Risk Factors and Impact of High-Risk Pregnancy on Neonatal Outcomes in Lamongan

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Abstract: High-risk pregnancy is a problem which received great attention in the current era, considering that the pregnancy poses a great risk of increasing morbidity and perinatal mortality both in pregnant women, the delivery process, and even newborns. Therefore, prevention efforts with early detection of risk factors need to be performed to reduce maternal and infant mortality. Likewise, data related to risk factors and their impact required to be conveyed to perceive the magnitude of the problem so that prevention and treatment efforts can be maximized. The purpose of this study was to present objective data related to sociodemographic and its relation to the impact of high-risk pregnancy. The research design applied correlational analytics with a population taken from the medical record data of pregnant women who at the time of entering the ward had high risk pregnancy indicators based on the Poedji Rochjati score above 6. The research sample was obtained by total sampling with a total sample size of 91 high-risk pregnant women. The data was then analyzed using a cross table and Spearman's rank test. The results showed that maternal age, medical history, and obstetric factors had a significant relationship with high-risk pregnancies (p=0.026; 0.004, rs; 0.229; 0.302), in which very high-risk pregnancy had a higher proportion in mothers over 35 years of age, and obstetric emergency namely bleeding and PEB also had a greater risk of very high-risk pregnancy than high-risk pregnancy while the weight and length of the baby and gestational age, had no statistical effect in high-risk pregnancies. Thus, it can be concluded that maternal age and obstetric medical factors are risk factors for high-risk pregnancy and very high-risk pregnancy based on Poedji Rochjati's score.

Keywords: High-risk pregnancy, Sociodemographic, Poedji Rochjati's score

INTRODUCTION

High-risk pregnancy is a pregnancy which endangers the life and health of the mother or fetus because of accidental or unique pregnancy disorders. Pregnancy can be considered as high risk if there are one or more of the proven risk factors where the possibility of adverse effects on the mother and fetus is greater than a normal pregnancy (Aliabadi et al., 2022). Although high-risk pregnancies only occur in about 10-30% of pregnant women who receive antenatal care, they account for 70%-80% of perinatal morbidity and mortality (Rajbanshi et al., 2020). Every year nearly 529,000 women die worldwide from pregnancy-related causes (Firozi, 2012). Women with high-risk pregnancies are often associated with complications of pregnancy, childbirth, and postpartum, which enable pregnant women to show changes in psychological responses. The

presence of negative emotions, psychological stress, anxiety, and even depression will cause new problems for the mother and fetus, especially if the pregnant woman is hospitalized, receive pharmacological therapy, perform medical rehabilitation and modify lifestyle. This further raises concerns and feelings of vulnerability that trigger the emergence of new risks of complications during pregnancy (Rodrigues et al., 2016).

WHO (2017) states that around 15% of all pregnant women experience potentially life-threatening complications. A pregnant woman in a developing country is 36 times more likely to suffer from pregnancy complications than a pregnant woman in a developed country. Maternal mortality rate (MMR) is an indicator used to measure the health status of mothers in a region. Maternal mortality is death during pregnancy or within 42 days after pregnancy from all causes related to or aggravated by pregnancy or its management, but not caused by accident or injury. The maternal mortality rate in the world is quite high. WHO estimated that around 287,000 women died during and after pregnancy and childbirth in 2020, with nearly 95% of all maternal deaths occurring in low- and lower-middle-income countries in 2020. Although the global maternal mortality ratio (MMR) decreased by 34 percent, this is one-third of the 6.4 percent annual rate needed to achieve the Sustainable Development Goal (SDG) of 70 maternal deaths per 100,000 live births by 2030 (Vogel et al., 2015). According to the Maternal Perinatal Death Notification (MPDN) data on September 21, 2021, the top three causes of maternal death are eclampsia (37.1%), hemorrhage (27.3%), infection (10.4%) with the highest place/location of death is in the hospital (84%). Several studies also proved that the risk of maternal and neonatal death increased with high-risk pregnancies including increasing maternal age (<18 and >34 years), high parity (birth order >3), and short birth spacing (<24 months) (Brown et al., 2015). High-risk pregnancies also lead to the risk of infant mortality. In 2018-2023, the graph shows a decrease and increase in infant mortality rates in the last 6 years. However, nationally the IMR of Lima Puluh Kota Regency is still below the national target of 24 per 1,000 births and the results of the 2017 Indonesian Demographic and Health Survey (IDHS) showed an Infant Mortality Rate (IMR) of 24 per 1,000 births with the highest causes of low birth weight, asphyxia and congenital abnormalities

Considering that the causes and background of maternal mortality are very complex and involve areas handled by many sectors, both in the government and the private sector, efforts to accelerate the reduction of MMR require a comprehensive handling of existing problems by involving related sectors. In 2007 the Minister of Health launched the Childbirth Planning and Complication Prevention (P4K) Program with Stickers, which was a “breakthrough effort” in

accelerating the reduction of maternal and newborn mortality through activities to improve access and quality of services as well as activities that build community potential, especially community awareness for preparation and action in saving mothers and newborns. For this reason, the care of high-risk pregnant women is not only focused on the client as the center of care but needs specific and planned assistance to help clients maintain quality of life and prevent the risk of unwanted complications.

METHOD

The research design used in this study was correlational analytic with a cross sectional approach. The population was all laboring mothers in the Darussalam Room of the Muhammadiyah Babat General Hospital who had medical records for the last 3 months, from December 2024 to February 2024. Secondary data taken from medical records included maternal age, parity, gestational age at delivery, newborn weight, newborn length, obstetric risk factors based on Poedji Rochjati Score Card (KSPR), and delivery method. The sample criteria were the data of respondents who had high-risk pregnancy indicators and were presented completely, but the researcher excluded respondents who had a Poedji Rochjati score below 6 with the consideration that respondents with a score below 6 did not include high-risk pregnancies. Based on these criteria, the total population taken was 91 laboring mothers and taken with a total sampling. The data were then analyzed using a cross tabulation to determine the relationship between risk factors and their impact and then statistical tests were carried out using Mann Whitney and Rho Spearman.

RESULTS

Demographic and obstetric characteristics indicated that the average age of respondents was 30.51 years (± 5.52) with an age range between 19 to 44 years. This indicates that high-risk pregnancies and pregnancy complications are in the low-risk age range of 20-30 years with multiparous and most of them gave birth at term gestation (37-40 weeks). Laboring mothers with high-risk pregnancy and very high-risk pregnancy both had low average risk ages but there was a tendency that laboring mothers with high-risk pregnancy status were younger while laboring mothers with very high-risk pregnancy were more likely to be older. In general, respondents with both high-risk pregnancy and very high-risk pregnancy had 1 to 5 children with a mean parity of 2.22 (± 0.102), and there was no difference between the two in terms of parity. Based on gestational age, mothers with high-risk pregnancy had an average gestational age of premature (37.62) and

mothers with very high-risk pregnancy gave birth more at term, but both had a range of gestational ages between 35 to 42 weeks. table 1 also shows that the majority of pregnant women had KSPR scores of 6 - 30 with an average score of 10.2 (± 5.52), indicating that most pregnant women were classified as high-risk pregnancies and a small proportion of very high-risk pregnancy. Obstetric risk factors categorized as APGO (potential pregnancy distress) tended to be more prevalent among women with high-risk pregnancy, while AGO (obstetric distress) risk factors were more prevalent among women with very high-risk pregnancy. The risk factors are the presence of diseases in pregnant women such as anemia, diabetes mellitus, asthma, myopia, hemorrhoid and hepatitis, pregnancy hypertension and mild preeclampsia, twin / double pregnancy, hydramnios or polyhydramnios, fetal death in the womb (Intra Uterine Fetal Death / IUFD), serotinous pregnancy / over-pregnancy and abnormalities such as breech and latitude. Maternity mothers with high-risk pregnancy status mostly gave birth vaginally or spontaneously, but maternity mothers with very high-risk pregnancy mostly used the SC-assisted delivery method.

Table 1. Basic Characteristics of Respondents Based on Demographics and Obstetrics and the Impact of High-Risk Pregnancies on Newborns.

No	Mother Characteristic	Total (N = 91) %		KRT (N=68)		KRST (N=23)		*P* value
		$\bar{x}$± sd	Min-max	$\bar{x}$± sd	Min-max	$\bar{x}$± sd	Min-max	
1	Mother's age (year)	30,51 ± 5,52	19-44	29,65 ±5,248	19-41	32,35±5,60	22-44	0,18
2.	Parity	2,22 ± 0.102	1-5	2,18±0,961	1-5	2,35±1.027	1-4	0,472
3.	Gestational age (week)	37,62 ± 0,466	35-42	37,43±5,00	35-42	38,17±2.01	35-41	0,434
4.	KSPR Score	10,2 ± 0,433	6-30					
5.	Newborn weight (gr)	3089,81±44,138	1720-4185	3088,2±368,6	1970-4000	3094,5±557,9	1720-4185	0,695
6.	Body length (cm)	49,16 ± 0,594	45-54	49,13±6,36	47-53	49,26±2,88	39-54	0,476
7.	Risk Factors Obstetric							
	APGO	30 (33)		27 (39,7)		3 (13)		0,004
	AGO	55 (60,4)		39 (57,4)		16 (69,6)		
	AGDO	6 (6,6)		2 (2,9)		4 (17,4)		
8	Types of Delivery							0,033
	Spontaneous	18 (19,7)		17 (25)		1 (4,3)		
	SC	73 (80,2)		51 (75)		22 (95,7)		
	Total	**91**		**68**		**23**		

The impact of high-risk pregnancies on infants showed that the majority of birth weights and lengths were normal, with little difference between mothers who delivered under routine control (very high-risk pregnancy) and routine control without high scores (high-risk pregnancy). The average birth weight of babies from both groups was 3089.81 grams (±44.138), but it appears that high-risk mothers had babies with lower or higher birth weights compared to mothers with routine

controls. Meanwhile, in the category of type of delivery, the majority of pregnant women chose to deliver via caesarean method (SC).

Table 2. Overview of Obstetric Risk Factors in Laboring Mothers with High-Risk Pregnancies Based on KSPR Score

CRITERIA		**High-Risk Pregnancy**		**Very High-Risk Pregnancy**	
	Potential Obstetric Distress (APGO)	n	%	n	%
1.	Young primigravida (First pregnancy < 19 years)	2	2.5	0	0.0
2.	Old primigravida (First pregnancy after marriage > 4 years)	1	1.3	1	2.1
3.	Mother's age > 35 years	6	7.5	4	8.3
4.	Youngest child < 2 years	2	2.5	1	2.1
5.	Grand multiparity (delivery > 4 times)	1	1.3		0.0
6.	Bad Obstetric History (CPD, suspected macrosomia, history of abortion)	10	12.5	4	8.3
7.	Cesarean section marks	16	20.0	11	22.9
8.	Past delivery with procedure	1	1.3	0	0.0
	Obstetric Distress (AGO)				
1.	Diseases in pregnant women (anemia, malaria, tuberculosis, heart failure, DM, HIV/AIDS, Toxoplasmosis, Hepatitis, Hemiopia, hemorrhoid, asthma, hyperthyroid, hypotension, hypertension, obesity)	13	16.3	7	14.6
2.	Mild preeclampsia	1	1.3	1	2.1
3.	Twin pregnancy	2	2.5		0.0
4.	Hydramnios (Polyhydramnios)	2	2.5	2	4.2
5.	Intra Uterine Fetal Death	2	2.5	1	2.1
6.	Serotinous pregnancy / Over-month pregnancy	5	6.3	3	6.3
7.	Breech location and Latitudinal location	14	17.5	8	16.7
	Obstetric Emergency (AGDO)				
1.	Antepartum hemorrhage	1	1.3	3	6.3
2.	Severe Preeclampsia/Eclampsia	1	1.3	2	4.2
	TOTAL	80		48	

Table 2 shows that in APGO criteria, high risk pregnancies both high-risk pregnancy and very high-risk pregnancy are dominated by pregnancies with previous cesarean section (20%; 22.95), poor obstetric history (12.5%; 8.3%) and maternal age above 35 years (7.5%; 8.3%). In AGO risk factors, the majority were influenced by abnormality of location either breech location, transverse location or oblique location (17.5%; 16.7%), diseases accompanying pregnancy (16.3%; 14.6%) and late pregnancy or serotinus (6.3%; 6.3%). In AGDO risk factors, the majority of high-risk pregnancies were due to ante partum hemorrhage (1.3%;6.3%). In general, it can be seen that the biggest risk factor for high-risk pregnancies in pregnant women is caused by a history of previous caesarean section. This is understandable considering that this condition can cause serious complications, especially during labor.

Table 3. Cross Table of Correlation Between Maternal Age, Parity Obstetric Medical Factors with KSPR Score

No.	Maternal Age	KSPR Score						Spearman Test
		High-Risk Pregnancy (6-10)		Very High-Risk Pregnancy (>12)		Total		
		N	%	N	%	N	%	
1	< 20	5	100	0	0	5	100%	rs : 0.234
2	20-35	48	78.7	13	21.3	61	100%	P ; 0.026
3	≥35	15	60	10	40	25	100%	
	Parity							
1	Primipara	20	74.1	7	25.9	27	100	rs : -0.19
2	Multipara	47	74.6	16	25.4	63	100	P ; 0.856
3	Grand multipara	1	100	0	0	1	100	
	Obstetric Medical Factor							
1	APGO	27	90	23	10	30	100	rs : 0.302
2	AGO	39	70.9	15	29.1	55	100	P ; 0.004
3	AGDO	2	33.3	4	66.2	6	100	
	Total	68	74.7	23	25.3	91	100	

Table 3 describes that high-risk pregnancies had a tendency to occur at low-risk ages, which is 20 - 35 years old. While very high risk pregnancies also occur mostly in the age of 20 - 35 years and the age > 35 years. This result is corroborated by the Spearman statistical test that showed a significant relationship between maternal age and KSPR score with a p value = 0.029 and rs 0.229. Parity data showed that the majority of multiparous mothers had higher KSPR scores compared to primiparous and grand multiparous, while very high-risk pregnancies were more common in multiparous women. but the results of the Spearman test did not show a significant correlation. Obstetric medical risk factors in mothers with high-risk pregnancy tend to have AGO criteria (there is an obstetric distress), but in mothers with very high-risk pregnancy status more have AGDO criteria (there is an obstetric emergency). This shows that the higher the KSPR score, the higher the potential for obstetric emergencies experienced by pregnant women. This conclusion is supported by the Spearman test which shows a p value = 0.04 with rs 0.302 indicating that there was a significant correlation between the two variables, even though the correlation was moderate. A high-risk pregnancy is a pregnancy with one or more risk factors, both on the part of the mother and the fetus, which has an unfavorable impact on both the mother and the fetus, has a risk of emergency but is not an emergency. AGO criteria refer to the presence of danger signs during pregnancy, labor, and postpartum such as maternal diseases (anemia, malaria, tuberculosis, heart failure, DM, HIV/AIDS, toxoplasmosis), Mild pre-eclampsia, gemelli, Hydramnios

(Polyhydramnios), Intra Uterine Fetal Death (IUFD), Serotinous pregnancy / Over-month pregnancy, Breech location and latitudinal location, sedangkan AGDO criteria refers to the presence of life threatening mother and baby) such as antepartum hemorrhage and severe preeclampsia/eclampsia.

Table 4. Cross-correlation between KSPR Score and Birth Weight, Length, and Gestational Age

No.	KSPR Score	Newborn Weight						Total	
		Low Birth Weight		Normal Birth Weight		Macrosomia			
		N	%	N	%	N	%		
1	high-risk pregnancy (6-10)	2	2,9	66	97,1	0	0	68	100
2	very high-risk pregnancy (>12)	2	8,7	20	87	1	100	23	100
	Total	4	4,4	86	94,5	1,1	100	91	100
		P = 0,783, rs ; -0,29							
		Panjang Badan							
	KSPR Score	Normal		Abnormal		Total			
1	high-risk pregnancy (6-10)	59	86,8	9	13,2	68	100	rs : -0	
2	very high-risk pregnancy (>12)	22	95,7	1	4,3	23	100	P ; 0,856	
	Total	81	89	10	11	1	100		
		P = 0,244, rs ; 0,123							
		Gestational Age							
	KSPR Score	Preterm		Term		Postdate		Total	
1	high-risk pregnancy (6-10)	10	14,7	54	79,4	4	5,9	68	100
2	very high-risk pregnancy (>12)	4	17,4	16	69,6	3	13	23	100
	Total	14	15,4	70	76,9	7	7,7	91	100
		P = 0,730, rs ; 0,37							

Table 4 describes that pregnant women with KSPR scores between 6-10 mostly gave birth to babies with normal weight, normal length and term gestational age, as well as pregnant women who had KSPR scores above> 12 seemed to have normal birth weight and length and term gestational age. This shows that there is no difference in the impact on the condition of newborns. This conclusion is confirmed by the Spearman test which showed that all p values were above 0.05 (p = 0.738; 0.244; 0.730) meaning that there was no correlation between KSPR scores with baby birth weight, baby length and gestational age.

DISCUSSION

High-risk pregnancy is a condition in which pregnant women are potentially at-risk during pregnancy and childbirth. These conditions are associated with actual and potential harm to maternal and fetal well-being such as hemorrhage, sepsis, unsafe abortion, or preeclampsia, which account for more than 99% of maternal deaths in low- and middle-income countries (Holness, 2018, Bagayoko et al., 2023). In developing countries, maternal mortality remains a significant problem; limited access to and quality of care contributes significantly to maternal mortality, but maternal characteristics (e.g., age, parity) are also important factors, especially in high-risk pregnancies (Holness, 2018, Bagayoko et al., 2023). In fact, WHO reported that nearly 830 pregnant women died as a result of complications acquired during pregnancy (Majella et al., 2019). This requires comprehensive antenatal care including early screening of risk factors, adequate antenatal care focusing not only on medical but also psychological, timely medication management and maintenance and expert care during pregnancy and delivery. This study reports on the risk factors and the impact of high-risk pregnancies on newborns. This study was used to determine the clinical criteria and factors that affect high-risk pregnancies and their impact on newborns. High-risk pregnancies can be measured based on the Poedji Rochjati score, in which high-risk pregnancies will be confirmed if the KSPR score is more than 6. The results showed that the proportion of high-risk pregnancies in Muhammadiyah Babat Hospital was 73.38% during the last 3 months, with details of 58, 1% including the category of high-risk pregnancies and 13.2% including very high-risk pregnancies based on the KSPR score. It is a huge number compared to some other countries which only range from 34.3% to 48.5% (Gomindes et al., 2022, Ka et al., 2023). Demographic data showed that maternal age and obstetric medical factors have a greater chance of high-risk pregnancy and very high-risk pregnancy. The results also showed that high-risk pregnant women with high-risk pregnancy category were mostly in the age range of 20-35 years, while pregnant women with very high-risk pregnancy category tended to be in the age range of >35 years. Pregnant women over 35 years old are considered to contribute to an increased incidence of pregnancy complications and obstetric interventions during pregnancy and childbirth.

Pregnancy in women with an older maternal age (35 years or more) or in women with high parity (who have given birth 5 times or more) is also associated with the possibility of concomitant diseases that increase maternal and infant mortality (Ndiaye et al., 2018). The outcome of pregnancy at an older age also has a negative impact not only on physical health but also psychologically in which the occurrence of depression will also increase at that age (Correa-de-Araujo & Yoon, 2021). Considering that this age is the final age of a woman's reproductive period,

it increases the risk of pregnancy complications, including ectopic pregnancy, spontaneous abortion, fetal chromosomal abnormalities, congenital abnormalities, placenta previa and placental abruption, gestational diabetes, preeclampsia, and cesarean delivery (Correa-de-Araujo & Yoon, 2021, Cavazos-Rehg et al., 2015, Sheen et al., 2018, Waldenström et al., 2017). This is in accordance with the results of the study in which the majority of pregnant women were also medically decided to give birth by the SC method due to various complications that occurred during labor, Even in other studies, the rate of section cesarean delivery in high-risk pregnancies reached 77.67%, especially pregnancies with advanced age but this condition actually became one of the risk factors for subsequent pregnancies (Gao et al., 2022). As for the fetus, late pregnancy will cause the impact of small babies for gestational age and intrauterine growth retardation, low Apgar scores, and autism spectrum disorders (Glick et al., 2021). Parity data shows that high-risk pregnancies are more common in multiparous and primiparous mothers. Parity is the number of children born by the mother either alive or dead. Parity is considered high when giving birth to the fourth child or more. A study suggested that the safe parity in preventing deaths for mothers and fetuses is multipara (Amini et al., 2018), but the results of this study show that multiparous mothers recorded a greater number of high-risk pregnancies than primiparous and grand multiparous. Another study also found that the proportion of high-risk pregnancies was greater in multigravida pregnant women (74.6%) (K. C. et al., 2017). KSPR is a scorecard used as a family-based antenatal screening tool to find risk factors for pregnant women, which is then carried out integrated efforts to avoid and prevent the possibility of obtetric complications during labor. KSPR with a score of 6-10 is classified as a high-risk pregnancy in which pregnancy with one or more risk factors, both from the mother and the fetus that have an unfavorable impact, has a risk of emergency but not emergency. In respondents, KSPR scores of 6-10 were found in pregnant women who had one of the symptoms of medical and pathological obstetrics such as abnormality, hydramnios, anemia, history of abortion, pregnancy with 4T, previous SC scars and so on, while pregnancies with scores >12 were found in pregnant women who experienced antepartum bleeding, previous SC history, and severe preeclampsia. The impact of high-risk pregnancies on newborns statistically has no effect, birth weight and body length and gestational age have a tendency to normal numbers, this is not in accordance with several studies which state that high-risk pregnancies often produce low and very low birth weight, premature birth, and neonatal mortality (Kiely et al., 2011, Maheshwari et al., 2022).

WHO defines low birth weight (LBW) as a birth weight of less than 2,500 g in newborns. Other classifications include Low Birth Weight (<1,500 g) and Very Low Birth Weight (<1,000 g), which are two types of low birth weight that are strongly associated with prenatal and neonatal mortality and morbidity as well as delays in cognitive development. The tendency of normal birth weight among high-risk pregnant women in this study may be related to good antenatal care and early monitoring by health workers. Preterm birth is defined as birth before 37 weeks of gestation, which is categorized based on gestational age as very preterm (<28 weeks), preterm (28-32 babies), moderate to late preterm (32 - 37 weeks). In theory, high-risk pregnant women have the opportunity to give birth prematurely. In this study, the proportion of preterm births was quite high at 14.7% of the total respondents. This is worthy of concern because it risks a greater impact on acute respiratory, immunological, gastrointestinal, central nervous system, vision, and hearing as well as motor, cognitive, behavioral, auditory, visual, health, social-emotional, and long-term growth problems (Maheshwari et al., 2022).

CONCLUSION

High-risk pregnancy is a pregnancy that has a major impact on both mother and baby. Risk factors associated with high-risk pregnancies are greater in pregnant women above 35 years of age, a history of previous caesarean section delivery, abnormalities in the location of the baby, having medical and obstetric health problems including suffering from certain diseases such as pregnancy anemia, as well as the presence of antepartum bleeding and severe preeclampsia. High risk pregnancies may contribute to the occurrence of preterm birth, and LBW although statistically insignificant, but it still deserves attention.

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