

Early Detection Of Fetal Well-Being Disorders Through Blood Pressure Monitoring And Pregnancy Danger Signs

Arisda Candra Satriawati¹, Niken Wahyu Hidayati², Dian Permatasari³, Aulia⁴

¹⁻⁴Faculty of Health Sciences, Universitas Wiraraja Madura, Indonesia

Article Info

Article history:

Received Dec 17th, 2025

Revised Dec 26th, 2025

Accepted Dec 27th, 2025

Keywords:

Fetal Well-being
Blood Pressure
Pregnancy Danger Signs
Early Detection

ABSTRACT

Background: Fetal well-being disorders are one of the indirect contributors to increased perinatal morbidity and mortality. These conditions often originate from maternal problems that can actually be detected early through antenatal care services. **Objective:** To describe early detection of fetal well-being disorders through blood pressure monitoring and pregnancy danger signs among pregnant women. **Methods:** This study employed a descriptive design with a cross-sectional approach. The subjects were 15 pregnant women who attended antenatal care at the Banyuates Primary Health Center working area. Data were collected through blood pressure measurement, hemoglobin level assessment, maternal nutritional status evaluation, and fetal heart rate monitoring. Data were analyzed descriptively using frequency distributions and percentages. **Results:** The results showed that 40% of pregnant women had blood pressure $\geq 140/90$ mmHg, 33.3% experienced anemia, and 13.3% of fetuses exhibited abnormal fetal heart rates. Overall, 40% of respondents were categorized as having a risk of fetal well-being disorders. **Conclusion:** Blood pressure monitoring and assessment of pregnancy danger signs can be used as an effective method for early detection of fetal well-being disorders in primary healthcare settings.

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Corresponding Author:

Arisda Candra Satriawati¹

Faculty of Health Sciences, Universitas Wiraraja Madura, Indonesia

Email: arisdacandra@wiraraja.ac.id

1. INTRODUCTION

Maternal Mortality Rate (MMR) and Infant Mortality Rate (IMR) remain important indicators of public health status. One of the main causes of high MMR and IMR is delayed detection of pregnancy complications, particularly hypertension and anemia. These conditions directly affect uteroplacental perfusion and fetal well-being.

In Indonesia in 2019, the second-highest number of maternal deaths was caused by gestational hypertension, with 1,066 cases, followed by bleeding, and the third-highest cause was infection, with 207 cases. It is estimated that by 2024, the maternal mortality rate in Indonesia will decrease to 183 per 100,000 live births, and by 2030, it will decrease to 131 per 100,000 live births (1). Fandila stated that hypertension in pregnancy complicates 5-15% of pregnancies and is one of the three leading causes of maternal mortality and morbidity. In Indonesia, mortality and morbidity from hypertension in pregnancy remain quite high (2)

Nurhayati stated that hypertension in pregnancy is caused by several risk factors, namely age, use of hormonal contraceptives, history of hypertension, socioeconomic factors, salt consumption, smoking, and nutritional status (3). Hypertension in pregnancy can be prevented if risk factors can be controlled. These efforts include regular blood pressure monitoring, physical activity, and a healthy diet with balanced calories through consumption of high fiber, low fat, and low salt. Calcium deficiency in pregnant women increases the risk of hypertension in pregnancy, as calcium requirements increase during pregnancy for the formation of new tissue in the fetus. Adequate calcium intake can reduce the incidence of hypertension during pregnancy.

Fetal well-being reflects the fetus's ability to grow and develop optimally during pregnancy. Maternal disorders, such as hypertension and poor nutritional status, may reduce oxygen and nutrient supply to the fetus. Blood pressure monitoring and assessment of pregnancy danger signs are simple yet crucial components of antenatal care services. Preliminary observations in the Banyuates Primary Health Center working area indicated that awareness among pregnant women regarding routine antenatal check-ups was still relatively low. Therefore, this study aimed to describe early detection of fetal well-being disorders through blood pressure monitoring and pregnancy danger signs.

2. METHOD

This study was a quantitative descriptive study with a cross-sectional design. It was conducted in the Banyuates Primary Health Center working area in October 2025. The study subjects were 15 pregnant women who met the inclusion criteria and were selected using total sampling. Data collection was carried out through interviews and antenatal examinations, including blood pressure measurement, mid-upper arm circumference (MUAC), body mass index (BMI), hemoglobin level assessment, and fetal heart rate examination using Doppler. Data were analyzed descriptively and presented in frequency distribution tables.

3. RESULTS AND DISCUSSION

Tabel 1. Characteristics of Maternal Risk Factors

Characteristic	High Risk		Normal	
	n	%	n	%
High-risk age (<20 or >35 years)	3	20.0	12	80.0
Parity >2	5	33.3	10	66.7
Abnormal BMI	4	26.7	11	73.3
MUAC <23.5 cm	2	13.3	13	86.7
Anemia (Hb <11 g/dL)	5	33.3	10	66.7

Based on Table 1, most pregnant women were within the healthy reproductive age range (20-35 years). However, three women (20%) were classified as high risk due to age <20 or >35 years. Very young maternal age increases the risk of preterm labor and anemia due to immature reproductive organs, while maternal age above 35 years increases the risk of preeclampsia and metabolic complications (Cholifah & Rinata, 2022).

Tabel 2. Blood Pressure Monitoring and Fetal Well-Being

Variable	High Risk		Normal	
	n	%	n	%
Blood pressure $\geq 140/90$ mmHg	6	40.0	9	60.0
Abnormal fetal heart rate	2	13.3	13	86.7

Six pregnant women (40%) showed blood pressure $\geq 140/90$ mmHg, indicating a risk of hypertension or preeclampsia. Hypertension during pregnancy causes uterine artery vasospasm and placental insufficiency, which may inhibit fetal growth and trigger fetal distress (Hani, 2011).

Five respondents (33.3%) had a parity of more than two, indicating a potential risk of uterine fatigue and postpartum hemorrhage. According to Hanifah reaserch, women with high parity are more likely to experience decreased uterine contractions and anemia due to repeated blood loss (4). Frequent pregnancies, especially closely spaced pregnancies, can increase

pregnancy risks, one of which is hypertension. Therefore, it is important for mothers to maintain the spacing between pregnancies and pay attention to the number of children and the mother's age. Spacing can be achieved by using contraception. In addition to experiencing hypertension, pregnant women with high parity can also experience bleeding, anemia, congenital defects, and several other pregnancy risks.

Nutritional status based on BMI and MUAC showed that four respondents (26.7%) had an abnormal BMI and two respondents (13.3%) had a MUAC <23.5 cm, indicating chronic energy deficiency. These findings indicate that maternal malnutrition persists in the study area. Interviews with village midwives confirmed that some pregnant women rarely attend nutrition counseling sessions and do not regularly take iron tablets. Midwives can conduct home visits or mobilize Posyandu (Integrated Health Post) cadres to provide nutritional counseling to pregnant women with low MUAC values. They can also screen for anemia during Posyandu and integrated ANC sessions. If, after the counseling session, the mother's weight and mid-upper arm circumference do not increase, the pregnant woman should be immediately referred to the hospital for more intensive care and fetal monitoring. Weight gain is an indication of proper fetal growth and development. Pregnant women with a normal BMI will minimize risks during pregnancy and childbirth.

Five respondents (33.3%) had anemia (Hb <11 g/dL). Field observations showed that most of these women did not routinely check their hemoglobin levels at primary health centers and primarily relied on integrated health posts. This finding supports research by Prafitri, which reported that low maternal knowledge and poor adherence to antenatal care contribute to the high prevalence of anemia in rural areas (5)

In addition to hypertension, anemia in pregnant women plays a significant role in reducing oxygen delivery to the fetus. WHO states that anemia during pregnancy increases the risk of fetal hypoxia and poor perinatal outcomes. Therefore, the finding of an abnormal fetal heart rate in this study may serve as an early indicator of fetal well-being related to maternal health (6)

Midwives can conduct home visits or mobilize Posyandu (Integrated Health Post) cadres to screen for anemia if the mother does not attend Posyandu or integrated ANC. Iron supplementation is also recommended to reduce the incidence of anemia and prevent complications from anemia. In addition to FE tablets, mothers can also receive high-iron nutritional counseling, both individually and in groups. Prenatal classes can also be used as a platform for nutritional counseling during pregnancy, as well as teaching prenatal exercises to maintain maternal health and prepare for childbirth.

Hypertensive disorders in pregnancy are closely associated with impaired uteroplacental perfusion, which negatively impacts fetal well-being. International studies have reported that high maternal blood pressure contributes to fetal distress and intrauterine growth restriction (7)

Observations indicate that mothers with high blood pressure commonly report fatigue, high salt intake, and irregular antenatal visits. Some complain of headaches, blurred vision, and leg edema—classic symptoms of preeclampsia. Meanwhile, two mothers (13.3%) exhibited abnormal fetal heart rates, characterized by bradycardia (<110 beats/min) or tachycardia (>160 beats/min). Doppler examination revealed fetal heart rate fluctuations, and both cases were associated with maternal hypertension. These findings suggest a link between maternal hypertension and impaired fetal well-being, as decreased uteroplacental blood flow can trigger fetal hypoxia (4)

These results are consistent with research by Purwaningsih, which emphasizes the importance of real-time fetal monitoring to prevent delayed detection of fetal distress (8). Overall, the findings indicate that maternal blood pressure is one of the most significant early indicators of fetal well-being.

High salt intake, fast food, and ultra-processed foods, which are increasingly consumed in recent years, are among the triggers of hypertension before pregnancy and are only detected during prenatal checkups.

Hypertension has a significant impact on both the pregnant mother and the fetus. In addition to affecting the mother's condition, the fetus can also experience complications such as miscarriage and asphyxia. The mother can experience seizures and bleeding both during pregnancy

and during delivery. Hypertension can also persist for years after delivery if left untreated, and can even cause maternal and infant death. Therefore, regular checkups are crucial to control hypertension during pregnancy and ensure the safety of the mother and baby.

In addition to properly managing dietary intake, light exercise and stress management are also important. Constant communication with your partner, avoiding stressors, maintaining a positive mood, and partner support are all helpful in preventing hypertension, at least preventing excessively high blood pressure. Taking pregnant women for walks to relieve stress from their daily routines can help them better manage stress. Hypertension isn't just about lowering blood pressure with medication and food; it also involves self-acceptance and positive support from those closest to them. This can help avoid triggers and help pregnant women manage their hypertension.

Early detection in pregnancy is an important note for midwives and cadres to continue to carry out early detection in pregnant women not only at the community health center level but also at integrated health posts (posyandu), so that high-risk pregnant women can be detected immediately. According to Putri's research, early detection in pregnancy can be used as an effort to detect and treat high-risk pregnancies in pregnant women. High risk of pregnancy is a pregnancy where the life and health of the mother and or baby can be threatened. Risk pregnancy is a pregnancy that has a greater risk than usual (for both mother and baby), which can result in illness or death before and after delivery (9)

In addition to routine checkups, prenatal classes can also serve as a learning tool for early detection of pregnancy complications independently. Midwives and cadres can teach the danger signs in pregnant women and also the danger signs for the fetus. This means that if a mother's condition suggests an emergency, she can immediately seek optimal care. This is similar to Idai's research, which demonstrated a significant impact of implementing prenatal classes on the ability to detect pregnancy complications early (10)

4. CONCLUSION

Some pregnant women in the Banyuates Primary Health Center working area remain at high risk for fetal well-being disorders. Blood pressure monitoring and assessment of pregnancy danger signs are effective methods for early detection and should be optimized in antenatal care services.

Midwives are encouraged to strengthen routine blood pressure screening and education on pregnancy danger signs. Pregnant women are advised to attend regular antenatal care visits and adhere to nutritional recommendations during pregnancy.

ACKNOWLEDGMENTS

Thank you to Universitas Wiraraja Sumenep for granting permission and supporting this research.

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