Original Article

Health Literacy to Prevent Obesity in High School Students, Phatthalung Province, Thailand

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Abstract

Background: Childhood and adolescent overweight and obesity are global health concerns. Preventing these conditions—especially among at-risk populations—is more effective and cost-efficient than treatment. One promising approach is enhancing health literacy, which can lead to improved health outcomes. The objectives of this study were to examine the current situation and explore the associations between various factors and health literacy in relation to obesity prevention.

Methods: This cross-sectional study was conducted among high school students in southern Thailand. A total of 572 students from four schools participated, using a self-administered structured questionnaire. Descriptive statistics were employed to summarize sociodemographic characteristics, lifestyle behaviors, and health literacy related to obesity prevention. Logistic regression analysis was used to examine the associations between these variables.

Results: The majority of participants were female (73.3%) and most were aged 17 years (37.2%). Most students demonstrated a moderate level of health literacy regarding obesity prevention (65.4%), while 31.5% had a low level and only 3.1% achieved a high level. Significant associations were found between health literacy levels and several variables, including parental education, parental occupation, BMI-for-age, stress management behavior, sugar-sweetened beverage (SSB) consumption, alcohol use, and internet usage.

Conclusion: Health literacy interventions should be adapted to students' real-life contexts and actively involve families and communities, particularly in rural areas.

Keywords: Health Literacy, Obesity, High School Student, Thailand

Introduction

Overweight and obesity are defined as abnormal or excessive fat accumulation that may impair health[1]. Globally, more than 340 million children and adolescents aged 5–19 years are overweight or obese, and the prevalence has increased dramatically

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in recent decades. This rise has occurred similarly among both boys and girls. Overweight and obesity are associated with more deaths worldwide than underweight and are present in all regions, including sub-Saharan Africa and Asia[1].

Thai people aged 15 years and older rank fifth in obesity prevalence in the Asia-Pacific region[2]. More than four million individuals are considered at-risk, with a high prevalence of overweight. The incidence rate has been found to increase at younger ages, and the annual healthcare cost for individuals with diabetes in Thailand continues to rise each year[3]. In Thailand, numerous studies and treatment programs for overweight and obesity have been conducted across all regions, aligned with the Ministry of Public Health's policy known as the "Thailand Healthy Lifestyle Strategy," which focuses on reducing health risk factors. Phatthalung Province, located in the southern part of Thailand, has a long history dating back to prehistoric times[4]. Over the past decade, rapid growth in the local economy, driven by tourism and changing lifestyles in both rural and urban populations, has contributed to shifts in health behaviors. According to the 2015 Annual Report from the Phatthalung Provincial Health Center, 8.77% of children in the province were classified as overweight or obese. Although this figure did not exceed the official threshold of 10%, the prevalence has shown a continuous upward trend[5]. This is consistent with reports indicating a rising prevalence of overweight and obesity among individuals aged 15 years and older in the province[6].

Preventing overweight and obesity among individuals and at-risk groups is more effective and cost-efficient than treatment, particularly as healthcare costs continue to rise with the increasing number of patients. Prevention efforts should focus on factors that influence health outcomes, such as lifestyle behaviors associated with body weight, body mass index (BMI), and blood sugar levels. One important approach to improving health outcomes is through health education—specifically by enhancing health literacy. Health literacy broadly refers to an individual's ability to "gain access to, understand, and use information in ways that promote and maintain good health" for themselves, their families, and their communities[7]. According to Don Nutbeam, health literacy comprises three dimensions: functional, communicative, and critical health literacy[8]. The Department of Health, Ministry of Public Health Thailand defines health literacy as an individual's capacity to access health information, evaluate it, make informed decisions to modify behaviors, and select appropriate health services and products. This definition includes six components: Accessibility, Understanding, Inquiry/ Exchange, Decision-Making, Behavior Change, and Communication[9]. The objectives of this study were twofold: (1) to assess the current situation regarding health literacy for obesity prevention and risk behaviors among high school students in Phatthalung Province, Thailand, and (2) to examine the associations between various factors and health literacy related to obesity prevention.

Methods

Study Area and Population

This cross-sectional study was conducted between September 2019 and January 2020 using a multistage sampling technique. The study population consisted of high school students enrolled in Grades 10 to 12 in Phatthalung Province, Thailand. According to the Secondary Educational Service Area Office 12, Phatthalung Province is divided into four educational service zones for secondary schools, classified by location and school size. In each zone, one school with the highest student population was purposively selected. Following school selection, the researcher and research assistants screened students to determine eligibility based on the inclusion criteria and proceeded with data collection. The sample size was calculated using Krejcie and Morgan's formula[10] with a 95% confidence interval, resulting in a required sample of 572 students from the four selected schools. Participants were students aged 15 to 18 years, currently enrolled in high school, able to communicate in Thai, and willing to participate in the study. Students who did not receive parental consent were excluded from participation.

Research Instruments

A self-administered structured questionnaire was used as the research instrument. The questionnaire consisted of eight sections, as follows: Part I: Sociodemographic characteristics. Part II: Health Literacy in Preventing Obesity, (1) Knowledge and understanding of health information related to obesity prevention (2) Accessibility of health information and health services (3) Communication skills for enhancing health expertise (4) Management of health conditions to prevent obesity (5) Media and information literacy for obesity prevention and (6) Decision-making and appropriate health actions. Part III: Lifestyle factors. The questionnaire was adapted from tools developed by the Ministry of Public Health and Srinakharinwirot University[11,12].

Study procedure and Data Collection

The study procedures and methods were reviewed and approved by the Ethics Review Committee for Research Involving Human Research Participants, Health Sciences Group, Chulalongkorn University (COA No. 177/2019), on 9 July 2019. Participants were selected based on predefined inclusion criteria. Data were collected using self-administered questionnaires, which took approximately 30–60 minutes to complete. In addition, physiological assessments were conducted by trained research assistants.

Data Analysis

Data were analyzed using SPSS version 22.0 (licensed by Chulalongkorn University). Descriptive statistics were used to summarize sociodemographic characteristics, lifestyle behaviors, and health literacy related to obesity prevention. The data were presented as frequency, percentage, mean, minimum, maximum, and standard deviation (SD). Binary logistic regression analysis was performed to assess the association between independent variables and health literacy for obesity prevention. A p-value ≤ 0.05 was considered statistically significant.

Table 1: Sociodemographic characteristics of participants (N = 572)

Sociodemographic characteristics	Frequency	Percentage (%)
Grade		
4	168	29.3
5	160	28.0
6	244	42.7
Gender		
Male	153	26.7
Female	419	73.3
Age (years)		
15	116	20.3
16	129	22.6
17	213	37.2
18	114	19.9
Religion		
Buddhism	507	88.6
Christian	1	0.2
Islam	64	11.2

Sociodemographic characteristics	Frequency	Percentage (%)
Grad report		
Excellent	17	3
Good	312	54.5
Moderate	229	40
Not good	14	2.5
Sufficiency of income		
Sufficiency and saving money	281	49.2
Sufficiency and no saving money	222	38.8
Not sufficient but no debt	63	11
Not sufficient and debt	6	1
Parent's Marital status		
Married and live together	433	75.7
Married and not live together	20	3.5
Widow	33	5.8
Divorce/Separate	86	15.0
Parent's Education level		
Uneducated	1	0.2
Primary School	121	21.2
Secondary School	74	12.9
High school	167	29.2
Diploma	63	11.0
Bachelor degree	119	20.8
Master degree and higher	27	4.7
Parent's Occupational		
Agriculture	244	42.7
Contractors	66	11.5
Business/ Self-employed	129	22.6
Government service/ State enterprise	102	17.8
Factory worker	8	1.4
Employee	19	3.3
Unemployed	4	0.7
Family health history of obesity		
Father	74	12.9
Mother	116	20.3
Grandfather	21	3.7
Grandmother	24	4.2
Brother/ Sister	28	4.9
No obesity	186	32.5
More than two	123	21.5

Table 2: Health literacy levels for obesity prevention among high school students in Phatthalung Province, Thailand (N = 572)

Health literacy level / Variable	Frequency	Percentage (%)
Level of health literacy to prevent obesity		
Low (<60%)	180	31.5
Moderate (60–79%)	374	65.4
High (≥80%)	18	3.1
Functional Health Literacy to prevent obesity (1 + 2)		
Low (<60%)	97	17.0
Moderate (60–79%)	405	70.8
High (≥80%)	70	12.2
Communicative Health Literacy to prevent obesity (3 + 4)		
Low (<60%)	259	45.3
Moderate (60–79%)	286	50.0
High (≥80%)	27	4.7
Critical Health Literacy to prevent obesity (5 + 6)		
Low (<60%)	174	30.5
Moderate (60–79%)	328	57.3
High (≥80%)	70	12.2
(1) Knowledge and Understanding in Health Information for Prevent Obesity		
Absolutely Correct	249	43.5
Correct	254	44.4
Incorrect	69	12.1
(2) Accessibility of Health Information and Health Services for Prevent Obesity		
Good	101	17.7
Moderate	330	57.7
Poor	141	24.6
(3) Communication enhances Health Expertise for Prevent Obesity		
Good	33	5.8
Moderate	216	37.8
Poor	323	56.4
(4) Management of Health Conditions for Prevent Obesity		
Good	105	18.4
Moderate	309	54.0
Poor	158	27.6

Health literacy level / Variable	Frequency	Percentage (%)
(5) Know the media and information for Prevent Obesity		
Good	137	24.0
Moderate	240	42.0
Poor	195	34.0
(6) Decision Making and Choose the right action for Prevent Obesity		
Good	149	26.0
Moderate	252	44.1
Poor	171	29.9
Lifestyles Questionnaires		
Good	16	2.8
Moderate	440	76.9
Poor	116	20.3

Table 3: Personal Health status of high school students, Phatthalung province, Thailand (N = 572)

Variable	Frequency	Percentage (%)
Body mass index (BMI)		
Thinness (0–18.49)	139	24.3
Normal (18.5–22.99)	239	41.8
Overweight (23–24.99)	56	9.8
Obese level 1a (25–29.99)	88	15.4
Obese level 1b (30–34.99)	39	6.8
Obese level 2 (35–39.99)	9	1.6
Obese level 3 (40–100)	2	0.3
BMI for Age		
Severe thinness	3	0.5
Thinness	21	3.7
Normal	387	67.7
Overweight	102	17.8
Obesity	59	10.3
Waist circumference		
Normal	409	71.5
Abnormal	163	28.5

Table 4: Association between factors and health literacy to prevent obesity (N = 572)

Variables	Adequate Health Literacy	Inadequate Health Literacy	OR	p-value	95% CI
Gender					
Male	104	49	1.04	0.86	0.69-1.54
Female [ref]	288	131			
Age					
15	75	41	1.40	0.24	0.80-2.45
16	91	38	1.07	0.81	0.61-1.87
17	144	69	1.29	0.42	0.75-2.02
18 [ref]	82	32			
Religion					
Buddhism	346	161	1.13	0.68	0.64-1.99
Other [ref]	46	19			
Sufficiency of income					
Inadequate	45	24	1.19	0.53	0.70-2.02
Adequate [ref]	347	156			
Grad report					
Excellent	13	4	0.41	0.26	0.09-1.92
Good	221	91	0.55	0.28	0.19-1.63
Moderate	150	79	0.70	0.53	0.24-2.10
Not good [ref]	8	6			
Parental Marital status					
Widowed/Divorced/Seperated	79	40	1.13	0.57	0.47-1.74
Marry [ref]	313	140			
Parental Education level					
Primary school	76	46	1.78	0.03*	1.06-3.01
Secondary school	157	84	1.58	0.05	0.99-2.49
Associate Degree/Certificate	50	13	0.77	0.47	0.38-1.57
Bachelor's degree and above [ref]	109	37			
Parental Occupation					
Farming	160	84	1.80	0.03*	1.06-3.08
General employee	41	25	2.01	0.03*	1.06-4.14
Personal business	86	43	1.72	0.07	0.95-3.10
Work in a factory	6	2	1.15	0.87	0.22-6.06
Private company employees	16	3	0.64	0.51	0.17-2.41
Unemployed	4	0	0.00	0.99	0
Government employee [ref]	79	23			

Variables	Adequate Health Literacy	Inadequate Health Literacy	OR	p-value	95% CI
Family health history of obesity					
Answer more than 1	270	116	0.82	0.29	0.56-1.19
None [ref]	122	64			
BMI for Age					
Thinness	11	13	0.35	0.01*	0.15-0.8
Overweight	67	35	0.79	0.32	0.5-1.26
Obesity	40	19	0.87	0.64	0.48-1.56
Normal [ref]	274	113			
Waist circumference					
Abnormal (over standard)	112	51	1.00	0.95	0.67-1.50
Normal [ref]	280	129			
Physical activity					
Poor	116	72	1.50	0.10	0.92-2.44
Moderate	189	72	0.92	0.73	0.57-1.48
Good [ref]	87	36			
Physical activity					
Poor	116	72	1.50	0.10	0.92-2.44
Moderate	189	72	0.92	0.73	0.57-1.48
Good [ref]	87	36			
Eating Behavior					
Poor	159	86	1.34	0.11	0.94-1.91
Moderate and Good [ref]	233	94			
Stress management behavior					
Poor [ref]	115	66			
Moderate	148	69	1.19	0.35	0.82-1.75
Good	129	45	1.54	0.04*	1.02-2.31
Sugar–sweetened behavior					
6-7day/week [ref]	58	44			
4-5day/week	106	42	0.52	0.02*	0.31-0.89
3day/week	110	60	0.72	0.20	0.44-1.19
1-2day/week	108	32	0.39	0.001*	0.22-0.68
Never	10	2	0.26	0.10	0.05-1.27
Smoking behavior					
6-7day/week	6	3	1.04	0.96	0.26-4.19
4-5day/week	16	3	0.39	0.14	0.11-1.35
3day/week	17	3	0.37	0.11	0.11-1.27
1-2day/week	9	5	1.15	0.80	0.38-3.49
Never [ref]	344	166			

Variables	Adequate Health Literacy	Inadequate Health Literacy	OR	p-value	95% CI
Alcohol consumption behavior					
6-7day/week	10	3	0.80	0.74	0.22-2.97
4-5day/week	17	9	1.41	0.42	0.61-3.27
3day/week	36	15	1.11	0.75	0.59-2.12
1-2day/week	46	47	2.73	0.00*	1.72-4.34
Never [ref]	283	106	Ref	Ref	Ref
Sleep behavior					
Never [ref]	12	4			
1-2day/week	70	31	1.33	0.65	0.40-4.45
3day/week	96	42	1.31	0.65	0.40-4.31
4-5day/week	113	57	1.51	0.49	0.47-4.90
6-7day/week	101	46	1.37	0.61	0.42-4.47
Internet used behavior					
6-7day/week [ref]	153	95			
4-5day/week	111	42	0.61	0.03*	0.39-0.94
3day/week	60	17	0.46	0.01*	0.25-0.83
1-2day/week	56	17	0.49	0.02*	0.27-0.89
Never	12	9	1.21	0.68	0.49-2.98
Slim pill behavior					
4-7day/week	27	4	0.63	0.14	0.33-1.19
3day/week	11	6	1.12	0.82	0.41-3.09
1-2day/week	12	4	0.69	0.52	0.22-2.16
Never [ref]	342	166			
Health Behaviors					
Poor	72	44	4.28	0.06	0.93-19.72
Moderate	306	134	3.07	0.14	0.69-13.68
Good [ref]	14	2			
Health Behaviors					
Poor [ref]	72	44			
Moderate	306	134	0.72	0.13	0.47-1.10
Good	14	2	0.23	0.06	0.05-1.08

* *p-value* < 0.05

Results

A total of 572 high school students participated in the study. The majority were female (73.3%), and most were 17 years old (37.2%), followed by 16 years (22.6%), 15 years (20.3%), and 18 years (19.9%). Most students were in Grade 6 (42.7%), followed by Grade 4 (29.3%) and Grade 5 (28.0%). The predominant religion among participants was Buddhism (88.6%). Regarding academic performance, 54.5% of students reported good grades, while 40.0% had moderate performance, 3.0% were excellent, and 2.5% reported poor performance. In terms of household income, 49.2% of students indicated their income was sufficient with savings, and 38.8% reported sufficiency without savings. The majority of students (75.7%) stated that their parents were married and living together. Parental education levels varied, with the highest proportion having completed high school (29.2%), followed by a bachelor's degree (20.8%) and primary school (21.2%). The most common parental occupation was agriculture (42.7%), followed by self-employment (22.6%) and government service (17.8%). Regarding family health history, 32.5% of participants reported no family members with obesity, while 21.5% reported obesity in more than two family members. The most commonly reported obese relatives were mothers (20.3%) and fathers (12.9%).

Table 2 shows the distribution of health literacy levels among high school students regarding obesity prevention. The majority of students (65.4%) demonstrated a moderate level of health literacy, while 31.5% exhibited a low level, and only 3.1% reached a high level of health literacy. When examining the sub-dimensions of health literacy: Functional health literacy was found to be moderate in 70.8% of students, low in 17.0%, and high in 12.2%. Communicative health literacy was low in 45.3% of students, moderate in 50.0%, and high in only 4.7%. Critical health literacy was moderate in 57.3%, low in 30.5%, and high in 12.2%. These findings suggest that although most students possess a functional understanding of health information, communicative and critical literacy remain areas for improvement. The relatively low proportion of students with high levels in all three dimensions highlights the need for targeted health education interventions that go beyond basic knowledge and focus on developing interactive and evaluative skills.

Table 3 presents the personal health status of high school students based on body mass index (BMI), BMI-for-age, and waist circumference measurements. According to the BMI classification for Asian populations, the majority of students had a normal BMI (18.5–22.99), accounting for 41.8%. Approximately 24.3% were classified as thinness (BMI < 18.5), while 9.8% were overweight (23–24.99). A total of 15.4% had obesity level 1a (25–29.99), 6.8% had obesity level 1b (30–34.99), 1.6% had obesity level 2 (35–39.99), and 0.3% were classified as obesity level 3 (BMI ≥ 40). These results suggest that although the majority of students maintained a normal BMI, a considerable proportion (approximately 34%) were overweight or obese to varying degrees. Based on BMI-for-age classification, 67.7% of students had a normal BMI-for-age, 17.8% were categorized as overweight, 10.3% as obese, 3.7% as thin, and 0.5% were classified as severely thin. This age-adjusted data reinforces the finding that most students fall within a healthy weight range, though a notable proportion are overweight or obese—indicating an increased risk of future non-communicable diseases (NCDs). In terms of waist circumference, 71.5% of participants had a normal waist circumference, while 28.5% exhibited abnormal (high-risk) waist circumference levels. This suggests that nearly one-third of the students may be at increased risk for abdominal obesity, which is frequently associated with metabolic disorders.

The associations between individual, familial, and behavioral factors and health literacy to prevent obesity were analyzed using multiple logistic regression (Table 4). The results revealed several statistically significant associations: Parental education level was significantly associated with students' health literacy. Students whose parents had completed only primary school were 1.78 times more likely to have adequate health literacy compared to those whose parents held a bachelor's degree or higher (OR = 1.78, 95% CI = 1.06–3.01, p = 0.03). Parental occupation was also significantly associated. Students whose parents were general employees (OR = 2.01, 95% CI = 1.06–4.14, p = 0.03) or farmers (OR = 1.80, 95% CI = 1.06–3.08, p = 0.03) were significantly

more likely to have adequate health literacy compared to those with parents in government employment. BMI-for-Age, found to be significantly associated with adequate health literacy. After combining the "Severe thinness" and "Thinness" groups into one category, participants with thinness (combined) were significantly less likely to have adequate health literacy compared to those with normal BMI. The odds ratio (OR) was 0.35 (95% CI: 0.15–0.80, p = 0.013), indicating a strong negative association. In contrast, those in the overweight (OR = 0.79, 95% CI: 0.50–1.26, p = 0.318) and obese (OR = 0.87, 95% CI: 0.48–1.56, p = 0.638) categories showed no statistically significant difference in health literacy when compared to the normal group. Stress management behavior had a strong association. Students with poor behavior were significantly more likely to report adequate health literacy (OR = 2.72, 95% CI = 1.48–5.01, p = 0.001), as were those with moderate behavior (OR = 2.08, 95% CI = 1.23–3.52, p = 0.006), compared to those with good stress management. Sugar-Sweetened Beverage Consumption, compared to adolescents who consumed sugar-sweetened beverages 6–7 days/week, those who consumed such beverages 1–2 days/week were significantly more likely to have adequate health literacy (OR = 0.39, 95% CI = 0.22–0.68, p = 0.001). Also, those who drank 4–5 days/week had a significantly lower likelihood (OR = 0.52, p = 0.02). This suggests an inverse relationship between frequency of sugar-sweetened drink consumption and health literacy. Alcohol Consumption, unexpectedly, those who drank 1–2 days/week were 2.73 times more likely to have adequate health literacy ($p < 0.001$; 95% CI: 1.72–4.34) compared to non-drinkers. Other drinking frequencies (3–7 days/week) did not show a statistically significant association with health literacy. This finding may appear counterintuitive as abstinence is generally associated with better health outcomes. However, those who consumed alcohol occasionally (1–2 days/week) may possess greater awareness and decision-making skills, enabling moderate and informed behavior. It is also possible that self-reporting bias or cultural norms influenced the outcome. Variables such as gender, age, religion, income sufficiency, family history of obesity, sleep patterns, smoking, and eating behaviors were not significantly associated with health literacy in this study ($p > 0.05$).

Discussion

This study aimed to examine the factors associated with health literacy (HL) for obesity prevention among high school students in Phatthalung Province, Thailand. The findings revealed several statistically significant associations between personal characteristics, family background, and health-related behaviors and the students' levels of health literacy. These results underscore the multifactorial nature of health literacy and highlight the importance of considering both individual and contextual factors when developing health promotion strategies targeting adolescents.

One of the key findings of this study is the association between parental education and students' health literacy. Interestingly, students whose parents had completed only primary or secondary education were more likely to have adequate health literacy compared to those whose parents held a bachelor's degree or higher. This may reflect greater attentiveness to health or more active participation in community-based health promotion programs among families with lower educational backgrounds. However, this finding contradicts previous studies, which typically report a positive correlation between higher parental education and children's health literacy[13], indicating a need for further context-specific investigation. Parental occupation also significantly influenced student health literacy. Students whose parents were employed in agriculture or general labor had higher odds of possessing adequate health literacy. These occupations may allow for more time spent at home, enabling family-based health discussions, or may provide greater exposure to local health volunteers or community health workers, as observed in similar rural studies[8]. Another notable finding was that students classified as thin based on BMI-for-age were more likely to demonstrate adequate health literacy than those with normal weight. This may reflect increased body image awareness or concern about nutrition among underweight adolescents. However, no significant association was observed for students who were overweight

or obese—contrasting with existing literature that links higher health literacy with healthier weight status[13]. Contrary to expectations, students with poor physical activity levels were more likely to exhibit adequate health literacy. This may suggest a disconnect between knowledge and behavior—students may be aware of obesity-related risks but fail to translate that knowledge into active lifestyles. This phenomenon aligns with behavior-change models such as the Health Belief Model[14]. Similarly, students who reported poor stress management behaviors also had higher health literacy levels, which may indicate heightened awareness of stress-related health risks without corresponding coping strategies. Unexpectedly, students who consumed sugar-sweetened beverages less frequently (1–2 days per week) were less likely to have adequate health literacy than those who consumed them daily. While counterintuitive, this may reflect underreporting of consumption, or suggest that health literacy alone may not fully predict dietary behavior. In contrast, alcohol consumption (1–2 days per week) was associated with higher odds of adequate health literacy, possibly reflecting a subgroup of students who are both socially exposed and more aware of health issues, highlighting a complex interplay between awareness, age, and lifestyle risk-taking. Furthermore, internet use demonstrated an inverse relationship with health literacy. Students who used the internet less frequently had lower odds of possessing adequate health literacy compared to daily users. This supports the notion that regular internet use can enhance access to health information, especially among digitally native adolescents[15]. Finally, factors such as gender, age, religion, income sufficiency, family history of obesity, sleep patterns, smoking, and eating behaviors showed no statistically significant associations with health literacy in this study, suggesting that health literacy may be shaped more by behavioral, informational, and educational exposures than by demographic characteristics alone.

Conclusion

This study highlights several behavioral and parental factors that significantly influence health literacy for obesity prevention among Thai high school students. Key factors associated with higher health literacy include parental occupation and education, BMI-for-age, physical activity levels, stress management behaviors, alcohol consumption, sugar-sweetened beverage intake, and internet usage. The results underscore a critical gap between health knowledge and actual health behavior, reinforcing the need for comprehensive, school-based health education programs that go beyond information delivery and focus on behavior change, critical thinking, and life skills development. Health literacy interventions should be tailored to students' real-life environments and involve families and communities, especially in rural settings. Future studies should explore these associations longitudinally and qualitatively to better understand the motivations and barriers behind adolescent health literacy and behavior. A key limitation of this study is the use of self-administered questionnaires, which may be subject to recall bias and social desirability bias, particularly in the self-reporting of health behaviors such as dietary habits, physical activity, and alcohol consumption.

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References

1. World Health Organization. Obesity and overweight [Internet]. Geneva: WHO; 2017 [cited 2018 Jan 28]. Available from: http://www.who.int/en/news-room/fact-sheets/detail/obesity-and-overweight
2. Infographic Thailand [Internet]. 2017 [cited 2017 Jan 20]. Available from: http://www.infographicthailand.com

3. Diabetes Association of Thailand. Briefing book No. 38 [Internet]. 2017 [cited 2017 Jan 20]. Available from: http://www.dmthai.org/sites/default/files/briefingbook_38.pdf

4. Phatthalung Province. Provincial history [Internet]. 2017 [cited 2017 Jan 20]. Available from: http://www.phatthalung.go.th/history

5. Bureau of Policy and Strategy, Ministry of Public Health. Thailand health profile 2005–2007. Bangkok: Ministry of PublicHealth;2008[cited2018Jan28].Availablefrom:http://www.moph.go.th/ops/thp/index.php?option=com_content&task=view&id=6&Itemid=2&lang=en

6. Phatthalung Provincial Health Office. Health inspection report [Internet]. 2017 [cited 2017 Jan 20]. Available from: http://203.157.229.18/inspec/pdf_phatthalung_258.pdf

7. World Health Organization. Health literacy: The solid facts [Internet]. Copenhagen: WHO Regional Office for Europe; 2013 [cited 2017 Jan 20]. Available from: http://www.who.int/healthpromotion/conferences/9gchp/health-literacy/en/

8. Nutbeam D. Health promotion glossary. 2nd ed. Geneva: World Health Organization; 1998.

9. Department of Health Education, Ministry of Public Health. [Title unavailable]. 2017.

10. Krejcie RV, Morgan DW. Determining sample size for research activities. Educ Psychol Meas. 1970;30(3): 607–10.

11. Intarakamhang I. Health literacy: Measurement and development. Bangkok: Behavioral Science Research Institute, Srinakharinwirot University; 2017.

12. Health Literacy Office, Ministry of Public Health; Srinakharinwirot University. Health literacy scale for Thai childhood overweight. Bangkok: Ministry of Public Health; 2014.

13. Chang LC. Health literacy, health status, and health behaviors of adolescents in Taiwan. J Pediatr Nurs. 2017;32:e1–e6. https://doi.org/10.1016/j.pedn.2016.10.002

14. Glanz K, Rimer BK, Viswanath K. Health behavior and health education: Theory, research, and practice. 4th ed. San Francisco: Jossey-Bass; 2008.

15. Norman CD, Skinner HA. eHealth literacy: Essential skills for consumer health in a networked world. J Med Internet Res. 2006;8(2):e9. https://doi.org/10.2196/jmir.8.2.e9