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NUTRITIONAL STATUS PROFILE OF WOMEN OF REPRODUCTIVE AGE BASED ON ANTHROPOMETRIC INDICATORS

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ABSTRACT
Nutritional status reflects the balance between nutritional needs and intake, which is crucial for the health of women of reproductive age, as it directly affects reproductive function, pregnancy, and overall family well-being. This study aimed to accurately assess their nutritional status using anthropometric indicators as an initial step to prevent metabolic disease risks in women of reproductive age. This was a descriptive study with a cross-sectional design conducted from November 2024 to January 2025. The population consisted of all women of reproductive age (WRA) with total of 45 respondents were selected using purposive sampling. Data were collected through direct observation using a checklist that included demographic characteristics and anthropometric measurements. The data were analyzed univariately and classified based on WHO standards to determine categories of undernutrition, normal, overweight, and central obesity. Results were presented in tables, charts, and descriptive narratives. Most women of reproductive age (WRA) were in the productive age range of 21–35 years, with the majority having a senior high school education and working as employees or laborers. Nutritional status, based on BMI and MUAC, was predominantly in the normal category; however, waist circumference and waist-to-hip ratio (WHR) measurements indicated a high prevalence of central obesity among the WRA. All respondents had a WHR $\geqslant$ 0.85, indicating a high risk of non-communicable diseases such as hypertension and type 2 diabetes. This study assessed the nutritional status of women of reproductive age using anthropometric indicators such as BMI, MUAC, waist circumference, and WHR. While most had normal nutritional status, there was a high prevalence of central obesity, which poses a risk for non-communicable diseases like hypertension and diabetes.

Keywords: anthropometry nutritional status; metabolic syndrome; obesity; women of reproductive age

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INTRODUCTION

Nutritional status is defined as the balance between nutritional needs and the intake received by the body (Sunu et al., 2024). Eating habits and food intake are key factors in assessing a person's nutritional status (Bathla et al., 2018). The nutritional status of women of reproductive age (WRA) is an important indicator for determining the health and well-being of a population, as well as individual quality of life, and serves as a critical component in the healthcare system (Kandel et al., 2024). Women aged 15 to 49 years play a strategic role in reproductive processes and maintaining family health (Bidang Penelitian dan Pengembangan Kesehatan, 2019). making good nutritional status in this group vital due to its direct impact on maternal health, pregnancy outcomes, and the growth and development of children.

Inadequate nutrient intake, especially in women, can lead to various health problems both in the short and long term. In the short term, malnutrition may cause issues such as chronic energy deficiency, hormonal imbalances, and obesity. In the long term, particularly during pregnancy, poor nutrition can result in serious complications including intrauterine growth restriction (IUGR), low birth weight (LBW), premature birth, anemia, malnutrition, other

pregnancy-related disorders, and even increased risks of fetal and maternal mortality (Acharya et al., 2017; Sunu et al., 2024).

Efforts to address malnutrition remain a priority and serve as key indicators for achieving the Millennium Development Goals (MDGs) and Sustainable Development Goals (SDGs). However, overnutrition is gradually emerging as a new public health issue. Currently, malnutrition includes both undernutrition and overnutrition of macronutrients and micronutrients. The World Health Organization (WHO) reports that one in eight people worldwide is now living with obesity. Globally, the prevalence of adult obesity has more than doubled since 1990, with an estimated 2.5 billion adults aged 18 and over classified as overweight, including about 890 million who are obese. Overall, 43% of adults are overweight, and 16% fall into the obesity category (World Health Organization, 2025).

The prevalence of obesity among adults in Indonesia has shown a significant upward trend over the past decade. According to Basic Health Research (Riskesdas) data, obesity rates increased from 18.8% in 2007 to 31.0% in 2018. (Riskesdas 2007, 2013, dan 2018). Furthermore, data from the 2023 Indonesian Health Survey (SKI) indicates that the prevalence of central obesity in the population aged over 15 years reached 36.8%, with the highest proportion observed among women at 54.1% (Badan Penelitian dan Pengembangan Kesehatan, 2018). The prevalence of obesity in Central Java in 2018 reached 27.5%, with higher rates among women compared to men in the 20–24 age group. In Kudus Regency, the number of obesity cases continued to rise, increasing by 5,588 individuals in 2021 (United Nations Children's Fund (UNICEF) Indonesia, 2022).

Nutritional status assessment influences clinical outcomes in disease management and helps identify whether an individual has a nutritional imbalance that may pose a risk of health disorders. Various tools and methods are available for conducting nutritional status assessments, including dietary surveys, nutrition assessment questionnaires, anthropometric measurements, biochemical markers, as well as technological devices such as dual-energy X-ray absorptiometry (DXA) and bioelectrical impedance analysis (BIA) (Tang & Yang, 2023). Among the various measurement tools, anthropometry is the most widely used due to its cost-effectiveness and ease of application (Phadke et al., 2020). Anthropometric assessment measures physical body aspects such as weight, height, BMI, waist circumference, and skinfold thickness. Although this method is simple, it is essential because indicators like unintentional weight loss and decreased BMI are still employed as phenotypic criteria in diagnosing malnutrition according to the GLIM (Global Leadership Initiative on Malnutrition) guidelines (Tang & Yang, 2023).

Sixteen factories surround the Patiayam site area, so most residents work as factory laborers. Based on initial survey interviews with several women of reproductive age, it was found that most of them work in shifts as factory workers, which causes challenges such as limited time for physical activity and disrupted eating patterns. This study was conducted considering the dual burden of malnutrition—where individuals experience both undernutrition and overnutrition simultaneously—making malnutrition diagnosis more complex. Additionally, understanding the nutritional status of women of reproductive age is crucial for pregnancy preparation and preventing metabolic diseases caused by dietary imbalances; therefore, this research aims to assess the nutritional status of women of reproductive age in the Patiayam site area through anthropometric measurements

METHOD

This study is a descriptive cross-sectional design aimed at analyzing and portraying a condition or phenomenon in the study population through observation and data collection at a

single point in time. Conducted from November 2024 to January 2025 in the Patiayam site area, the population consisted of all women of reproductive age (WRA). A purposive sampling technique was used to select 45 WRA aged 15–49 years residing in the area based on the inclusion criteria.

Primary data were collected through direct observation of WRA in the Patiayam area. Data collection began with obtaining informed consent from respondents, followed by completing a checklist containing WRA characteristics and anthropometric measurements, including height, weight, mid-upper arm circumference (MUAC), waist circumference, abdominal circumference, and hip circumference to calculate the waist-to-hip ratio (WHR). The collected data were analyzed univariately to determine the nutritional and health status of WRA (15–49 years) in the area.Nutritional status cutoffs for WRA under 18 years were based on height and weight measurements using BMI-for-age (IMT/U) criteria: undernutrition (-3 SD to <-2 SD), standard (-2 SD to +1 SD), overweight (+1 SD to +2 SD), and obesity (> +2 SD). For WRA aged 18 and over, BMI was calculated as weight (kg) divided by height (m) squared, with classifications of undernutrition (<18.5 kg/m²), normal (18.5–24.9 kg/m²), overweight (25–29.9 kg/m²), and obesity (>30 kg/m²).

MUAC cutoffs identified a risk of chronic energy deficiency (CED) at <23.5 cm. Waist circumference indicated a low risk for metabolic disease if ≤80 cm, and a normal abdominal circumference was <80 cm. Women with high body fat distribution were identified using the waist-to-hip ratio (WHR), calculated by dividing waist circumference by hip circumference. WHR was used to detect central obesity linked to cardiovascular risk, categorized as low risk (<0.85) and high risk (≥0.85).The collected data were interpreted and presented in tables, graphs, and descriptive narratives to depict the nutritional status of women of reproductive age, followed by discussion and conclusions. The research was conducted after obtaining an ethical clearance letter from the Ethics Committee of the Faculty of Health Sciences, Satya Wacana Christian University, with the ethical approval number 7/07.12/2024111301/EA/2024.

RESULT

Table 1.
Respondent characteristics (n=45)

Respondent characteristics	f	%
Age		
< 21 tahun	2	4,4
21 – 35 tahun	31	68,8
>35 tahun	12	26,6
Education Level		
Elementary School	6	13,3
Junior High School	12	26,6
Senior High School	23	51,1
Associate Degree	1	2,2
Bachelor's Degree	3	6,6
Occupation		
Housewife	14	31,1
Seller	3	6,6
Private Employee	25	55,5
Teacher	1	2,2
Student	2	4,4

Table 2.
Anthropometric Data of Women of Reproductive Age in the Patiayam Site Area, Terban Village (n=45)

Indicators	f	%
Nutritional Status of Women of Reproductive Age (WRA) > 18 Years		
Underweight (thinness): < 18.5 kg/m²	4	8,8
Normal: 18.5 – 24.9 kg/m²	20	44,4
Overweight: 25 – 29.9 kg/m²	16	35,5
Obese: > 30 kg/m²	3	6,6
Nutritional Status of Women of Reproductive Age (WRA) < 18 Years		
Severely underweight (severe thinness): < -3 SD	0	0
Underweight (thinness): -3 SD to < -2 SD	0	0
Normal: -2 SD to +1 SD	2	4,4
Overweight: +1 SD to +2 SD	0	0
Obese: > +2 SD	0	0
Mid-Upper Arm Circumference (MUAC) (cm)		
< 23.5 cm (high risk of chronic energy deficiency)	8	17,7
≥ 23.5cm	37	82,2
Waist Circumference (cm)		
< 80 cm	7	15,5
≥ 80 cm	38	84,4
Abdominal Circumference (cm)		
< 80 cm (low risk)	21	46,6
≥ 80 cm (increased risk)	24	53,3
Waist-to-Hip Ratio (WHR)		
< 0.85 (normal)	0	0
≥ 0.85 (central obesity risk)	45	100

DISCUSSION

Respondent Characteristics

The data presented in Table 1 shows that most respondents (68.8%) are in the age range of 21–35 years, which is considered the productive age for women and is often associated with readiness for pregnancy. Studies indicate that young pregnant women under 18 years old are at a higher risk of poor nutritional status due to the additional demands of pregnancy. In contrast, women over 35 years old are less likely to experience undernutrition but face other health risks such as gestational diabetes, hypertension, and preeclampsia (Workicho et al., 2020) (Kurniawati et al., 2025). The highest education level for most respondents was senior high school graduates (51.1%). Research in Morocco found that women with lower education levels had twice the prevalence of obesity compared to those with higher education (Manoussi et al., 2024). Other studies also suggest that individuals with higher education tend to choose healthier foods than those with lower education (Permatasari et al., 2021).Regarding occupation, most women of reproductive age worked as private employees or laborers (55.5%). Employment significantly affects dietary patterns, as people in their productive years usually have high daily activity levels, influencing their food choices. Limited time for meal preparation often leads to increased consumption of processed and fast foods. (Pertiwi et al., 2022). Moreover, occupation relates to income, which impacts the household's ability to meet nutritional needs (Negash et al., 2015).

Nutritional Status of Women of Reproductive Age

Research related to the nutritional status of women of reproductive age is an essential field of study because it has implications for the health of both mother and child.The study results in Table 2, univariate tests for anthropometric measurements, show that the nutritional status of women of reproductive age under 18 years, measured based on the BMI-for-age indicator, shows normal dietary status in 20 women (44.4%). For women over 18 years old, measured based on the BMI indicator = weight (kg)/height (m)², normal nutritional status was found in 2 women (4.4%).Nutritional status in women of reproductive age is a key determinant of the risk of non-communicable diseases. Other studies have found that undernutrition and overnutrition can increase the risk of non-communicable diseases such as cardiovascular disease and diabetes mellitus (Chowdhury et al., 2023), Furthermore, malnutrition during the reproductive age is associated with adverse pregnancy outcomes such as complications during pregnancy, increased maternal and infant mortality rates, and long-term risks for the child, such as developing non-communicable diseases like heart disease, type II diabetes mellitus, and certain types of cancer in adulthood (Pullar et al., 2019), (The Lancet, 2024).

MUAC (Mid-Upper Arm Circumference) measurement is conducted to reinforce the BMI results in women of reproductive age. The results showed that the majority fell within the normal range (≥ 23.5 cm), with 38 women (82.2%) classified as normal. The upper arm circumference is an index of muscle tissue, protein, subcutaneous fat, and energy reserves, which can serve as a benchmark for the risk of Chronic Energy Deficiency (CED) due to inadequate protein availability. This deficiency can impact fetal growth and development during pregnancy. MUAC measurement is carried out to monitor the nutritional status of women of reproductive age, providing vital information for pregnant women or those planning pregnancy to prevent malnutrition in both mother and fetus (Yosefinata et al., 2022). Most waist circumference measurements averaged ≥ 80 cm in 38 women of reproductive age (84.4%). Waist circumference is specifically measured to assess abdominal fat as an indicator of central obesity, a risk factor for cardiovascular disease, metabolic syndrome, and type II diabetes (AlBaloul et al., 2024) (Jibril et al., 2022) Other research has found that in women of reproductive age, both BMI and waist circumference are independently associated with higher systolic blood pressure, indicating that both overall obesity and central obesity contribute to the risk of hypertension (Hilyatin et al., 2024).

The results of waist circumference measurements indicate that the average women of reproductive age fall into the increased risk category, with 24 individuals (53.3%) having a waist circumference ≥ 80 cm. Abdominal fat is divided into two types: intraperitoneal fat and retroperitoneal fat. Intraperitoneal fat, often called visceral fat, is around the momentum's mesentery and adipose tissue. Increased visceral fat levels are associated with elevated free fatty acid release into the portal bloodstream, which subsequently contributes to insulin resistance and various metabolic syndromes (Gadekar et al., 2020). Several studies have indicated that central obesity measurement is the most representative parameter in illustrating its association with cardiovascular disease, type 2 diabetes mellitus, breast cancer, colorectal cancer, Alzheimer’s disease, and various other conditions. (Gadekar et al., 2020; Islam et al., 2020).

The results of the Waist-to-Hip Ratio (WHR) measurements indicate that all women of reproductive age are at risk of central obesity, with a ratio ≥ 0.85 found in 45 women (100%). WHR is a commonly used parameter to assess an individual's health status and degree of obesity. Elevated WHR values have been shown to correlate with an increased risk of various serious diseases. Body fat distribution is associated with a higher risk of coronary artery disease, diabetes, etc. According to the WHO, the threshold for WHR, categorized as central obesity, is greater than 0.90 for men and greater than 0.85 for women. Overweight and obesity

are closely linked to reduced quality of life and impairments in musculoskeletal system function. Excess body weight is a significant risk factor for developing lower back pain. Women with central obesity, as assessed by waist circumference and WHR, have a higher prevalence of lower back pain, further strengthening the association between body fat distribution and the occurrence of lower back pain (Arif et al., 2022).

CONCLUSION

This study successfully assessed the nutritional status of women of reproductive age (WRA) using various anthropometric indicators such as Body Mass Index (BMI), Mid-Upper Arm Circumference (MUAC), waist circumference, and Waist-to-Hip Ratio (WHR). The results showed that most WRA had a normal nutritional status based on BMI and MUAC; however, there was a high prevalence of central obesity indicated by waist circumference $\geqslant$ 80 cm and WHR $\geqslant$ 0.85, which may signal an increased risk of non-communicable diseases such as hypertension, diabetes, and cardiovascular disorders. Additionally, respondent characteristics such as age, education, and occupation played essential roles in nutritional status. Women with higher education tended to adopt healthier dietary patterns, whereas occupations involving high physical activity often influenced dietary choices toward processed foods. Therefore, maintaining good nutritional status is critical to preventing pregnancy complications and long-term risks for both mother and child. Comprehensive nutritional monitoring and appropriate interventions are thus essential to improving the health and quality of life of women of reproductive age.A limitation of this study is its reliance on anthropometric measurements as the primary indicators without incorporating other factors such as daily dietary intake, clinical health status, or more detailed socioeconomic conditions, meaning that a comprehensive picture of nutritional status may not have been fully captured.

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