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Non-communicable disease risk factors, health knowledge, and anthropometric and blood pressure profiles among midwifery students

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Abstract

Background: The increasing prevalence of non-communicable diseases (NCDs) among young adults, particularly university students, is a growing concern due to unhealthy lifestyle behaviors.
Purpose: To describe NCD risk factors, knowledge of NCDs and healthy eating, blood pressure, waist circumference, and body weight among female midwifery students.
Methods: A descriptive quantitative study with a cross-sectional design was conducted among 151 female students in the second, fourth, and sixth semesters of the Diploma III Midwifery Program at Tanjungkarang. Stratified sampling was applied. Data were collected using questionnaires, a sphygmomanometer, measuring tape, and weighing scales. Univariate analysis was performed.
Results: The most prevalent lifestyle risk factor was infrequent physical activity (64%). Other behaviors included daily carbonated soft drink consumption (20%), fast-food consumption (18%), and sugar-sweetened beverage consumption (11%). No respondents reported smoking. Regarding knowledge, 51% had good NCD knowledge, while 69.9% demonstrated moderate knowledge of healthy eating. Most respondents had normal blood pressure (93%) and body weight (62%), whereas 51% had waist circumferences exceeding 80 cm.
Conclusion: Infrequent physical activity was the predominant lifestyle risk factor. Although most respondents had normal blood pressure and body weight, elevated waist circumference remained a concern. Continuous health education, routine NCD screening, and improved campus exercise facilities are recommended.

Keywords: Blood Pressure; Health Knowledge; Healthy Eating; Midwifery Students; Non-Communicable Diseases; Risk Factors; Waist Circumference.

INTRODUCTION

In 2023, approximately 71% of deaths worldwide were attributed to non-communicable diseases (NCDs), which accounted for approximately 36 million deaths annually (Siswanto & Lestari, 2020). Approximately 80% of these deaths occurred in low- and middle-income countries. Of all deaths worldwide, 73% were attributed to NCDs, with 35% caused by cardiovascular diseases, 12% by cancer, 6% by chronic respiratory diseases, 6% by diabetes, and 15% by other NCDs (World Health Organization, 2023). The significant increase in NCD cases places an additional burden on society because their management requires considerable time, substantial financial resources, and advanced technology (Sandra & Kusumaningrum, 2019). Although NCDs are not transmitted from person to person, they can be fatal and may reduce individuals' productivity or prevent them from participating fully in productive activities. Nevertheless, NCDs can be prevented by controlling risk factors through early detection (Wahidin, 2023).

Indonesia is currently facing a double burden of disease, comprising both communicable and non-communicable diseases (Arsyad et al., 2025). Changes in disease patterns are influenced by several factors, including environmental changes,

community behavior, demographic transitions, technological developments, economic conditions, and sociocultural changes (Arisdiani & Aisyah, 2025). The increasing burden of NCDs is associated with the growing prevalence of risk factors, including elevated blood pressure, elevated blood glucose levels, increased body mass index (BMI) or obesity, unhealthy dietary patterns, insufficient physical activity, smoking, and alcohol consumption (Purqoti et al., 2025). The 2023 Basic Health Research data indicated increases in several key NCD indicators. The prevalence of hypertension among adults aged 18 years and older increased from 25.85% to 34%, the prevalence of obesity among adults in the same age group increased from 14.8% to 21.8%, and the prevalence of smoking among adults aged 18 years and older increased from 7.2% to 9.1% (Musabikhah et al., 2023).

Non-communicable diseases have significant impacts on health, the economy, and quality of life. In terms of health, NCDs can cause serious complications and potentially life-threatening conditions (Hardianti, 2025). They can also cause disabilities, including permanent disabilities, such as stroke resulting from hypertension (Arisdiani & Aisyah, 2025). Furthermore, NCDs can reduce quality of life by necessitating regular hospital visits and limiting the ability to engage in strenuous activities. NCDs may also lead to disability, reduced physical activity, and dependence on others for daily activities (Pasha et al., 2025). In addition, NCDs can cause premature death, as seen in cases of sudden heart attacks.

The economic impact of NCDs includes an increased financial burden on the government, particularly in the management of diseases such as diabetes that may require ongoing hemodialysis due to complications (Ibrahim & Idham, 2025). NCDs can also impose substantial financial burdens on individuals, including transportation and accommodation costs for hospital visits, medication expenses, and the time required to access healthcare services. Furthermore, NCDs can contribute to poverty and increase the demand for healthcare services.

In 2024, a female midwifery student at Tanjungkarang Health Polytechnic was reported to have developed an unhealthy lifestyle characterized by excessive consumption of sugar-sweetened beverages. This behavior was associated with elevated blood glucose levels, which subsequently led to diabetic coma and ultimately resulted in her death. This incident highlights the importance of increasing awareness of NCD risk factors and promoting healthy lifestyle behaviors among university students. Based on this phenomenon, the researcher was interested in investigating the profile of NCD risk factors, knowledge of NCDs, knowledge of healthy nutrition, blood pressure, waist circumference, and body weight among female midwifery students.

RESEARCH METHOD

This study employed a descriptive quantitative method with a cross-sectional design to describe non-communicable disease (NCD) risk factors, knowledge of NCDs and healthy eating, blood pressure, waist circumference, and body weight among female midwifery students. The cross-sectional approach was used to obtain information about respondents' lifestyle characteristics, health knowledge, and physical health indicators at a single point in time.

The study population consisted of female students enrolled in the second, fourth, and sixth semesters of the Diploma III Midwifery Program at Tanjungkarang. A total of 151 respondents participated in this study. The sample size was determined using Slovin's formula, with the sampling technique employing stratified sampling to ensure representation from each academic semester. Respondents were selected according to the proportion of students in each semester.

Data were collected using several instruments, including a structured questionnaire, a sphygmomanometer, a measuring tape, and a weighing scale. The questionnaire was used to obtain information regarding respondents' demographic

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characteristics, lifestyle-related NCD risk factors, knowledge of NCDs, and knowledge of healthy eating.

Lifestyle-related risk factors assessed in this study included fruit and vegetable consumption, carbonated soft drink consumption, fast-food consumption, physical activity, smoking habits, and sugar-sweetened beverage consumption. Knowledge of NCDs and healthy eating was assessed through questionnaire responses and categorized according to the scoring criteria used in the study. Blood pressure was measured using a sphygmomanometer. Waist circumference was measured using a measuring tape, while body weight was assessed using a weighing scale. The measurements were conducted to describe respondents' physical health indicators.

Data collection was conducted by administering questionnaires to eligible respondents and performing physical measurements. Respondents were informed about the purpose and procedures of the study before participating. Completed questionnaires were checked for completeness, and physical measurement results were recorded for subsequent analysis. Data were processed through editing, coding, scoring, and tabulation. Univariate analysis was performed to describe the distribution of each study variable. Categorical data were presented as frequencies and percentages, while numerical measurements were summarized using appropriate descriptive statistics. The findings were presented in tables and descriptive narratives to provide an overview of NCD risk factors, health knowledge, blood pressure, waist circumference, and body weight among the respondents.

RESEARCH RESULTS

Table Characteristic of Respondent (N=151)

Variable	Results
Age (Mean±SD) (Years) (Range)	(18.24 ± 0.64) (16-20)
16	2/1.3
17	10/6.7
18	90/60.0
19	48/32.0
20	1/0.3
NCD Risk Factors (n/%)	
Consuming Fewer Than 5 Servings Of Fruits And Vegetables Per Day	27/12.0
Consuming Soda Every Day	3/2.0
Consuming Fast Food Every Day	28/21.0
Rarely Engaging In Physical Activity	97/86.0
Smoking	0/0
Consuming Sugary Drinks Every Day	16/30.0
Waist Circumference (n/%)	
< 80 cm	75/49.0
≥ 80 cm	76/51.0
Blood Pressure Risk Factors (n/%)	
Low	10/6.4
Normal	140/93.0
High	1/0.67

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Body Mass Index (BMI) Risk Factors (n/%)	
Underweight	23/15.0
Normal weight	94/62.0
Overweight	34/23.0
NCD Knowledge Level Non NCDs (n/%)	
Good	75/49.0
Moderate	56/37.0
Poor	20/14.0
Knowledge of Healthy Eating (n/%)	
Good	45/28.0
Moderate	70/48.0
Poor	36/24.0

The study involved 151 respondents, with a mean age of 18.24 ± 0.64 years and an age range of 16–20 years. The majority of respondents were 18 years old (90; 59.6%), followed by 19 years old (48; 31.8%). Meanwhile, 10 respondents (6.6%) were 17 years old, two (1.3%) were 16 years old, and one (0.7%) was 20 years old. Regarding non-communicable disease (NCD) risk factors, the most frequently reported behavioral risk factor was insufficient physical activity, reported by 97 respondents (86.0%). Other identified risk factors included daily fast-food consumption (28; 21.0%), insufficient fruit and vegetable consumption (27; 12.0%), daily consumption of sugary drinks (16; 30.0%), and daily soda consumption (3; 2.0%). No respondents reported smoking. Regarding waist circumference, 76 respondents (51.0%) had a waist circumference of ≥80 cm, while 75 (49.0%) had a waist circumference of less than 80 cm. For blood pressure, most respondents were classified as having normal blood pressure (140; 93.0%), followed by low blood pressure (10; 6.4%) and high blood pressure (1; 0.67%). Based on BMI classification, the majority of respondents had normal weight (94; 62.0%), followed by overweight (34; 23.0%) and underweight (23; 15.0%). In terms of NCD knowledge, 75 respondents (49.0%) demonstrated good knowledge, 56 (37.0%) had moderate knowledge, and 20 (14.0%) had poor knowledge. Regarding healthy eating knowledge, 70 respondents (48.0%) had moderate knowledge, 45 (28.0%) had good knowledge, and 36 (24.0%) had poor knowledge.

DISCUSSION

Based on the data presented in table, the most prevalent NCD risk factor was infrequent physical activity, reported by 97 respondents (86%). The least prevalent risk factor was smoking, which was reported by 0 respondents (0%). This finding is higher than that of the study by (Pradana & Winarno, 2025), which reported that 82% of respondents were physically inactive.

Regular physical activity is an important preventive measure for reducing the risk of NCDs. Engaging in regular exercise can improve the body's metabolism, strengthen cardiovascular function, and help control major risk factors, including blood pressure and blood glucose levels. Encouraging university students to develop an interest in exercise can begin with selecting light, enjoyable activities that fit their academic schedules. Although educational institutions have organized various sports competitions as annual events, the findings indicate that students' participation in regular physical activity remains low. This may be attributable to the limited role of the campus and its surrounding environment in promoting physical activity, including the lack of facilities such as jogging tracks and gym equipment. The facilities currently available include basketball courts, futsal courts, and badminton courts.

The findings indicated that more than half of the respondents had a waist circumference exceeding 80 cm. This proportion was higher than that another reported who found that 11.8% of respondents had a waist circumference above the normal range (Fitriani, 2025).

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A waist circumference exceeding 80 cm in women may indicate an accumulation of visceral fat, which surrounds internal organs such as the liver, pancreas, and heart and may contribute to various chronic diseases. Several health risks are associated with excessive visceral fat. Type 2 diabetes mellitus: Visceral fat can contribute to insulin resistance, reducing the body's ability to use glucose effectively and potentially increasing blood glucose levels. Cardiovascular disease and stroke: Inflammatory substances released by abdominal fat may contribute to blood vessel dysfunction and the development of hypertension and elevated low-density lipoprotein (LDL) cholesterol levels, thereby increasing cardiovascular risk. Certain types of cancer: Excess adipose tissue can influence estrogen production and metabolism, potentially increasing the risk of breast and endometrial cancer, particularly in postmenopausal women.

Hormonal disorders, including polycystic ovary syndrome (PCOS): Hormonal imbalances associated with insulin resistance and excess abdominal fat may contribute to PCOS, which can affect reproductive health and fertility. Fatty liver disease: Fat accumulation in the liver may increase the risk of inflammation and, in some cases, progressive liver damage, including cirrhosis. Obstructive sleep apnea: Excess body fat, particularly around the neck and upper airway, may contribute to temporary interruptions in breathing during sleep. Reducing excessive waist circumference requires sustainable lifestyle changes, including a balanced diet, appropriate energy intake, and regular physical activity. Several strategies can be implemented.

First, dietary habits should be improved by reducing added sugars and refined carbohydrates. Limiting sugar-sweetened beverages, cakes, and foods made from refined white flour may help reduce excessive energy intake and abdominal fat accumulation. Second, the intake of soluble fiber should be increased by consuming foods such as avocados, broccoli, legumes, and fruits. Third, adequate protein intake should be maintained through foods such as eggs, fish, chicken breast, tofu, and tempeh to support muscle maintenance and satiety.

Adequate water intake is also important. High-calorie beverages should be limited, and sufficient water should be consumed daily. Individual fluid requirements vary depending on body weight, physical activity, climate, and health conditions. Regular exercise, such as jogging, brisk walking, cycling, or swimming, for at least 30 minutes per day or 150 minutes per week can help improve overall health and reduce excess body fat. Strength-training exercises, including planks, crunches, and sit-ups, can strengthen the abdominal muscles, although these exercises do not selectively eliminate abdominal fat.

Healthy lifestyle management also includes obtaining sufficient sleep, ideally around 7–9 hours per night for most adults. Inadequate sleep may affect appetite-regulating hormones and contribute to weight gain. In addition, stress management through yoga, meditation, or enjoyable recreational activities may help support healthy lifestyle behaviors.

The findings showed that most respondents had blood pressure within the normal range. This result is consistent with the another study which reported that average blood pressure among adolescents was generally within the normal range, with only a small proportion experiencing elevated blood pressure or prehypertension (Isfaizah & Widyaningsih, 2021).

Hypertension in young adults can be associated with unhealthy lifestyle behaviors, including excessive salt intake, insufficient physical activity, smoking, and alcohol consumption. Excessive sodium intake can cause the body to retain fluid, increasing blood volume and potentially raising blood pressure. Young adults may also frequently consume highly processed foods, instant noodles, and ramen, which can contain substantial amounts of sodium and calories, particularly when their diets are not balanced with adequate physical activity.

Insufficient physical activity, including prolonged sedentary behavior and infrequent exercise, can contribute to reduced cardiovascular fitness and increase the risk of hypertension. Smoking is another risk factor because nicotine stimulates the cardiovascular system and can temporarily increase heart rate and blood pressure. Long-term excessive alcohol consumption can also contribute to elevated blood pressure and cardiovascular damage.

Chronic stress may increase blood pressure through the release of stress hormones that activate the sympathetic nervous system, leading to an

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increased heart rate and blood vessel constriction. Obesity and unhealthy dietary patterns, particularly diets high in sodium, added sugars, unhealthy fats, and highly processed foods, may further increase the risk of hypertension.

Inadequate sleep, particularly consistently sleeping for fewer than seven hours per night, may also be associated with an increased risk of elevated blood pressure.

University students, as young adults, may be exposed to lifestyle-related risk factors because of their academic demands and daily routines. Therefore, educational institutions should consider implementing routine blood pressure monitoring, providing health education on hypertension prevention, and referring students to appropriate healthcare facilities when elevated blood pressure is identified.

The findings showed that most respondents had a normal body weight, accounting for 62% of the study population. This proportion was higher than that another reported who found that 56.7% of adolescents had a normal BMI (Artharini, 2025).

An elevated BMI in women may be associated with several health risks, similar to those associated with an increased waist circumference. However, certain risks are particularly relevant to women's hormonal and reproductive health. Hormonal and reproductive disorders may include menstrual irregularities, reduced fertility, and PCOS. Excess body fat and insulin resistance may contribute to hormonal imbalances that affect ovulation and reproductive function. Pregnancy-related complications may include gestational diabetes mellitus, preeclampsia, and an increased likelihood of delivering a large-for-gestational-age infant or experiencing macrosomia. Excess maternal weight may also increase the likelihood of cesarean delivery and certain obstetric complications, including postpartum hemorrhage.

Chronic diseases associated with overweight and obesity include type 2 diabetes mellitus, cardiovascular disease, and stroke. Excess body fat may contribute to insulin resistance and metabolic dysfunction. Chronic inflammation and hormonal changes associated with obesity may also influence the risk of certain cancers, including breast and endometrial cancer.

Educational institutions should consider developing policies and health promotion programs that encourage healthy lifestyles among future healthcare professionals. Maintaining a healthy BMI may support physical well-being and functional capacity, which are important for providing effective healthcare services. In addition, midwifery students should receive appropriate education on the importance of maintaining a healthy body weight, adopting balanced dietary habits, and engaging in regular physical activity. These initiatives may help prepare future midwives to serve as role models for healthy living in the community.

The study findings showed that the largest proportion of respondents had a good level of knowledge about non-communicable diseases (NCDs), accounting for 42%. This proportion was higher than that reported by (Mathilda & Sadyah, 2026), who found that 12% of adolescents had a good level of knowledge about NCDs. Knowledge of NCDs is important for university students for several reasons. First, it supports early detection by helping individuals recognize early signs and risk factors for diseases such as hypertension and diabetes before these conditions become more severe. Second, knowledge provides a foundation for adopting healthy lifestyle behaviors, including smoking cessation, regular physical activity, and maintaining a balanced diet. Third, it supports the prevention of complications by helping reduce the risk of disability and premature death associated with cardiovascular diseases and stroke.

Educational institutions have a responsibility to provide health education to students through various strategies, including health education sessions, the use of official educational media such as Instagram, routine health check-ups, smoking prevention policies, and the promotion of regular physical activity. Early detection programs should also include blood pressure and blood glucose measurements, as well as body mass index (BMI) assessments, to help students better understand their health status.

The study findings showed that the largest proportion of respondents had a moderate level of knowledge about healthy eating, comprising 70 respondents (40%). This proportion was lower than the proportion reported in another study by conducted in Tulang Bawang Regency, Lampung, which found

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that 66% of adolescents had a good level of knowledge about food and nutrition (Dewanti et al., 2023). This difference may be attributable to variations in the classification criteria used, as the previous study reportedly categorized knowledge into only two levels: good and poor. Healthy eating provides several important benefits. First, it supplies energy, as carbohydrates, proteins, and other essential nutrients provide the fuel required for metabolism and daily activities. Second, it supports immune function, as vitamins such as vitamins A, C, and E, along with minerals such as zinc and selenium, contribute to the body's defense against infections. Third, a balanced diet that is low in added sugars, sodium, and saturated fats can help reduce the risk of chronic diseases, including diabetes, hypertension, and cardiovascular disease. Fourth, consuming fiber-rich foods helps regulate appetite and maintain a healthy body weight. Fifth, nutrients such as omega-3 fatty acids and B vitamins support brain function, concentration, memory, and mental well-being. Adequate nutritional knowledge can support positive attitudes and behaviors toward healthy eating, which may help prevent obesity and other metabolic disorders. Therefore, educational institutions should strengthen nutrition education programs for university students to encourage informed dietary choices and healthier eating habits.

CONCLUSION

The most prevalent lifestyle-related risk factor among the respondents was infrequent physical activity. Regarding knowledge of NCDs, the most prevalent category was moderate knowledge, while knowledge of healthy eating was also predominantly classified as moderate. In terms of physical health indicators, most respondents had normal blood pressure, more than half had a waist circumference exceeding 80 cm, and the majority had a normal body weight.

SUGGESTION

Educational institutions should provide continuous education on NCD prevention, conduct regular NCD screening, and improve access to healthcare services on campus through existing campus health clinics. In addition, institutions should provide more sports and exercise facilities in and around the campus to encourage students to engage in regular physical activity and adopt healthier lifestyles.

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