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Review Article

Exploring the Interplay of Health Literacy and Non-Communicable Disease Health Outcomes in Southeast Asia: A Systematic Review

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Abstract

Background: Non-communicable Diseases (NCDs) present a substantial challenge in low- and middle-income nations, especially in the Southeast Asia region. Health literacy (HL) is vital for managing NCDs and improving health outcomes by enhancing individuals' abilities to seek, understand, assess, and utilize health information.

Methods: A systematic review followed PRISMA guidelines, and relevant articles were sourced from PubMed, ProQuest, CINAHL, Scopus, Cochrane, and Google Scholar without limiting the publication year. Studies included were from Southeast Asia that examined the connection between HL and NCD outcomes. Sixteen cross-sectional studies from five countries were chosen for the final analysis.

Results: The review observed that higher HL was linked to better health outcomes for individuals with NCDs. Communicative and critical HL were found to be more impactful than functional HL in obtaining, analysing, and applying health information. Additionally, HL was influenced by sociodemographic aspects (age, gender, education, location, and marital status, socioeconomic factors (income and employment), and societal influences (patient-doctor relationships, cultural context, and family support). HL was important in managing NCDs and for better health outcomes.

Conclusion: Further studies are called for the evaluation of all three HL skills to comprehensively understand the HL of populations. Furthermore, the link between limited HL and employment status remains underexplored and deserves further attention.

Keywords: Health literacy; Health outcome; NCD; Health behaviour; Socioeconomic status; Southeast Asia

Introduction

Health literacy (HL) is the ability to find, comprehend, and use health information, enabling individuals to make informed decisions and take proper action (1). It included four steps: receiving, comprehending, evaluating, and applying health information (2). Advancing HL empowered individuals to sustain well-being by leveraging their knowledge and collaborating for optimal health outcomes (1). HL played a pivotal role in everyone's daily life to prevent and protect

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against health problems (2) and to understand the health system and health information better (3). People with high HL skills collaborated to solve the community's health problems (4), enhance resilience and improve health outcomes (5).

NCDs accounted for 74% of global deaths, with 41 million deaths annually, 77% were in low and middle-income countries (6). CVD caused (17.9 million) deaths, cancer (9.3 million), chronic respiratory diseases (4.1 million), and diabetes (2 million) accounted for over 80% of early deaths (6). In Southeast Asia, NCDs caused 62% (9 million) deaths, mostly before the age of 70 (7). HL varied widely from 1.6% to 99.5%, but on average, 55.3% (8). HL strongly predicted health outcomes. Low HL was connected to riskier health choices, poor disease management, increased healthcare costs (5), frequent emergency visits, delayed diagnosis and limited preventive care management (9). In contrast, higher HL correlated with proactive health screening (10). Low- and middle-income countries encountered HL challenges, encompassing healthcare access, low education status, diverse languages and cultural differences and a scarcity of skilled healthcare professionals, leading to low HL and poor health results (11).

In Southeast Asia, the likelihood of NCD deaths (ages 30-70) declined from 23.4% in 2010 to 21.6% in 2019, but the pandemic may disrupt the achievement, pinpointing the urgency to accelerate NCD prevention and control (7). Continuously, WHO also emphasised the need for timely and reliable data to guide action and address the research gap on HL and health outcomes in Southeast Asia. This systematic review aimed to investigate the impact of HL on NCD health outcomes and identify factors influencing HL in Southeast Asia.

Methods

Study Design

This systematic review focused on the association between HL and health outcomes of NCDs, and consideration of factors contributing to achieving HL in the Southeast Asia region. This review was registered in PROSPERO (CRD42024557492).

Research Questions

(1) **What is the HL's impact on NCD outcomes in Southeast Asia?**

(2) **What are the factors influencing HL achievement in Southeast Asia?**

Search Strategy

Five databases: PubMed, Proquest, CINAHL, Scopus, Cochrane, and Google Scholar were used without limiting the publication year. Key terms included health literacy, health outcome, non-communicable disease, health behaviour, socio-economic status, and Southeast Asia. After initial database searches, duplications were removed, and then, titles, abstracts and full texts were screened according to PRISMA guidelines (9). Disagreement between the two reviewers was solved by a third reviewer.

Inclusion and Exclusion Criteria

Inclusion criteria focused on the studies done in Southeast Asian countries, regardless of participants' age, gender, religion, ethnicity, or residence. Studies must focus on at least one of the major NCDs, such as CVD, diabetes or cancer. Articles must report the correlation between HL and NCDs' outcomes and examine the association between socioeconomic factors and HL. Only peer-reviewed journals in English with unrestricted publication years were included. Exclusion criteria included pilot studies, articles unrelated to HL and NCDs' outcomes in Southeast Asia countries, editorial opinions, and review articles.

Quality Assessment

Two reviewers assessed the articles' quality by applying Joanna Briggs Institute tools, focusing on the studies' objectives, settings, methodology, confounding factors, sample size, reliability, validity, clear presentation of the results, and proper utilization of statistics (12). The cut-off points

were determined as less than 49% as a high risk of bias, 50%-69% as moderate bias and more than 70% as a low risk of bias (13).

Data Extraction

Data were extracted into tabulation form, including study characteristics, factors contributing to HL and health outcomes related to HL (9).

Data Synthesis

Synthesising data followed Khatiwada's pattern by summarising the key findings to address research questions, and elaborating the impact of HL on NCD as well as the influence of demographic, socioeconomic factors and cultures on HL. Then, recommendations were provided to policymakers, healthcare practitioners and researchers on how to enhance HL in low-income countries (14).

Results

Using CINAHL, Cochrane, Proquest, Pubmed, Scopus, and Google Scholar, 949 articles were identified in the preliminary search. After removing 427 duplications, 522 articles underwent title screening. Finally, 16 articles were eligible to be included in the systematic review after the full-text assessment. Using PRISMA guidelines, the included articles and steps of screening can be seen in Fig. 1.

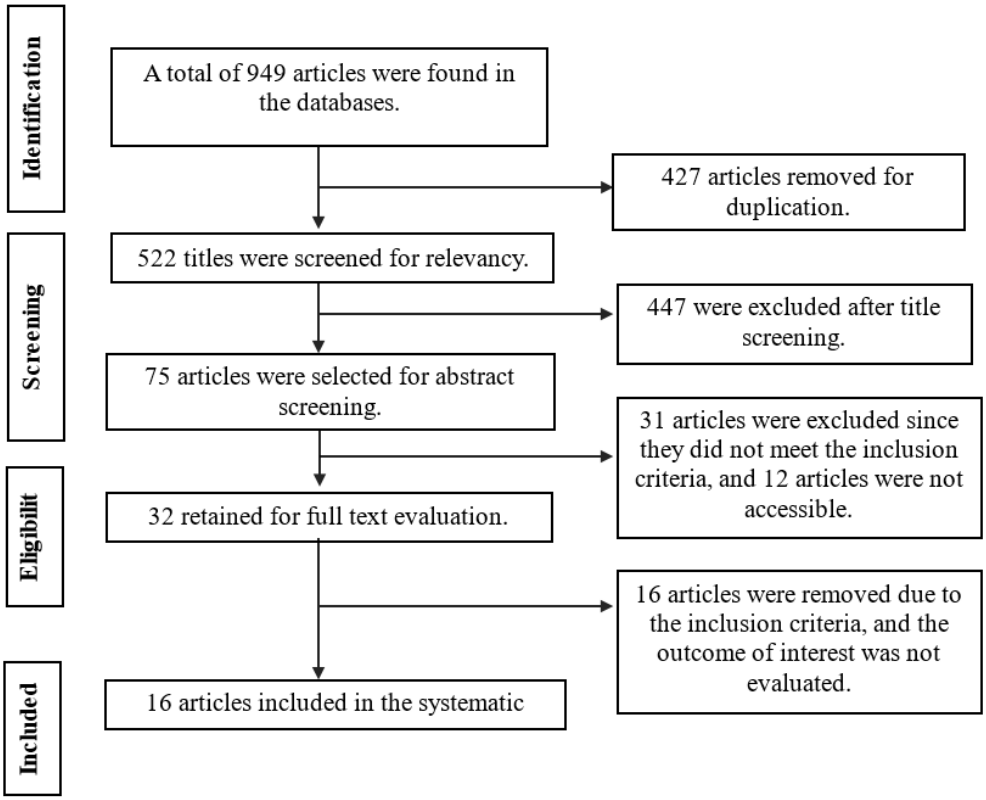

Fig. 1: The PRISMA procedure of article selection

Key Characteristics and Summary Outcomes of Included Articles

Sixteen cross-sectional studies included in this review evaluated HL and its association with NCD health outcomes and factors contributing to HL. Various sampling methods: convenience (15-19), purposive (20), accidental (21), multi-cluster sampling (22, 23), random (24, 25), and stratified multi-stage techniques (26-28) were applied. Two studies in Vietnam (29) and Singapore

(30) did not report the sampling methods. The sample sizes ranged from 63 (30) to 9478 participants (27). Four studies were done in Malaysia (15,19, 26, 27), four in Thailand (17, 23, 25, 28), two in Vietnam (16,19), two in Singapore (24, 30), and four in Indonesia (18, 20-22), but with no relevant articles from Myanmar, Brunei, Cambodia, the Philippines, Laos, and Timor-Leste. The study settings included communities (15, 17, 26, 28), hospitals (16, 29), foundations (30), healthcare centres (18-23) and nationwide surveys (24, 27).

Studies in Malaysia investigated factors affecting consumer health information and NCD (15), HL and T2DM (19), HL and healthy lifestyles (26), and the general adult HL (27). Studies in Indonesia explored CVD and HL (20), HL and stroke prevention (21), CKD self-management and HL (18), and HL and diabetes of older people (22). Thai studies focused on HL's impacts on health outcomes (17), HL, drug compliance (23), blood pressure control (28), and diabetes self-management (25). Vietnam researched HL in chronic diseases (16) and cancer (29). Singapore's studies explored HL and self-management practices (30) and functional HL and diabetes (24) (Table 1).

Table 1: Study characteristics and summary findings of selected articles

Authors, Country, Year	Studied Population, Age	Studied Subject	Finding	Influencing Factor
(Asharani et al., 2021), Singapore (24)	Multi-ethnic population, ≥18	Functional HL and adiabetes	Higher HL improved disease understanding, self-efficacy, and health outcomes. Nevertheless, behaviour change depended on other influencing factors. HL was low in older adults with chronic disease, lower income and lower education.	Age, education, income, and illness history
(Cheah & Su, 2012) , Malaysia (15)	Penang Population in Malaysia, ≥21	Factors influencing NCD	Older healthcare service users, rural residents and a family history of illness were associated with higher HL. Women and educated people had good health knowledge.	Age, education and residence
(Dai Minh et al., 2022), Vietnam (29)	Newly admitted cancer patients, ≥16	HL and socio-demographic characteristics	Older patients encountered problems in comprehending, seeking and analysing information for decision-making. Online misinformation directly affected decision-making and QoL. Urbanicity and education levels are linked to HL.	Age, education and residence
(Dinh et al., 2020), Vietnam (16)	Chronic CVD, Hypertension, CKD patients, ≥ 18	HL and its associated factors.	People with multiple chronic diseases had low HL. Higher education, urban residence and income were associated with better HL. Youths and less severe comorbidities had higher HL	Age, education, income, comorbidity burden, and residence
(Froze et al., 2019), Malaysia (26)	Major ethnic groups, ≥18	HL and healthy lifestyle practices and metabolic syndrome.	HL was a good predictor of healthy lifestyle. People with higher SES, education, and a history of chronic illness tended to have HL. Old people with limited HL struggled with written information sources.	Age, gender, education, SES, and illness history
(Jaafar et al., 2021), Malaysia (27)	Malaysian adults, ≥18	HL and its associated factors	Youths with higher education and income had higher HL. Age, education, income, location, and jobs were associated with HL. Urban people and women had higher HL, but ethnicities, language and culture caused HL differences.	Age, education, income, gender, language, culture and ethnicity

Table 1: Continued…

(Lai et al., 2013), Singapore (30)	Diabetes and ESRD Patients, ≥21	HL and self-management behaviour	Communicative and critical HL outweighed functional HL in managing diabetes. Patients with chronic diseases had higher critical HL. Education correlated with functional HL, but not others.	Education, HL types and illness history
(Medyati et al., 2019), Indonesia (20)	Informal cooks, Age(N/A)	HL and the risks of CVD	Low education and limited information access caused low HL. Low HL increased the risk of CVD. Personal factors, societal determinants, and social elements influenced HL.	Education, health information access, and personal and social factors.
(Piwpong et al., 2023), Thailand (17)	Older adults with diabetes and hypertension, ≥65	HL, personal factors and health outcomes	Limited HL weakened information accessing, understanding, and applying health information and self-care management. Sociodemographic factors were linked to HL, and low HL caused poor health information-seeking and health outcomes.	Age and social demographic factors
(Rachmawati et al., 2019), Indonesia (22)	T2DM older adults, Age (N/A)	HL of T2DM older people and self-management.	Low HL was related to poor health knowledge, self-management and uncontrolled diabetes. Family information support helped improve HL and diabetes management.	Access to health information and family support
(Rahmawati et al., 2021), Indonesia (21)	Patients with hypertension, Age (N/A)	Effect of HL on primary stroke prevention	Good functional HL didn't guarantee higher communicative and critical HL. Communicative and critical HL were better predictors of self-care behaviours, and Family support improved those HL.	HL types and family support
(Sornlorm & Thi, 2024), Thailand (28)	Myanmar migrant workers, ≥18	HBP, HL and and its associated factors	Low HL was associated with HBP. Lack of insurance and poor comprehension of health information worsened NCD outcomes. Men were affected more.	Gender and insurance
(Suarilah & Lin, 2022), Indonesia (18)	Patients with early-stage CKD, ≥18	Self-management of CKD patients and its influencing factors.	Higher education and family history of comorbidity improved HL and self-management. The family members' support was critical for managing CKD, leading to a better QoL and minimising disability.	Education level and family support
(Tan & Ismail, 2020), Malaysia (19)	T2DM Patients, ≥18	HL and glycemic control.	Limited HL was common among older and less educated patients. No relationship between HL and glycemic control. had been observed. Education correlated with HL.	Age and education
(Ong-Artborirak et al., 2023), Thailand (25)	T2DM patients, ≥60	HL, self-efficacy and diabetes control	Low education and income were related to low HL, reducing diabetes control and information understanding. HL affected medication and interaction with health providers.	Education, income and HL types
(Wannasirikul et al., 2016), Thailand (23)	hypertension patients, between 60 ≤ age ≤ 70	HL, medication adherence, and BP control	HL was affected by literacy, cognitive, and sociocultural factors. Low HL linked to poor medication, BP control and increased probability of CVD death.	Age, education, gender, urban/rural, job, ethnicity, language, culture

All the selected articles had a low risk of bias: <70%, despite some articles lacking unclear explanations of controlling confounding factors (Table 2).

Table 2: Quality Assessment of Included Articles

Reference No.	Criteria for inclusion in the sample	Study subjects and the setting description	Exposure measurement in a valid and reliable way	Using objective and standard criteria for conditional measurement	confounding factors Identification	Strategies to deal with confounding factors	Measurement of outcomes in a valid and reliable way	Appropriate use of statistical analysis	Result	Risk
(Asharani et al., 2021) (24)	Y	Y	Y	Y	Y	Y	Y	Y	100	Low
(Cheah & Su, 2012) (15)	Y	Y	Y	Y	Y	N	Y	Y	87.5	Low
(Dai Minh et al., 2022) (29)	Y	Y	Y	Y	Y	Y	Y	Y	100	Low
(Dinh et al., 2020) (16)	Y	Y	Y	Y	Y	Y	Y	Y	100	Low
(Froze et al., 2019) (26)	Y	Y	Y	Y	Y	N	Y	Y	87.5	Low
(Jaafar et al., 2021) (27)	Y	Y	Y	Y	Y	N	Y	Y	87.5	Low
(Medyati et al., 2019) (20)	Y	Y	Y	Y	UN	UN	Y	Y	75	Low
(Lai et al., 2013) (30)	Y	Y	Y	Y	Y	UN	Y	Y	87.5	Low
(Ong-Artborirak et al., 2023) (25)	Y	Y	Y	Y	Y	Y	Y	Y	100	Low
(Piwpong et al., 2023) (17)	Y	Y	Y	Y	N	N	Y	Y	75	Low
(Rachmawati et al., 2019) (22)	Y	Y	Y	Y	Y	N	Y	Y	87.5	Low
(Rahmawati et al., 2021) (21)	Y	Y	Y	Y	N	N	Y	Y	75	Low
(Sornlorm & Thi, 2024) (28)	Y	Y	Y	Y	Y	Y	Y	Y	100	Low
(Suarilah & Lin, 2022) (18)	Y	Y	Y	Y	Y	Y	Y	Y	100	Low
(Tan & Ismail, 2020) (19)	Y	Y	Y	Y	Y	Y	Y	Y	100	Low
(Wannasirikul et al., 2016) (23)	Y	Y	Y	Y	Y	N	Y	Y	87.5	Low

The Importance of Health Literacy and Its Impacts on NCD Outcomes

A study in Singapore highlighted that communicative and critical HL were more important than functional HL in managing NCDs (30). In Indonesia, patients scored higher in functional HL, but they struggled with communicative and critical HL, affecting their ability to gather and analyze health information (21). Malaysian research expressed that higher communicative and critical HL increased disease knowledge and good health practices (26). Low HL was associated with poor medication compliance and blood pressure control, as indicated in Thai studies (23), while interactive HL improved health information interpretation and social engagement (25).

HL predicted health status: low HL disturbed decision-making (20), but higher HL helped blood pressure control (28). Poor HL also disrupted health information accessibility and decision-making (17) and poor treatment plan compliance (18). Higher HL was connected to higher disease knowledge, self-care management, physical exercises, and better health outcomes (24). Low HL was linked to poor diabetes knowledge, decreased health conditions, and poor medication adherence (22).

Factors Contributing to Achieving Health Literacy

Age dominated HL as older patients tended to have lower HL, but age alone was not a contributor; however, education (19, 20, 25-27). Life experience and health knowledge could improve HL in the older population (15, 17). Younger people had better HL than older people due to higher education and technological proficiency (16, 29). Gender variations in HL showed women commonly had higher HL than men (15, 17, 26, 27), though the analysis in Vietnam showed no difference (29). Education significantly influenced HL, with higher education increasing HL (15,16,19, 25, 26, 29) while lower education was connected to low HL (22, 24, 27). Besides, limited HL was prevalent in low-income households (17, 25, 27). Interestingly, in Singapore, employment was related to limited HL (24). People with chronic disease and family histories of severe illness had good health knowledge and high HL (15, 24, 26). Chronic disease patients had lower HL than those with a single condition (16). The location influenced HL, with urban populations had higher HL (16, 27, 29), but rural residents had less access to health information and limited HL (26). Poor communication between healthcare providers and patients led to misunderstanding and low HL (16,19, 22, 29). Family support helped patients gather, analyse, and apply information (20-22), with married people generally having higher HL (27). HL was closely linked to health information accessibility, as those with poor HL struggled with information-seeking (20, 22). Older adults experienced challenges in HL due to memory loss (17). Ethnicity and cultural differences correlated with HL (20, 24).

Discussion

This systematic review examined how HL affects NCD outcomes and identifies contributing factors. Nutbeam classified HL into functional (basic reading/writing), communicative (understanding and applying information), and critical HL (evaluating and using health information) (31). Communicative and critical health literacy was more vital in self-management and health outcomes. In Poland, individuals with high functional HL but low in communicative and critical HL struggled to receive and apply credible health information (32). A consistent finding in the Netherlands highlighted that functional HL was less important in chronic disease management, but context-dependent (33, 34). The wide variation could be different HL tools used in diverse populations (35). HL was a predictor of health status; low HL caused frequent hospitalization (36), riskier health choices and even early death (5, 35). Medication compliance was also interrelated with HL. The higher the HL, the more drug adherence occurred among hypertension patients in Iraq (37), while poor HL had lower drug compliance and more hospital readmissions (38, 39).

HL correlated with good health practices; however, a study in Japan indicated that basic HL alone did not change behavior (40). Elderly Chinese with high HL engaged more in health screening and information-seeking (41). In Denmark, limited HL caused difficulties for diabetes patients to follow recommendations due to complex practices and personal and societal factors (42). Age-related findings included, firstly, younger generations had higher HL but may struggle in analyzing and utilizing health information, dominated by socioeconomic factors and education (43). Secondly, older adults with lower education tended to have low HL, hampering them in dealing with health information (35,44). Thirdly, some older adults with chronic or family disease history exhibited high HL, and actively sought preventive care and updated health information (45-47). Not all chronic patients and individuals with a family history of chronic illness had higher HL, as disease could disturb the quality of life, medical compliance, treatment plan, dietary habits, and decision-making (48).

Gender variations were explored in HL. In Korea, women had higher HL due to their role of taking care of family members (49). Nevertheless, in Ghana, men showed higher HL due to higher educational achievement (50). However, income, education and chronic disease experience affected the HL of men and women (51). Higher education was associated with higher HL since educated individuals better communicated with healthcare providers and made informed decisions (52). Inconsistency between income and health literacy was observed. While two studies revealed that low income was related to low HL, one study pinpointed that employment was related to limited HL. In China, low-income people struggled to find health information, which negatively affected HL and health outcomes (53). Then, financial constraint and lack of health insurance caused people to prioritise daily survival first, leading to lower HL and poor health outcomes (54). However, employment was associated with limited HL in Singapore (24), contradicting where employed people in Iran had higher HL than retired and unemployed individuals (55).

Location was also contributing to HL disparities. Rural residents commonly had lower HL owing to limited access to healthcare facilities and limited job opportunities (14). Opposing this, in Germany, rural people had higher HL than urban residents due to urban migration (56). Rurality itself was not the main factor when education, age, gender, socioeconomic status, and ethnicity were adjusted (9). Family support was essential in improving HL. Patients without family support suffered challenges in physical movement, timely health monitoring and rehabilitation plans (57). Family encouragement and support helped patients handle anxiety and develop psychological resilience (58).

Married people had higher HL than single people since they were responsible for their own and their family's health, making greater attention to updated health information and utilising it (59). Among married populations, women had higher HL because of care caregiving role, involvement in health-related decision-making, and a wider social network (50), while males may prioritise financial stability over health engagement (51) and depend largely on their wives for their health, especially in Korea (49). HL dominated health information-seeking behaviour. Older people with low HL sought less health information (60), while those with higher HL and internet skills were more likely to look for health information (61). Older individuals with low internet skills preferred traditional sources of information, while older individuals with higher education, internet surfing skills, and higher socioeconomic status sought health information online (62).

Cognitive ability was one of the contributors to lower HL. Memory impairment and speech deficiencies hindered health information comprehension (63), also lowered HL, and decreased the ability to recognise words (35). Older patients had dropping cognitive abilities, making it challenging to recall and adhere to medical instructions once they left healthcare centers (64).

Cultural practices correlated with HL and health outcomes. Cultural differences influenced health behaviour (65), lifestyles, diet, and self-care practices (66). In New Zealand, cultural practices

were embedded in individuals with high HL. They still chose unhealthy traditional food due to flavor, convenience, and the low cost of preparation. This suggested that opting for unhealthy food indicated lower levels of HL (67). In a hierarchical culture, cultural values hindered open discussions with healthcare providers. For instance, in Hong Kong, Taiwan, and Los Angeles, questioning healthcare providers was viewed as impolite or a challenge to their expertise, leading patients to suppress their questions and hesitate to seek clarification (65).

This systematic review included articles from only 5 countries, missing data from 6 countries, limiting the generalizability of the Southeast Asia Region. Furthermore, all the study designs used cross-sectional designs, preventing causal inference and temporal sequence analysis. Though the articles had a low risk of bias and a good control of confounders, variation in settings, populations, sampling, context and tools affected the interpretation of research. Furthermore, analysing HL through general HL and three different levels of HL would result in some discrepancies when measuring and comparing the importance of HL and its association with NCD outcomes.

Conclusion

This systematic review highlighted the importance of HL in managing NCDs and its impacts on health outcomes. HL was crucial in seeking, understanding, and applying health information. However, functional HL was less important than communicative and critical HL. Sociodemographic factors (such as age, gender, education, marital status, duration of chronic illness, geographic location, and cognitive ability), socioeconomic factors (including employment and income levels), and societal factors (communication between patients and healthcare providers, and the social support from families) contributed to HL. The findings comprehensively reflected the present situation in the Southeast Asia region and were in line with the present literature, providing supportive and valuable insights when designing HL promotion programs. However, to promote HL, more studies are needed in Southeast Asia; also, national HL strategies should address the specific three HL levels and prioritize vulnerable groups: older adults, low-income and low-education groups. Considering long-term benefits, HL education should be integrated into school curricula and adult learning programs. Healthcare providers should be trained to construct HL-sensitive communication to improve patients' understanding and decision-making. Importantly, one study in Singapore highlighted that employment was related to limit HL. Further concrete data is needed to confirm the relationship between health literacy and employment.

Journalism Ethics considerations

Ethical issues (Including plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission, redundancy, etc.) have been completely observed by the authors.

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Conflict of interest

The authors declare that there is no conflict of interests.

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