

The Influence of Health Literacy on Diabetes Prevention Behaviors in Sai Mai District Communities, Bangkok

Ampon Jeangwirichaikull¹, Siriwan Turongruang², Dr. Pacharaporn Tanamee³

^{1,2,3} Department of Nursing Adult and Geriatric, Faculty of Nursing, University of North Bangkok, Bangkok, Thailand

ABSTRACT

This research aimed to 1) assess health literacy levels 2) evaluate diabetes prevention behaviors and 3) analyze the influence of health literacy on diabetes prevention behaviors among residents in Sai Mai District communities, Bangkok. This cross-sectional survey research included 317 participants aged 35 years and above, selected through stratified random sampling. Data were collected from June to September 2024 using questionnaires with content validity and reliability (Cronbach's alpha coefficient = 0.87). Data were analyzed using descriptive statistics and multiple regression analysis.

The results showed that the majority of participants had moderate levels of health literacy (65.3%) and diabetes prevention behaviors (58.7%). Factors significantly influencing diabetes prevention behaviors included education level ($\beta = .325$, $p < .001$), health information accessibility ($\beta = .298$, $p < .001$), self-management ($\beta = .276$, $p < .001$), age ($\beta = .245$, $p < .01$), and income ($\beta = .198$, $p < .01$). These variables collectively explained 52.3% of the variance in diabetes prevention behaviors ($R^2 = .523$). The findings can be applied to develop appropriate health literacy promotion programs and diabetes prevention behaviors suitable for the community context.

KEYWORDS: Health Literacy, Diabetes Prevention, Community Health, Health Behavior, Health Education, Primary Prevention

ARTICLE DETAILS

Published On:
02 January 2025

Available on:
<https://ijmscr.org/>

INTRODUCTION

Diabetes is a chronic non-communicable disease that poses a significant global public health challenge, impacting healthcare systems and economies worldwide. According to the International Diabetes Federation (IDF), the prevalence of diabetes continues to rise, from 285 million cases in 2010 to 415 million in 2015, with projections reaching 592 million by 2035 and 612 million by 2040. Type 2 diabetes accounts for 85-95% of all cases.

In Thailand, the Department of Disease Control (2023) reported 3.3 million cumulative diabetes cases in 2022, an increase of 150,000 from 2021, with 300,000 new cases in 2023. Concerningly, 5 million people aged 35 and above (from a target population of 22 million) have not been screened for diabetes. Recent data indicates that 1 in 11 Thai adults aged 15 and above has diabetes, with 40% unaware of their condition and only 54.1% receiving diagnosis and treatment.

The Sai Mai district of Bangkok, particularly Zone 2 communities, faces significant challenges related to chronic diseases, including diabetes. Local health center data (2022-2024) shows that 21% of the population suffers from non-communicable diseases (NCDs), primarily diabetes and hypertension. Key risk factors include tobacco use, alcohol consumption, poor dietary habits, and insufficient physical activity, compounded by environmental factors such as PM2.5 air pollution.

Research Objectives

1. To assess health literacy levels among residents in Sai Mai District communities
2. To evaluate diabetes prevention behaviors among residents in Sai Mai District communities
3. To analyze the influence of health literacy on diabetes prevention behaviors

The Influence of Health Literacy on Diabetes Prevention Behaviors in Sai Mai District Communities, Bangkok

METHODOLOGY

Research Design

This study employed a cross-sectional survey design to examine the predictive relationship between health literacy and diabetes prevention behaviors.

Population and Sampling

- Population: 1,820 residents of Soi Air Force Village and Ruamjai Rak Community in Sai Mai District
- Sample size: 317 participants (calculated using Krejcie and Morgan's table)
- Sampling method: Stratified random sampling proportional to community size

Research Instruments

The questionnaire comprised three sections:

1. Personal information (15 items)
2. Health literacy assessment (58 items across 6 dimensions)
3. Diabetes prevention behaviors assessment (36 items across 4 dimensions)

Data Collection

Data collection occurred between June and September 2024 following ethical approval (NS9/2567). Researchers and trained assistants administered questionnaires to eligible participants who provided informed consent.

Data Analysis

- Descriptive statistics for demographic data and variable levels
- Multiple regression analysis to examine relationships between variables
- Statistical significance set at .05 level

RESULTS

Data Analysis

The data were analyzed using descriptive statistics including frequency, percentage, mean, and standard deviation. Inferential statistics included Pearson's correlation coefficient and multiple regression analysis. The significance level was set at $p < .05$. Health literacy and prevention behavior levels were interpreted using the following criteria: 4.21-5.00 = Very high, 3.41-4.20 = High, 2.61-3.40 = Moderate, 1.81-2.60 = Low, 1.00-1.80 = Very low.

Research Findings

1. Participant Characteristics

Table 1. Demographic Characteristics of Study Participants (n = 317)

Characteristic	Number	Percentage
Gender		
Male	118	37.2
Female	199	62.8

Characteristic	Number	Percentage
Age (years)		
35-44	89	28.1
45-59	134	42.3
60 and above	94	29.6
$(\bar{x} = 48.6, SD = 8.4, Min = 35, Max = 72)$		
Education Level		
Primary education	85	26.8
Secondary education	122	38.5
Diploma/vocational	67	21.1
Bachelor's degree or higher	43	13.6
Occupation		
Employee/worker	113	35.6
Business owner/trader	98	30.9
Agriculture	45	14.2
Housewife/unemployed	61	19.3

From Table 1, participants were predominantly female (62.8%) and aged between 45-59 years (42.3%), with a mean age of 48.6 years ($SD = 8.4$). The majority had completed secondary education (38.5%) and worked as employees or workers (35.6%).

2. Health Literacy Assessment

Table 2. Health Literacy Levels by Dimension (n = 317)

Dimension	Mean	SD	Level
Information access	3.45	0.68	High
Self-management	3.41	0.70	High
Decision making	3.35	0.71	Moderate
Knowledge comprehension	3.32	0.72	Moderate
Communication	3.28	0.75	Moderate
Media literacy	3.18	0.82	Moderate
Overall	3.33	0.72	Moderate

Table 2 shows that participants' overall health literacy was at a moderate level ($\bar{x} = 3.33, SD = 0.72$). Information access ($\bar{x} = 3.45, SD = 0.68$) and self-management ($\bar{x} = 3.41, SD = 0.70$) scored at high levels, while the remaining dimensions scored at moderate levels, with media literacy showing the lowest score ($\bar{x} = 3.18, SD = 0.82$).

3. Diabetes Prevention Behaviors

Table 3. Diabetes Prevention Behaviors by Domain (n = 317)

Domain	Mean	SD	Level
General health care	3.42	0.71	High

The Influence of Health Literacy on Diabetes Prevention Behaviors in Sai Mai District Communities, Bangkok

Domain	Mean	SD	Level
Diet control	3.38	0.74	Moderate
Stress management	3.25	0.78	Moderate
Physical exercise	3.12	0.85	Moderate
Overall	3.29	0.77	Moderate

Table 3 indicates that participants' overall diabetes prevention behaviors were at a moderate level ($\bar{x} = 3.29$, $SD = 0.77$). General health care scored at a high level ($\bar{x} = 3.42$, $SD = 0.71$), while diet control ($\bar{x} = 3.38$, $SD = 0.74$), stress management ($\bar{x} = 3.25$, $SD = 0.78$), and physical exercise ($\bar{x} = 3.12$, $SD = 0.85$) were at moderate levels.

4. Relationship Analysis

Table 4. Correlation Matrix Between Health Literacy Dimensions and Prevention Behaviors (n = 317)

Variable	1	2	3	4	5	6	7
1. Information access	1.000						
2. Knowledge comprehension	.521**	1.000					
3. Communication	.498**	.543*	1.000				
4. Self-management	.612**	.587*	.532*	1.000			
5. Media literacy	.465**	.498*	.521*	.543*	1.000		
6. Decision making	.543**	.512*	.498*	.587*	.532*	1.000	
7. Prevention behaviors	.587**	.521*	.498*	.612*	.465*	.543*	1.000

Note: ** $p < .01$

Table 4 reveals significant positive correlations between all health literacy dimensions and prevention behaviors ($p < .01$). Self-management showed the strongest correlation with prevention behaviors ($r = .612$), followed by information access ($r = .587$) and decision making ($r = .543$).

5. Predictive Analysis

Table 5. Multiple Regression Analysis Results (n = 317)

Predictor	b	SE	β	t	P-value	95% CI
Constant	0.854	0.245	-	3.485	.001	0.371, 1.337
Education level	0.412	0.089	.325	4.629	<.001	0.237, 0.587

Predictor	b	SE	β	t	P-value	95% CI
Information access	0.376	0.092	.298	4.087	<.001	0.195, 0.557
Self-management	0.345	0.087	.276	3.966	<.001	0.174, 0.516
Age	0.298	0.095	.245	3.137	.002	0.111, 0.485
Income	0.245	0.098	.198	2.500	.003	0.052, 0.438

$R = .723$, $R^2 = .523$, Adjusted $R^2 = .515$, $F = 45.872$, $p < .001$

Table 5 presents the multiple regression analysis results, which explained 52.3% of the variance in diabetes prevention behaviors ($R^2 = .523$, $F = 45.872$, $p < .001$). Education level emerged as the strongest predictor ($\beta = .325$, $p < .001$), followed by information access ($\beta = .298$, $p < .001$), self-management ($\beta = .276$, $p < .001$), age ($\beta = .245$, $p < .01$), and income ($\beta = .198$, $p < .01$). All predictors showed significant positive relationships with prevention behaviors.

DISCUSSION

The findings reveal several significant patterns in health literacy and diabetes prevention behaviors that warrant detailed discussion in the context of existing theoretical frameworks and empirical research.

Health Literacy Patterns and Their Implications

The moderate overall health literacy level ($\bar{x} = 3.33$) found in this study aligns with Nutbeam's (2008) conceptualization of health literacy as a developmental capacity. The higher scores in information access ($\bar{x} = 3.45$) and self-management ($\bar{x} = 3.41$) reflect the fundamental aspects of functional health literacy, while the lower scores in media literacy ($\bar{x} = 3.18$) indicate challenges in critical health literacy development. This pattern supports Sukprasert et al.'s (2023) findings among Thai urban populations and suggests a hierarchical development of health literacy capabilities.

The significant relationship between health literacy dimensions and prevention behaviors ($r = .465 - .612$) supports Nutbeam's theory that health literacy directly influences health behaviors. Particularly, the strong correlation between self-management and prevention behaviors ($r = .612$) emphasizes the importance of interactive health literacy in behavioral outcomes, consistent with findings from recent studies in Asian contexts (Kim & Park, 2024).

Prevention Behavior Patterns Through the Health Belief Model Lens

The moderate level of prevention behaviors ($\bar{x} = 3.29$) can be understood through Rosenstock's (1974) Health

The Influence of Health Literacy on Diabetes Prevention Behaviors in Sai Mai District Communities, Bangkok

Belief Model. The higher score in general health care ($\bar{x} = 3.42$) suggests strong perceived benefits of preventive actions, while lower scores in physical exercise ($\bar{x} = 3.12$) may reflect perceived barriers in urban settings. These findings align with Thompson et al.'s (2023) research on environmental constraints in urban communities.

The variation in behavior scores across domains reflects the multifaceted nature of prevention behaviors and supports the model's emphasis on multiple influencing factors. Particularly, the moderate scores in diet control ($\bar{x} = 3.38$) and stress management ($\bar{x} = 3.25$) suggest a need to address both perceived susceptibility to diabetes and self-efficacy in managing lifestyle factors.

Socioeconomic Determinants and Their Impact

The significant influence of education level ($\beta = .325$) and income ($\beta = .198$) on prevention behaviors highlights the role of modifying factors in the Health Belief Model. These findings support Johnson et al.'s (2024) research on socioeconomic determinants of health behaviors and suggest that interventions must address both individual capabilities and social determinants of health.

The positive relationship between age and prevention behaviors ($\beta = .245$) may reflect increased perceived susceptibility to health risks among older adults, consistent with the Health Belief Model's predictions. This finding aligns with recent Thai studies showing higher health awareness among older urban residents (Wongdaeng & Sirikamonsathian, 2023).

Integration of Health Literacy and Health Beliefs

The study's findings demonstrate the complementary nature of health literacy and health belief frameworks. Strong correlations between health literacy dimensions and prevention behaviors support Nutbeam's assertion that health literacy enables informed health decisions. Simultaneously, the influence of socioeconomic factors aligns with the Health Belief Model's emphasis on modifying factors in health behavior adoption.

Predictive Relationships and Theoretical Integration

The multiple regression results explaining 52.3% of variance in prevention behaviors highlight the complex interplay of factors theorized by both frameworks. The significant contribution of information access ($\beta = .298$) and self-management ($\beta = .276$) supports Nutbeam's emphasis on both functional and interactive health literacy. Meanwhile, the influence of socioeconomic factors aligns with the Health Belief Model's recognition of structural influences on health behaviors.

CONCLUSIONS

The findings revealed moderate levels of both health literacy ($\bar{x} = 3.33$) and diabetes prevention behaviors ($\bar{x} = 3.29$) among residents in Sai Mai District communities. Information access and self-management demonstrated high levels, while media literacy and physical exercise showed

the lowest scores in their respective dimensions. Education level emerged as the strongest predictor of prevention behaviors ($\beta = .325$, $p < .001$), followed by health information accessibility ($\beta = .298$, $p < .001$), self-management ($\beta = .276$, $p < .001$), age ($\beta = .245$, $p < .01$), and income ($\beta = .198$, $p < .01$).

These findings suggest the need for comprehensive health promotion strategies that consider both individual capabilities and socioeconomic factors. The results support developing targeted interventions to enhance health literacy and promote diabetes prevention behaviors, particularly focusing on improving physical activity participation and media literacy skills in urban communities. Future health promotion programs should address the identified gaps while building upon existing strengths in health information access and general health care practices.

ACKNOWLEDGMENT

The researchers would like to express sincere gratitude to the Ethics Committee of the University of North Bangkok (IRB No. NS9/2567) for their approval and support. We are deeply grateful to community leaders and residents of Zone 2 communities in Sai Mai District, particularly those in Air Force Village Community and Ruamjai Rak Community, for their valuable participation in this research. Special appreciation goes to the director and staff of Public Health Center 61, as well as village health volunteers, for their assistance in coordinating with community members and facilitating data collection. We also thank our research assistants who contributed significantly to the success of data collection and verification. Finally, we extend our appreciation to the Faculty of Nursing, University of North Bangkok, for their academic support throughout this study. The researchers would like to express sincere gratitude to the Ethics Committee of the University of North Bangkok (IRB No. NS9/2567) for their approval and support. We are deeply grateful to community leaders and residents of Zone 2 communities in Sai Mai District, particularly those in Air Force Village Community and Ruamjai Rak Community, for their valuable participation in this research. Special appreciation goes to the director and staff of Public Health Center 61, as well as village health volunteers, for their assistance in coordinating with community members and facilitating data collection. We also thank our research assistants who contributed significantly to the success of data collection and verification. Finally, we extend our appreciation to the Faculty of Nursing, University of North Bangkok, for their academic support throughout this study.

REFERENCES

- I. Asian Diabetes Prevention Study Group. (2023). Diabetes trends in Southeast Asia: A regional analysis. *Asian Journal of Medicine*, 45(3), 234-248.

The Influence of Health Literacy on Diabetes Prevention Behaviors in Sai Mai District Communities, Bangkok

- II. Centers for Disease Control and Prevention Thailand. (2023). National Diabetes Prevention Strategy Report 2023. Bangkok: Ministry of Public Health.
- III. Chamjuree, S., et al. (2021). Health literacy among elderly population in central Thailand. *Journal of Nursing Science*, 15(2), 45-58.
- IV. Chen, Y., & Wang, L. (2024). Health literacy and diabetes prevention: A systematic review and meta-analysis. *Health Education Research*, 39(1), 45-62.
- V. Department of Disease Control. (2023). Annual Report on Diabetes Situation in Thailand. Bangkok: Ministry of Public Health.
- VI. Department of Disease Control. (2021). Strategic Plan for Health Literacy Development. Bangkok: Ministry of Public Health. International Diabetes Federation. (2021). *IDF Diabetes Atlas (10th ed.)*. Brussels, Belgium: IDF.
- VII. Jeanwirichaikull, A., et al. (2023). Health literacy and self-care behaviors among diabetes patients: A correlational study. *Thai Journal of Nursing Research*, 41(2), 78-92.
- VIII. Kim, S. J., et al. (2023). Urban lifestyle factors affecting diabetes prevention behaviors: A multi-city study. *Journal of Urban Health*, 100(2), 289-302.
- IX. Lee, H. K., & Park, J. S. (2024). Digital health literacy intervention for diabetes prevention: A randomized controlled trial. *Journal of Medical Internet Research*, 26(1), e45678.
- X. Ngamampornara, P. (2017). Health literacy levels among diabetes patients: A qualitative study. *Nursing Research Journal*, 25(3), 89-102.
- XI. Nutbeam, D. (2008). The evolving concept of health literacy. *Social Science & Medicine*, 67(12), 2072-2078.
- XII. Public Health Center 61. (2024). Report on Non-communicable Diseases in Sai Mai District. Bangkok: Bangkok Metropolitan Administration.
- XIII. Rosenstock, I. M. (1974). Historical origins of the Health Belief Model. *Health Education Monographs*, 2(4), 328-335.
- XIV. Smith, K., & Johnson, R. (2023). Socioeconomic determinants of health literacy in urban communities. *Health Promotion International*, 38(4), 567-582.
- XV. Somphan, A., et al. (2016). Relationship between health literacy and adherence to medical recommendations among diabetes patients. *Journal of Nursing Science*, 34(4), 77-89.
- XVI. Suwanrat, K., et al. (2024). Development of health literacy promotion program in urban communities. *Journal of Nursing Science*, 42(1), 89-102.
- XVII. Thompson, M., et al. (2024). Environmental barriers to physical activity in urban settings: A qualitative study. *Journal of Environmental Research*, 205, 114885.
- XVIII. Wilson, J., & Brown, A. (2023). Community-based approaches to health literacy development: A scoping review. *BMC Public Health*, 23(1), 1-15.
- XIX. World Health Organization. (2023). *Health Literacy Framework for Non-communicable Disease Prevention*. Geneva: WHO.
- XX. World Health Organization. (2016). *Global Report on Diabetes*. Geneva: WHO.