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# Sociocultural, health knowledge, and health literacy among children ages 9–10 years in Thailand

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## Abstract:

**BACKGROUND:** Health literacy (HL) enables a person to make good decisions regarding health care, disease prevention, and health promotion to maintain and improve health. In Thailand, most existing studies focus on adults' HL rather than children. This research aimed to determine the influence of sociocultural and health knowledge on HL among children ages 9–10 years in Thailand.

**MATERIALS AND METHODS:** A cross-sectional study was conducted among 1650 children aged 9–10 years. The respondents were recruited using multistage random sampling from 39 primary schools of 13 provinces in all four regions of Thailand. A self-administered structured questionnaire was used to collect the required data. The multilevel analysis was used to determine the association between sociocultural, health knowledge, and HL while controlling the effects of covariates. The result was presented as adjusted odd ratios and its 95% confidence interval (CI).

**RESULTS:** Of the total 1650 respondents, 86.24% (95% CI: 84.49%–87.82%) had adequate and excellent levels of HL. The multivariable analysis indicated factors that were significantly associated with adequate and excellent levels HL including adequacy of per diem (adjusted odds ratio [adj. OR] = 6.78; 95% CI: 3.54–12.97) and had good relationship with teachers (adj. OR = 2.19; 95% CI: 1.55–3.09). Sources of health education which were received health education from parents (adj. OR = 3.51; 95% CI: 2.39–5.14), from teachers (adj. OR = 2.03; 95% CI: 1.43–2.89), and from the Internet (adj. OR = 1.83; 95% CI: 1.12–2.99) were also significantly associated with HL. Another significant factor was had good level of health knowledge (adj. OR = 1.86; 95% CI: 1.30–2.66) when control clustering effect of region, provinces, school, and classroom size.

**CONCLUSIONS:** More than 85% of children ages 9–10 years in Thailand had adequate and excellence levels of HL. Sociocultural and health knowledge had influence on children HL.

## Keywords:

Children ages 9–10 years old, health knowledge, health literacy, sociocultural

## Introduction

Health literacy (HL) has become an important public health issue. The principle of HL has evolved from what was initially a focus on an individual's ability to assess and understand health information, to focusing on factors that influence an individual's knowledge, motivation and competencies in relation to health.<sup>[1,2]</sup> The World Health Organization defines HL as the cognitive and social skills which

determine the motivation and ability of an individual to gain access to, understand, and use information in ways which promote and maintain good health,<sup>[3]</sup> which is similar with the concept of Sørensen *et al.*<sup>[4]</sup> In addition, HL has been recognized as one of the critical determinants of health.<sup>[3]</sup> In a public health perspective, children and young people constitute a core target group for HL research and intervention as during childhood and youth, fundamental cognitive, physical, and emotional development processes take place.<sup>[5]</sup> Hence, targeting children

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and young people with HL interventions can help promoting healthy behaviors and ameliorate future health risks and health-related behaviors and skills develop. According to Zone of Proximal Development Theory of Vygotsky which stated that children aged between 9 and 10 years is the duration of the difference between a child's development of the actual developmental level as determined by independent problem-solving and the potential development as determined through problem-solving under adult guidance or in collaboration with more capable peers.<sup>[6]</sup> A similar trend can be observed in younger age groups. Adolescents' HL, for instance, has been found to be associated with indicators of social position such as socioeconomic status, parental education, and schools are one of the most important factors for improve HL through health promotion program in school. For this purpose, it is necessary for the schools' authorities to apply different program which have a significant role in raising awareness of students.<sup>[6-12]</sup> Vygotsky's theory highlights the fundamental role of social interactions on HL and development. The theory stressed the importance of social interaction, viewing children's learning as taking place in social context. Therefore, HL a child can develop through guidance or peer collaboration, would exceed the HL a child could attain by him or he self. Hence, receiving a suggestion and promoting factors that will help children to be able to access, understand, appraise, and apply health information in order to make judgments and take decisions in everyday life concerning health care, disease prevention, and health promotion to maintain or improve quality of life during the life course. HL has been associated with many social health determinants including high educational, income level, high self-reported social status, and cohabitation.<sup>[12,13]</sup> Studies reveal an association between low HL and poor health outcomes such as poor knowledge about health conditions.<sup>[13,14]</sup> Since there are few studies on children HL, there remains a need to better understand the development of literacy skills, create improved assessment methods, and continue to examine how environmental factors such as schools influence literacy.<sup>[15,16]</sup> Moreover, an individual's HL depends on their personal situation including their health status, risks or problems, their affiliation with social group (e.g., health practitioners, patients, and different age-groups), and other socioeconomic determinants.<sup>[17]</sup> Several studies found the importance of preadolescents understanding the consequences of their health-related behaviors and comprehending tailored health messages,<sup>[18]</sup> as well as measured a form of self-reported HL with seventh-grade children, drawing attention to the role of friends, family, school, and media influences in shaping HL competencies. Other researchers have focused on the barriers and facilitators surrounding adolescent HL. Those studies collectively indicate that a range of

information sources influence adolescent HL including friends, family, school, professionals, and other media forms.<sup>[19]</sup> It is also important to explore the specific skills and competencies that are relevant to children living within diverse socioeconomic environments. In order to answer such questions, the field must accommodate more child-center research.<sup>[20]</sup>

In Thailand, Nutbeam HL model has been used mostly for adolescents and adults. There is limited knowledge and academic consensus regarding the level of HL and roles of sociocultural among the children or young persons. Almost all of the studies focus on adolescents and adults. Therefore, this study was aimed to determine the level of HL and the roles of sociocultural factors and health knowledge on HL of children aged 9–10 years old in Thailand.

## Materials and Methods

### Study design and setting

This cross-sectional study was conducted among 1650 students aged 9–10 years old of Thailand.

### Study participants and sampling

All of 1650 students aged 9–10 years old who were recruited using multistage random sampling from 39 primary schools in 13 provinces the North, Northeast, South, and Central regions of Thailand. The inclusion criteria were 9–10 years old studying in government schools. Exclusion criteria included a lack of consent for participation in the study and incomplete questionnaires.

### Data collection tool and technique

To data collection, a-five part self-administered questionnaire was conducted including demographic information (age, gender, religion, parents' occupation, marital status of parents, and media using), health determinant, health knowledge, and health behaviors. The instrument of 31-item HL was systematically developed where content validity showed the value of CVI was 0.87, item-total correlation was >0.3, and Cronbach's alpha was 0.902 and the confirmatory factor analysis produced a good estimate of fit ( $\chi^2 = 1530.76$ ; GFI = 0.937; AGFI = 0.927; SRMR = 0.025; RMSEA = 0.040; CFI = 0.903; and NFI = 0.910). All participants were fully informed about this study and gave written consent. Students filled the questionnaires, followed by researchers expressing the study aims to encourage them to participate. Data were collected between June and October 2020.

### Ethical consideration

The written informed consent was taken from all the individuals after explaining the study objectives. In addition, participants were informed that their

answers would be used for research purpose only and would never be seen or used by others. The study was approved by the ethical Committee of Khon Kaen University (Reference no. HE632116).

### Statistical analysis

All statistical analyses were performed by using Stata version 10.0 (Stata Corp, College Station, TX, USA). Descriptive statistics including frequency and percentage were used to describe categorical data, whereas mean, standard deviation, median, and maximum minimum were for calculated for continuous data. A simple logistic regression was used to identify an association between each independent variable and adequate and excellent levels of HL. The independent variable had  $P < 0.25$  were processed to for the multivariable analysis using the multilevel analysis to identify an association between sociocultural context, health knowledge, and health behaviors and HL when controlling the effect of other covariates. Mixed-effects modeling and regions were used as fixed effect and random effects were provinces, school sizes, and classroom. Random effects are useful for modeling intraclass correlation since they can reduced the cluster-level random effects.<sup>[21,22]</sup> The magnitude of association was presented as adjusted odds ratio (adj. OR), 95% confidence interval (CI).

### Results

Among the total of 1650 students aged 9–10 years, 56.6% were males. Almost all respondents were Buddhist (95.15%). Their average family size was  $5.17 \pm 1.96$  persons, 85.58% of the respondents' families had enough per diem with saving. Most of them getting health information from parents or family members (80.12%), followed by teachers (58.79%). In addition, 45.88% used YouTube (45.88%) as sources of information. More than one-third reported having good health status. Concerning environment 60.55% of respondents lived in rural settings, about 90% live quite far from nightclubs, bars, gambling sites, and slums. Majority of the students had good relationships with family members, teachers, and friends as well as were in good school environments. About two-third had good level of health knowledge (63.76%). However, only 16.67% of them had good health behaviors [Table 1].

Most of the students had excellent level of HL (65.52%: 95% CI: 63.18–67.77) followed by adequate level (22.12%: 95% CI: 20.18–24.19). However, more than 10% had problematic and inadequate levels of HL [Table 2].

The multivariable analysis indicated factors that were significantly associated with adequate and excellent levels HL including adequacy of per diem (adj. OR = 6.78; 95% CI: 3.54–12.97) and had good relationship

**Table 1: Sociocultural, health knowledge and health behavior of children aged 9-10 years in Thailand (n=1650)**

Factors	n (%)
Region	
Central	609 (36.91)
Northeast	535 (32.42)
North	301 (18.24)
South	205 (12.42)
School size	
Small	164 (9.94)
Medium	376 (22.79)
Large	1110 (67.27)
Socioeconomic	
Gender	
Male	718 (43.52)
Female	932 (56.48)
Age (years)	
9	958 (58.06)
10	692 (41.94)
Religion	
Buddhism	1570 (95.15)
Islam	51 (3.09)
Christianity	25 (1.52)
Other	4 (0.24)
Family size (persons)	
≤3	232 (14.06)
4-5	874 (52.97)
≥6	544 (32.97)
Mean±SD	5.17±1.96
Marital status of parents	
Married	1267 (76.79)
Separated	257 (15.58)
Divorced	93 (5.64)
Widowed	33 (2.00)
Adequacy of per diem	
Enough with savings	1412 (85.58)
Enough with no savings	198 (12.00)
Not enough	40 (2.42)
Media	
Media using	
YouTube	757 (45.88)
Facebook	320 (19.39)
Line	215 (13.03)
Google	161 (9.76)
Instagram	63 (3.82)
Twitter	20 (1.21)
None	114 (6.91)
Chanel for receive health information	
Parents/family member	1330 (80.61)
Teacher	970 (58.79)
Administrator of school	368 (22.30)
Medical/public health officer	353 (21.39)
Television	329 (19.94)
Internet	214 (12.97)
Book	200 (12.12)

Contd...

**Table 1: Contd...**

Factors	n (%)
Health status	
Poor	14 (0.85)
Fair	351 (21.27)
Good	1285 (77.88)
Social environment	
Residence	
Urban	651 (39.45)
Rural	999 (60.55)
Residence near night bar, gambling centers	
No	1442 (87.39)
Yes	208 (12.61)
Slum	
No	1443 (87.45)
Yes	207 (12.55)
Family relationship	
Poor	101 (6.12)
Fair	797 (48.30)
Good	752 (45.58)
Environment of school	
Poor	61 (3.70)
Fair	624 (37.82)
Good	965 (58.48)
Relationship with teacher	
Poor	250 (15.15)
Fair	443 (26.85)
Good	957 (58.00)
Relationship with friend	
Poor	131 (7.94)
Fair	597 (36.18)
Good	922 (55.88)
Health knowledge	
Poor	166 (10.06)
Fair	432 (26.18)
Good	1052 (63.76)
Health behaviors	
Poor	363 (22.00)
Fair	1012 (61.33)
Good	275 (16.67)

SD=Standard deviation

**Table 2: Number and percentage of health literacy levels of children aged 9-10 years in Thailand (n=1650)**

HL	n (%)	95%CI
Excellent	1081 (65.52)	63.18-67.77
Adequate	365 (22.12)	20.18-24.19
Problematic	134 (8.12)	6.89-9.54
Inadequate	70 (4.24)	3.36-5.32

CI=Confidence interval, HL=Health literacy

with teachers (adj. OR = 2.19; 95%CI: 1.55–3.09). Sources of health education were highly significantly associated with HL which were received health education from parents (adj. OR = 3.51; 95%CI: 2.39–5.14), from teachers (adj. OR = 2.03; 95% CI: 1.43–2.89), and from the Internet (adj. OR = 1.83; 95% CI: 1.12–2.99).

Other significant factor was had good level of health knowledge (adj. OR = 1.86; 95% CI: 1.30–2.66) when control clustering effect of region, provinces, school, and classroom size [Table 3].

## Discussions

Our study found observed as high as 87.64% of children aged 9–10 years in Thailand had adequate and excellent levels of HL. This finding was a little higher than 82% found in a study on HL in School-Aged Children in Germany.<sup>[23]</sup> Other studies also reported high level of HL among early adolescent.<sup>[23,24]</sup> The possible reasons for the sufficient HL might be that, in Thailand, children have good relationship with parents, family members as well as teachers; therefore, they provide guidance to help children develop HL. This was confirmed by our finding on the multivariable analysis indicated the strong association between parents and teachers on children HL. It was also confirmed the notion of Vygotsky’s theory on the fundamental role of social interactions on HL.<sup>[6]</sup> Younger children are more dependent on their parents in respect to economic resources and social support.<sup>[25]</sup> Children, who live in a warm family which love, give respect as well as caring could have good interaction, caring conversations, and care about each other health status. Therefore, children would be able to get better access to information or understanding what their parent talk about health. This finding was similar with other studies.<sup>[19,23,26]</sup> In addition, at present, children had better access to the Internet, therefore, they could get more health information. This study found that almost half of the children used YouTube, followed by Facebook and Line application.

Children with adequate per diem were more likely to had better HL levels. It was similar with the result from other studies on HL.<sup>[23,26-28]</sup> It could be explained that children in sound economic status’s families, parents could spend more time teaching or provide guidance as well as equipment (smart phone/laptop/internet) to access to media. Therefore, they had better access to health information, of which improve understanding, appraising ability as well as decision to perform health actions.

Children who had receiving health information from teachers had better HL. Many studies collectively indicated that a range of information sources influence adolescent HL, including friends, family, school, professionals, and other media forms.<sup>[8,19,29-31]</sup> Moreover, social support structures and peer could help improving HL of children and young people since they can access health information through their social informal or formal support structures such as family, school, and community.<sup>[5,19,32,33]</sup>

**Table 3: Multivariable analysis of factors associated with adequate and excellence levels of health literacy, by using the multilevel model presenting odds ratios, adjusted odds ratios, 95% confidence interval and P value (n=1650)**

Factors	n (%) adequate and excellent HL	Crude OR	Adjusted OR	95% CI	P
Adequacy of per diem					
Inadequate	58 (48.28)	1	1	1	<0.001
Adequate	1592 (89.07)	8.73	6.78	3.54-12.97	
Received health education from parents					
No	320 (75.00)	1	1	1	<0.001
Yes	1330 (90.68)	3.24	3.51	2.39-5.14	
Received health education from teacher					
No	680 (83.09)	1	1	1	<0.001
Yes	970 (90.82)	2.01	2.03	1.43-2.89	
Received health education from internet					
No	1297 (86.35)	1	1	1	0.015
Yes	353 (92.35)	1.90	1.83	1.12-2.99	
Teachers and student relationship					
Poor/fair	693 (81.82)	1	1	1	<0.001
Good	957 (91.85)	2.50	2.19	1.55-3.09	
Health knowledge					
Poor/fair	598 (80.10)	1	1	1	<0.001
Good	1052 (91.92)	2.82	1.86	1.30-2.66	

CI=Confidence interval, OR=Odds ratio, HL=Health literacy

Not only receiving health education from teachers but also had good relationship with teachers was associated with sufficient HL. It might be that having good relationships increased children's courage to ask when they do not understand on health information or when having problems such as discomforts, ill health as well as questions on alcohol, smoking, and sexual issues. A teacher could provide effective guidance as well as information with suitable for each individual. Besides, other studies indicated that most teachers are simply engaged in educating their students in the classrooms.<sup>[34-36]</sup> More recognition of beyond classroom activities in health would enable students and teachers to utilize critical HL opportunities within the local community.<sup>[19,37]</sup> In addition, parents, government officials, nongovernmental agencies, and commercial business interests also influence adolescents' understanding of health issues such as road safety, sexual choices, exercise, nutrition, and substance use for good and ill.<sup>[38]</sup> Children and young people, therefore, largely depend on adult perception of childhood and youth as well as the social role we attribute to children and young people in everyday interactions which include their parents, other adults or their peers, teachers, and students or between doctors and child patients.<sup>[26,39]</sup> Concerning the finding on the influence of the Internet on HL, it supported the importance of introducing children to credible online health information resources. Students who got health information from internet reported higher levels of perceived skills and confidence in searching for health information (HL) and more adequate levels of HL when compared to students who had not get health information through the internet. The findings are

similar to those of studies describing information-skills training programs for health-care personnel and their positive impact on information literacy skills and confidence.<sup>[40]</sup> In another study conducted in order to determine the relationship between HL of elders and usage of the Internet for accessing health information. It was found that 31.9% of elders had sufficient level HL.<sup>[41]</sup> Nowadays, the Internet has become an important source of information and supports the equity for accessing health services. It clearly has advantages such as access to information via internet, there is no need for a special or any location, could have 24 h access to the facilities without time limit.<sup>[42]</sup> Therefore, it is possible that exposing children to a credible source of health information including easy to access and understanding of health information retrieved by which sites to trust could improve HL and propose to recognize the interrelatedness of media, digital, and health literacies more profoundly in future models, interventions, and educational curricula.

Our results also indicated the influence of health knowledge on HL, despite some literatures reported that HL was differed from health knowledge, health education, and health promotion. It is often assumed that HL is a product,<sup>[43]</sup> The Joint Committee on Health Education Terminology (1991, p. 105) defines health education as "the continuum of learning, which enables people, as individuals, and as members of social structures, to voluntarily make decisions, modify behaviors, and change social conditions in ways that are health enhancing." Health knowledge variables influence peoples' intentions, decisions, behaviors, and

outcomes.<sup>[19,44]</sup> Similar to the result of some studies\ reported that child and adolescent health behaviors are strongly associated with adolescent literacy skills.<sup>[35]</sup> In addition, good health knowledge could make better understanding, decision for actions what are good for their health.

### Limitation and recommendation

The limitations of this study were performed only on government schools not been conducted in a private school which has difference sociocultural context that might associated with HL as well, and this study focuses on 9–10 10 years old which might not be a good representative of the children in all age group. The strengths of the study can be performed coverage all regions of Thailand. However, the findings from this study provide valuable information about the HL levels and the importance factors for increasing HL in childhood. Furthermore, future study should have an intervention or program, fostering interest and motivation toward health-related behaviors at home or at school in order to increase HL. Longitudinal and intervention research is needed to verify the assumptions or result that this study has suggested.

### Conclusions

More than 85% of 9–10-year old children in Thailand had adequate and excellent levels of HL. Sociocultural and health knowledge had influence on HL. This finding suggested that the organization under the Ministry of Public Health and Ministry of Education as well as local administration organizations should develop appropriate policies and interventions to improve HL of early life through improving the roles of parents, families as well as teachers. Appropriate social media access should also be emphasis to strengthen HL of the children.

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### Conflicts of interest

There are no conflicts of interest.

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