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

Nopparat Senahad, Wongsa Loahasiriwong1, Naowarat Maneenin2

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.[1,2] 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,[3] which is similar with the concept of Sørensen et al.[4] In addition, HL has been recognized as one of the critical determinants of health.[3] 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.[5] Hence, targeting children...
Studies reveal that low HL and health outcomes such as poor knowledge about health conditions affect children's learning and quality of life during the life course. HL is associated with many social determinants including high educational, income level, high self-reported social status, and cohabitation. Studies reveal an association between low HL and health outcomes such as poor knowledge about health conditions. Since there are few studies on children's 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. Moreover, an individual's HL depends on their personal situation including their health status, risks or problems, their affiliation with social groups, and other socioeconomic determinants. Several studies found the importance of preadolescents understanding the consequences of their health-related behaviors and comprehending tailored health messages, 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. 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.

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 in 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 (χ² = 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 intracluster correlation since they can reduced the cluster-level random effects. 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) |
| **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**                              |         |
| 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...*
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.[23] Other studies also reported high level of HL among early adolescent.[23,24] 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.[6] Younger children are more dependent on their parents in respect to economic resources and social support.[25] 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.[19,23,26] 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.[23,26–28] 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, apprising 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.[8,19,29–31] 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.[5,19,32,33]
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. More recognition of beyond classroom activities in health would enable students and teachers to utilize critical HL opportunities within the local community. 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. 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. Concerning the finding on the influence of the Internet on health knowledge 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. 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. 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. 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 use for good and ill. 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. Concerning the finding on the influence of the Internet on health knowledge, 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. 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. 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. 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 use for good and ill.
outcomes.\textsuperscript{18,44} Similar to the result of some studies\textsuperscript{39} reported that child and adolescent health behaviors are strongly associated with adolescent literacy skills.\textsuperscript{38} 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.

References
1. Nutbeam D. Health promotion glossary. Health Promot Int 1998;13:349-64.
2. Nutbeam D, McGill B, Premkumar P. Improving health literacy in community populations: A review of progress. Health Promot Int 2018;33:901-11.
3. World Health Organization. Shanghai declaration on promoting health in the 2030 agenda for sustainable development. Health Promot Int 2017;32:7-8.
4. Serensen K, Van den Broucke S, Fullam J, Doyle G, Pelikan J, Slonska Z, et al. Health literacy and public health: A systematic review and integration of definitions and models. BMC Public Health 2012;12:1-13.
5. Borzekowski DL. Considering children and health literacy: A theoretical approach. Pediatrics 2009;124 Suppl 3:S282-8.
6. Vygotsky LS. and Michael Cole. Mind in Society: The Development of Higher Psychological Processes. United States of America: Harvard University Press; 1978.
7. Johnson RL. Pathways to adolescent health: Early intervention. J Adolesc Health 2002;31:240-50.
8. Levin-Zamir D, Lemish D, Gofin R. Media health literacy (MHL): Development and measurement of the concept among adolescents. Health Educ Res 2011;26:323-35.
9. Chisolm DJ, Manganello JA, Kelleher KJ, Marshal MP. Health literacy, alcohol expectancies, and alcohol use behaviors in teens. Patient Educ Couns 2014;97:291-6.
10. Chisolm DJ, Sarkar M, Kelleher KJ, Sanders LM. Predictors of health literacy and numeracy concordance among adolescents with special health care needs and their parents. J Health Commun 2015;20 Suppl 2:43-9.
11. Quenzel G, Schaeffer D, Messer M, Vogt D. Gesundheitskompetenz bildungsferner Jugendlicher. Bundesgesundheitsblatt Gesundheitsforschung Gesundheitsschutz 2015;58:951-7.
12. Karimi N, Saadat-Gharin S, Tol A, Sadeghi R, Yaseri M, Mohammadi B. A problem-based learning health literacy intervention program on improving health-promoting behaviors among girl students. J Educ Health Promot 2019;8:251.
13. Bo A, Friis K, Osborne RH, Maidal HT. National indicators of health literacy: Ability to understand health information and to engage actively with healthcare providers – A population-based survey among Danish adults. BMC Public Health 2014;14:1095.
14. Chang I-C. Health literacy, self-reported status and health promoting behaviours for adolescents in Taiwan. J Clin Nurs 2011;20:190-6.
15. Bröder J, Chang P, Kickbusch I, Levin-Zamir D, McElhinney E, Nutbeam D, et al. IUHPE position statement on health literacy: A practical vision for a health literate world. 1st ed. Canada. International Union of Health Promotion and Education Publications; 2018. p. 15-16.
16. Manganello JA, DeVellis RF, Davis TC, Schottler-Thal C. Development of the health literacy assessment scale for adolescents (HAS-A). J Commun Healthc 2015;8:172-84.
17. Rudd RE, Comings JP, Hyde JN. Leave no one behind: Improving health and risk communication through attention to literacy. J Health Commun 2003;8 Suppl 1:104-15.
18. Paek HJ, Reber BH, Lariscy RW. Roles of interpersonal and media socialization agents in adolescent self-reported health literacy: A health socialization perspective. Health Educ Res 2011;26:131-49.
19. Wharf Higgins J, Begoray D, MacDonald M. A social ecological conceptual framework for understanding adolescent health literacy in the health education classroom. Am J Community Psychol 2009;44:350-62.
20. Velardo S, Drummond M. Emphasizing the child in child health literacy research. J Child Health Care 2017;21:5-13.
21. Hox JJ, Moerbeek M, Van de Schoot R. Multilevel Analysis: Techniques and Applications. 3rd ed. New York: Routledge Publisher; 2017.
22. Kenward MG, Roger JH. Small sample inference for fixed effects from restricted maximum likelihood. Biometrics 1997;53:983-97.
23. Fretian A, Bollweg TM, Okan O, Pinheiro P, Bauer U. Exploring associated factors of subjective health literacy in school-aged children. Int J Environ Res Public Health 2020;17:E1720.
24. Brown SL, Teufel JA, Birch DA. Early adolescents perceptions of health and health literacy. J Sch Health 2007;77:7-15.
25. Brady G, Lowe P, Lauritzen SO. Children, Health and Well-Being: Policy Debates and Lived Experience. The Sociology of Health & Illness 2015;37:2.
26. Bröder J, Okan O, Bauer U, Bruland D, Schlupp S, Bollweg TM, et al. Health literacy in childhood and youth: A systematic review of definitions and models. BMC Public Health 2017;17:1-25.
27. Lopes RT, Neves ET, Dutra LD, Gomes MC, Paiva SM, Abreu MH, et al. Socioeconomic status and family functioning influence oral health literacy among adolescents. Rev Saude Publica 2020;54:30.
28. Amoah PA, Phillips DR. Socio-demographic and behavioral correlates of health literacy: A gender perspective in Ghana. Women Health 2020;60:123-39.
29. Begoray DL, Wharf-Higgins J, Macdonald M. High school health curriculum and health literacy: Canadian student voices. Glob Health Promot 2009;16:35-42.
30. Gray NJ, Klein JD, Noyce PR, Sesselberg TS, Cantrill JA. Health information-seeking behaviour in adolescence: The place of the internet. Soc Sci Med 2005;60:1467-78.
31. Massey PM, Prelip M, Calimlim BM, Quiter ES, Glik DC. Contextualizing an expanded definition of health literacy among adolescents in the health care setting. Health Educ Res 2012;27:961-74.
32. Rubene Z, Stars I, Goba L, editors. Health Literate Child: Transforming Teaching in School Health Education. Society Integration Education Proceedings of the International Scientific Conference; 2015.
33. Vygotsky L. Interaction between learning and development. Read Dev Child 1978;23:34-41.
34. Peralta LR, Rowling L. Implementation of school health literacy in Australia: A systematic review. Health Educ J 2018;77:363-76.
35. Sanders LM, Federico S, Klass P, Abrams MA, Dreyer B. Literacy and child health: A systematic review. Arch Pediatr Adolesc Med 2009;163:131-40.
36. Shih SF, Liu CH, Liao LL, Osborne RH. Health literacy and the determinants of obesity: A population-based survey of sixth grade school children in Taiwan. BMC Public Health 2016;16:1-8.
37. St Leger L. Schools, health literacy and public health: Possibilities and challenges. Health Promot Int 2001;16:197-205.
38. Hansen DL, Derry HA, Resnick PJ, Richardson CR. Adolescents searching for health information on the Internet: An observational study. J Med Internet Res 2003;5:e25.
39. Serensen K, Pelikan JM, Röthlin F, Ganahl K, Slonska Z, Doyle G, et al. Health literacy in Europe: Comparative results of the European health literacy survey (HLS-EU). Eur J Public Health 2015;25:1053-8.
40. Trinder VM, Fleet GE, Gray AE. Evaluating the impact of library user training programmes across Thames valley strategic health authority in the UK. Health Info Libr J 2007;24:34-40.
41. Levy H, Janke AT, Langa KM. Health literacy and the digital divide among older Americans. J Gen Intern Med 2015;30:284-9.
42. Aydin GÖ, Kaya N, Turan N. The role of health literacy in access to online health information. Proc Soc Behav Sci 2015;195:1683-7.
43. Speros C. Health literacy: Concept analysis. J Adv Nurs 2005;50:633-40.
44. Paasche-Orlow MK, Parker RM, Gazmararian JA, Nielsen-Bohlman LT, Rudd RR. The prevalence of limited health literacy. J Gen Intern Med 2005;20:175-84.