to a tertiary hospital. The results demonstrated a substantial negative correlation between adverse pregnancy outcomes and high-risk women, including those aged 30-34, even after controlling for confounding variables. The relationship between high-risk pregnancy outcomes and bad outcomes was shown to be partially mediated by the higher risk of preeclampsia, according to the study.[14] Advanced-age women (those over 35) constitute a separate risk factor for premature delivery. The placenta's vascular pathology might be one cause. Another potential cause in the development of preterm labor and preeclampsia in older women may be a lack of progesterone. The mother's progesterone hormone levels fall with age. Preterm labor is linked to low progesterone levels, and supplementing with progesterone can effectively prevent preterm labor.[15]

Previous research has typically addressed the association between preeclampsia and premature delivery. Davies et al reported that preeclampsia and preterm delivery were significantly positively correlated (adjusted odds ratio 4.43; 95% confidence range 3.80-5.16). The year of delivery and the commencement of labor impact the association's strength.[16]

An increasing body of research indicates that placental malfunction has a pathophysiological role in some cases of preterm delivery, early rupture of the membranes, fetal growth retardation, preeclampsia, and placental abruption. Inflammation of the placenta or membranes (acute or chronic chorioamnionitis, chronic nonspecific villitis, and chronic deciduous) contributes to preterm delivery. According to new research, pregnant women may be more susceptible to preterm delivery, preeclampsia, and PROM with or without a systemic inflammatory response. Preeclampsia and early delivery also have a recurrence risk. Therefore, it is possible to speculate that repeated placental malfunction and chorioamnionitis might predispose a woman to premature delivery in her first pregnancy, with or without PROM, and then to preeclampsia difficulties in her following pregnancies.[17]

Pre-eclampsia is classified as a first-pregnancy illness. Pre-eclampsia and primiparity are related, the foundation of many pathophysiological hypotheses. For instance, it's been suggested that maternal immune responses to paternal antigens produced in the placenta result in pre-eclampsia. Damaged trophoblasts may invade due to these responses, leading to placenta malfunction. In multiparous women, desensitization following exposure to paternal antigens in the placenta during a prior pregnancy is linked to a decreased incidence of pre-eclampsia.[18]

There is evidence that environmental and occupational variables have an impact, which runs counter to some research suggesting that these factors might contribute to the genesis of hypertension problems in pregnancy. The processes behind risk factors associated with the workplace, such as physically demanding employment and chemical exposure, are yet unknown. Physically taxing jobs, including prolonged standing and heavy lifting, may raise catecholamine levels, impacting blood vessel dilatation or narrowing. It has been demonstrated that individuals with preeclampsia have elevated catecholamine levels. Moreover, it is thought that high catecholamine levels may impact early placentation and reduce uterine blood flow. However, there is conflicting and limited data on work that causes chemical connections and hypertensive issues during pregnancy.[19]

The findings agree with those of earlier research. According to studies by Silva et al, women with lower secondary education (OR: 1.52; 95% CI: 1.02, 2.27) and lower education (OR: 1.30; 95% CI: 0.80, 2.12) had a greater risk of gestational hypertension than women with higher education, even after controlling for age and gravidity. Primarily due to their greater BMI and earlier in pregnancy, women with relatively low levels of education are more likely to develop gestational hypertension. Women who already have a predisposition to hypertension may experience a higher risk of gestational hypertension during pregnancy.[20]

This result is further supported by another Sole et al study. According to education level, among nulliparous women, more excellent education decreased the incidence of preeclampsia/eclampsia by 34% (adjusted OR 0.66, 95% CI 0.62-0.69) and among parous women, by 39% (adjusted OR 0.61, 95% CI 0.57-0.65) compared with women with just a secondary education. When compared to equivalent parity women with secondary education, the risk of gestational hypertension is more significant in highly educated nulliparous women, but the risk of preeclampsia/eclampsia is lower.[21]

About 10% of pregnancies result in hypertensive disorders of pregnancy, which are defined as new-onset hypertension (≥140 mmHg systolic or ≥90 mmHg diastolic) after 20 weeks of gestation by the International Society for the study of hypertension in pregnancy (ISSHP). De novo or superimposed preeclampsia on chronic hypertension, as well as gestational hypertension, are all included in this classification. The long- and short-term health of the mother and fetus can be significantly impacted by either of these diseases.[22]

These included a 1.5-fold higher risk of stroke, a two-to-four-fold increased risk of severe adverse cardiovascular events and cardiovascular mortality, and an elevated risk of long-term hypertension. For the fetus, these risks

include the potential for intrauterine fetal mortality, placental abruption, oligohydramnios, (intrauterine growth restriction (IUGR), and preterm delivery (usually iatrogenic).[23] Additionally, there is mounting evidence that exposure to hypertensive diseases during pregnancy in utero might result in substantial long-term cardiovascular consequences for children, such as early-onset hypertension and a higher risk of stroke and ischemic heart disease. These aftereffects have been linked, independently of other pregnancy problems, to hypertensive pregnancies.[8] Thus, understanding the general demographic picture is crucial to identifying individuals at risk of developing preeclampsia.

According to the 2019 National Institute for Health and Care Excellence (NICE) guidelines, a woman is considered to be at high risk of developing preeclampsia if she has a history of maternal illness, such as diabetes, autoimmune disease, chronic hypertension, or chronic kidney disease, or if she had hypertensive disease during a previous pregnancy.[8] This study discovered that 42.27% of patients had hypertension before becoming pregnant based on the medical records of prior patients. The research results by Sukmawati et al corroborates these findings. Garut's research revealed a strong correlation between the occurrence of preeclampsia and a history of high blood pressure. Families should use the study's findings as a guide to identifying preeclampsia risk factors as early as feasible, particularly a history of hypertension. Health professionals may counsel expectant mothers on managing and preventing preeclampsia.[24]

Studies conducted in Ethiopia corroborate this conclusion. The primary risk factors for preeclampsia include advanced maternal age (AOR=4.79; 95% CI 1.031-22.18) and a family history of hypertension (AOR=11.16; 95% CI 5.41-41.43). Pregnant women who have a family history of hypertension are most at risk for developing preeclampsia. Encouraging pregnant moms to seek health care during their pregnancy might offer an early chance to identify preeclampsia and hypertension.[4]

The fetus's modified cytotrophoblast cells' invasion of the uterus and spiral arterioles is the first stage of preeclampsia development. Because of this circumstance, these arterioles remodel less, which reduces blood supply to the placenta. When the mother is hypoxic, the placenta releases various substances into her bloodstream. These substances include proinflammatory factors like tumor necrosis factor alpha (TNF-α), linked to endothelial dysfunction in the mother, and anti-angiogenic soluble tyrosine kinases 1 (sFlt-1) factors. These factors are elevated in the plasma of preeclamptic women, as we have previously demonstrated. One of the hypothesized pathways between obesity with the risk of preeclampsia is this series of alterations. Although the precise mechanism is uncertain, clinical and experimental data points to the possibility that obesity may impact placental function and perfusion through specific metabolic abnormalities linked to obesity, such as hyperlipidemia, hyperinsulinemia, or hyperleptinemia.[25]

These results are corroborated by prior Swedish research. Pre-eclampsia risk was reported to be 1.7% overall in future pregnancies and 4.1% in first pregnancies. However, for women who had pre-eclampsia in their first pregnancy, the risk was 14.7% in the second pregnancy, and for those who had pre-eclampsia in their first two pregnancies, it was 31.9%. The pre-eclampsia incidence linked to deliveries before 34 weeks of gestation was 6.8% and 12.5% among women who had one or two previous pregnancies affected, 0.11% in multiparous women without a history of pre-eclampsia, and 0.42% in primiparous women. Pre-eclampsia in one pregnancy is a significant indicator of the return of pre-eclampsia in later pregnancies, but it is also a poor predictor of subsequent pregnancies. It is not plausible that fewer conceptions among women who had experienced preeclampsia in prior pregnancies account for the decreased overall risk of pre-eclampsia among parous women.[18]

Preeclampsia is known to be a risk factor for the diagnosis of persistent hypertension in the future, as well as other severe cardiovascular consequences such as heart failure, coronary artery disease, and stroke. However, the final therapy for preeclampsia includes birthing. Early cardiovascular disease development is independently correlated with preeclampsia. Preventable cardiometabolic risk factors before pregnancy also provide a significant risk for the development of preeclampsia. For instance, women who had chronic hypertension before becoming pregnant were five times more likely to experience preeclampsia, and those who had chronic diabetes mellitus (DM) were three to four times more likely to experience preeclampsia. The most significant risk factor for the development of preeclampsia among pregnancy-related variables is a prior history of the condition (unadjusted risk ratio [RR] 8.4 [95% CI, 7.1-9.9]).[26]

Blood pressure reaches its maximum at 190 mmHg for the systolic and 120 mmHg for the diastolic levels. To diagnose hypertension in pregnancy, blood pressure is the primary metric used. This is consistent with the hypothesis that preeclampsia is a group of symptoms that impact women during pregnancy, delivery, and the puerperium. A systolic/diastolic hypertension that is ≥140/90 mmHg is called preeclampsia at first.[27]

The BMI range of 17.8 to 33.8 was seen in the patients with preeclampsia at Prof. Dr. I.G.N.G. Ngoerah General Hospital in Denpasar, where the median value was 22.3. This contradicts other studies that found a connection between preeclampsia and the prevalence of obesity. Preeclampsia is thought to be influenced by obesity, and several shared processes associate obesity with an increased risk of preeclampsia. Furthermore, preeclampsia and obesity are linked to a higher chance of cardiovascular disease in the mother in the future. Many pregnancy-related complications, such as fetal overgrowth, fetal

malformations, spontaneous miscarriage, gestational diabetes, thromboembolic complications, stillbirth, premature birth, caesarean section, and hypertensive complications, have been linked to obesity, according to numerous studies.[28]

Preeclampsia and pregnancy-related hypertension were found to be strongly correlated with an increase in body mass index (BMI). For mothers who were overweight (BMI >26 kg/m^2) and obese (BMI >30 kg/m^2), the adjusted risk of having preeclampsia almost quadrupled and doubled, respectively. It was discovered that moms of other races worldwide are also at elevated risk, in addition to Caucasian and African-American mothers. Preeclampsia was observed to rise with BMI not just in early or moderate forms but also in late and severe forms, which are linked to more significant perinatal morbidity and death.[6]

When proteinuria and hypertension appear more than 20 weeks after delivery, the condition is known as preeclampsia. Of the research participants, 93 (95.88%) had proteinuria. A laboratory test used to determine kidney function during pregnancy is the urine protein screening of pregnant women. Understanding proteinuria is crucial for determining the diagnosis and course of treatment for hypertensive disorders during pregnancy.[28]

Complete blood laboratory values, including those for WBC, platelets, hematocrit, hemoglobin, and liver function, were acquired for this investigation and were within normal limits. Good early treatment and few complications in this research may be the reason for preventing further organ damage. This is comparable to the study conducted by Amyranti et al which found no correlation between the severity of preeclampsia and laboratory tests such as hematocrit, LDH, hematological findings, and liver function.[29] On the other hand, BUN and creatinine levels increased in several participants who experienced problems; the highest amounts were 49.9 mg/dl and 5.6 mg/dl, respectively. In Sungkar et al investigation, they discovered that HELLP syndrome had poorer laboratory markers ($p<0.001$) than preeclampsia, including greater urea and creatinine levels and lower albumin levels.[30]

The non-stress test (NST) examination is a technique used to assess the fetus at a gestational age of at least 26 weeks using cardiotocography. The test examines how fetal movement and heart rate variations interact. It is advisable to reexamine after one week if reactive NST results are not consistent with a favourable fetal status. Let's say, nevertheless, that there are risk factors like DM, oligohydramnios, hemorrhage, or hypertension. The fetus's condition may not be assured by reactive NST results, necessitating regular re-examination. According to the study conducted by Hortense et al, eclampsia accounted for 31.8% of the problems, whereas HELLP syndrome came in second at 8.4%. Complications in research subjects may be due to a late referral from the first health facility due to administrative problems or funding, resulting in delays in handling cases.[31]

Pre-eclampsia and eclampsia are two of the world's most common causes of maternal death. They have the potential to seriously raise maternal and perinatal morbidity and death rates globally and complicate up to 10% of pregnancies. The prevalence of this illness differs substantially between nations or areas. Not only are pre-eclampsia and eclampsia more common in low-income countries, but both conditions also carry a 300-fold more significant risk of maternal mortality.[32]

One of the most frequent causes of stopping pregnancy treatment is pre-eclampsia. It is crucial to specify the delivery method when expressing the expectation of birth: planned vaginal delivery or planned caesarean section. Since early pregnancies sometimes result in pre-eclampsia, abortion is frequently advised when there is no birth. Since many obstetricians prefer to perform caesarean sections in women with pre-eclampsia, even with a reassuring fetal state, the rate of caesarean sections in situations of severe pre-eclampsia is considered to be high (about 70% or more in preterm pregnancies). Depending on the status of the mother, the fetus, or both, induction is often suggested for instances of severe pre-eclampsia beginning at 34 weeks or less and for cases of pre-eclampsia starting at 37 weeks. Interruption of pregnancy at any gestational age is often recommended for all cases of eclampsia.[32]

This study still has several limitations, such as limited descriptive design, so the results just limited to the demographic aspect without analyzing the relationship among variables. This study also used a relatively small sample size for a descriptive study. Because this study was conducted retrospectively within a short period, the data available in this study is quite limited. However, the results of this study are expected to be a reference material for further research and analysis in the future. Additional research is needed to assess the relationship between demographic characteristics as a risk factor for the incidence of preeclampsia in pregnant women in the Bali region. Such follow-up research can serve as a preventive means for pregnant women to reduce morbidity and mortality due to preeclampsia in the current pregnancy or future pregnancies. In-depth and appropriate protocol management is needed to overcome preeclampsia cases, especially in determining the proper delivery to reduce maternal mortality and increase the baby's live birth rate.

CONCLUSION

Demographic characteristics, history of disease and previous pregnancies, clinical and supporting conditions, complications, and baby outcomes of pregnant women with preeclampsia in VK Obstetric of RSUP Prof. Dr. I.G.N.G Ngoerah in 2022 varies greatly. This research is expected to be a reference material for further research and analysis in the future. Additional research is needed to

assess the relationship between demographic characteristics as a risk factor for the incidence of preeclampsia in pregnant women in the Bali region.

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