



FACTORS ASSOCIATED WITH THE INCIDENCE OF NON-COMMUNICABLE DISEASES

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ABSTRACT

Non-communicable diseases (NCDs) are chronic diseases that are not transmitted between individuals. The course of these diseases generally progresses slowly, influenced by a combination of genetic, physiological, environmental, and behavioral factors. This study aims to analyze the relationship between lifestyle, physical activity, and exercise and the incidence of NCDs. This study used a cross-sectional approach. The study was conducted from August to September 2025 at the Ciloto Health Training Center of the Ministry of Health of the Republic of Indonesia. The population in this study was all 159 employees, and a sample of 141 respondents was selected using purposive sampling. Data were collected using a validated questionnaire with an r value in the range of 0.476-0.87 (valid) and a Cronbach's alpha value of 0.97 (reliable). Data analysis used the chi-square test. The results showed a relationship between lifestyle, physical activity, and exercise and the incidence of NCDs among BBPK Ciloto employees of the Ministry of Health of the Republic of Indonesia.

Keywords: exercise; lifestyle; non-communicable diseases; physical activity

How to cite (in APA style)

Puspasari, R., Berawi, K. N., Suharmanto, S., Karyus, A., & Sutarto, S. (2025). Factors Associated with the Incidence of Non-Communicable Diseases . Indonesian Journal of Global Health Research, 8(2), 167–174. <https://doi.org/10.37287/ijghr.v8i2.859>.

INTRODUCTION

Non-communicable diseases (NCDs) are chronic illnesses that are not spread from person to person. Their progression is usually slow and influenced by a mix of genetic, physiological, environmental, and behavioral factors (Sudayasa et al., 2020). According to the most recent data from the World Health Organization (WHO), NCDs resulted in approximately 43 million deaths globally in 2025. This number is remarkably high, indicating that three out of every four deaths (75%) worldwide, excluding those caused by pandemics, were due to NCDs, underscoring their status as the leading cause of death globally. Even more concerning, 18 million of these deaths occurred prematurely, in individuals under 70 years old (Sudayasa et al., 2020). The majority of these premature deaths (82%) occur in low- and middle-income countries. Heart and blood vessel disease is the leading cause of death from NCDs, with 19 million cases, followed by cancer (10 million cases), chronic respiratory diseases (4 million cases), and diabetes (over 2 million cases, including kidney complications) (WHO, 2025a). These four diseases together account for 80% of all premature deaths from NCDs (Nathaniel et al., 2022).

The trend of NCDs in Indonesia continues to increase annually. This increase is driven by changes in lifestyle, including unbalanced diets and an environment that does not support healthy behaviors, creating a heavy burden on society and the national health system (Defianna et al., 2021). This is relevant, as data from the Indonesian Health Survey (2023) show high prevalence of hypertension (30.8%), high cholesterol (17.5% in those aged 45–54), and coronary heart disease (0.85%) (Ministry of Health of the Republic of Indonesia, 2023). A similar situation is also found among employees of the Indonesian Ministry of Health, who should serve as role models for promoting a healthy lifestyle. As a control measure, the Indonesian Ministry of Health prioritizes recording and reporting NCDs to monitor disease trends, support data-driven policies, and optimize resource

allocation (Zakaria et al., 2022). A study using the E-Bugar system found that physical activity levels among these employees were actually low (Ervina et al., 2020).

These findings indicate that lack of physical activity is not only a problem for the general public, but also among healthcare workers with access to information and facilities. Furthermore, research by Yuningrum et al. (2021) revealed that unhealthy lifestyles, such as consuming fewer than five servings of fruit and vegetables per day and consuming fast food, are major risk factors for NCDs. These findings suggest that healthy lifestyle interventions are not optimal, despite the availability of information and awareness about the risks of NCDs (Septiyanti et al., 2020). Non-communicable diseases (NCDs) are a major obstacle to achieving the 2030 Sustainable Development Agenda targets, particularly in public health. The WHO targets a one-third reduction in NCD deaths among those aged 30–70 by 2030. However, poverty exacerbates the impact of NCDs by increasing the burden of healthcare costs. Vulnerable social groups have limited access to medical services. This situation demands the strengthening of inclusive and equitable health systems, especially for vulnerable groups (WHO, 2025b).

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METHOD

This study used a cross-sectional study design. The study was conducted at the Ciloto Health Training Center (BBPK), Ministry of Health, Republic of Indonesia, from August to September 2025. The study population was all 159 employees. Not all respondents were included in the study sample, as some respondents did not want to be included. Therefore, the sample size for this study was 141 respondents, who met the eligibility criteria. A purposive sampling technique was used to exclude 18 respondents. The independent variables in this study were lifestyle, physical activity, and exercise. The dependent variable was the incidence of non-communicable diseases (NCDs). Data were collected using a validated questionnaire with an r value in the range of 0.476-0.87 (valid) and a Cronbach's alpha value of 0.97 (reliable). Data analysis included univariate and bivariate analyses using the Chi-Square statistical test. This study received ethical approval from the Research Ethics Committee of Malahayati University Health Research Ethics Committee, issued by letter No. 500/EC/KEP-UNMAL/VII/2025, dated July 30, 2025.

RESULT

Respondent Characteristics

Based on the research results, the characteristics of respondents among BBPK Ciloto employees at the Ministry of Health of the Republic of Indonesia, based on age, were the most at-risk age (age >45 years) at 77 (54.6%), and the most common gender characteristics were female at 79 (56.0%). Meanwhile, the most common waist circumference category for men was <90 cm (31 respondents, 67.6%), and for women, it was >80 cm (65 respondents, 78.3%). The most common BMI was normal (18.5-25.0), with 76 (53.4%).

Table 1.
Respondent Characteristics

Characteristics	f	%
Age		
Not Risk	64	45,4
Risk	77	54,6
Gender		
Male	62	44,0
Female	79	56,0
Waist		
Male		
Normal (<90cm)	31	67,6
Abnormal (>90cm)	21	32,4
Female		
Normal (<80cm)	18	21,7
Abnormal (>80cm)	65	78,3
Nutritional Status		
Thin (<18,5)	2	1,4
Normal (18,5-25,0)	76	53,4
Overweight (>25,0-27,0)	22	15,4
Obese (>27,0)	41	29,8

Table 2.
Frequency Distribution of Lifestyle, Physical Activity, Exercise, Age, and Gender Among Employees of the Ciloto Health Center, Ministry of Health, Republic of Indonesia.

Variable	f	%
Life Style		
High	34	24,1
Medium	48	34,0
Low	59	41,8
Physical Activity		
High	34	24,1
Medium	37	26,2
low	70	49,6
Exercise		
Sangat aktif	15	10,6
Cukup aktif	26	18,4
Aktif	28	19,9
Tidak Aktif	72	51,1
NCD's Incidence		
No. NCD	60	42,6
NCD	81	57,4

Based on the frequency distributions shown in the tables, the following key findings were obtained: The majority of respondents at the Ciloto BBPK, Ministry of Health of the Republic of Indonesia, had a low healthy lifestyle (41.8%), followed by A moderately healthy lifestyle (34.0%) and a highly healthy lifestyle (24.1%). In terms of physical activity, the majority of respondents had low physical activity (49.6%), while 26.2% were in the moderate physical activity category and 24.1% were in the high physical activity category. Regarding exercise, most respondents were inactive (51.1%), while 19.9% were regularly active and 10.6% were very active. Based on age, most respondents were at-risk (54.6%), while 45.4% were not at-risk. Regarding gender, 56.0% of respondents were female and 44.0% were male. Finally, regarding the incidence of non-

communicable diseases (NCDs), more than half of respondents (57.4%) experienced NCDs, while 42.6% did not experience any.

Table 5.
Relationship of Lifestyle, Physical Activity, Exercise, Age, and Gender to the Incidence of Non-Communicable Diseases (NCDs) Among Employees of the Ciloto Health Center (BBPK Ciloto), Ministry of Health, Republic of Indonesia

Variable	No NCD	NCD	Total	p-value
Healthy Lifestyle				0,001
High	16 (11,3%)	18 (12,8%)	34 (24,1%)	
Medium	27 (19,1%)	21 (14,9%)	48 (34,0%)	
Low	17 (12,1%)	42 (29,8%)	59 (41,8%)	
Physical Activity				0,001
High	21 (14,9%)	13 (9,2%)	34 (24,1%)	
Medium	20 (14,2%)	17 (12,1%)	37 (26,2%)	
Low	19 (13,5%)	51 (36,2%)	70 (49,6%)	
Exercise				0,007
Very Active	8 (5,7%)	7 (5,0%)	15 (10,6%)	
Fairly Active	13 (9,2%)	13 (9,2%)	26 (18,4%)	
Active	18 (12,8%)	10 (7,1%)	28 (19,9%)	
Inactive	21 (14,9%)	51 (36,2)	72 (51,1%)	

Based on the analysis, a significant relationship was found between several lifestyle variables and the incidence of Non-Communicable Diseases (NCDs) among BBPK Ciloto employees of the Ministry of Health of the Republic of Indonesia. Respondents with a high level of healthy lifestyle were less likely to experience NCDs (p-value 0.014), indicating that the better a person's lifestyle, the lower the risk of developing NCDs. Similarly, respondents with high levels of physical activity experienced fewer NCDs. Compared to those with low or moderate activity (p-value 0.001), indicating the importance of physical activity in maintaining health.

Similar results were also seen for the exercise variable, where respondents who actively exercised had a lower incidence of NCDs than those who were inactive (p-value 0.007). In addition to behavioral factors, age and gender also significantly influence the incidence of NCDs. Respondents of at-risk age experienced more NCDs than those of non-risk age (p-value 0.000), while women tended to experience more NCDs than men (p-value 0.000). Overall, these results indicate that lifestyle, physical activity, exercise, age, and gender are interrelated factors influencing the incidence of NCDs in the workplace.

DISCUSSION

Non-Communicable Diseases (NCDs)

Non-communicable diseases (NCDs) are diseases that are not transmitted by viruses, bacteria, or vectors but are instead influenced by unhealthy lifestyles and diets. NCDs are a major burden in both developing and industrialized countries (Septiana et al., 2022). The WHO lists the five most common types of NCDs in Southeast Asia: heart disease, diabetes, cancer, COPD, and injuries. Most NCDs are degenerative, and the risk increases with age. All of these diseases share common risk factors (Indra et al., 2023).

Lifestyle

A healthy lifestyle plays a crucial role in maintaining the quality of life for individuals and society as a whole. These activities include a nutritious diet, regular physical activity, adequate sleep, and avoiding alcohol and cigarette consumption (Harahap, 2023). Research shows that a healthy lifestyle not only improves physical condition but also helps prevent chronic diseases, including hypertension (Dianita et al., 2021). In this context, clean and healthy living behaviors (PHBS) are crucial, especially within families, where mothers often serve as primary caregivers and educators

regarding health (Santoso & Sudarsih, 2021).

Physical Activity

Physical activity is bodily movement that involves skeletal muscles and increases energy expenditure. Physical activity increases energy requirements compared to when the body is at rest (Suryoadji & Nugraha, 2021). Activities such as working, sleeping, and relaxing include physical activity with varying intensities. This activity level is influenced by lifestyle, age, gender, type of activity, and daily habits. The energy used in an activity can be an indicator of its intensity (Purwanto & Winarno, 2023).

Sport

According to Webster's Dictionary (1980), sport is physical activity for pleasure or specific pursuits, such as hunting and competition. It is a structured bodily activity, involving the muscular and skeletal systems, and having a specific frequency, intensity, type, and duration. Movement is a part of life; exercise acts as both a stressor and a source of nutrition for the body. In addition to maintaining fitness, exercise effectively relieves stress and boosts the immune system. Therefore, regular exercise is highly recommended for maintaining physical and mental health (Firmansyah Dlis, 2023).

The Relationship of Lifestyle Factors to the Incidence of Non-Communicable Diseases (NCDs) Among Employees of the Ciloto Health Center (BBPK Ciloto), Ministry of Health of the Republic of Indonesia

Analysis of lifestyle variables revealed that 42 (29.8%) respondents (without NCDs) had a highly healthy lifestyle, while 27 (19.1%) respondents (without NCDs) had a moderate lifestyle. The p-value was $0.014 < 0.05$, indicating that H_a was accepted and H_0 was rejected, indicating a relationship between lifestyle and NCDs among employees of the Ciloto Health Center (BBPK Ciloto), Ministry of Health of the Republic of Indonesia. A healthy lifestyle plays a crucial role in maintaining quality of life and productivity in the modern era (Gratia & Septiani, 2014). A healthy lifestyle includes regular exercise, a balanced diet, adequate sleep, stress management, and avoiding cigarettes and alcohol (Widayati et al., 2019). Unhealthy lifestyles such as lack of exercise, stress, fast food consumption, and smoking increase the risk of NCDs (Yuningrum et al., 2021). Lack of physical activity can lower metabolic rate, which in the long term contributes to chronic health disorders (Dianita et al., 2021).

According to the researchers' analysis, based on the results of previous research, the lifestyle of employees at the Ciloto Health Center (BBPK) of the Ministry of Health of the Republic of Indonesia is influenced by lifestyle. This is confirmed by the results of the chi-square statistical test, with a p-value of 0.001, indicating a result < 0.05 . This is also confirmed by the results of the partial test (T-test), with a significance value of $0.007 < 0.05$, indicating an influence of lifestyle on the incidence of non-communicable diseases (NCDs) at the Ciloto Health Center (BBPK) of the Ministry of Health of the Republic of Indonesia. The regression results obtained an R^2 (coefficient of determination) in this study of 0.457, or 45.7%. This can be concluded that the variables lifestyle (X1), physical activity (X2), and exercise (X3) influence the incidence of NCDs. $M(Y)$ indicates that the independent variable's ability to explain the variance of the dependent variable is 45.7%. This concludes that the R-Square test results are at the "Moderate" level because they have a value above 0.19 (Lubar, 2021). Therefore, 54.3% of the variance in the dependent variable (Customer Satisfaction) can be explained by other factors.

Relationship of Physical Activity Factors to the Incidence of Non-Communicable Diseases (NCDs) Among Employees of the Ciloto Health Center (BBPK Ciloto), Ministry of Health of the Republic of Indonesia

The analysis of the physical activity variable revealed that the majority of respondents who did not

experience NCDs were highly active (42 (29.8%)), while the majority of respondents who experienced NCDs were low-to-moderate (51 (36.2%)). The p-value of $0.001 < 0.05$ indicates that H_a is accepted and H_0 is rejected, indicating a relationship between physical activity and NCDs among employees of the Ciloto Health Center (BBPK Ciloto), Ministry of Health of the Republic of Indonesia.

Physical activity is body movement that involves skeletal muscles and increases energy expenditure. Physical activity increases energy requirements compared to when the body is at rest (Suryoadji & Nugraha, 2021). Activities such as working, sleeping, and relaxing involve physical activity with varying intensities. This level of activity is influenced by lifestyle, age, gender, type of activity, and daily habits. The energy used in an activity can be an indicator of its intensity (Purwanto & Winarno, 2023). Researchers hypothesize that physical activity can influence the occurrence of non-communicable diseases (NCDs). Poor physical activity or excessive physical activity can lead to coronary heart disease. However, not all NCDs are caused by physical activity; some are influenced by other triggering factors, as explained in the study results, where 54.3% are due to other factors.

The Relationship Between Exercise and the Incidence of Non-Communicable Diseases (NCDs) Among Employees of the Ciloto Health Center (BBPK Ciloto), Ministry of Health of the Republic of Indonesia

The analysis of the exercise variable revealed that 51 (36.2%) respondents who did not experience NCDs were highly active, while 18 (12.8%) respondents who experienced NCDs were actively inactive. The p-value was $0.007 < 0.05$, indicating that H_a was accepted and H_0 was rejected, indicating a relationship between exercise and NCDs among employees of the Ciloto Health Center (BBPK Ciloto), Ministry of Health of the Republic of Indonesia. Non-communicable diseases (NCDs) are diseases that are not transmitted by viruses, bacteria, or vectors but are influenced by unhealthy lifestyles and diets. NCDs are a major burden in developing and industrialized countries (Septiana et al., 2022). The WHO lists the five most common NCDs in Southeast Asia: heart disease, diabetes, cancer, chronic obstructive pulmonary disease (COPD), and injuries. Most NCDs are degenerative, and the risk increases with age. All of these diseases share common risk factors (Indra et al., 2023).

According to researchers, NCDs are caused by inadequate or excessive exercise, resulting in prolonged fatigue or a lack of adequate exercise. Researchers believe that non-communicable diseases are not solely caused by a lack of exercise; they are also caused by genetic factors, age, as most respondents were pre-elderly and are experiencing a decline in immunity. They can also be caused by unhealthy diets, unfavorable environmental conditions, and many other factors. Non-communicable diseases are caused by various risk factors, generally related to lifestyle and the environment. The four main risk factors contributing to NCDs are tobacco use, unhealthy diet, lack of physical activity, and excessive alcohol consumption. In addition to these four main risk factors, other factors contribute to the occurrence of NCDs, including social and economic factors, environmental factors, and genetics and biology.

CONCLUSION

The results of this study indicate that age, gender, lifestyle, physical activity, and exercise are significantly associated with the incidence of non-communicable diseases (NCDs) among employees of the Ciloto Health Center (BBPK Ciloto), Ministry of Health, Republic of Indonesia. The study found a relationship between lifestyle, physical activity, and exercise with the incidence of NCDs among employees of the Ciloto Health Center (BBPK Ciloto), Ministry of Health, Republic of Indonesia.

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