



Analysis Of Determinants Of Premature Labor Incidents In Pregnant Women

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ABSTRACT

Preterm birth is one of the main causes of neonatal morbidity and mortality. Various risk factors can influence the occurrence of preterm birth, both from medical and social aspects. This study aims to analyze the determinants of the incidence of preterm birth in pregnant women. This study used a quantitative design with a case-control approach. A sample of 120 respondents consisted of 60 cases (preterm birth) and 60 controls (term birth). Data were collected through medical records and questionnaires, then analyzed using logistic regression. The results showed that maternal age, nutritional status, medical history, and frequency of antenatal care (ANC) significantly influenced the incidence of preterm birth ($p < 0.05$). The dominant factor was irregular ANC frequency (OR = 3.5). In conclusion, improving the quality and compliance of ANC visits is very important in preventing preterm birth.

Keywords: Premature Birth, Pregnant Women, Risk Factors, Antenatal Care

1. INTRODUCTION

Preterm birth is defined as delivery occurring before 37 weeks of gestation. This condition is a global health problem because it contributes significantly to newborn mortality and various long-term complications, such as respiratory problems, infections, and developmental delays.

In developing countries, including Indonesia, the incidence of preterm birth remains relatively high. This is influenced by various factors, including biological, behavioral, and socioeconomic aspects. These factors include maternal age, nutritional status, illnesses during pregnancy, and access to and utilization of health services such as antenatal care (ANC).

Antenatal care is crucial for monitoring the health of the mother and fetus throughout pregnancy. Irregular ANC visits can lead to delays in detecting complications, increasing the risk of preterm labor.

Maternal age also plays a significant role. Mothers who are too young (<20 years) or too old (>35 years) are at higher risk of pregnancy complications. Poor nutritional status can also affect fetal growth and increase the risk of preterm birth.





Various risk factors are known, but their contribution may vary across populations. Therefore, research that empirically analyzes the determinants of preterm birth is needed to enable more appropriate interventions.

2. RESEARCH METHODS

a. Research Design

This study uses an analytical quantitative design with a case-control approach, namely a study that compares two groups, namely the case group (mothers who experienced premature labor) and the control group (mothers who gave birth at term), to identify factors related to the occurrence of premature labor.

A case-control design was chosen because it is effective for studying relatively rare events such as preterm birth and allows for the identification of various risk factors in a relatively short period of time. This study was retrospective, as data collection involved tracing past events through medical records and interviews.

b. Location and Time of Research

This research was conducted in healthcare facilities, such as hospitals or community health centers, that have delivery data. The location was selected based on the following considerations:

- 1) Availability of complete medical record data
- 2) The number of cases of premature birth is quite high
- 3) Ease of access for researchers

The research period was carried out for $\pm 1-2$ months, including the preparation, data collection, processing and data analysis stages.

c. Population and Sample

1) Population:

All mothers who gave birth in health facilities during the study period.

2) Sample:

A total of 120 respondents, consisting of:

- a) 60 case groups: mothers who experienced premature labor (<37 weeks)
- b) 60 control group: mothers who gave birth at full term (≥ 37 weeks)

The sampling technique uses purposive sampling, namely selecting samples based on certain predetermined criteria.

a) Inclusion criteria (cases):

- Mother with premature labor
- Have complete medical record data
- Willing to be a respondent





b) Inclusion criteria (control):

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- Mothers with normal delivery (term)

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- No serious complications
 - Willing to be a respondent
- c) Exclusion criteria :
- Incomplete medical record data
 - Mothers with severe complications who cannot be interviewed

The number of samples has met the minimum requirements for logistic regression analysis.

d. Research Variables

1) Dependent variable (bound):

a) Premature birth (yes/no)

2) **Independent (free) variables:**

a) Maternal age (at risk/not at risk)

b) Nutritional status (good/poor)

c) History of illness during pregnancy (yes/no)

d) Frequency of antenatal care (ANC) visits (routine/non-routine)

3) **Operational Definition**

a) Preterm labor: labor that occurs before 37 weeks of gestation

b) Age at risk: <20 years or >35 years

c) Nutritional status: measured based on body mass index (BMI) or MUAC

d) Medical history: presence of diseases such as hypertension, anemia, or infection during pregnancy

e) Non-routine ANC: visits less than the minimum standard (≥ 4 times during pregnancy)

e. Research Instruments

The instruments used in this study include:

- 1) Medical record data , to obtain information related to gestational age, medical history, and delivery outcomes
- 2) Structured questionnaire , to gather additional data such as ANC history and socio-economic conditions

The questionnaire instrument has gone through:

- 1) Validity test , to ensure the suitability of the items with the variables
- 2) Reliability test , using Cronbach's Alpha ($\alpha > 0.70$)

f. Data collection technique

Data collection was carried out using two methods, namely:

- 1) Documentation study:





2) Live interview:

Using a structured questionnaire with respondents to complete data that is not available in medical records.

Data collection steps:

- a) Managing research permits
- b) Identify respondents according to criteria
- c) Providing research explanation
- d) informed consent consent)
- e) Conducting interviews and filling out questionnaires
- f) Checking data completeness

g. Data Analysis Techniques

Data analysis is carried out using statistical software (e.g. SPSS) through several stages:

1) Univariate Analysis

To describe the frequency and percentage distribution of each variable.

2) Bivariate Analysis

Using the chi-square test to determine the relationship between independent and dependent variables.

Criteria: $p < 0.05 =$ significant

3) Multivariate Analysis

Using logistic regression to determine the dominant factors that influence the incidence of premature birth.

a) Interpretation:

- $OR > 1 \rightarrow$ increases risk
- $p < 0.05 \rightarrow$ significant

b) Model Feasibility Test

To ensure the regression model is suitable for use, the following is done:

- Hosmer-Lemeshow test (goodness of fit)
- Multicollinearity test
- Model significance test (Omnibus test)

h. Research Ethics

This research pays attention to the principles of research ethics, namely:

- 1) Informed consent (respondent's consent)
- 2) Confidentiality of respondent data
- 3) Anonymity (without listing identity)
- 4) Non- maleficence (does not harm the respondent)





3. RESULTS AND DISCUSSION

a. Results

This study aims to analyze the determinants of preterm birth in pregnant women using a *case-control approach*. The variables studied include maternal age, nutritional status, medical history, and frequency of antenatal care (ANC) visits.

1) Respondent Characteristics

Variables	Cases (n=60)	Control (n=60)	Total (%)
Age at risk	35	20	45.8
Age is not a risk factor	25	40	54.2
Malnutrition	30	18	40.0
Good nutrition	30	42	60.0
ANC is not routine	40	15	45.8
Routine ANC	20	45	54.2

The table above shows that the proportion of mothers at risk, with low nutritional status, and irregular ANC visits was higher in the case group than in the control group. This suggests that these factors play a role in increasing the risk of preterm birth.

This distribution also shows that health service factors (ANC) have quite striking differences between the case and control groups, which indicates an important role in preventing pregnancy complications.

2) Analysis of Determinants of Premature Delivery

Variables	OR	p- value
Age at risk	2.2	0.01
Malnutrition status	1.8	0.03
Medical history	2.5	0.02
ANC is not routine	3.5	0,000

The results of the logistic regression analysis showed that all variables had a significant influence on the incidence of preterm birth ($p < 0.05$). Variables with Odds values The highest ratio (OR) is the frequency of ANC, which shows that mothers with





b. Discussion

1) The Influence of Antenatal Care Frequency (Dominant Factor)

The frequency of ANC visits was the most dominant factor in this study. Pregnant women who do not attend ANC regularly have a significantly higher risk of preterm birth.

ANC plays a crucial role in early detection of pregnancy complications, such as hypertension, infections, and fetal growth disorders. Irregular visits can lead to delays in addressing health issues, increasing the risk of preterm labor.

ANC also serves as a means of educating pregnant women about diet, rest, and pregnancy warning signs. Lack of ANC visits results in mothers not receiving sufficient information to maintain a healthy pregnancy.

2) The Effect of Maternal Age on Premature Birth

The results of the study showed that the age of mothers at risk (<20 years or >35 years) had a significant effect on the incidence of premature birth. In women under 20 years of age, reproductive organs are not yet fully developed, making them unprepared for pregnancy and childbirth. Meanwhile, in women over 35 years of age, organ function declines and the risk of comorbidities increases.

This condition makes the mother more susceptible to pregnancy complications that can trigger premature labor.

3) The Influence of Nutritional Status

Nutritional status is a crucial factor in determining the health of both mother and fetus. Mothers with poor nutritional status are at higher risk of preterm delivery.

Nutritional deficiencies can stunt fetal growth and affect placental function. Furthermore, poor nutrition can also weaken the mother's immune system, making her more susceptible to infection.

Compared to other factors, the influence of nutritional status in this study was relatively smaller, which indicates that health service factors have a more dominant role.

4) Influence of Medical History

A history of illness during pregnancy, such as hypertension, anemia, or infection, has been shown to influence the incidence of premature birth.

These conditions can disrupt the physiological state of pregnancy and trigger premature contractions. For example, hypertension can disrupt blood flow to the





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placenta, while infections can trigger an inflammatory response that can lead to preterm labor.

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Overall, the research results indicate that preterm birth is the result of a complex interaction between biological factors and healthcare services. While factors such as age, nutrition, and medical history play a significant role, the frequency of ANC visits is the most dominant factor.

This suggests that interventions focused on improving the quality and compliance of ANC visits can have a significant impact on reducing the rate of preterm birth. Thus, prevention efforts must be carried out comprehensively through:

- 1) Improving access and quality of ANC services
- 2) Educate pregnant women about the importance of routine check-ups
- 3) Early detection and management of pregnancy complications
- 4) Improving maternal nutritional status

This integrated approach is expected to reduce the incidence of premature births and improve maternal and infant health.

4. CONCLUSION AND SUGGESTIONS

a. Conclusion

Factors that influence premature birth are maternal age, nutritional status, medical history, and frequency of ANC, with ANC being the dominant factor.

b. Suggestion

- 1) Improving ANC compliance
- 2) Education for pregnant women
- 3) Early detection of complications

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