

Health literacy and health-promoting behaviors in the prevention of non-communicable diseases among people in Samut Songkhram province



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ABSTRACT

This study aimed to assess (1) the level of health literacy for preventing non-communicable diseases (NCDs) among adults in Samut Songkhram Province, (2) their health-promoting behaviors for NCD prevention, and (3) the relationship between personal factors, health literacy, and health-promoting behaviors. A total of 400 participants aged 20–59 years were selected using simple random sampling. Data were collected through a structured questionnaire consisting of demographic information, health literacy measured by the HLS-EU-16, and health-promoting behaviors assessed by the HPLP-II. Descriptive statistics and correlation analysis were performed. The findings showed that participants had good health literacy (mean = 3.13, SD = 0.45) and moderate-to-good health-promoting behaviors (mean = 2.60, SD = 0.50). A moderate positive correlation was observed between health literacy and health-promoting behaviors ($r = 0.504$, $p < 0.001$). Higher education and income were significantly associated with better health literacy and behaviors ($p < 0.05$), while employment status and self-rated health compared to the previous year were negatively associated with health-promoting behaviors. These results highlight the importance of improving health literacy to support sustainable health behaviors and reduce the risk of NCDs. Interventions such as workplace wellness programs, digital health tools, and school-based education, along with efforts to reduce socioeconomic disparities, are recommended to promote equitable health outcomes.

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1. Introduction

Non-communicable diseases (NCDs) are currently the leading global health concern and the number one public health issue in Thailand. This is evident in both the mortality rates and the overall disease burden. In Thailand, the primary contributors to the NCD burden include cardiovascular diseases, diabetes, cancer, and chronic obstructive pulmonary disease (COPD). The population at risk of or already suffering from these diseases is increasing rapidly, with no signs of decline. Additionally, changes in social factors, such as urbanization, marketing strategies, technological advancements, and communication innovations, have significantly altered lifestyles, further

escalating the prevalence of NCDs ([Khunakorncharatphong et al., 2021](#)).

NCDs contribute significantly to the loss of healthy life years among the Thai population. In 2013, the main causes of such losses among men were alcohol addiction (8.8%), road traffic accidents (8.0%), and cerebrovascular diseases (6.9%). Among women, the leading causes were cerebrovascular diseases (8.2%), diabetes (7.9%), and depression (5.4%). The fifth Thai population health survey in 2014 reported an increase in NCD cases. One-third of the Thai population aged 15 years and above was found to suffer from major NCDs. The prevalence of diabetes increased from 6.9% in 2009 to 8.9%, equating to approximately 4.8 million cases. This represents an annual increase of 300,000 new cases over five years. Similarly, the prevalence of hypertension rose from 21.4% in 2009 to 24.7%, affecting about 13 million people, with an annual increase of 600,000 cases. Obesity prevalence (BMI ≥ 25 kg/m²) also rose from 34.7% in 2009 to 37.5% ([Lovrić et al., 2022](#)). The latest Behavioral Risk Factor Surveillance System (BRFSS) survey in 2015

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reported the following statistics: overweight prevalence at 30.5%, obesity at 7.5%, current smoking at 21.3%, current alcohol consumption at 36.2%, heavy drinking within the past 30 days at 7.3%, binge drinking within the past 30 days at 13.6%, and consumption of more than five servings of fruits and vegetables per day within the past seven days at 24.3% (Division of Non-Communicable Diseases, 2019). In 2016, NCDs remained the leading health issue for Thais, as reflected in the disease burden and premature mortality rates (ages 30-69). Key contributors included cerebrovascular diseases, ischemic heart disease, diabetes, hypertension, and COPD. Although there was a slight decline and stabilization in premature mortality from NCDs by 2018, cerebrovascular diseases remained the leading cause, with a premature mortality rate of 44.3 per 100,000 people. Men were more affected than women. The Ministry of Public Health has developed and reviewed a five-year National NCD Prevention and Control Strategic Plan (2017-2021), which is aligned with the 20-year National Strategic Framework for development, capacity building, and public sector reform. This plan, formulated with inputs from various stakeholders, aims to reduce the NCD burden under the vision: "Healthy citizens free from preventable NCD burdens."

The Faculty of Nursing and Health at Suan Sunandha Rajabhat University, based in Samut Songkhram Province, focuses on health education and research. Its mission emphasizes community-oriented research to promote health in alignment with national strategies and policies. This study aims to investigate health literacy and health-promoting behaviors of people in Samut Songkhram, considering prior findings that associate these factors with health problems. The research outcomes will serve as a database for planning health promotion and care strategies to reduce new cases and mitigate the severity of existing diseases. This will ultimately minimize human and economic resource losses. The research problem, questions, and objectives are outlined as follows:

1. To study the level of health literacy in preventing chronic non-communicable diseases (NCDs) among the population of Samut Songkhram Province.
2. To examine health-promoting behaviors for NCD prevention among the population of Samut Songkhram Province.
3. To explore the relationship between personal factors, health literacy, and health-promoting behaviors for NCD prevention.

The research hypotheses are as follows:

1. Demographic factors and Socioeconomic factors, at least one of which affects health literacy to prevent NCDs.
2. Health literacy to prevent NCDs related to health-promoting behaviors.

This study is based on a framework that shows how demographic and socioeconomic factors are linked to health literacy and health-promoting behaviors for preventing non-communicable diseases (NCDs). It suggests that a person's background, such as age, education, income, and job, can affect their level of health literacy. In turn, health literacy influences how well people follow healthy behaviors to prevent NCDs. This framework helps to explain how personal and social factors can shape health knowledge and actions, which are important for improving overall health.

2. Methodology

2.1. Descriptive research

The population in this study includes literate male and female citizens aged 20 to 59 years who live in Samut Songkhram Province. This province has three districts: Mueang Samut Songkhram, Bang Khonthi, and Amphawa. The sample consists of 400 individuals selected through multistage random sampling based on [Yamane's \(1967\)](#) table. The sampling process included four stages:

- District selection: 200 participants were selected from Mueang Samut Songkhram, 100 from Amphawa, and 100 from Bang Khonthi.
- Sub-district selection: Sub-districts (Tambon) were randomly selected from each district.
- Household selection: Households were randomly chosen from the selected sub-districts.
- Individual selection: Individuals aged 20–59 were randomly selected from the chosen households.

2.2. Research instrument

A questionnaire was used and divided into three sections:

- Part 1: Demographic information.
- Part 2: Health Literacy Assessment, adapted from the European Health Literacy Survey (HLS-EU-16) by [Emiral et al. \(2018\)](#). This part includes 16 items rated on a 4-point scale: 1 = Very easy, 2 = Fairly easy, 3 = Fairly difficult, 4 = Very difficult.
- Part 3: Health Promotion Behavior Assessment, based on the Health-Promoting Lifestyle Profile II (HPLP II) developed by [Walker et al. \(1995\)](#). This section contains 52 items rated on a 4-point scale: 1 = Never, 2 = Sometimes, 3 = Often, 4 = Always.

2.3. Instrument validation

The questionnaire was translated into Thai. Its language structure was checked by a certified language institute. A pilot test was conducted with 30 participants who had similar characteristics to the study sample. Reliability analysis showed strong internal consistency: the Health Literacy Assessment had a Cronbach's alpha of 0.944, and the Health

Promotion Behavior Assessment had a Cronbach's alpha of 0.972.

2.4. Data analysis

Data were analyzed using SPSS software. Descriptive statistics (frequency, percentage, mean, and standard deviation) and correlation analysis were used to explore relationships between variables.

3. Results and discussion

The average age of the participants was 48.91 years. Most participants had completed 12 years of education (equivalent to primary education) (39.5%) and were employed as laborers (33.0%). The vast majority (98.0%) practiced Buddhism. The average monthly income was 8,868.75 baht. Half of the participants were married (50.0%), and 48.0% were living with their spouses. Regarding health status, 41.5% rated their current health as good, while 45.5% felt their health had remained the same compared to the previous year. In terms of health literacy, 51.3% of participants had a good level, followed by 46.7% with a very good level. None of the participants had low health literacy (Table 1).

For health-promoting behaviors, 71.3% of participants demonstrated good behavior, followed by 16.7% with very good behavior (Table 2). The average health literacy score was 3.13 (SD = 0.45), and the average score for health-promoting behaviors was 2.60 (SD = 0.50) (Table 3). There was a moderate positive correlation between health literacy and health-promoting behaviors ($r = .504$, $p < .001$) (Table 4). To analyze the relationships between independent variables (age, years of education, income, health status, and chronic disease) and health literacy among people in Samut Songkhram Province, the Pearson Product-Moment Correlation Coefficient was used. This method identifies the relationship between two numerical variables (Table 5).

As shown in Tables 5 and 6, some of the independent variables were significantly correlated with each other ($p < 0.05$), suggesting multicollinearity. Therefore, Factor Analysis was used to explore the underlying structure of the independent variables (Table 7).

Table 1: Samples classified by health literacy levels

Health literacy level	Number of samples	Percent
Low (0-1)	0	0.0
Moderate (1.1-2)	8	2.0
Good (2.1-3)	205	51.3
Very good (3.1-4)	187	46.7
Total	400	100

Table 2: Samples classified by health promoting behavior levels

Health-promoting behavior level	Number of samples	Percent
Low (0-1)	0	0.0
Moderate (1.1-2)	48	1.2
Good (2.1-3)	285	71.3
Very good (3.1-4)	67	16.7
Total	400	100

Table 3: Health literacy and health promoting behaviors

Topic	Mean	SD
Health literacy	3.13	0.45
Health-promoting behavior	2.60	0.50

Table 4: Health literacy and health promoting behaviors to prevent non communicable diseases

Variable	Health-promoting behavior for NCDs	
	r	p
Health literacy	.504**	.000

** $p < .01$

Table 5: Independent variables affecting the health literacy of people in Samut Songkhram province

	AGE	EDU	INC
AGE	-	-.331*	-.095
EDU	-.331**	1	.371**
INC	-.095	.371**	1
HST	-.165**	.118*	.176**
NCD	.359**	-.118*	-.177*
HLC	-.004	.233**	.123*

** $p < .01$; * $p < .05$

Table 6: Independent variables affecting the health literacy of people in Samut Songkhram province

	HST	NCD	HLC
AGE	-.165*	.359*	-.004
EDU	.118*	-.118*	.233**
INC	.176**	-.117*	.123*
HST	1	-.325*	.030
NCD	-.325**	1	-.012
HLC	.030	-.012	1

** $p < .01$; * $p < .05$

Table 7: Factor analysis showing factor loadings of independent variables affecting health literacy to prevent NCDs of people in Samut Songkhram province

Independence factor (IF)	Factor	
	1	2
AGE	-.669	.181
EDU	.643	.543
INC	.543	.589
HST	.559	-.368
NCD	-.640	.535

Kaiser-Mayer-Olkin = .577; df = 10; p-value = .000

From Table 7, the Factor Analysis showing Factor Loadings of independent variables affecting the health literacy of people in Samut Songkhram Province revealed a Kaiser-Mayer-Olkin value of 0.577. Data suitable for Factor Analysis should have a value of at least 0.5. The analysis resulted in two components: Component 1 (Factor 1), referred to as the Individual Factor, and Component 2 (Factor 2), referred to as the Socio-economic Factor. The factor score coefficients were then examined for suitability, as shown in Table 8.

Table 8: Factor score coefficients

Independence factor (IF)	Factor score coefficients	
	1	2
AGE	.633	-.281
EDU	-.156	.827
INC	-.049	.800
HST	-.666	.067
NCD	.834	.011

Kaiser-Mayer-Olkin = .577; df = 10; p-value = .000; Factor1(INF)= .633AGE-.156EDU-.049INC-.666HS+.834NCD; Factor2(SE)=-.281AGA+.827EDU+.800INC+.067HS+.011NCD

The variables most suitable for prediction were determined by considering the coefficient of determination (R^2) with the highest value. The results of the multiple linear regression analysis

affecting the health literacy of people in Samut Songkhram Province are shown in [Table 9](#).

Table 9: Multiple linear regression analysis affecting health literacy to prevent NCDs of people in Samut Songkhram province

IF	B	SE	β	t	P-value	VIF
C	3.130	.022		141.195	.000	
F1	.001	.022	.003	.061	.952	1.000
F2	.095	.022	.210	4.280	.000	

R=.210; R²=.044; Adj R²=.039; F=9.162; p-value=.000

From [Table 9](#), Factor 2 was affecting Health Literacy to prevent NCDs, EDU factors, and HST factors were affecting Health Literacy to prevent NCDs. The study results indicate that health literacy to preventing NCDs has a moderate positive correlation with health-promoting behaviors to preventing NCDs ($r = 0.504$, $p < 0.05$) and Socioeconomic factor (Number of year's study, Income) affecting the health literacy to preventing NCDs which aligns with a study on the health literacy has been shown to improve the health-promoting behaviors of type 2 diabetes patients in managing blood sugar and foot care, [Yusefi et al. \(2022\)](#) also highlighted that during the COVID-19 pandemic, health literacy and health behaviors in hospitalized women were positively influenced by education and income levels, [Ranjbaran et al. \(2022\)](#) which found that higher education levels enhanced health literacy and health-promoting behaviors among urban adults. A review of key factors affecting health-promoting behaviors in adolescents revealed that current health status significantly influences these behaviors. Poor health may reduce motivation or the ability to engage in health-promoting activities ([Tabrizi et al., 2024](#)).

But [Finbråten et al. \(2020\)](#) found no empirical evidence linking health literacy to blood sugar control or health behaviors. Similarly, [Svendsen et al. \(2020\)](#) found Danish population has relatively high education levels, no significant relationship between health literacy and health-promoting behaviors. However, after the pandemic of COVID-19, digital technology plays an increasingly important role in health, such as digital communication tools in health have great potential to enhance health literacy and improve health outcomes. The digital literacy development project aimed at significantly enhancing the digital skills of the elderly ([Fitzpatrick 2023](#); [Arias López et al., 2023](#)), a model for health interventions for Black and Latinx/Hispanic individuals in the United States, developed from an analytical review and intergenerational communication and/or social support ([Vaccaro et al., 2021](#)), related between Health literacy in nutrition and consumption behavior of Bangladesh adult ([Al Banna et al., 2022](#)).

This study confirms that health literacy is a key factor in promoting health behaviors. Developing activities or programs that emphasize health literacy should be tailored to the context of specific populations, particularly those with economic and

social limitations, and digital literacy to improve long-term healthy practices.

4. Conclusions

Health literacy to prevent NCDs has a moderate positive correlation with health-promoting behaviors to prevent NCDs and collated with a year's study and income. Socioeconomic factors (Number of years' study, Income) affect health literacy to prevent NCDs. Recommendations for the development of health-promoting behaviors to prevent NCDs should focus on increasing the health literacy of the population to prevent NCDs of the population, considering Socio-economic factors (Number of years' study, Income). The limitations of the study were related to social context and digital health literacy factors. Future research should focus on studying social context factors and digital health literacy to prevent NCDs.

List of abbreviations

AGE	Age
BRFSS	Behavioral risk factor surveillance system
COPD	Chronic obstructive pulmonary disease
EDU	Education
HLC	Health literacy
IF	Independence factor
INC	Income
NCD/NCDs	Non-communicable disease/non-communicable diseases
HST	Health status
r	Pearson's correlation coefficient
R ² /Adj R ²	Coefficient of determination/adjusted R-squared
SD	Standard deviation
SE	Standard error
VIF	Variance inflation factor

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Compliance with ethical standards

Ethical considerations

The study was approved by the Human Research Ethics Committee of the Research and Development Office, Suan Sunandha Rajabhat University (Approval No. COA. 1-033/2024, dated June 6, 2024). All participants gave informed consent. The purpose and duration of the study were explained before participation.

Conflict of interest

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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