The relationship between knowledge and healthy lifestyle behaviors in preventing Non-Communicable Diseases (NCDs) in the productive age group

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Abstract

Background: Non-communicable diseases (NCDs) account for nearly 74% of all global deaths. While in Indonesia prevalence among individuals of productive age reach 34.1%.
Method: This cross-sectional study examined the relationship between knowledge and healthy lifestyle behaviors in the prevention of NCDs, using purposive sampling select 112 respondents aged 19 and 50 years. The data were analyzed using the Chi-square test with a significance level of $\alpha = 0.05$."
Results: The findings indicated that most respondents were female (76.8%), had higher educated (82.1%), and were students (51.8%). Their knowledge level was mostly categorized as adequate (72.3%), where as their lifestyle practices tended to fall into the unhealthy category (42%).
Conclusion: There was no significant relationship between knowledge and healthy lifestyle behaviors (p=0.055). It is expected that non-communicable disease (NCD) prevention programs should not be limited to improving knowledge through conventional educational approaches, but should also incorporate Behavior Change Communication (BCC) or Social and Behavior Change Communication (SBCC) strategies that emphasize strengthening behavioral intentions, enhancing motivation, and fostering sustainable healthy lifestyle practices.

Keywords: Healthy Lifestyle; Knowledge; Behavior; Non-Communicable Diseases.

INTRODUCTION

Non-communicable diseases (NCDs) have emerged as a major global health threat in the 21st century, accounting for 74% of all global deaths, or more than 41 million fatalities annually[1]. The productive age group (15-64 years) experiences a substantial increase in the risk of NCDs due to modern lifestyle transformations, including unbalanced diets, minimal physical activity, and high stress levels[2]. In Indonesia, the prevalence of NCDs including hypertension, diabetes mellitus, and cardiovascular disease among productive age population reached 34.1%, indicating the urgency of comprehensive preventive interventions[3].

Health behavior determinants in the productive age population are influenced by complex cognitive factors, where health knowledge is an essential foundation in shaping preventive behavior. The *Health Belief Model and Theory of Planned Behavior* emphasize that health knowledge plays a significant role in predicting the adoption of a healthy lifestyle[4]. However, *the knowledge-behavior gap* paradox remains a complex phenomenon in public health literature. Several studies indicate that adequate knowledge levels do not always correlate linearly with the

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implementation of healthy behaviors ((5),(6)).

Previous studies have reported research heterogeneous findings regarding the relationship between knowledge and healthy lifestyle behaviors, underscoring the importance of contextual studies that account for sociocultural and demographic diversity (7) . Contradicting these findings, research(8) A study conducted in Indonesia revealed that although 67.3% of respondents possessed good knowledge about NCDs, only 42.1% consistently practiced preventive behaviors. This discrepancy underscores the need for contextual research that takes into account specific sociocultural and demographic conditions. The identified research gap includes the limited number of empirical studies examine the connection between knowledge and behavior among individuals among the productive age in Indonesian. Most previous studies have focus on elderly populations or particular disease categories, while the productive age group despite being a high-risk segment with substantial economic impact has received relatively limited scholarly attention.

The novelty of this study lies in its comprehensive approach in examining the multidimensional link between health knowledge and healthy lifestyle behaviors, covering five key NCDs categories: cardiovascular disease, diabetes mellitus, cancer, chronic obstructive pulmonary disease, and mental disorders. This study integrates the measurement assessment that include nutrition, physical activity, stress management, and routine health screening(9). Accordingly, this study aim to examine the relationship between the level of knowledge about NCDs and healthy lifestyle behaviors in preventing NCDs in the productive age population? This research question is elaborated into specific research questions: (1) What is the level of knowledge about NCDs among the productive age population? (2) What is the profile of healthy lifestyle behaviors in preventing NCDs among the productive age population? (3) Is there a correlation between knowledge and healthy lifestyle behaviors in preventing NCDs?

This study to aims to examine the relationship between knowledge of NCDs and healthy lifestyle behaviors among individuals in the productive age group. More specifically, the objectives are to include: (1) identifying the level of knowledge regarding NCDs within this age group, (2) describing healthy lifestyle practices related to NCD prevention, and (3) analyzing how knowledge and healthy lifestyle behaviors are connected. Theoretically, this study is expected to contribute to the expansion of public health literature, particularly in the area of behavioral epidemiology of NCDs among the productive age population. For health institutions, this study provides empirical data for the development of more *targeted* and *impactful* health communication and public education strategies(10) .

RESEARCH METHOD

This study applies a quantitative approach with a *cross-sectional* design to explore the relationship between knowledge and healthy lifestyle behaviors in preventing NCDs in the productive age group. Data were collected using a structured questionnaire administered to 112 respondents selected through purposive sampling. The inclusion criteria comprised individuals aged 19–50 years, classified as being of productive age, and not diagnosed with specific diseases requiring special dietary management. The exclusion criterion applied to respondents who failed to complete the questionnaire in full.

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The research instrument assessed two primary variables: the independent variable, namely the level of knowledge regarding NCD prevention, which was categorized into three levels: good (≥80), moderate (65–79), and poor (<65); and the dependent variable, healthy lifestyle behavior, classified into healthy, moderately healthy, and unhealthy practices. The questionnaire underwent validity and reliability testing, yielding Cronbach's alpha coefficients of 0.687 for knowledge, 0.680 for attitude, and 0.725 for behavior, while external reliability testing (test–retest) demonstrated reliability coefficients ranging from 0.564 to 0.683.

Data analysis was performed using the Chi-square test with a significance level of $\alpha = 0.05$ to examine the association between variables. The cross-sectional design enabled simultaneous data collection at a single point in time, providing a representative snapshot of the phenomenon under investigation without longitudinal observation (11) .

DISCUSSION

1. Respondent Characteristics

This study involved 112 respondents with diverse demographic characteristics. Table 1 presents the distribution of respondents based on various demographic categories.

Table 1. Distribution of Respondent Characteristics

Characteristics	Category	Frequency	Percentage
Age	< 19 Years	28	25
	19-30 years old	40	35.7
	31-50 years	44	39.3
Gender	Male	26	23.2
	Female	86	76.8
Education	High school	6	5.4
	Higher Education	92	82.1
	Others	14	12.5
Work	Civil Servant	22	19.6
	Students	58	51.8
	Housewife	7	6.3
	Merchant/Entrepreneur	4	3.6
	Private Employee	8	7.1
	Others	13	11.6

The demographic profile shows that the majority of respondents were in the 31-50 age group (39.3%), followed by the 19-30 age group (35.7%). The dominance of this age group indicates that the research sample represents the productive age population as targeted by the research(12) . The gender distribution shows an imbalance with a dominance of women (76.8%) compared to men (23.2%). This phenomenon can be explained by the tendency of women to exhibit higher level of health awareness, health seeking behavior, and participation in health related surveys. The respondents' education level was dominated by college graduates (82.1%), reflecting a population with a higher educational background that theoretically has better access to health information. The most common employment status was student (51.8%), followed by civil servant (19.6%), describing the socio-economic characteristics of the respondents.

This age distribution is epidemiologically relevant, as individuals in this life stage experience increased exposure to occupational stress, sedentary lifestyles, and dietary transitions, all of which contribute to elevated risk of non-communicable diseases (NCDs). Consequently, this group constitutes a critical target for preventive health interventions. Previous studies have consistently shown that women

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demonstrate higher engagement in preventive health activities, greater responsiveness to health promotion programs, and stronger motivation to seek health-related information compared to men (13).

2. Level of Knowledge about NCDs

The results of the study on respondents' knowledge level about non-communicable diseases (NCDs).

Table 2. Shows the respondents' knowledge level about NCDs

Category	Frequency	Percentage
Low	10	8.9
Sufficient	81	72.3
Good	21	18.8
Total	112	100.0

Table 2 shows varying levels of knowledge, with the most common finding being adequate, followed by good and poor. The dominant findings in this study are in line with findings on the level of knowledge about non-communicable diseases and risky behavior, with an adequate level of knowledge of 41.8% of the 146 respondents(14) . Descriptive analysis shows variability in respondents' knowledge levels regarding non-communicable disease prevention. Considering that higher education dominates the research sample at 82.1%, this should correlate with adequate access to health information(12) .

This research use simple language enabled respondents to select correct answers relatively easily by relying on everyday knowledge, particularly regarding lifestyle practices and degenerative diseases. This condition may have facilitated correct response based on lifestyle behaviors and degenerative diseases. Consequently, the high knowledge scores observed may reflect basic conceptual awareness rather than in-depth or practical comprehension. These

findings should therefore be interpreted cautiously, as they may not fully capture respondents' actual level of health literacy (15).

The Indonesian context shows a similar phenomenon where, despite the nationwide implementation of the POSBINDU program, the penetration of health information still faces various systemic barriers.(1) in his study in four Indonesian districts found that access to community-based screening programs increased knowledge (aOR: 1.4; 95% CI: 1.2-1.8), but this increase in knowledge did not automatically transform attitudes and health practices. This phenomenon underscores the complexity of *the knowledge-behavior gap* that is the focus of this study.

3. Healthy Lifestyle Behaviors in the Prevention of NCDs

Research findings on respondents' knowledge levels regarding healthy lifestyles for non-communicable diseases (NCDs).

Table 3. Shows healthy lifestyle behaviors in preventing NCDs

Category	Frequency	Percentage
Unhealthy	47	42
Fairly healthy	41	36.6
Healthy	24	21.4
Total	112	100.0

The finding showed that unhealthy lifestyle behaviors were the most frequently practiced, followed by moderately healthy behaviors, while fully healthy behaviors were the least commonly observed. The practice of healthy lifestyle behaviors in the context of NCD prevention shows a heterogeneous pattern among respondents of productive age. Although respondents have a high educational background and adequate access to information, the implementation of preventive behaviors still faces various

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challenges. Internal factors such as diet patterns, sleep quality, and body mass index, as well as external factors including the implementation *of the Health University Framework* and student perceptions, significantly influence healthy behaviors among ASEAN students(16) .

The findings(9) show that Daily fruit consumption among student is extremely low, at only 10%. While vegetable intake remains below 40% among students. Highlighting a clear disconnect between nutritional knowledge and actual healthy eating behaviors. Respondents reported that inadequate infrastructure to support physical activity and limited access to healthy food options, both at home and in their surrounding environment serves as a major barrier. Parental involvement plays a crucial role in shaping children's healthy eating patterns and their engagement in recreational physical activity. This context is particularly relevant, as the research findings where the majority of respondents are young adults in the transition phase of independent living(17) .

Other research results show that as many as 75 (51.4%) adolescents have behaviors that are quite risky for NCDs(14) . Purnamasari et al., 2020 reported that counseling interventions on NCDs, balanced nutrition, and Clean and Healthy Living Behaviors (PHBS) resulted in a significant increase in knowledge. However, the sustainability of behavioral changes post-intervention requires systemic support in the form of accessible healthcare services and routine screening for early detection of NCDs (Oberg et al., 2021). This emphasizes that knowledge is a necessary but insufficient condition for health behavior transformation.

4. **Analysis of the Relationship Between Knowledge and Healthy Lifestyle Behavior**

Statistical testing using the Chi-Square test revealed important findings in the context of this study. Table 4 presents the results of the analysis of the relationship between knowledge and healthy lifestyle behaviors.

Table 4. Chi-Square Test Results for the Relationship Between Knowledge and Behavior

Statistical Test	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)
Pearson Chi-Square	9.275	4	.055	.051
Likelihood Ratio	11,099	4	.025	.036
Fisher's Exact Test	8,528	-	-	.063
Linear-by-Linear Association	.166	1	.684	.717
Number of Valid Cases	112	-	-	-

The statistical analysis indicated that there was no significant association existed between knowledge levels and healthy lifestyle behaviors (p = 0.055, p > 0.05). This result reinforces the well-documented knowledge–behavior gap that has been highlighted across public health literature. A p-value close to the significance threshold (0.055) indicates a tendency for association, but this result does not provide sufficient statistical evidence to confirm a meaningful association between knowledge and healthy lifestyle behaviors.

The results of this study are in line with the findings of(18) , which identified that participation in the POSBINDU program increases knowledge but does not consistently correlate with better health

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practices.(19) shows that health promotion through Posbindu PTM does significantly increase early detection behavior (p<0.05), but the intervention is structured with intensive assistance, unlike the observational measurement of knowledge and behavior in this study. Another study also found that there is no relationship between knowledge and healthy living behaviors in non-communicable diseases such as type 2 diabetes(20) . Another study also concluded that medical students have good knowledge and attitudes towards type 2 diabetes, but this is not in line with their practices(21) .

Many factors influence unhealthy behaviors besides knowledge, including socioeconomic status, commercial effects, and the physical environment, which can trigger risky behaviors such as smoking, unhealthy diets, alcohol consumption, and lack of physical activity(22) . In today's digital era, the widespread availability health information knowledge, yet this does not always lead to corresponding behavioral change. The results of a meta-analysis found that digital health literacy is related to healthy behavior, but the effect is only moderate, so a combination with other factors is needed to encourage related behavioral change(23) .

The discrepancy between knowledge and behavior can be explained through several theoretical perspectives. First, the existence of moderator or mediator variables that were not measured in this study, such as *self-efficacy*(24) social support, and accessibility to health facilities. Second, the knowledge measured may be declarative (*knowing what*) but not accompanied by procedural knowledge *(knowing how)* to implement healthy behaviors in the context of daily life. Third, structural and *environmental barriers* that limit individuals from translating knowledge into concrete actions(25) .

Within the productive-age population, the adoption of healthy behaviors is increasingly challenged by occupational demands, social pressures, time constraints, and limited environmental support. Evidence from Indonesia indicates that, despite relatively high levels of health literacy, workplace environments, psychosocial stress, and the prevalence of instant consumption culture constitute major barriers to the implementation of healthy lifestyles (26). These findings highlight the need for health promotion interventions targeting productive-age groups to extend beyond conventional educational approaches and incorporate motivation-driven behavior change strategies, social support mechanisms, and environmental modifications.

Approaches such as Behavior Change Communication (BCC) and Social and Behavior Change Communication (SBCC) are particularly relevant, as they not only enhance knowledge but also strengthen behavioral intentions, self-efficacy, and practical skills, thereby facilitating more sustainable lifestyle changes. Previous studies have demonstrated that these strategies are effective in improving physical activity, promoting healthy dietary patterns, and increasing adherence to health screening among productive-age populations (13).

The implications of these findings emphasize that health interventions cannot focus solely on increasing knowledge but must adopt a holistic approach that considers contextual factors, *behavioral skill development*, and environmental modifications conducive to healthy lifestyle practices. Health promotion programs need to be optimized with strategies that are not only informative but also transformative in facilitating sustainable behavioral change(27) .

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CONCLUSION

Based on a study involving 112 respondents, no statistically significant association was found between knowledge of non-communicable diseases (NCDs) and healthy lifestyle behaviors (p = 0.055), highlighting the presence of a knowledge–behavior gap. The majority of participants were female (76.8%), had a high level of education (82.1%), and were students (51.8%).

This study has several limitations. The use of a cross-sectional design restricts the ability to draw causal inferences between knowledge and healthy lifestyle behaviors. In addition, the assessment of knowledge primarily focused on conceptual understanding rather than applied competence, which may not fully capture respondents' actual levels of health literacy.

Future research is recommended to explore more complex determinants of health behavior by incorporating variables that function as mediators and moderators in the process of behavior formation.

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