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Early Screening of Non-Communicable Diseases and Risk Factors in the Poltekkes Tanjungkarang Academic Community

Efa Trisna[1], Faidana Yaumil Syifa[2], Hadeci Lovenda Putri[3], Wahyu Dwi Ari Wibowo[4]
[1,2,3]Jurusan Keperawatan, Poltekkes Kemenkes Tanjungkarang
[4]Jurusan Keperawatan, Poltekkes Kemenkes Palembang
Email: efatrisna@poltekkes-tjk.ac.id, faidana@poltekkes-tjk.ac.id, hadeci@poltekkes-tjk.ac.id,
wahyudwi74@poltekkespakembang.ac.id

Article Info	ABSTRACT
	Screening plays a vital role in the early detection and prevention of non-communicable diseases (NCDs), which remain one of the leading causes of global morbidity and mortality. According to the 2023 Indonesian Health Survey (SKI), the most prevalent NCDs include asthma, cancer, diabetes mellitus, heart disease, hypertension, stroke, and chronic kidney disease. These conditions are primarily caused by unhealthy lifestyles, such as physical inactivity, poor dietary habits, and excessive tobacco and alcohol consumption, leading to elevated blood pressure, cholesterol, blood glucose, and obesity. This study aimed to assess the risk factors associated with NCDs through screening among the academic population of Poltekkes Tanjungkarang. Methods: A quantitative research design with a cross-sectional approach was applied. The study involved 100 respondents selected using purposive sampling based on inclusion and exclusion criteria. Data were collected through early detection screenings, including measurements of blood pressure, body mass index (BMI), blood glucose, cholesterol, and dietary assessment. Results: The screening results showed that 90% of respondents had normal blood pressure, 80% were at risk based on BMI, 90% had normal blood glucose, 88% had normal cholesterol, and 56% were at risk due to poor diet. Conclusion: Most respondents demonstrated normal blood pressure, glucose, and cholesterol levels; however, BMI and dietary patterns were identified as major risk factors for NCDs. These findings emphasize the importance of continuous screening and health promotion programs to prevent NCD-related complications within the academic community.

Corresponding Author:
Efa Trisa,
Jurusan Keperawatan, Poltekkes Kemenkes Tanjungkarang
Jl. Soekarno Hatta No.6 Bandar Lampung
Email: efatrisna@poltekkes-tjk.ac.id

1. INTRODUCTION

One of the key pillars of health transformation is the implementation of early detection strategies, which serve as a fundamental aspect of disease prevention and health promotion [1]. Early detection is a preventive action aimed at identifying potential health problems before they progress to more severe stages, thereby reducing morbidity and mortality rates. This proactive approach is aligned with the broader goals of global health systems that emphasize disease prevention, health promotion, and community empowerment rather than focusing solely on curative services.

Among the leading contributors to global mortality are non-communicable diseases (NCDs), which continue to impose a substantial burden on healthcare systems and economies worldwide. NCDs are often referred to as catastrophic diseases due to their severe, long-term impact on individuals' quality of life and the significant financial costs associated with their treatment and management. According to data from the World Health Organization (WHO), approximately 43 million people worldwide died as a result of NCDs in 2021 [2]. This figure highlights the persistent and growing challenge posed by NCDs despite global advancements in healthcare and technology.

WHO data indicate that cardiovascular diseases are the leading cause of death globally, claiming around 19 million lives per year, followed by cancer (10 million deaths annually), chronic respiratory diseases (around 4 million per year), and diabetes mellitus (DM) (1.6 million per year). These diseases not only account for the majority of deaths

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but also contribute to long-term disability, reduced productivity, and increased healthcare expenditures. The majority of NCD-related deaths occur in low- and middle-income countries, where access to early screening, diagnosis, and treatment remains limited [3].

In Indonesia, NCDs have become a national public health concern. According to the 2023 Indonesian Health Survey (Survei Kesehatan Indonesia/SKI), the most prevalent NCDs include asthma, cancer, diabetes mellitus (DM), heart disease, hypertension, stroke, and chronic kidney disease [4]. These conditions collectively represent a major portion of the disease burden in the country, affecting millions of Indonesians across different age groups.

In the province of Lampung, several NCDs are ranked among the highest in Indonesia. The prevalence of asthma in Lampung reaches 1.4%, placing it within the top ten provinces nationally. Similarly, cancer ranks among the top ten with a prevalence of 1.2%, while diabetes mellitus (DM) also affects 1.2% of the population. Heart disease accounts for 0.58% of cases in the province, whereas hypertension affects 7.4%, ranking Lampung as the twelfth-highest province in Indonesia. Stroke prevalence is also notably high, with 7.9%, positioning Lampung among the top ten provinces with the highest number of stroke cases. Alarmingly, chronic kidney disease affects approximately 30% of the population in Lampung, the highest percentage in Indonesia [4]. These statistics illustrate the urgent need for comprehensive NCD prevention and control programs at the regional level.

Unlike infectious diseases, non-communicable diseases are not transmitted through microorganisms or person-to-person contact. Instead, they emerge primarily due to unhealthy lifestyle behaviors and modifiable risk factors [5]. These include physical inactivity, poor dietary habits, tobacco use, and excessive alcohol consumption. Such behaviors contribute to metabolic and physiological changes such as elevated blood pressure, high cholesterol, hyperglycemia, and obesity, all of which are precursors to NCDs [6].

Furthermore, the urbanization and modernization of lifestyles have exacerbated these risk factors. Increased sedentary behavior, reliance on processed foods high in fat, salt, and sugar, and exposure to environmental pollutants have significantly contributed to the rising trend of NCDs in developing countries, including Indonesia. These conditions are often compounded by limited public awareness of preventive health behaviors, insufficient screening programs, and disparities in access to healthcare facilities [7].

To address this challenge, health systems must emphasize early detection and routine screening programs, which enable individuals to identify risk factors and early signs of disease before complications arise. Such initiatives should be integrated into primary healthcare services, ensuring that screening for hypertension, diabetes, cancer, and other chronic diseases becomes a routine component of community health care. The transformation of Indonesia's health system, therefore, must prioritize preventive and promotive approaches that empower individuals to take an active role in maintaining their health [8].

Early detection, combined with lifestyle modification and public health education, represents a cost-effective strategy to curb the rising prevalence of NCDs. When implemented effectively, it not only improves health outcomes but also reduces the financial strain on healthcare systems, particularly in resource-limited settings. Thus, strengthening early detection mechanisms is not merely a medical necessity but also a strategic investment in the nation's human capital and sustainable development.

2. RESEARCH METHOD

This study is a quantitative research employing a cross-sectional approach. The population of this study consisted of the academic community of Poltekkes Tanjungkarang, with a sample size of 100 respondents. The sampling technique used was purposive sampling, with the following inclusion criteria: (1) respondents aged over 30 years, (2) having a family history of non-communicable diseases (NCDs), and (3) having been exposed to information regarding NCDs. The exclusion criteria included: (1) respondents who were absent during the early detection activity, and (2) those who had comorbid diseases.

The research instrument utilized in this study was a physical examination tool. Data analysis was conducted using univariate analysis to determine the frequency distribution (f) and percentage (%) of variables such as gender, blood pressure, body mass index (BMI), blood glucose, cholesterol levels, and dietary patterns.

3. RESULTS AND DISCUSSION
3.1. Characteristics of Respondents

Table 1. Frequency Distribution of Respondents by Sex

Sex	Frequency (n)	Percentage (%)
Male	30	30
Female	70	70
Total	**100**	**100**

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Table 1 shows that the majority of respondents were female (70%), while male respondents accounted for 30% of the total sample. This indicates that female participation in this study was higher compared to males, which may reflect the demographic composition of the academic community or greater health awareness among female respondents.

An increase in blood pressure (hypertension) is one of the leading causes of non-communicable diseases (NCDs) worldwide. Hypertension is often referred to as a "silent killer", with a prevalence of 36% in Indonesia [9]. It serves as a major gateway to cardiovascular diseases. According to Manongga et al. (2024), there are gender-based differences in hypertension occurrence: men tend to develop hypertension at a younger age, while women are more likely to experience it after menopause [10]. Another contributing factor is family history, where individuals with hypertensive relatives are more prone to the same condition. Hypertension can lead to severe complications such as heart disease, stroke, and kidney failure [11].

The results of the current early detection showed that 10% of respondents were at risk of hypertension, which may be influenced by the fact that the majority of respondents were women who had not yet entered menopause. However, this does not eliminate the potential risk of developing NCDs among female respondents; therefore, routine early screening remains essential to help maintain blood pressure within the normal range.

3.2. Univariate Analysis

Table 2. Frequency Distribution of Respondents Based on Body Mass Index (BMI)

Category	Frequency (n)	Percentage (%)
At risk	10	10
Not at risk	90	90
Total	100	100

Table 2 demonstrates that most respondents (90%) were not at risk based on their Body Mass Index (BMI), while 10% were categorized as at risk. This finding suggests that the majority of the respondents maintained a healthy weight status, which can serve as a protective factor against non-communicable diseases (NCDs).

According to Nugrahaeni et al. (2023), both age and BMI are significantly associated with elevated systolic blood pressure and increased blood glucose levels. Uncontrolled BMI can lead to metabolic disorders and greater susceptibility to NCDs [12].

Overweight and obesity often result from excessive food intake, lack of physical activity, and prolonged sedentary work (Paraqleta & Nur et al., 2022). In this study, 80% of respondents were identified as being at risk for NCDs, largely due to insufficient physical activity—many participants work 8–9 hours per day, leaving little time for exercise. According to Kusumo (2020), the recommended level of physical activity is 3–5 times per week for at least 30 minutes per session. These findings reinforce the role of physical activity in maintaining a healthy BMI. Therefore, it is important to design efficient and feasible exercise routines suitable for individuals with limited time, particularly professionals or academic staff [13].

Table 3. Frequency Distribution of Respondents Based on Blood Glucose Levels

Category	Frequency (n)	Percentage (%)
At risk	10	10
Not at risk	90	90
Total	100	100

Table 3 indicates that 90% of respondents had normal blood glucose levels and were therefore not at risk, while 10% showed elevated glucose levels, placing them in the at-risk category. This finding highlights the importance of regular blood glucose screening as part of early detection for metabolic disorders such as diabetes mellitus. Hyperglycemia, or high blood glucose, is a key characteristic of diabetes mellitus (DM), a chronic disease categorized into Type 1 (childhood-onset) and Type 2 (lifestyle-related) diabetes [14].

Several factors influence the occurrence of diabetes mellitus, including age, BMI, family history, education level, and sex [15]. Older adults are more prone to diabetes due to a decline in insulin sensitivity, while being overweight (high BMI) also increases the risk due to poor diet and insufficient physical activity. Excessive consumption of carbohydrates and sugar overwhelms the pancreas, reducing its ability to produce insulin—the hormone responsible for lowering blood glucose.

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Males are generally considered more prone to diabetes due to X-chromosome–related factors, although some studies have found no significant relationship between diabetes and gender. Higher education levels may contribute to better dietary control and healthier lifestyle choices. The present study's finding—that 90% of respondents were not at risk for diabetes—may be attributed to the fact that most respondents had a minimum education level of undergraduate degree, which supports better health literacy and disease prevention behaviors.

Table 4. Frequency Distribution of Respondents Based on Cholesterol Levels

Category	Frequency (n)	Percentage (%)
At risk	12	12
Not at risk	88	88
Total	100	100

Table 4 shows that 12% of respondents were classified as at risk based on their cholesterol levels, while the remaining 88% were not at risk. Elevated cholesterol is a major risk factor for cardiovascular disease; therefore, these results suggest that a small portion of respondents may require further monitoring or lifestyle modifications to prevent future complications.

Elevated cholesterol is strongly associated with an increased risk of heart disease and stroke [16]. Major risk factors contributing to high cholesterol include diets rich in saturated fats, unhealthy lifestyle habits (such as smoking), low physical activity, and biological sex [17]. Saturated fat intake can lead to lipid buildup in the arteries, which increases vascular resistance and results in hypertension as the heart works harder to circulate blood. Conversely, regular physical activity and balanced nutrition can lower levels of low-density lipoprotein (LDL), or "bad cholesterol," by reducing fatty plaque accumulation in blood vessels.

Women generally have lower cholesterol levels than men before menopause, but post-menopausal women experience a rise in cholesterol due to decreased estrogen levels, a hormone that helps regulate lipid metabolism. The results of this study, showing 88% of respondents with normal cholesterol levels, may be explained by the fact that most participants were premenopausal women, hence benefiting from the protective role of estrogen.

Table 5. Frequency Distribution of Respondents Based on Dietary Patterns

Category	Frequency (n)	Percentage (%)
At risk	56	56
Not at risk	44	44
Total	100	100

Table 5 reveals that more than half of the respondents (56%) were classified as at risk based on their dietary patterns, while 44% were not at risk. This indicates that a considerable proportion of respondents may have unhealthy eating habits, such as high consumption of fatty, salty, or sugary foods, and low intake of fruits and vegetables. Poor dietary patterns are among the key modifiable risk factors contributing to the development of NCDs, emphasizing the need for targeted health education and nutritional interventions within the academic community.

Dietary habits play a crucial role in determining the risk of NCDs. According to Leviana & Agustina (2024), dietary pattern refers to the behaviors associated with food selection, portion size, and meal frequency [18]. Unbalanced or unhealthy dietary patterns can lead to obesity, blood sugar imbalance, and hypertension, which collectively contribute to NCD development. To promote better nutrition, the Indonesian Ministry of Health has replaced the traditional "Four Healthy, Five Perfect" dietary guideline with the "Isi Piringku (My Plate)" concept. This guide recommends that one meal plate should consist of carbohydrates (two-thirds of half the plate), animal and plant-based protein (one-third of half the plate), and fruits and vegetables (one-third of the remaining half) [19]. Moreover, adequate hydration (around 2 liters of water daily), timely meal patterns, and regular physical activity are emphasized.

Factors influencing dietary behavior include physical activity levels, education, socioeconomic status, cultural norms, and environmental influences. The finding that 56% of respondents were at risk suggests that many participants may have low physical activity levels and poor food selection practices, inconsistent with the "Isi Piringku" recommendations. These findings highlight the need for ongoing health education, focusing on nutritional awareness and behavior modification to prevent NCDs in the academic community.

4. CONCLUSION

Early detection of Non-Communicable Diseases (NCDs) revealed that most respondents were at low risk, although several factors such as BMI, physical activity, and diet contributed to potential NCD development. The study

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found 10% of respondents at risk of hypertension, 80% at risk due to high BMI, 90% with normal blood glucose, 88% with normal cholesterol, and 56% at risk due to poor diet. These findings emphasize the importance of regular screening, physical activity, and balanced nutrition as effective preventive strategies against NCDs.

5. ACKNOWLEDGEMENTS

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