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Assessment of Nutritional Status of Pregnant Women, Age, Occupation and Risk Factors for Pregnancy Due

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ABSTRACT
The nutritional status of pregnant women is a crucial factor that impacts the health of both the mother and fetus during pregnancy, childbirth, and the postpartum period. This study aims to describe and analyze the relationships between the nutritional status of pregnant women, pregnancy risk groups, and the demographic characteristics of pregnant women in Kupang City. The design of this study was descriptive-analytic with a quantitative approach. Data were collected from most health centers in Kupang City in March 2024 through pre-pregnancy body mass index (BMI) measurements, pregnancy risk scores based on the Poedji Rochjati Score Card (PRSC), and demographic data of pregnant women. Chi-Square and Fisher's Exact Test were used to analyze the relationship between variables. Of the 140 respondents, the majority of pregnant women had normal nutritional status (79%), were at reproductive age (69%), and belonged to the low pregnancy risk group (74%). The analysis results showed a significant relationship between the nutritional status of pregnant women and age and pregnancy risk group ($p<0.05$), but no significant relationship between nutritional status and employment status or education level. In conclusion, good nutritional status before pregnancy correlates with lower reproductive age and pregnancy risk, so it is important for promotive and preventive efforts to focus on improving nutrition from adolescence and before pregnancy.

Keywords: Nutritional Status, Pregnant Women, Body Mass Index, Pregnancy Risk Group, Reproductive Age.

ABSTRAK
Status gizi ibu hamil merupakan faktor krusial yang memengaruhi kesehatan ibu dan janin selama masa kehamilan, persalinan, dan periode nifas. Penelitian ini bertujuan untuk mendeskripsikan dan menganalisis hubungan antara status gizi ibu hamil, kelompok risiko kehamilan, dan karakteristik demografis ibu hamil di Kota Kupang. Desain penelitian ini adalah deskriptif-analitik dengan pendekatan kuantitatif. Data dikumpulkan dari sebagian besar puskesmas di Kota Kupang pada bulan Maret 2024 melalui pengukuran indeks massa tubuh (IMT) sebelum kehamilan, penilaian risiko kehamilan berdasarkan Kartu Skor Poedji Rochjati (KSPR), serta data demografis ibu hamil. Analisis hubungan antarvariabel dilakukan menggunakan uji Chi-Square dan Fisher's Exact Test. Dari 140 responden, sebagian besar ibu hamil memiliki status gizi normal (79%), berada pada usia reproduksi (69%), dan termasuk dalam kelompok risiko kehamilan rendah (74%). Hasil analisis menunjukkan adanya hubungan yang signifikan antara status gizi ibu hamil dengan usia dan kelompok risiko kehamilan ($p<0,05$), namun tidak terdapat hubungan yang signifikan antara status gizi dengan status pekerjaan maupun tingkat pendidikan. Kesimpulannya, status gizi yang baik sebelum kehamilan berkorelasi dengan usia reproduksi yang lebih rendah dan risiko kehamilan yang lebih kecil, sehingga upaya promotif dan preventif perlu difokuskan pada peningkatan status gizi sejak masa remaja dan sebelum kehamilan.

Kata Kunci: Status Gizi, Ibu Hamil, Indeks Massa Tubuh, Kelompok Risiko Kehamilan, Usia Reproduksi.

INTRODUCTION

During pregnancy, women's nutritional requirements increase significantly, as nutrients are needed not only to support maternal physiological changes throughout pregnancy, childbirth, and the postpartum period, but also to support fetal development from organogenesis to term. Adequate maternal nutrition is therefore recognized as one of the key determinants of successful pregnancy outcomes and the health of both the mother and fetus (D'Souza et al., 2019).

One of the most commonly used indicators to assess the nutritional status of pregnant women is Body Mass Index (BMI), based on the World Health Organization (WHO) classification. Previous studies have demonstrated a linear relationship between BMI and various adverse pregnancy outcomes (D'Souza et al., 2019). These findings are further supported by Krsman et al. (2023), who reported that women with a BMI ≥40 kg/m² have a higher risk of developing gestational diabetes mellitus, hypertensive disorders of pregnancy, cesarean delivery, neonatal hypoglycemia, and fetal macrosomia.

Nutritional problems among women of reproductive age are influenced by multiple factors, including inadequate or excessive macronutrient intake, micronutrient deficiencies, and underlying conditions such as infections. In addition, socioeconomic status, educational level, limited access to health and nutrition services, and persistent gender inequalities that affect decision-making related to women's health play a significant role (Kemenkes RI & UNICEF, 2023; Oh et al., 2019).

Globally, pregnancy and childbirth complications remain major contributors to maternal mortality. In 2020, approximately 800 women were estimated to die each day from preventable causes related to pregnancy and childbirth, equivalent to one maternal death every two minutes (World Health Organization, 2021). In Indonesia, a systematic review by Syairaji et al. (2024) showed that although the national maternal mortality ratio has declined from 1970 to 2022, substantial regional disparities persist, with maternal mortality in Eastern Indonesia being more than twice the national average. Pregnancy is essentially a physiological process; however, it can become high-risk when accompanied by factors such as hypertension, diabetes, infectious diseases, and abnormal nutritional status. In Indonesian midwifery practice, pregnancy risk factors are commonly identified using the Poedji Rochjati Score Card (PRSC) as a screening tool for early detection of high-risk pregnancies (Petricka et al., 2025).

In East Nusa Tenggara Province, particularly in Kupang City, maternal nutritional problems remain a serious public health challenge. Data from the Kupang City Health Office in 2023 reported that approximately 1,300 pregnant women experienced chronic energy deficiency (CED) (Radja, 2025). Maternal CED has been associated with various adverse health outcomes, including childhood stunting (Fitriani et al., 2020) and an increased risk of preeclampsia and eclampsia (Karemoi et al., 2020). Although national data and several local studies have highlighted the high prevalence of maternal malnutrition and maternal mortality in Eastern Indonesia, empirical evidence that systematically examines the relationship between maternal nutritional status measured using anthropometric indicators such as BMI and pregnancy risk stratification based on PRSC remains limited, particularly in Kupang City. Most existing studies address maternal nutrition or pregnancy risk separately, thereby failing to provide a comprehensive understanding of how nutritional status contributes to pregnancy risk stratification in midwifery care. Several reviews have concluded that maternal nutrition influences various pregnancy outcomes, yet they often focus on a single aspect (e.g., birth weight, gestational diabetes mellitus, or preterm birth) without integrating multiple dimensions of pregnancy risk, underscoring the need for broader and more comprehensive risk screening models in clinical practice (Alamri & Abdeen, 2022; Koletzko et al., 2019).

Based on these considerations, this study aims to analyze the relationship between the nutritional status of pregnant women, as measured by body mass index, and pregnancy risk stratification using the Poedji Rochjati Score Card (PRSC) in the context of midwifery services in Eastern Indonesia.

RESEARCH METHODS

This study employed a descriptive-analytic design with a cross-sectional approach to describe the nutritional status of pregnant women and to analyze its association with pregnancy risk groups and maternal characteristics. The study population consisted of all pregnant women receiving antenatal care (ANC) at health facilities in Kupang City in 2024. Sampling was conducted using total sampling or consecutive sampling, depending on the availability and completeness of eligible data.

The study utilized secondary data obtained from the Maternal and Child Health (MCH) Handbook, pregnancy registers, and medical records at the respective health facilities. Maternal nutritional status was assessed using Body Mass Index (BMI) calculated from pre-pregnancy weight and height, and classified according to World Health Organization (WHO) standards as underweight (BMI <18.5 kg/m²), normal (BMI 18.5–24.9 kg/m²), and overweight/obese (BMI ≥25.0 kg/m²).

Maternal age was categorized into high-risk age (<20 years and >35 years) and non–high-risk age (20–35 years). Pregnancy risk groups were determined using the Poedji Rochjati Score Card (PRSC), which classifies pregnant women into low risk, high risk, and very high risk categories based on the cumulative score of pregnancy related risk factors.

Data analysis was performed using univariate analysis to describe the frequency distribution of each variable and bivariate analysis to examine the relationships between maternal nutritional status, pregnancy risk groups, and maternal characteristics. The Chi-square test was applied, and when the assumptions for the Chi-square test were not met, Fisher's Exact Test was used. Statistical significance was set at $p < 0.05$.

This study received ethical approval and was conducted in accordance with ethical principles for health research, ensuring the confidentiality and anonymity of respondents' data, in compliance with the Declaration of Helsinki (World Medical Association, 2013).

RESULTS

Table 1. Characteristics of Respondents (n = 140).

Variable	Frequency (n)	Percentage (%)
Nutritional Status Based on Pre-pregnancy BMI (kg/m²)		
Underweight (<18.5)	22	16
Normal (18.5–24.9)	111	79
Overweight (25.0–29.9)	7	5
Maternal Age		
Reproductive age (20–35 years)	97	69
High-risk age (<20 or >35 years)	43	31
Pregnancy Risk Group		
Low risk	104	74
High risk	25	18
Very high risk	11	8
Employment Status		
Employed	9	6
Unemployed	131	94
Educational Background		
Primary school	18	13
Junior high school	26	19
Senior high school	79	56
University	17	12

Table 1 shows that among the 140 respondents, the majority of pregnant women had a normal nutritional status based on pre-pregnancy BMI (79%). Most respondents were in the reproductive age group (20–35 years) (69%) and belonged to the low pregnancy risk group (74%). The majority of respondents were not employed (94%), and the highest level of education attained was senior high school (56%). Overall, these findings indicate that most pregnant

women were in normal nutritional condition, within the reproductive age range, and classified as having low pregnancy risk, suggesting generally normal pregnancy conditions.

Table 2. Association Between Maternal Nutritional Status, Maternal Age, Pregnancy Risk Group, and Employment Status.

Nutritional Status	Reproductive Age	High-risk Age	Total	p-value*	Contingency Coefficient
Nutritional Status and Maternal Age					
Underweight (<18.5)	4	18	22		
Normal (18.5–24.9)	93	18	111	0.000	0.531
Overweight (25.0–29.9)	0	7	7		
Nutritional Status and Pregnancy Risk Group					
Nutritional Status	**Low Risk**	**High Risk**	**Very High Risk**	**p-value***	**Contingency Coefficient**
Underweight (<18.5)	4	14	4		
Normal (18.5–24.9)	110	1	0	0.000	0.644
Overweight (25.0–29.9)	3	3	1		
Nutritional Status and Employment Status					
Nutritional Status	**Unemployed**	**Employed**	**Total**	**p-value†**	**Contingency Coefficient**
Underweight (<18.5)	19	3	22		
Normal (18.5–24.9)	105	5	110	0.149	0.147
Overweight (25.0–29.9)	6	1	7		

** Chi-square test*
† Fisher's Exact Test

Table 2 demonstrates a significant association between maternal nutritional status and maternal age, with a moderate strength of association (p = 0.000; contingency coefficient = 0.531). In addition, the relationship between maternal nutritional status and pregnancy risk group was statistically significant and showed a strong association (p = 0.000; contingency coefficient = 0.644).

In contrast, although most respondents were not employed, the analysis using Fisher's Exact Test revealed no statistically significant association between maternal nutritional status and employment status (p = 0.149; contingency coefficient = 0.147). This finding suggests that further investigation using alternative research methods may be required to better understand this relationship.

Table 3. Association Between Maternal Nutritional Status and Educational Background.

Nutritional Status	Primary School	Junior High School	Senior High School	University	Total	p-value*	Contingency Coefficient
Underweight (<18.5)	1	5	13	3	22		
Normal (18.5–24.9)	17	20	62	12	111	0.600	0.630
Overweight (25.0-29.9)	0	1	4	2	7		

** Chi-square test*

Table 3 shows that there was no statistically significant association between maternal nutritional status and educational level (p > 0.05). The strength of the relationship between variables was interpreted using the contingency coefficient (C). Based on correlation interpretation criteria, a contingency coefficient value of <0.30 indicates a weak association, 0.30–0.59 indicates a moderate association, and ≥0.60 indicates a strong association. In this study, the contingency coefficient value was 0.63, indicating a relatively strong association; however, this relationship was not statistically significant (p > 0.05).

The analysis in this study was limited to bivariate analysis using the Chi-square test, and therefore could not control for potential confounding variables such as age, educational level, and employment status. Consequently, the findings represent initial associations between variables rather than statistically controlled relationships.

DISCUSSION

Maternal nutritional status is a crucial determinant of pregnancy outcomes, as it plays a vital role in supporting fetal growth and development and reducing the risk of obstetric complications. Based on the findings of this study, the majority of respondents had a normal nutritional status before pregnancy, were within the healthy reproductive age range (20–35 years), and were classified as having low-risk pregnancies. This profile indicates that most pregnant women in the study population were in relatively stable physiological conditions, which may contribute to a lower risk of pregnancy-related complications. The predominance of normal pre-pregnancy nutritional status among respondents is consistent with the recommendations of the Institute of Medicine, which emphasize that pre-pregnancy BMI serves as the primary basis for determining optimal gestational weight gain (Rasmussen et al., 2009).

This condition is particularly important because gestational weight gain outside BMI-based recommendations has been shown to be associated with an increased risk of adverse pregnancy outcomes for both mothers and infants (Goldstein et al., 2017). These findings suggest that most respondents entered pregnancy with adequate nutritional reserves, which is essential for supporting maternal and fetal health throughout gestation.

The analysis also revealed a tendency toward an association between normal nutritional status and maternal age within the healthy reproductive range. Pregnant women aged 20–35 years are generally in an optimal biological phase for pregnancy, characterized by more stable metabolic balance and nutritional requirements compared to adolescents or older women. This physiological advantage supports more adequate fulfillment of maternal and fetal nutritional needs during pregnancy. These findings are in line with previous studies indicating that maternal malnutrition, particularly among adolescents and during late pregnancy, is associated with impaired fetal growth, low birth weight, and preterm birth. Conversely, excessive nutritional status has been shown to increase the risk of gestational diabetes mellitus, hypertension, and macrosomia (Song et al., 2022), as well as preterm birth and cesarean delivery (National Academies of Sciences, Engineering, and Medicine, 2021).

In this study, the proportion of respondents with overweight or excessive nutritional status was relatively small. This condition may be related to the social and cultural characteristics of the population in Kupang City and Eastern Indonesia more broadly, where dietary patterns are still dominated by locally sourced foods with minimal processing and relatively high levels of daily physical activity, particularly among housewives. Economic factors may also limit excessive consumption of energy-dense foods, resulting in a lower prevalence of overweight among pregnant women compared to those in major urban areas in Indonesia.

Table 1 illustrates the characteristics of respondents, showing that the study population was predominantly composed of pregnant women with normal pre-pregnancy BMI, within the healthy reproductive age range (20–35 years), and classified as low-risk pregnancies. This profile suggests that most respondents were in stable physiological conditions, where pre-pregnancy BMI likely contributed to a lower risk of obstetric complications and served as an appropriate baseline for assessing nutritional status during pregnancy. Pregnancy is influenced by multiple maternal factors; therefore, statistical analyses were conducted to examine whether significant associations existed between maternal nutritional status and maternal risk factors, education level, and employment status, as presented in Tables 2 and 3.

The analysis presented in Table 2 demonstrates a relatively strong association between normal maternal nutritional status and maternal age. Respondents with normal nutritional status were predominantly within the reproductive age range of 20–35 years, which is considered optimal for both maternal health and fetal development, as women in this age group are more likely to meet the nutritional requirements necessary to support pregnancy. Malnutrition during pregnancy, particularly in late gestation and among adolescents, has been reported to have serious consequences for fetal growth, including intrauterine growth restriction, low birth weight,

and preterm birth. These conditions not only increase the risk of pregnancy and delivery complications but also contribute to long-term, intergenerational health impacts, posing significant challenges to improving maternal and neonatal health in developing countries.

Table 2 also indicates that normal maternal nutritional status is associated with lower maternal risk factors. In contrast, higher-than-normal nutritional status has been reported to contribute to adverse pregnancy outcomes. Overweight, obesity, and unhealthy dietary patterns prior to pregnancy are associated with poor pregnancy outcomes, including gestational diabetes, hypertension, large-for-gestational-age (LGA) infants, and macrosomia.

These findings highlight the importance of weight management and nutritional guidance before and during pregnancy, particularly among women with lower educational levels. The results are consistent with studies by Arwan and Sriyanti (2020), which demonstrated a strong association between maternal nutritional status assessed by BMI and the incidence of preeclampsia, as well as associations between maternal nutritional status, maternal age, and the occurrence of gestational diabetes mellitus (Lin et al., 2024; Song et al., 2022). Furthermore, Voerman et al. (2019) reported that higher maternal pre-pregnancy BMI and excessive gestational weight gain are associated with an increased risk of overweight and obesity in offspring, with stronger effects observed at older ages. Collectively, these findings emphasize that normal maternal nutritional status during the healthy reproductive age of 20–35 years is associated with lower pregnancy risk, underscoring the urgency of strengthening pre-pregnancy BMI screening, continuous nutritional monitoring, and integrated nutritional counseling within Antenatal Care (ANC) services and Maternal and Child Health (KIA) programs as key strategies to prevent pregnancy complications and improve maternal and child health outcomes in Indonesia.

Table 3 shows no significant association between maternal nutritional status and educational background. Maternal education does not always directly correlate with nutritional status, although Goldstein et al. (2017) noted that younger pregnant women, those with lower educational levels, or those who do not adhere to general health advice tend to be at higher risk of inadequate nutritional intake. While education is often assumed to reflect knowledge, formal education does not necessarily correspond to nutrition-related knowledge among pregnant women. A woman may have a high educational background but limited understanding of appropriate nutritional needs during pregnancy, unless her education is specifically health-related. These findings suggest that practical and applicable nutritional knowledge plays a more decisive role in determining maternal and child nutritional status than formal education alone, as formal education does not guarantee appropriate understanding or implementation of adequate nutritional practices during pregnancy (Appoh & Krekling, 2005).

The study further emphasizes that interventions aimed at improving maternal nutritional status should focus on strengthening contextual, practical, and continuous nutrition education through antenatal services rather than relying solely on formal educational attainment. These findings reinforce the importance of enhancing practical and context-based nutrition education through KIA services, ANC, and Posyandu as primary strategies for improving maternal nutritional status. Economic factors and access to food appear to play a more dominant role in determining nutritional adequacy among pregnant women, as reported by Armini, Kusumaningrum, and Hidayati (2020), who suggested that the low proportion of overweight pregnant women may be influenced by contextual factors such as dietary patterns and physical activity, which warrant further investigation in future studies.

Pre-pregnancy BMI measurement should be integrated into routine health screening for women of reproductive age at primary healthcare facilities. In addition, nutritional counseling and weight monitoring during pregnancy should be prioritized for women outside the healthy reproductive age range (≤19 years and ≥35 years), as these groups are more vulnerable to pregnancy complications. The utilization of the Poedji Rochjati Score Card (PRSC) as a pregnancy risk screening tool should also be optimized by integrating assessments of obstetric risk and maternal nutritional status, allowing for more comprehensive risk detection. Furthermore, nutrition education for pregnant women should be developed in an applied and contextual manner through ANC services, Maternal and Child Health (KIA) programs, and Posyandu, with an emphasis on daily nutritional practices rather than solely on formal educational levels.

This study has several limitations. First, the cross-sectional design limits the ability to assess causal relationships between maternal nutritional status and pregnancy risk. Second, pre-pregnancy BMI data were partially obtained from records and participant recall, which may introduce recall bias. Third, the distribution of respondents across nutritional status categories was unbalanced, with a relatively small proportion of overweight pregnant women, potentially affecting the statistical power of the analysis. Additionally, this study did not control for other confounding factors such as dietary intake, socioeconomic status, and access to healthcare services through multivariate analysis; therefore, the findings should be interpreted with caution.

CONCLUSION

Based on the analysis of pregnant women in Kupang City, the majority of respondents had a normal nutritional status, were within the healthy reproductive age range, and were classified as having low pregnancy risk. Bivariate analysis demonstrated that maternal nutritional status was significantly associated with maternal age and pregnancy risk category, while no significant association was found with educational level or employment status. These findings indicate that reproductive age and pre-pregnancy nutritional status are closely related to pregnancy risk. Therefore, pre-pregnancy BMI screening and comprehensive pregnancy risk assessment should be prioritized in antenatal care services, particularly for women who are outside the healthy reproductive age range.

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