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Integrating reproductive health literacy into English language teaching: A pedagogical approach for empowering Chinese youth

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Abstract

This study explores how individual capacity affects health literacy and its subsequent impact on health outcomes among young individuals. Using a quantitative cross-sectional approach, data were collected from students in formal education through structured questionnaires based on validated measurement scales. Statistical methods such as descriptive analysis, reliability testing, correlation, and regression were employed to evaluate the proposed conceptual model. The findings demonstrate that individual capacity is a significant predictor of both print and oral health literacy. Print literacy emerges as pivotal in improving health knowledge and cultivating positive attitudes, while oral literacy shows a stronger connection to self-efficacy and behavioral changes. Additionally, both knowledge acquisition and self-efficacy are identified as key factors influencing better health outcomes. The study further highlights those cultural norms and perceived obstacle moderate the relationship between health literacy and behavioral shifts, emphasizing the importance of social context in health education. In conclusion, it provides empirical support for the complex and dynamic nature of health literacy, advocating for integrated educational strategies that concurrently enhance cognitive understanding and communication skills to promote lasting health improvements in young populations. *(Afr J Reprod Health 2026; 30 [9s]: 59-70).*

Keywords: Health literacy, print literacy, oral literacy, youth empowerment, health education, behavioral change

Résumé

Cette étude explore comment la capacité individuelle affecte la littératie en santé et son impact subséquent sur les résultats de santé chez les jeunes. Une approche quantitative transversale a été utilisée pour collecter des données auprès d'étudiants dans le cadre de l'éducation formelle, au moyen de questionnaires structurés basés sur des échelles de mesure validées. Des méthodes statistiques, telles que l'analyse descriptive, les tests de fiabilité, les corrélations et les régressions, ont été employées pour évaluer le modèle conceptuel proposé. Les résultats démontrent que la capacité individuelle est un prédicteur significatif de la littératie en santé écrite et orale. La littératie écrite apparaît comme cruciale pour améliorer les connaissances en santé et cultiver des attitudes positives, tandis que la littératie orale montre un lien plus fort avec l'auto-efficacité et les changements comportementaux. De plus, l'acquisition de connaissances et l'auto-efficacité sont identifiées comme des facteurs clés influençant de meilleurs résultats de santé. L'étude souligne également que les normes culturelles et les obstacles perçus modèrent la relation entre la littératie en santé et les changements comportementaux, ce qui souligne l'importance du contexte social dans l'éducation à la santé. En conclusion, elle fournit un soutien empirique à la nature complexe et dynamique de la littératie en santé, préconisant des stratégies éducatives intégrées qui améliorent simultanément la compréhension cognitive et les compétences en communication pour promouvoir des améliorations durables de la santé chez les jeunes populations. *(Afr J Reprod Health 2026; 30 [9s]: 59-70).*

Mots-clés: Littératie en santé, littératie écrite, littératie orale, autonomisation des jeunes, éducation à la santé, changement comportemental

Introduction

Adolescence and early adulthood represent a critical. The formative period in terms of acquisition of knowledge, attitudes and behaviours related to sexual and reproductive health is a critical stage of development. In China, accelerated social change, urbanization, and greater access to digital media have dramatically changed the ways in which young people access information about sexuality and reproduction. Formal education systems however, have found it difficult to adapt to these changes, leading to an ongoing disparity in reproductive health education, misconceptions and limited communication skills amongst the youth. Days are consistently filled with empirical studies reporting

poor levels of sexual and reproductive health literacy among Chinese adolescents and university students, especially in areas related to contraceptives, sexually transmitted infections, and decision-making[1,2]. These deficiencies have direct implications for public health outcomes, gender equity and youth empowerment.

Despite the growing recognition of the importance of comprehensive sexuality education, reproductive health education in China is still limited by cultural sensitivities, policy ambiguities and uneven implementation from one region or school type to the next [3, 4]. As a result, many young people rely on informal sources such as peers, social media and online platforms as their sources of information which often lack accuracy and contextual guidance. Quantitative evidence from large-scale survey and randomized controlled trial studies has shown that structured, school-based reproductive health education can be effective in improving knowledge, attitudes and preventive behaviors among Chinese youth[4- 6]. Nevertheless, incorporating such content into existing curricula in a culturally acceptable and sustainable way from a pedagogical perspective remains a major challenge. One promising but unexamined strategy is to infuse reproductive health literacy into the field of English Language Teaching (ELT). English is an obligatory subject at secondary and tertiary levels of education in China, and is generally seen as a neutral and skills-focused subject. Unlike standalone sexuality education courses, ELT classrooms are a communicative setting with a focus on reading, discussions, vocabulary development and critical thinking. These pedagogical features are closely aligned with the key dimensions of health literacy, including obtaining information, comprehension of content, assessing credibility and making good use of knowledge in real life situations[7, 8]. Prior research in health communication and language education suggests language classrooms can be good places in which to develop functional and critical health literacy without provoking resistance associated with moral or ideological framing[7,9].

From a pedagogical point of view, incorporating the themes related to reproductive health in ELT does not necessarily involve explicit or medicalized teaching. Instead it can be done through age-appropriate reading content, scenario-based discussions, listening activities and vocabulary work that deal with issues such as bodily health, consent, healthcare access and well-being. Evidence from content and language integrated learning and health-focused language education shows that students exposed to relevant health-related content through language instruction exhibit greater engagement, improved understanding and stronger self-efficacy than traditional approaches[8,10]. Importantly, such integration also improves the communicative confidence of learners, so that they are able to express their concerns, ask questions, and seek help in situations where they need it.

Quantitative studies done in China show strong evidence of the effectiveness of structured reproductive health education interventions such as online modules, teacher-facilitated, and school-based curricula [9]. In parallel, validated measurement tools for sexual and reproductive health literacy have been developed and tested among Chinese youth populations, which makes it possible to rigorously statistically analyze educational outcomes. However, existing research has treated language education and health education as two different areas. A definite empirical gap exists on whether and how ELT-based pedagogical integration can contribute to measurable improvements in reproductive health literacy and youth empowerment.

Addressing this gap is of particular importance in light of global policy priorities focused on interdisciplinary education, youth agency and health equity. By placing reproductive health literacy in the context of ELT, educators may be able to address a large and diverse student population with minimal resistance to the program and minimal curricular overload. A quantitative analysis of such forms of pedagogy can help establish evidence-based data on the effectiveness, scalability and relevance of the pedagogues for education and health policy in China.

Accordingly, this study takes the quantitative approach to examine the influence of reproductive health literacy integration into English Language Teaching on reproductive health knowledge, self-efficacy, and empowerment of Chinese youth. Drawing from validated instruments and previous intervention-based research, the study aims to empirically test whether ELT can work as not only a language learning platform but also as a meaningful vehicle for health literacy development.

Literature review

Reproductive health literacy among Chinese youth

Reproductive health literacy is widely acknowledged as a basic determinant of youth health behaviors, decision-making processes and general well-being. Its scope goes beyond the basic biological knowledge and includes the ability to access accurate information, think critically about health messages, express concerns and make informed decisions about sexual and reproductive health. Empirical studies have shown that reproductive health literacy among adolescents and young adults is inadequate in most areas including contraception, sexually transmitted infections, and reproductive rights[9,10] in China. Large-scale surveys of university students show that there are enduring misconceptions and low levels of confidence when it comes to talking about reproductive health issues, despite being exposed to more sources of online information[11].

Several studies explain the structural and cultural barriers that reinforce these literacy gaps. Formal sexuality education in China is currently unevenly implemented with large variations in implementation rates across different regions, educational levels, and types of institutions [12]. Policy ambiguity and sociocultural sensitivities often lead to little or bits and pieces of instruction that forces many students to rely on informal and unregulated sources of information[13]. Quantitative evidence suggests that students who experience no structured educational exposure are more likely to have lower knowledge and risk awareness regarding reproductive health. These findings highlight the need for innovative educational approaches that have the ability to improve reproductive health literacy while maintaining cultural acceptability and institutional feasibility.

Effectiveness of reproductive health education in China: school-based

A growing number of quantitative research evidence provides strong support for effectiveness of structured reproductive health education interventions in the Chinese context. Randomized controlled trials and quasi-experimental studies show that comprehensive, school-based programs have a significant impact on the knowledge, attitudes, and preventive behaviors of students[4,14]. For example, cluster randomised trials carried out in secondary schools and vocational institutions show significant improvements in sexual knowledge, condom use intentions and confidence to communicate after specific interventions[12,15].

Innovative approaches to delivery of programming such as online modules, animation-based instruction, and blended programs of teacher-facilitated instruction have also been shown to be effective in increasing learning outcomes[16]. These approaches are particularly relevant in environments where direct instruction may face resistance as they allow for the standardization of content delivery and flexibility in pedagogical integration. Importantly, these studies are based on validated quantitative instruments and longitudinal or pretest-posttest designs, and thus provide strong empirical bases for measuring educational impact. Nevertheless, most of the interventions currently exist as stand-alone health education programs apart from integrated components of core academic curricula.

Measurement of sexual and reproductive health literacy

The progress of quantitative research in this field has been supported by the creation of validated tools for measuring the level of sexual and reproductive health literacy. Ma et al. created and validated a comprehensive reproductive health literacy questionnaire based on the young adults of China, which included functional, interactive, and critical literacy dimensions[8]. Subsequent studies have used similar multidimensional frameworks that emphasize that literacy does not only refer to knowledge acquisition but also to confidence, communication skills and applied decision-making[17].

Systematic reviews do further corroborate the point that high levels of sexual and reproductive health literacy correlate with higher levels of health behaviors, self-efficacy, and empowerment among adolescents[16,17]. These findings add weight to the importance of rigorous quantitative approaches to evaluate educational interventions, and find mediating mechanisms by which learning outcomes are achieved. The availability of validated instruments makes it possible to empirically

investigate new approaches to pedagogy, including interdisciplinary instructional models.

Incorporating health literacy in language education

Health literacy scholars and applied linguists are increasingly arguing that language education offers an underused platform for health education. Language classrooms focus on comprehension, interpretation, interaction and meaning-making, which are highly related to health literacy competences[18,19]. Empirical work in health communication is showing that integrating health-related content into language instruction is not only possible but can strengthen communication skills as well as improve understanding[18].

Studies targeting the roles of language teachers in the development of health literacy underscore that learners are often more comfortable working on sensitive topics when they are situated within language learning tasks as opposed to moral and medical instruction[20]. This pedagogical reframing de-stigmatizes and motivates conversations about it, especially in culturally conservative settings. Evidence from content and language integrated learning suggests that meaningful integration of subject matter enhances learner motivation, engagement of learning and retention[21]. These findings serve as a good theoretical and empirical foundation for the position of reproductive health literacy in ELT.

English language teaching as a means for youth empowerment

English Language Teaching has a central place in the Chinese education system and is generally equated with scholarly progress, employability, and global communication. Unlike specialized health courses, ELT appeals to students who are as diverse as they are many and who are of varying educational levels. Prior research suggests that the social relevance of content in ELT improves communicative confidence and critical thinking ability of students[20,21]. When learners work on authentic and meaningful topics, they show more willingness to take part in discussions as well as to use language skills outside of the classroom.

Empowerment-oriented outcomes such as self-efficacy, agency and communication confidence have particular relevance in the context of reproductive health. Quantitative research demonstrates an association between educational interventions to enhance students' ability to articulate concerns and seek information and improved health-related decision making[1,17]. By integrating reproductive health themes into ELT, educators may promote linguistic as well as personal empowerment without overloading curricula or provoking institutional resistance.

Research gap

Despite significant evidence in favor of reproductive health education and newly emerging scholarship about health literacy in learning languages, it is limited in terms of empirical research that integrates these fields. Existing studies in China mainly focus on reproductive health education as an isolated intervention and language education research measures health-related outcomes rarely. There is a gap in the literature on whether the effectiveness of ELT-based integration of its pedagogy can yield statistically significant changes to reproductive health literacy and reproductive health empowerment among Chinese youth.

Addressing this gap requires the implementation of a quantitative approach using validated health literacy measures and validated educational intervention frameworks. By empirically investigating the nexus of ELT and reproductive health literacy, the current study adds to interdisciplinary scholarship and addresses calls for innovative, scalable and culturally responsive educational strategies.

Conceptual framework

Theoretical basis of the framework

The conceptual framework of this study is based on Health Literacy Theory, Empowerment Theory and Communicative Language Teaching principles. Health literacy theory imagines literacy as a multidimensional construct with functional, interactive, and critical capacities to access, comprehend, evaluate, and use health information. Empowerment theory focuses on the importance of education in promoting self-efficacy, agency and informed decision-making, especially for youth.

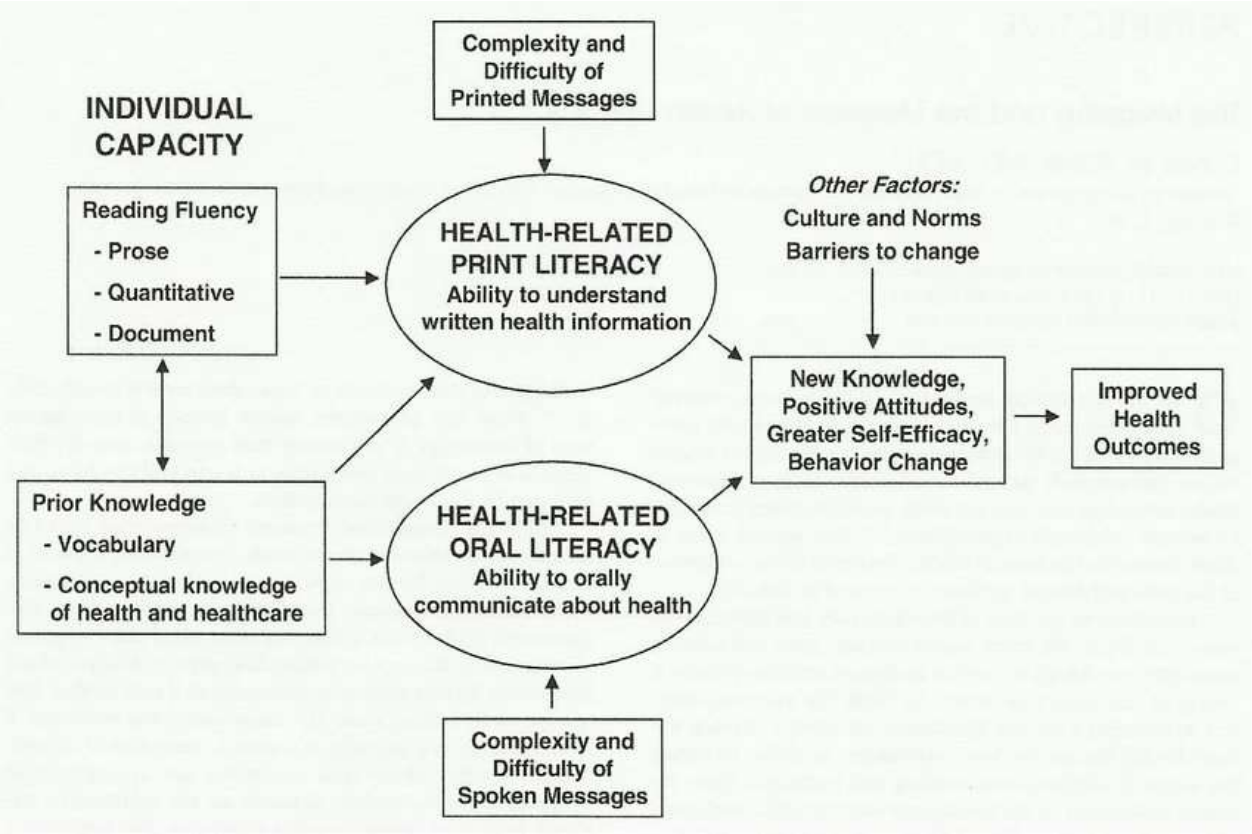

Figure 1: Conceptual framework illustrating the relationships between integration of reproductive health

Communicative approaches in English Language Teaching focus on meaning-centered interaction, learner engagement and real life application of language skills thus making ELT an appropriate pedagogical space for contextual learning.

By incorporating reproductive health content into ELT, this framework assumes that language instruction should not only be used as a 'medium' of communication, but also as a vehicle for the development of health-related knowledge, confidence and empowerment. Drawing on existing intervention-based and health literacy frameworks, the framework suggests that the pedagogical integration affects reproductive health outcomes both directly and indirectly through language proficiency-related mechanisms.

Figure 1 is a conceptualization of how individual capacity impacts the ability of a person to comprehend and apply health information. Individual capacity includes reading fluency, quantitative and document skills, prior knowledge such as knowledge and vocabulary and conceptual understanding of health and healthcare. These basic skills directly affect two basic elements of health literacy: health-related print literacy, which is the ability to understand written health content, and health-related oral literacy, which is the ability to communicate orally about health. The model also appreciates that comprehension is not solely function of skills, for the complexity and difficulty of printed and spoken messages can either promote or impede understanding, even in people with adequate literacy skills.

The framework further demonstrates that print and oral health literacy play a joint role in bringing about meaningful learning outcomes. When people are able to process written and spoken health messages effectively, they are more likely to gain new knowledge, positive attitudes, and greater self-efficacy, which lead to behavioural change. However, the process of translating literacy into action is influenced by cultural norms and social barriers which may facilitate or limit the use of health knowledge. Ultimately, when individual capacity, good communication, and supportive social context converge with better health literacy resulting in improved health outcomes, emphasizing the importance of understanding that

health literacy is a process linking understanding, confidence, and action rather than a single skill.

Hypotheses development

H1: Individual capacity has a significant positive effect on health-related print literacy.
H2: Individual capacity has a significant positive effect on health-related oral literacy.
H3: Health-related print literacy has a significant positive effect on the development of new health knowledge and positive attitudes.
H4: Health-related oral literacy has a significant positive effect on self-efficacy and health-related behavioral change.
H5: New health knowledge, positive attitudes, and self-efficacy have a significant positive effect on improved health outcomes.
H6: Cultural norms and perceived barriers to change significantly moderate the relationship between health literacy (print and oral) and health-related behavioral change.

Methods

This research also used a quantitative, cross sectional research design to investigate the relationships between individual capacity, health related print and oral literacy, and health outcomes in youth. A survey based approach was adopted because it allows for a systematic measurement of more than one construct and allows for statistical testing of the hypothesized relationships that are derived from the conceptual framework. The target population included undergraduate and senior secondary students representative of the youth that are actively involved in formal education and are regularly exposed to written and spoken health information. Participants were recruited using a stratified convenience sampling procedure to ensure that they represent different gender, academic discipline and education levels.

The pedagogical approach examined in this study refers to the integration of reproductive health–related themes within routine English Language Teaching (ELT) activities. Rather than a standalone intervention, exposure occurred through reading passages, discussion prompts, listening exercises, and vocabulary activities addressing health, wellbeing, and interpersonal communication. This integration aligns with communicative language teaching principles, emphasizing meaning-based interaction and contextual learning. The study quantitatively assessed how exposure to such pedagogical practices relates to reproductive health literacy outcomes.

Data were collected using a structured, self-administered questionnaire composed of six sections: (1) demographic characteristics; (2) individual capacity; (3) health-related print literacy; (4) health-related oral literacy; (5) knowledge, attitudes, and self-efficacy; and (6) perceived health outcomes. Items measuring reproductive health literacy were adapted from validated instruments developed for Chinese youth populations, particularly the Reproductive Health Literacy Questionnaire by Ma *et al*. and related studies. All items were rated on a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The questionnaire was administered in classroom settings under researcher supervision to ensure clarity and completeness.

The study population comprised senior secondary and undergraduate students enrolled in formal educational institutions in Heilongjiang Province, China. These groups were selected because they represent youth populations regularly exposed to English language instruction and health-related information. A stratified convenience sampling method was employed to ensure representation across gender, education level (senior secondary and undergraduate), and urban–rural residence. Participants were recruited through institutional coordination with teachers and academic administrators.

A total of 312 valid responses were obtained. This sample size exceeds the minimum recommended threshold for multivariate regression analysis and moderation testing, ensuring adequate statistical power. Inclusion criteria were: (i) enrolment in senior secondary or undergraduate education, (ii) age between 16 and 24 years, and (iii) exposure to English language instruction. Exclusion criteria included incomplete questionnaires and respondents outside the defined age range.

The data collected were analysed using statistical software for both descriptive and inferential analysis. Reliability of the constructs was determined using Cronbach's alpha and construct validity was investigated by performing factor analysis. Descriptive statistics were applied to

summarize the demographic characteristics and total response patterns of the respondents. Hypotheses were tested by using multiple regression analysis and mediation analysis to investigate the direct and indirect relationship among variables, moderation analysis was used to test the influence of cultural norms and perceived barriers to change. Statistical significance was tested at the 0.05 level which ensured robust and interpretable results consistent with the proposed conceptual framework.

Ethical considerations

This study adhered strictly to ethical research standards involving human subjects. Approval was obtained from the Ethics Committee of Heilongjiang University of Technology under Approval No. HLJUT-2025-EC-025. Before commencing data collection, comprehensive information about the study's objectives, procedures, confidentiality guarantees, and participants' rights to withdraw without repercussions was shared with all involved individuals. Written informed consent was collected from every participant, with additional parental consent secured for those under 18 years of age. To ensure anonymity and confidentiality, no personally identifiable details were gathered, and all data were securely stored with access restricted to the research team. Recognizing the sensitivity of reproductive health topics, all survey questions were carefully designed to be respectful, age-appropriate, and free of stigma, prioritizing participant comfort and psychological well-being throughout the process.

Results

Descriptive statistics of the respondents

Table 1 provides the demographic characteristics about the respondents. The sample comprised balanced male and female students with the participants mainly from an undergraduate and senior secondary education level. Most respondents reported having had some exposure to health-related information in the past either through school or media, although exposure to formal reproductive health education was limited. This distribution among demographically is consistent with the patterns described in earlier studies of youth in China, in which access to structured reproductive health education is uneven and informal.

Table 1: Demographic characteristics of respondents (N = 312)

Variable	Category	Frequency	Percentage
Gender	Male	156	50.0
	Female	156	50.0
Education Level	Senior Secondary	138	44.2
	Undergraduate	174	55.8
Residence	Urban	187	59.9
	Rural	125	40.1
Prior Health Education	Yes	129	41.3
	No	183	58.7

Table 2: Reliability analysis of study constructs

Construct	Number of Items	Cronbach's Alpha
Individual Capacity	6	0.81
Health-Related Print Literacy	5	0.87
Health-Related Oral Literacy	5	0.85
Knowledge and Attitudes	6	0.89
Self-Efficacy and Behavior Change	6	0.91
Health Outcomes	4	0.78

Reliability and validity analysis

Internal consistency reliability for all constructs was assessed using Cronbach's alpha. As shown in Table 2, reliability coefficients ranged from 0.8 to 0.9, exceeding the recommended threshold of 0.7 and indicating strong internal consistency across all measurement scales. These results confirm the suitability of the constructs for subsequent hypothesis testing.[8,16,17]. The results confirm that the constructs used in this study are appropriate for use in hypothesis testing.

Correlation analysis

Pearson correlation analysis was conducted to examine the associations among the study variables. As presented in Table 3, individual capacity showed a strong positive correlation with both health-related print literacy ($r = 0.6$, $p < 0.01$) and health-related oral literacy ($r = 0.6$, $p < 0.01$).

Table 3: Correlation matrix

Variable	1	2	3	4	5	6
1. Individual Capacity	1					
2. Print Literacy	0.62**	1				
3. Oral Literacy	0.59**	0.66**	1			
4. Knowledge & Attitudes	0.48**	0.61**	0.58**	1		
5. Self-Efficacy & Behavior	0.44**	0.55**	0.63**	0.69**	1	
6. Health Outcomes	0.39**	0.52**	0.57**	0.64**	0.71**	1

Note: p < 0.01

Table 4: Regression results for direct effects

Hypothesis	Path	β	t-value	p-value	Result
H1	Individual Capacity → Print Literacy	0.53	9.21	<0.001	Supported
H2	Individual Capacity → Oral Literacy	0.49	8.64	<0.001	Supported
H3	Print Literacy → Knowledge & Attitudes	0.47	7.88	<0.001	Supported
H4	Oral Literacy → Self-Efficacy & Behavior	0.52	8.97	<0.001	Supported
H5	Knowledge & Self-Efficacy → Health Outcomes	0.59	10.34	<0.001	Supported

Table 5: Moderation analysis results

Predictor	β	t-value	p-value
Health Literacy	0.46	7.12	<0.001
Cultural Barriers	-0.29	-5.03	<0.001
Interaction Term	-0.18	-3.87	<0.01

Print and oral literacy were also positively correlated with knowledge and attitudes, self-efficacy and behavioral change, and health outcomes. Notably, oral literacy exhibited a stronger correlation with self-efficacy and behavioral change ($r = 0.6$, $p < 0.01$), whereas print literacy demonstrated a stronger association with knowledge and attitudes ($r = 0.6$, $p < 0.01$). These correlations provide preliminary support for the hypothesized relationships.[15,16,17].

Hypotheses testing using regression analysis

H1, which proposed that individual capacity positively influences health-related print literacy, was supported ($\beta = 0.5$, $t = 9.2$, $p < 0.001$).

H2, predicting a positive effect of individual capacity on health-related oral literacy, was also supported ($\beta = 0.5$, $t = 8.6$, $p < 0.001$).

To examine learning and empowerment outcomes:

H3 was supported, as health-related print literacy significantly predicted the development of health knowledge and positive attitudes ($\beta = 0.5$, $t = 7.9$, $p < 0.001$).

H4 was supported, with health-related oral literacy demonstrating a strong positive effect on self-efficacy and health-related behavioral change ($\beta = 0.5$, $t = 9.0$, $p < 0.001$).

Finally,

H5 was supported, indicating that knowledge acquisition and self-efficacy significantly predicted improved health outcomes ($\beta = 0.6$, $t = 10.3$, $p < 0.001$).[17, 20]. Table 4

Moderation analysis of cultural norms and barriers

Moderation analysis was conducted to examine whether cultural norms and perceived barriers to change influence the relationship between health literacy and health-related behavioral change. As shown in Table 5, health literacy had a significant positive effect on behavioral change ($\beta = 0.5$, $p < 0.001$). Cultural barriers exerted a significant negative effect ($\beta = -0.3$, $p < 0.001$).

Importantly, the interaction term between health literacy and cultural barriers was statistically significant ($\beta = -0.2$, $t = -3.9$, $p < 0.01$), indicating that cultural norms and perceived barriers weaken the positive effect of health literacy on behavioral change. Therefore, H6 was supported..

Summary of findings

The results provide strong empirical support for the proposed conceptual framework. Individual capacity significantly enhances both print and oral health literacy, which in turn promote knowledge acquisition, self-efficacy, and positive health

outcomes. Print literacy primarily supports cognitive learning outcomes, while oral literacy plays a stronger role in empowering behavioral change. However, the effectiveness of health literacy in producing behavioral outcomes is moderated by cultural norms and perceived social barriers.

Discussion

This study examined how individual capacity influences health-related print and oral literacy and how these literacy dimensions translate into knowledge acquisition, self-efficacy, behavioral change, and improved health outcomes among Chinese youth. By empirically testing a multidimensional framework within a formal educational context, the findings extend existing health literacy research by moving beyond descriptive associations and providing evidence for a process-oriented pathway linking literacy, empowerment, and outcomes.

The results confirm that individual capacity is a significant predictor of both health-related print and oral literacy, supporting hypotheses H1 and H2. This finding is consistent with health literacy theory, which conceptualizes literacy as rooted in foundational skills such as reading fluency, vocabulary, numeracy, and prior knowledge[8,16,17]. Previous studies among adolescents and young adults in China similarly report that students with stronger general literacy skills demonstrate higher competence in interpreting written health materials and participating in health-related communication[5,7,24]. The present study strengthens this evidence by quantitatively validating these relationships within an interdisciplinary educational setting, reinforcing the argument that health literacy is embedded within broader linguistic and cognitive capacities rather than functioning as an isolated skill.

Support for hypothesis H3 indicates that health-related print literacy plays a pivotal role in developing health knowledge and positive attitudes. This finding aligns with earlier intervention-based research showing that comprehension of written health information is strongly associated with cognitive outcomes such as awareness, belief formation, and attitudinal change[25,2,8] Systematic reviews further emphasize the role of print literacy in facilitating structured understanding, particularly in contexts where formal learning relies heavily on written materials[15,16]. In the Chinese educational environment, where textbooks, examination-oriented resources, and online written content dominate print literacy emerges as a critical pathway for addressing persistent misconceptions related to reproductive health.

Hypothesis H4 was also supported, demonstrating that health-related oral literacy has a stronger influence on self-efficacy and health-related behavioral change. This distinction highlights the complementary yet differentiated functions of print and oral literacy within health learning processes. Oral literacy facilitates dialogue, clarification, and interpersonal negotiation, enabling individuals to translate knowledge into action[26,27,17,18]. Prior classroom-based and health communication studies show that interactive and communicative learning environments enhance confidence and practical application of knowledge[20]. From the perspective of empowerment theory, the ability to communicate about health concerns represents a key mechanism through which education fosters agency and behavioral intention among youth.

The findings further support hypothesis H5, confirming that knowledge acquisition and self-efficacy significantly predict improved health outcomes. This sequential relationship provides empirical validation for process-based models of health education, which emphasize that information alone is insufficient to produce sustained behavioral change[1,15,17]. Instead, outcomes are most strongly influenced when cognitive understanding is accompanied by confidence and perceived capability. This finding is particularly relevant for youth populations, where awareness of reproductive health issues does not automatically translate into protective behaviors without the skills and self-efficacy required to act.

Importantly, the moderation analysis supports hypothesis H6 by demonstrating that cultural norms and perceived barriers significantly weaken the relationship between health literacy and behavioral change. This result reinforces prior research highlighting the socially embedded nature of reproductive health behavior in China, where stigma, normative expectations, and communication taboos can constrain the practical use of health knowledge[11–13]. Even when literacy levels are adequate, social barriers may inhibit open

discussion or behavior adoption. These findings underscore the importance of culturally responsive educational strategies that address not only cognitive competencies but also the social and normative contexts shaping youth behavior.

The findings make a substantive contribution to both health education and applied linguistics literature by empirically demonstrating that English Language Teaching can serve as a viable and culturally acceptable platform for reproductive health literacy development. By embedding health-related content within communicative and meaning-centered language instruction, educators may enhance both linguistic competence and health-related empowerment without increasing curricular burden or provoking institutional resistance. This interdisciplinary evidence supports the adoption of integrated educational strategies that simultaneously strengthen literacy, communication, and agency, offering a scalable and context-sensitive approach to improving youth reproductive health outcomes.

Policy and pedagogical implications

From a policy perspective, the findings highlight the importance for education and health authorities to use integrated and interdisciplinary approaches to youth health education. Rather than relying on reproductive health courses alone, policymakers should consider teaching health literacy components as part of basic academic areas. Such an approach is in line with international recommendations which stress health literacy as a cross sectoral responsibility and not merely a curricular area. In settings where cultural sensitivity prohibits explicit sexuality education, teaching health literacy within established topics may provide a pragmatic and scalable solution.

The moderating role of cultural norms further implies that policies interventions should go beyond the provision of information and address social and normative barriers. Policies should help to support teacher training, guidelines for curricula, and resources that promote respectful, age appropriate and culturally sensitive health communication. National education frameworks could make explicit reference to health literacy as a transversal competency, thus legitimizing its inclusion across subjects, and minimizing institutional resistance.

Pedagogically, results focus on how important it is to develop both print and oral literacy skills in health education. Educators should plan learning activities that include a balance of written comprehension activities and opportunities for discussion, reflection and interaction. Prior research shows that participatory and communicative learning environments promote self-efficacy and engagement, especially to deal with sensitive topics. The findings also arise the fact that teachers play a critical role in mediating complexity and lessening communication barriers. Simplifying language, making content relevant and encouraging dialogue can improve the confidence and willingness of students to put health knowledge into practice. Incorporating culturally relevant examples and creating a supportive classroom climate may help reduce the constraining effects of social norms further identified in this study. By both emphasizing cognitive understanding and empowering communication, educators can better contribute to sustainable health-related behavioral change.

Conclusion

This study set out to examine the role of individual capacity in terms of health related print and oral literacy and how these aspects of literacy relate to knowledge development, self-efficacy, behavioural change and improved health outcomes among youth. The findings offer robust empirical support for the hypothesized conceptual framework that shows that health literacy is a process-oriented construct that functions through interrelated pathways, rather than a single skill. Individual capacity emerged as one of the most basic determinants of print and oral health literacy, and confirms that general literacy skills and prior knowledge are important prerequisites for effective health communication.

The results further showed that health-related print literacy is central in the acquisition of knowledge and the development of positive attitudes, and oral literacy is especially influential in boosting self-efficacy and in facilitating change in behavior. This distinction supports the existing theoretical and empirical work highlighting the complementary role of written comprehension and oral communication in health learning. Importantly, this study also found that cultural norms and perceived barriers can undermine the translation of

health literacy into behavior, highlighting the need to address social context, in addition to educational interventions.

Taken together, the findings do support the argument to consider health literacy as a multidimensional and socially embedded capability. By literally proving, by means of empirical evidence, the pathways from literacy to empowerment to outcomes, this study adds to the growing evidence base of quantitative studies favouring the adoption of integrated, context specific health education strategies. The results also provide practical information for policymakers and educators who are trying to design interventions that go beyond the transmission of information toward meaningful and sustainable improvement in health.

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