ความสัมพันธ์ระหว่างความรอบรู้ด้านสุขภาพกับภาวะน้ำหนักเกินและโรคอ้วน ในนักเรียนวัยรุ่น จังหวัดยะลา
Relationship between Health Literacy and Overweight and Obesity among Adolescent Students in Yala Province

นิพนธ์ต้นฉบับ

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Original Article

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บทคัดย่อ

วัตถุประสงค์: เพื่อศึกษาความสัมพันธ์ระหว่างความรอบรู้ด้านสุขภาพกับภาวะน้ำหนักเกินและโรคอ้วน และความสัมพันธ์ระหว่างปัจจัยภูมิหลังส่วนบุคคลและครอบครัวกับความรอบรู้ด้านสุขภาพ **วิธีการศึกษา:** เป็นการศึกษาเชิงสำรวจแบบภาคตัดขวางในนักเรียนชั้นมัธยมศึกษาตอนปลายในสายสามัญและสายอาชีพ จังหวัดยะลา จำนวน 324 คน สุ่มตัวอย่างแบบหลายขั้นตอน เครื่องมือที่ใช้ในการวิจัยได้แก่แบบสอบถาม ซึ่งทดสอบค่าสัมประสิทธิ์ความเชื่อมั่นของครอนบาคได้เท่ากับ 0.87 วิเคราะห์ข้อมูลโดยใช้สถิติพรรณนา และ Chi-square test **ผลการศึกษา:** ความรอบรู้ด้านสุขภาพด้านทักษะการสื่อสารมีความสัมพันธ์กับภาวะน้ำหนักเกินและโรคอ้วนของนักเรียนวัยรุ่นอย่างมีนัยสำคัญทางสถิติ (*P*-value < 0.05) รายได้ครอบครัว (มากกว่า 10,000 บาทต่อเดือน) อาชีพของผู้ปกครอง (ข้าราชการ รัฐวิสาหกิจ พ่อค้า นักธุรกิจหรือเอกชน) และระดับชั้นปีที่ศึกษา (มัธยมศึกษาปีที่ 4 และประกาศนียบัตรวิชาชีพปีที่ 2) มีความสัมพันธ์กับความรอบรู้ด้านสุขภาพด้านทักษะการสื่อสารอย่างมีนัยสำคัญทางสถิติ (*P*-value < 0.05) **สรุป:** ผู้วางแผนนโยบายควรมุ่งเน้นการพัฒนาความรอบรู้ด้านสุขภาพด้านทักษะการสื่อสารเพื่อป้องกันภาวะน้ำหนักเกินและโรคอ้วนในนักเรียนวัยรุ่นและผู้ปกครองที่ประกอบอาชีพเกษตรกรและรับจ้างทั่วไปที่มีรายได้น้อยและการศึกษาต่ำ พร้อมทั้งฝึกอบรมให้บุคลากรสาธารณสุขสามารถเพิ่มทักษะของนักเรียนในการฟัง อ่าน พูด เขียน สื่อสารให้ผู้อื่นเข้าใจและสามารถโน้มน้าวผู้อื่นให้ยอมรับแนวทางการปฏิบัติตัวเพื่อให้มีพฤติกรรมสุขภาพที่ถูกต้อง

คำสำคัญ : ความรอบรู้ด้านสุขภาพ, ทักษะการสื่อสาร, ภาวะน้ำหนักเกิน, โรคอ้วน, นักเรียน

Abstract

Objective: To study the relationship between health literacy and overweight and obesity, and the relationship between personal and family backgrounds and health literacy. **Method:** A cross-sectional survey study was conducted on 324 upper secondary and vocational students in Yala province. A multistage sampling technique was used. The research instrument was a questionnaire, which was tested and resulted in a Cronbach's alpha coefficient of 0.87. Data were analyzed using descriptive statistics and Chi-square test. **Results:** Communication skills on health literacy were related to overweight and obesity among adolescent students (*P*-value < 0.05). Family income (greater than 10,000 Baht per month), occupation of parents (as government officials, state enterprise workers, merchants, businessmen, or private sector workers), and students' year of study (1st year of high school or 2nd of vocational school) were related to communication skills on health literacy (*P*-value < 0.05). **Conclusion:** Policy planners should focus on developing communication skills on health literacy to prevent overweight and obesity among teenage students, especially those with parents who are farmers and general contractors with low incomes and low education levels. Public health personnel should be trained to promote student skills in reading, speaking, writing, and communicating information to assist others in understanding the issues related to overweight and obesity, and to persuade others to accept the relevant practical guidelines.

Keywords: health literacy, communication skills, overweight, obesity, students

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Introduction

Overweight and obesity among teenagers is a major public health problem worldwide.[1] It is estimated that 254 million children aged 5-19 years will become obese by 2030.[1] The People's Republic of China will have the most obese children of that age at 61 millions. In comparison, Thailand (ranked 21st in the world) is estimated to have 2 million obese school-aged children, anticipating that up to 20.3% of Thai adolescents aged 10 - 19 years will become obese in that year. A survey in 2016 found that there were 11.8% and 7.3% obese Thai male and female adolescents, respectively.[1] People with obesity are at risk of cardiovascular diseases, hypertension, diabetes mellitus, and cancer, which result in an increase in global health expenditures.[2] There are many key factors, such as health literacy and personal and family backgrounds, that affect overweight and obesity in adolescents.[3-5]

This research used the health literacy concept of Manganello which states that demographic characteristics

affect health literacy and health literacy further affects health behavior.[6] Herein, health literacy is defined by Nutbeam[7] as people's competence to access, understand, assess, and use knowledge, and communicate about health information as needed to promote and maintain good health throughout life. The concept of health literacy as a factor in preventing diseases can be divided into three levels specifically functional literacy meaning the ability to read and write, interactive literacy referring to the social skills required for communication, and critical literacy meaning the use of skills to analyze, evaluate, and apply information to make appropriate decisions for one's own lifestyle. Health literacy consists of six components namely health cognitive skills, decision-making skills, health information access skills, communication skills, self-management skills, and media literacy skills.[8] Adolescents who possess less health literacy have a higher risk of overweight and obesity[3,4,9] because they tend to lack the ability to seek and check for accurate health information, to take care of themselves to prevent diseases, to analyze the pros and cons of health practice in order to select proper health practices, which collectively results in poor health behaviors[8], e.g., consuming fast foods and unhealthy snacks, and omitting exercise.[10]

Individual characteristics and family background such as age, year of study, and family income affect health literacy.[11,12] For example, 3rd year and 4th year nursing students have more health literacy than students in early years because they have had the opportunity to talk to patients and health professionals while interning at clinics, thus, increasing their health literacy.[12] Therefore, there is a need for studies of health literacy, individual characteristics, and family backgrounds as factors which could influence increasing knowledge and gaining understanding in the prevention of overweight and obesity. Since obesity affects both short-term and long-term health in adolescents, obesity in the teenage life stage can lead to obesity in adulthood and is associated with premature morbidity and mortality rates in adults.[13] If adolescents who represent the work force in a family unit have inappropriate health behaviors and health problems, then that would further cause the nation to lack a quality labor-aged population.

Even though overweight and obesity affects teenage health, only a small number of research have been conducted to study the relationship between health literacy and overweight and obesity in adolescents. Most studies were on obesity in childhood and lower secondary school students.[3,9,14]

Even though there have been studies in upper secondary school students, those studies aimed only to determine overall, not individual components of health literacy.[4,15] Therefore, each component of health literacy should be studied to understand its relationship with overweight and obesity. The study outcomes could be used to propose guidelines for overweight and obesity prevention in adolescents, either at the individual, family, school, community, regional, or national level.[13,14] For example, a research found that the lower the health literacy in teenagers, the greater the overweight and obesity. These researchers suggested a public health policy to screen the health literacy levels of lower and upper secondary school students in order to identify students with low health literacy and organize programs to raise health literacy for those students.[14] Furthermore, most studies on the factors related to health literacy were conducted among adults and university students[11,12,16], and only a few were done in upper secondary students.

In Yala, a southern province in Thailand, like other provinces, the relationship between health literacy components with overweight and obesity and the factors related to health literacy in high school students are still largely unknown. Fom 2017 to 2019, 22,692 people aged 15 years or older in Yala had become obese.[17] The provincial district was found to have the highest prevalence of obesity at 23.42%. This study aimed to examine the relationship between each component of health literacy and overweight and obesity, with health literacy components as independent variables and overweight and obesity as a dependent variable. In addition, this study aimed to determine the relationship between personal and family background factors as independent variables and health literacy components as dependent variables. The assumptions were that health literacy was related to overweight and obesity, and personal and family background factors were related to health literacy. The results could be used to formulate guidelines for teachers, as well as health policy makers, in promoting health literacy for high school students in the provincial district of Yala province in order to prevent overweight and obesity.

Methods

This research was a cross-sectional survey study. The research population consisted of 6,931 students in high school

or equivalent level, specifically, 5,835 students from 5 general upper secondary high schools and 1,096 students from 2 vocational schools, in the academic year 2018 at 7 locations within the Yala city municipality in the Yala provincial district.

The study sample was students at upper secondary or equivalent level from two schools, i.e., a high school and a vocational school, as a result of simple random sampling at the school level. The sample size was determined by G*power 3.1[18] based on a Chi-square statistical analysis. The effect size at a moderate level of 0.25 was based on a previous study of adolescent health behavior.[19] Statistical significance value was set at P-value < 0.05, and a test power value was defined at 0.95, which made the sample a better representative of the population and yielded more accurate test results.[20] The obtained sample size was 324 students. To be proportional to the study population regarding school type, a sample of 273 and 51 students from high school and vocational school, respectively, was expected.

In terms of sampling process, once stratified by school type, one upper high school and one vocational school were selected by simple random sampling method (Figure 1). Each school was then stratified by year of study, specifically grades 10, 11 and 12 for high school and years 1, 2 and 3 for vocational school. Number of prospective participating students were proportional to the respective total number of students in each year of study (89, 84 and 100 high school students of grades 10, 11, and 12, respectively, and 18, 17 and 16 vocational school students of years 1, 2, and 3, respectively). Each year of study was further stratified by gender and individual participating students were selected by simple random sampling method to achieve a sample with gender ratio proportional to the total number of each gender in each year of study (Figure 1).

Based on the target population, participants were male and female students aged 15 - 19, currently studying in the first semester of the academic year 2018. They were willing to participate and their permission to participate was granted by their legal guardians.

Research instruments

Scales and height gauges were used for measurements in order to calculate Body Mass Index (BMI) of all students. Based on the BMI standard for Asians[21], students were divided into two groups, specifically those not overweight nor obese (BMI < 23 kg/m^2) and those who were (BMI $\geq$ 23 kg/m^2).
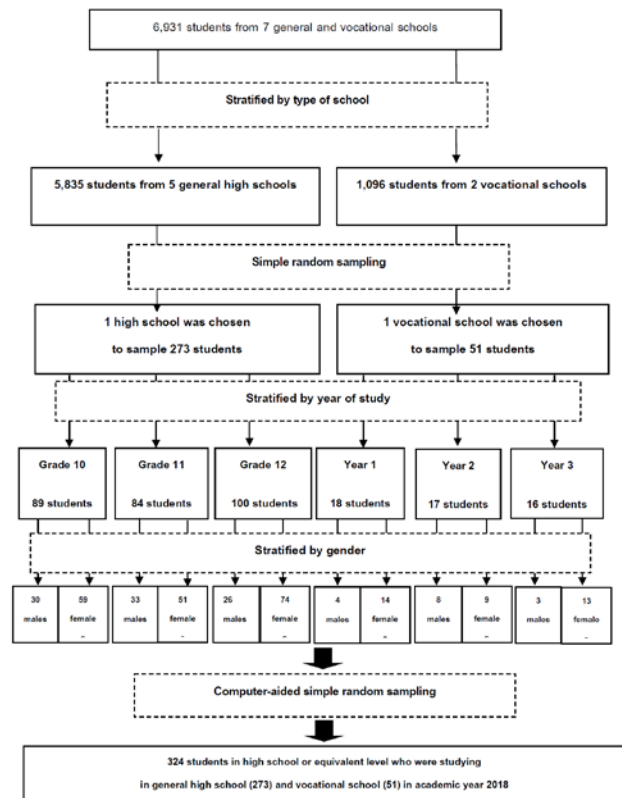
Figure 1 Participant sampling procedure.

The questionnaire consisted of 2 parts, with 13 items asking personal and family backgrounds and 35 items evaluating health literacy. The researcher developed the question items from the health literacy questionnaire of the Health Education Division, Ministry of Public Health, because it was a reliable tool and consistent with objectives in this present study.[8,22] Original question items regarding emotion, smoking, and alcohol cessation were discarded; while those on dietary and exercise behaviors were maintained. Some texts were adjusted to focus on dietary and exercise behaviors, while 3 additional question items of decision-making skill were also created to complete the number of questions as in the original questionnaire, thus maintaining its orginal scale concepts.

Content validity was examined by three experts using the Item Objective Congruence (IOC) index. With IOC coefficients between 0.67 and 1.00 for all items, the questionnaire had an acceptable content validity. Internal consistency reliability was also acceptable with a Cronbach's alpha coefficient of 0.87 from the pilot test. The pilot test study was conducted in 15 students in a high school and 15 students a vocational school other than the two schools the main study was taken.

The health literacy questions were divided into six components[8] as follows. **First**, knowledge and understanding

on health or cognitive skill was referred to the application of knowledge and understanding about diet and exercise in right and suitable practices for obesity prevention. There were 10 questions with a score of 1 point for each correct answer and 0 for each wrong one. With a possible total score of 10 points, cognitive skill health literacry was classified into poor (0 – 5 points or less than 60%), fair (6 – 7 points or 60% to less than 80%), and very good (8 – 10 points or 80% to 100%).[8]

In the **second** component, decision-making skill was defined as the ability to reason or analyze the positive and negative effects of dietary and exercise practices in order to inhibit harmful and inappropriate behaviors for obesity prevention. There were five multiple-choice questions with response options of 1-no concern on one's own health regardless of good or bad effects on health, 2-somewhat improper decision made but beginning to focus on practices that are good for health, 3-proper decision made based on practices good for oneself health only, and 4-proper decision made based on practices good for health of oneself and others. With a possible total score of 20 points, decision making skill health literacry was classified into three levels, specifically poor (1 – 11 points or less than 60%), fair (12 – 15 points or 60% to less than 80%), and very good (16 – 20 points or 80% to 100%).[8]

The **third** component, access to health information skill, was referred to the ability to select information sources, to find information about dietary and exercise practices to prevent obesity, and to verify the reliability of information using other sources. The **fourth** component, communication skill, was defined as the ability to speak, read, and write, as well as communicate and persuade others to realize and accept obesity prevention information. In the **fifth** component, self-management skill was referred to the ability to set goals and to plan, and implement dietary and exercise behaviors correctly and appropriately in order to prevent obesity. The **sixth** component, media literacy skill was defined as the ability to check the accuracy and credibility of the information presented by the media regarding diet and exercise as well as the ability to avoid health risks that may occur in oneself and others in order to prevent obesity. In the components 3 to 6, there were five questions in each component with a 3-point rating scale ranging from 1-never, to 2-sometimes, and 3-every time. With a possible total score of 15 points for each component, each component was classified into three level,

specifically poor (1 – 8 points or less than 60%), fair (9 – 11 points or 60% to less than 80%), and very good (12 – 15 points or 80% to 100%).[8] The whole questionnaire took about 15 minutes to complete.

Data collection procedure

The schools' administrators, teachers, and related personnel were contacted in order to request assistance and clarify the research objectives, as well as to schedule an appointment for data collection with the participants. The researcher handed out the questionnaires and collected them back personally. This research had been approved by the Songkhla Rajabhat University Ethics Committee in Human Research (Number EH2018-005).

Data analysis

Data were examined for accuracy and then analyzed by SPSS Version 20. For personal data, frequency with percentage and mean were used for descriptive statistics. For analysis of the relationship between health literacy and overweight and obesity, and the relationship between health literacy and personal and family background factors, Chi-square statistic test was used. In this regard, to analyze the relationship between the students' year of study and communication skills, number of participants with poor and fair levels of literacy were combined since the observed count was zero.

Results

Of the 324 participants, the majority were female (68.2%) and Buddhist (70.1%) with an average age of 16.7 years and a mean BMI of 21.2 kg/m^2. As expected, the participants were mostly studying in a general school (84.6%). The average number of family members was 5 people. They lived with either a single parent (89.5%) or with both their parents (65.4%). Their total family income was in a range of 10,001 - 20,000 Baht/month (45.1%), and the occupations of their parents with dependent students were mainly as farmers and general contractors (66.0%). Educational level of the majority of parents with dependent students was lower than a Bachelor's degree (52.1%).

Communication skill on health literacy was related to overweight and obesity among adolescent students with statistical significance (*P*-value < 0.05); whereas other components of health literacy skill were not (Table 1).

Specifically, students with very good communication skill were less likely to be overweight or obese.

Table 1 Relationship between health literacy and overweight and obesity (N = 324).

Health literacy	Overweight and obesity, N (%)		χ^2	df	P-value
	Yes (N = 75)	No (N = 249)			
Cognitive skill			2.509	2	0.285
Poor	49 (65.3)	137 (55.0)			
Fair	21 (28.0)	90 (36.1)			
Very good	5 (6.7)	22 (8.8)			
Information access skill			1.698	2	0.428
Poor	4 (5.3)	6 (2.4)			
Fair	57 (76.0)	198 (79.5)			
Very good	14 (18.7)	45 (18.1)			
Communication skill			8.512	2	**0.014**
Poor	4 (5.3)	5 (2.0)			
Fair	66 (88.0)	196 (78.7)			
Very good	5 (6.7)	48 (19.3)			
Decision-making skill			2.566	2	0.277
Poor	25 (33.3)	60 (24.1)			
Fair	30 (40.0)	111 (44.6)			
Very good	20 (26.7)	78 (31.3)			
Self-management skill			0.039	2	0.857
Poor	3 (4.0)	14 (5.6)			
Fair	62 (82.7)	203 (81.5)			
Very good	10 (13.3)	32 (12.9)			
Media literacy skill			1.120	2	0.571
Poor	4 (5.3)	7 (2.8)			
Fair	60 (80.0)	205 (82.3)			
Very good	37 (14.9)	11 (14.7)			

Note: χ^2 = Chi-square test; df = degree of freedom.

Table 2 Relationship between personal and family background factors and communication skill on health literacy (N = 324).

Variables	Communication skill, N (%)			χ^2	df	P-value
	Poor (N = 9)	Fair (N = 262)	Very good (N = 53)			
Age (yrs)				2.599	2	0.273
15 - 16	4 (44.4)	98 (37.4)	26 (49.1)			
17 - 18	5 (55.6)	164 (62.6)	27 (50.9)			
Gender				5.391	2	0.068
Male	1 (11.1)	79 (30.2)	23 (43.4)			
Female	8 (88.9)	183 (69.8)	30 (56.6)			
Religion				2.007	2	0.367
Buddhism	7 (77.8)	187 (71.4)	33 (62.3)			
Others (Islam/Christianity)	2 (22.2)	75 (28.6)	20 (37.7)			
School type				4.063	2	0.131
General high school education	8 (88.9)	226 (86.3)	40 (75.5)			
Vocational education	1 (11.1)	36 (13.7)	13 (24.5)			
Number of family members				1.617	2	0.446
1 – 3	2 (22.2)	107 (40.8)	19 (35.8)			
≥ 4	7 (77.8)	155 (59.2)	34 (64.2)			
Living with parents				1.391	2	0.499
Yes	7 (77.8)	235 (89.7)	48 (90.6)			
No	2 (22.2)	27 (10.3)	5 (9.4)			
Parents living status				0.018	2	0.991
Live together	6 (66.7)	171 (65.3)	35 (66.0)			
Separated	3 (33.3)	91 (34.7)	18 (34.0)			
Total family income (Baht/month)				18.745	2	**0.001**
≤ 10,000	8 (88.9)	68 (26.0)	11 (20.8)			
> 10,000	1 (11.1)	194 (74.0)	42 (79.2)			
Occupations of parents				8.090	2	**0.018**
Farmers and general contractors	8 (88.9)	179 (68.3)	27 (50.9)			
Non-farmers and general contractors	1 (11.1)	83 (31.7)	26 (49.1)			
Parents' education				1.575	2	0.455
Lower than Bachelor's degree	6 (66.7)	130 (52.8)	22 (45.8)			
Bachelor's degree and higher	3 (33.3)	116 (47.2)	26 (54.2)			

Note: χ^2 = Chi-square test; df = degree of freedom.

Family income, occupations of parents, and students' year of study were also related to communication skills on health literacy with statistical significance ($P < 0.05$) (Tables 2 and 3); whereas age, gender, religion, school type, number of family members, living situation with parents, status of parents, and educational level of parents were not (Table 2).

Table 3 Relationship between year of study and communication skill on health literacy (N = 324).

Variables	Communication skill, N (%)		χ^2	df	P-value
	Poor/Fair	Very good			
Senior high school			7.866	2	**0.020**
Grade 10	73 (31.2)	21 (52.5)			
Grade 11	71 (30.3)	11 (27.5)			
Grade 12	90 (38.5)	8 (20.0)			
	(N = 234)	(N = 40)			
Vocational school			9.738	2	**0.008**
Year 1	16 (43.2)	2 (15.4)			
Year 2	8 (21.6)	9 (69.2)			
Year 3	13 (35.1)	2 (15.4)			
	(N = 37)	(N = 13)			

Note: χ^2 = Chi-square test; df = degree of freedom.

Discussions and Conclusion

This study found that there was a relationship between communication skills on health literacy and overweight and obesity among teenage students in Yala province. Communication skills in this research meant that students were able to understand suggested practices from others and to suggest these practices to family members and friends in an understandable and effective manner, including reading various practical documents. These skills involved listening, speaking, reading, and writing, as well as skills in convincing others to understand dietary and exercise practices in order to prevent obesity. This finding was in accordance with the study results of Shih et al,[9] which explained the relationship that students with poor health literacy were usually obese. In addition, the study results of Sharif and Blank confirmed that minors with a lower health literacy had a higher BMI.[3]

The teenage students who were participants in this study especially those with very good communication skills were mostly neither overweight nor obese (19.3% were not overweight or obese vs. 6.7% were overweight or obese). This could be because students who were neither overweight nor obese might better understand what others have suggested with regard to their health practices. They were able to read, acquire information, and discuss health issues on obesity prevention with their family and friends more than students who were overweight and obese. This was consistent with

Nutbeam who stated that health literacy is the result of the ability to use knowledge and communication skills, which is a highly intellectual skill set to apply information in comparative analysis and to manage situations in daily life.[7] In addition, these skills enable students to handle situations of surrounding problems that affect self-health in order to be able to decide and choose actions that promote and maintain good health continually and to relay such actions to persuade others to act in the same manner.

This research found that the health literacy components of cognitive skill, access to health information skill, decision-making skill, self-management skill, and media literacy skill were not related to overweight and obesity among adolescent students. This was consistent with the studies of Farideh & Rahman[23] and Moghaddam et al[11] which found no such relationship in adolescents or medical science students. Possibly apart from health literacy, there may be other factors (e.g. lifestyle, culture, etc.) that influence BMI.

The relationship that was found between family income and communication skill on health literacy was in accordance with the findings of Moghaddam et al,[11] which found that the higher the family income the higher the health literacy. As seen in this study, the students in high-income families of more than 10,000 Baht per month possessed communication skill on health literacy at a level higher than students in low-income families. It may be likely that students from low-income families may not be able to fully benefit from health information, most of which can be accessed via the internet. A study by Zia et al found that students who could access more information were highly capable to communicate by listening, speaking, reading, and writing at a higher level than students who have less access to information.[24] Students from high-income families may have the chance to access the internet at all times, while students from low-income families may be able to access the internet on certain occasions or sometimes only in areas providing free internet (e.g. schools). This was consistent with Nutbeam who stated that communication gives people an assistance with health decisions.[7]

In addition, parents' occupations were related to communication skill on health literacy in adolescent students. This was consistent with the study of Alseraty which found that maternal education had a relationship with health-related communication of students aged 12 - 16 years in Egypt.[25] Students with parents who have a secure career, such as engineer or government personnel, could have good health-related communication. On the other hand, the results of a health-related communication study in Thailand found that the majority of a sample population who were farmers and only finished high school or received a vocational certificate were lacking in communication skills with regard to dietary and exercise practices.[26]

Results of this study indicated that there were more high school students with very good communication skills in grade 10 than those in grades 11 and 12. There was the least number of students with very good communication skills in grade 12. With regard to vocational education, there were more students with very good communication skills from year 2 than those in years 1 and 3. This was in accordance with Erunal et al who stated that level of communication skills depended on the stimulation that arouses learners or the opportunity to gain knowledge at a certain time.[12]

In summary, communication skill regarding health literacy is important. If students whether in general or vocational school possessed a very good level of health literacy in this component, especially with regards to dietary and exercise behaviors, the likelihood of being overweight or obese could be low. Family income of more than 10,000 Baht per month and parents' occupations as government officials, state enterprise workers, merchants, businessmen, or private sector workers, as well as students' year of study in the first year of high school or second year of vocational school were associated with good communication skills on health literacy when compared to other groups.

Therefore, a crucial suggestion is for policy planners to focus on instilling communication skills on health literacy for students with parents who are farmers or general contractors with low income and low education. Public health personnel should be trained to be able to conduct activities with students and parents for the prevention of obesity, for example, game playing, practicing of negotiating or abstaining, role playing, storytelling, and establishing an online social group to share health information within the group. These activities need to emphasize developing the capability of participants to communicate (e.g., reading, speaking, and writing), to persuade others to accept practical guidelines, and to be role models in health behavior. Health personnel should also be responsible in arranging and providing health counseling to students by collaborating with education institutions so that students can access health services easily and conveniently.

Education institutions should prepare courses for students of all years to have activities to continually boost communication skills on health literacy. School administrators should support free internet inside the school to let students have more access to health information and seek out more useful health-related media. This would help students peruse useful information, make decisions on health-related matters, and act accordingly.

This research had limitations in that it did not represent the population of other age groups and from other provinces. There may also be many other factors that are related to health literacy. Future research should study other variables, including students' personal backgrounds and family factors such as parents' BMI, sickness records, diet type, dietary and exercise behaviors, support system for exercise, online gaming behavior, etc. Future research should also study lifestyle and culture which may affect health literacy and overweight and obesity, as well as the effectiveness of organizing enhancement programs on communication skills related to health literacy in order to prevent overweight and obesity in teenage students.

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