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Review Article

Health literacy programs for adolescents in the school context: a scoping review*

Programas de letramento em saúde para adolescentes no contexto escolar: revisão de escopo

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ABSTRACT

Objective: to map health literacy programs targeting adolescents in school settings. **Methods:** a scoping review was conducted in accordance with JBI guidelines. Full-text studies were included, with no restrictions on date or language. Screening and selection were performed by two independent researchers using the Catchii Systematic Review Screener tool. Data were extracted using a tool developed by the authors and presented descriptively. **Results:** the search identified 177 studies; 13 were removed due to duplication. During screening, 88 studies were excluded. After full-text review, 41 were excluded, resulting in a final sample of 35 studies. Most of the studies were conducted in Europe (n=11) and North America (n=7). Participants' ages ranged from 10 to 19 years, with a greater focus on the 12–15 age group. The most frequently assessed dimension of Health Literacy was Mental Health Literacy (n=19). General Health Literacy was the focus of six programs and media literacy in three. **Conclusion:** a predominance of mental health programs was observed; general dimensions of literacy should be included in the curriculum, with the adoption of co-creation. **Contributions to practice:** the presented synthesis can support the creation of school programs led by nurses.

Descriptors: School Nursing; Health Literacy; Adolescent; Program Development; Education.

RESUMO

Objetivo: mapear os programas de letramento em saúde voltados para adolescentes no contexto escolar. **Métodos:** revisão de escopo realizada conforme as diretrizes do JBI. Foram incluídos estudos com texto completo, sem restrição de data ou língua. A triagem e seleção foram realizadas por duas pesquisadoras independentes na ferramenta *Catchii Systematic Review Screener*. Os dados foram extraídos através de instrumento elaborado pelas autoras e apresentados de forma descritiva. **Resultados:** a busca identificou 177 estudos, 13 foram removidos por duplicidade. Na triagem, 88 estudos foram excluídos. Após a leitura completa, 41 foram excluídos, resultando em uma amostra final de 35 estudos. A maioria das pesquisas foi realizada na Europa (n=11) e na América do Norte (n=7). A idade dos participantes variou de 10 a 19 anos, com maior foco na faixa de 12-15 anos. A dimensão de Letramento em Saúde mais avaliada foi o Letramento em Saúde Mental (n=19). O Letramento em Saúde geral foi foco de seis programas e o midiático em três. **Conclusão:** observou-se predomínio de programas de saúde mental; dimensões gerais do letramento devem ser incluídas no currículo, com adoção da cocriação. **Contribuições para a prática:** a síntese apresentada pode subsidiar a criação de programas escolares liderados por enfermeiros.

Descritores: Serviços de Enfermagem Escolar; Literacia para a Saúde; Adolescente; Desenvolvimento de Programas; Educação.

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Introduction

The school environment is a setting where adolescents develop their identity and establish healthy lifestyle habits. At school, adolescents interact with others and learn about key topics that support their full and healthy development, a process that occurs through health education and can influence their level of health literacy[1-3]. Health literacy has been advocated as a mediator for the adoption of healthy habits[1]; it refers to the degree to which individuals can find, understand, and use information and services to guide their health-related decisions and actions for themselves and others[2].

Health literacy has been incorporated by many countries as a goal in public policies and advocated by the World Health Organization as a strategy to achieve the Sustainable Development Goals[4]; it should be employed as an educational objective and implemented as early as possible in early childhood education, as it serves as a personal resource for managing health-related information[5].

Health literacy interventions in school settings have the potential to improve outcomes among adolescents[6]. Certain dimensions have been incorporated into specific strategies, such as media literacy, defined as the ability to access and critically analyze health information conveyed by the media. An analysis of 16 interventions in Israel, North America, Europe, and Australia, involving approximately 7,400 participants[7], indicated small to moderate effects on improving body image and reducing body dissatisfaction. However, the focus on developed countries limits generalizability, indicating the need for studies in other socioeconomic contexts.

In Brazil, evidence on adolescent health literacy is preliminary, with research related to digital literacy[8] and associations with vaccine hesitancy[9] and sociodemographic factors[3].

Despite the studies presented, a notable gap exists in the explicit theoretical foundation regarding health literacy in the educational approaches described, coupled with the scarcity of interventions developed in schools in developing countries and the lack of programs specifically aimed at promoting general levels of health literacy among adolescents in the Brazilian context.

Health education initiatives aimed at expanding knowledge predominate in school health programs, in contrast to health literacy initiatives, which emphasize the development of skills for the critical and independent use of health information. Against this backdrop, the objective of this study was to map health literacy programs targeting adolescents in school settings.

Methods

Study design

This is a scoping review conducted in accordance with the methodological approach proposed by the JBI[10] and reported in accordance with the recommendations of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses for Scoping Reviews (PRISMA-ScR)[11].

Protocol and registration

The research question was formulated based on the PCC strategy, considering adolescents as the population (P), health literacy programs as the concept (C) and the school environment as the context (C). Thus, we sought to answer the following question: "What health literacy programs for adolescents exist in the school context?" It was assumed that these programs exist and present themselves in a different way in terms of their organization and implementation. The review protocol was registered in the Open Science Framework (OSF): https://doi.org/10.17605/OSF.IO/VF54D.

Eligibility criteria

For the eligibility criteria, primary and secondary studies (original articles, reviews, dissertations and theses) with adolescents (10 to 19 years old) in

a school environment were included, with no restriction on year or language, as long as full text was available. Studies not related to health literacy interventions in the school context, carried out exclusively with children or adults, duplicates and those that, after complete reading, did not answer the guiding question were excluded. Protocols were excluded when the corresponding study with results was identified.

Information sources and search strategy

The search was conducted in the following electronic databases: Latin American and Caribbean Health Sciences Literature (LILACS), Medical Literature Analysis and Retrieval System Online (MEDLINE) via PubMed, Cumulative Index to Nursing and Allied Health Literature (CINAHL), Web of Science (WOS), Excerpta Medica Database (EMBASE), Cochrane Library, Brazilian Digital Library of Theses and Dissertations (BDTD), Open Access Theses and Dissertations (OATD), Preprints.org, and Scientific Electronic Library Online (SciELO).

The search strategy consisted of controlled terms and keywords, tailored to the specific characteristics of each database, as well as a manual search of the reference lists of the selected studies. The strategy development process occurred in three stages: 1) exploratory phase, involving the identification of relevant articles to identify terms and keywords; 2) pilot search to guide the formulation of the definitive strategy; and 3) definition of the final strategy.

The final strategy utilized controlled descriptors and free-text terms, combined with Boolean operators. The descriptors included terms from the Medical Subject Headings (MeSH) and the Descriptors in Health Sciences (DeCS), such as "Health Literacy," "Health Education," and "Adolescents." To broaden the search, the following free-text terms were also used: "health literacy," "health education," "educational intervention," "school," "adolescent," "health literacy interventions," "health literacy programs", "health promotion programs", "school health programs", "school-based programs", "school health education", "teens", "youth", "young people", and "outcome/results/impact/evaluation", combined with Boolean operators (AND, OR) and adapted to each database. The final search, aimed at identifying published and unpublished studies, was conducted on June 20, 2025 (Figure 1).

Database	Strategy
LILACS	("letramento em saúde" OR "literacia em saúde" OR "alfabetização em saúde" OR "health literacy") AND (intervenção OR "intervenção educacional" OR "educational intervention" OR "health promotion") AND (escola OR escolar OR ensino OR "school health" OR "school programs") AND (adolescente OR adolescência OR "adolescents" OR "estudante" OR "student" OR "youth" OR "young people")
MEDLINE	("Health literacy interventions" OR "Health literacy programs" OR "Health promotion programs") AND ("School health services" OR "School health programs" OR "School-based health education") AND ("Adolescents" OR "Teens" OR "Youth" OR "Young people") AND ("Outcome" OR "Results" OR "Impact" OR "Evaluation")
Web of Science	("Health literacy" OR "Health education strategies" OR "Health promotion strategies") AND ("School health programs" OR "School health education" OR "School-based programs") AND ("Adolescents" OR "Youth" OR "Young people")
CINAHL	"Health literacy" AND ("School health programs" OR "School health education" OR "School-based programs") AND ("Adolescents" OR "Youth" OR "Young people")
EMBASE	("Health literacy" OR "Health education strategies" OR "Health promotion strategies") AND ("School health programs" OR "School health education" OR "School-based programs") AND ("Adolescents" OR "Youth" OR "Young people")
BDTD*	(Adolescents) AND ("Health Literacy" OR "Health Literacy" OR "Health Education") AND ("Educational Intervention" OR "School Health Program" OR "Health Promotion at School" OR "Health Intervention" OR "Health Education at School")
OATD†	(Adolescents OR "Young people" OR Youth) AND ("Health literacy" OR "Health education" OR "Health promotion") AND (Intervention OR "Educational intervention" OR "Health promotion strategies") AND ("School health programs" OR "School-based programs" OR "School health")
Preprints.org	("Health literacy" OR "Health education strategies" OR "Health promotion strategies") AND ("School health programs" OR "School health education" OR "School-based programs") AND ("Adolescents" OR "Youth" OR "Young people")
SciELO	("Health literacy interventions" OR "Health literacy programs" OR "Health promotion programs") AND ("School health services" OR "School health programs" OR "School-based health education") AND ("Adolescents" OR "Teens" OR "Youth" OR "Young people") AND ("Outcome" OR "Results" OR "Impact" OR "Evaluation")
Cochrane	("Health literacy interventions" OR "Health literacy programs") AND ("School health services" OR "School health programs" OR "School-based health education") AND ("Adolescents" OR "Teens" OR "Youth" OR "Young people") AND ("Outcome" OR "Results" OR "Impact" OR "Evaluation")

*BDTD: Brazilian Digital Library of Theses and Dissertations; †OATD: Open Access Theses and Dissertations

Figure 1 – Access routes, search strategies and fields used in the databases, for the results obtained in the scoping review. Botucatu, SP, Brazil, 2025

Selection of sources and data extraction process

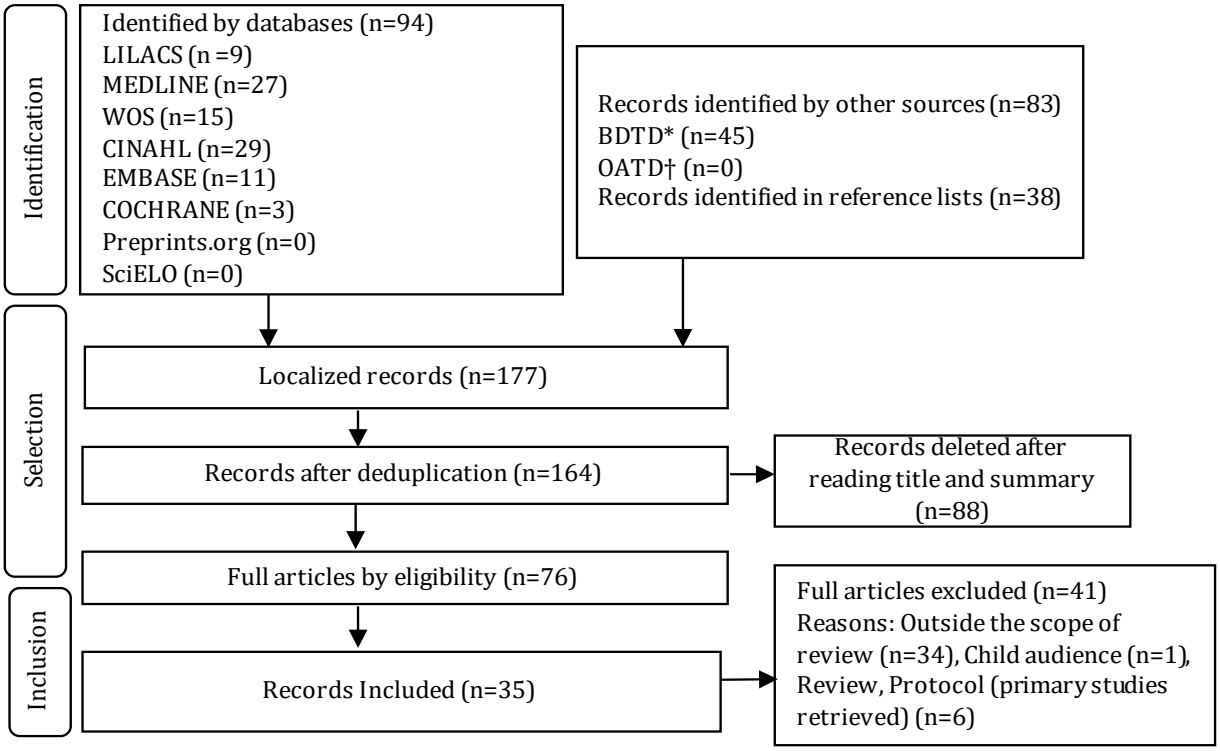
The retrieved studies were imported into the Catchii Systematic Review Screener[12]. Selection was performed independently by two reviewers, with disagreements resolved by a third reviewer. Study screening occurred in two stages: reading of titles and abstracts, followed by reading of the full text. Data extraction was performed in a Microsoft Excel spreadsheet, based on a previously developed instrument.

Items and summary of results

Information was extracted regarding the identification of the study, method, level of evidence[13], sample characteristics, definition and dimension of health literacy addressed, pedagogical approach, design of the intervention or program and instrument used. The data were analyzed through a descriptive--analytical approach, aiming to map and characterize the programs and interventions.

Results

The search identified 177 studies, excluding 13 duplicates. After screening the titles and abstracts, 88 were excluded. The remaining 76 articles were read in full, resulting in the exclusion of 41. The final sample consisted of 35 studies, as shown in Figure 2.



*BDTD: Brazilian Digital Library of Theses and Dissertations; †OATD: Open Access Theses and Dissertations

Figure 2 – PRISMA-ScR flowchart of the selection process of the studies included in the review (n=35). Botucatu, SP, Brazil, 2025

Most of the studies were conducted in Europe, notably in the United Kingdom (n=5) and Portugal (n=2), as well as in Germany, the Netherlands, Italy, and Norway (n=1 each). In North America, studies were conducted in the United States (n=5) and Canada (n=2), and in Oceania, in Australia (n=4). In the Middle East, Iran and Turkey each had three studies. In Asia, Japan (n=2) and China, Taiwan, Indonesia, Nepal, and Thailand (n=1 each) stood out, as shown in Table 1.

Table 1 – Characterization of the included articles by year, program, first author, country of origin, sample, age, study type, and level of evidence (n=35). Botucatu, SP, Brazil, 2025

Program, author, year and country	Sample	Age	Type of study	LoE*
Mental Health Awareness Workshops, Pinfold et al[14], 2003, United Kingdom	472	14-15	Quasi-experimental	3
MasterMind, Tacker et al[15], 2007, United States	30	13-14	Pilot intervention	4
In Our Own Voice, Pinto-Foltz et al[16], 2011, United States	156	13-17	RCT†	2
Mental health for everyone, Skre et al[17], 2013, Norway	1.070	13-15	RCT	3
HeadStrong, Perry et al[18], 2014, Australia	380	13-16	RCT	1
The Guide, Mcluckie et al[19], 2014, Canada	265	14-15	Quasi-experimental	4
The Curriculum Guide, Milin et al[20], 2016, Canada	534	16-18	RCT	2
Contact interventions, Chisholm et al[21], 2016, United Kingdom	769	12-13	RCT	2
Adolescent Depression Awareness Program, Swartz et al[22], 2017, United States	6.679	14-15	RCT	2
Media Literacy Intervention, Lucidi et al[23], 2017, Italy	389	13-19	RCT	2
Health Literacy for Kids, Nash et al[24], 2018, Australia	–	4-12‡	Protocol	5
Kids SIPsmartER, Lane et al[25], 2018, United States	74	11-13	RCT	2
Short Mental Health Literacy Program, Ojio et al[26], 2018, Japan	662	10-12	RCT	2
Finding Space for Mental Health, Campos et al[27], 2018, Portugal	543	12-14	RCT	2
Teen Mental Health First Aid, Guajardo et al[28], 2019, Australia	256	14-17	RCT	3
Problem-Based Learning Health Literacy, Karimi et al[29], 2019, Iran	377	15-18	Quasi-experimental	2
Help Out a Mate, Liddle et al[30], 2019, Australia	102	12-18	RCT	2
Mind Your Head, Glazzard et al[31], 2020, United Kingdom	570	12-15	Mixed (Focus groups)	5
Drug-Use Prevention, Lin et al[32], 2021, Taiwan	648	13-14	Quasi-Experimental	2
Promotion of Mental Health Literacy, Morgado et al[33], 2021, Portugal	38	14-16	RCT	1
Health Education Program, Narkarat et al[34], 2021, Thailand	128	14	Quasi-experimental	3
LifeLab, Woods-Townsend et al[35], 2021, United Kingdom	2.487	13-14	RCT	1
Moving Storie, Tuijnman et al[36], 2022, Netherlands	185	12-15	RCT	2
StresSOS, Lehner et al[37], 2022, Germany	510	12-18	Quasi-experimental	4
Sanita, Mori et al[38], 2022, Japan	125	12-13	RCT	1
Protection Motivation Theory based Intervention, Ardekani et al[39], 2022, Iran	180	14-15	RCT	1
The Guide Cymru, Simkiss et al[40], 2023, United Kingdom	1.926	13-14	RCT	2
Healthy Together, Wang et al[41], 2023, China	724	12-15	RCT	1
Improving Mental Health Literacy Among Children and Young People in Indonesia, Brooks et al[42], 2023, Indonesia	56	11-15	Case studies	3
Web-based education program grounded on health literacy, Dülger et al[43], 2024, Turkey	114	12-13	RCT	1
Health Literacy Education, Yüksek et al[6], 2024, Turkey	80	12-13	RCT	1
Motivational interviewing and health education, Akca et al[44], 2024, Turkey	63	14-15	RCT	1
Oral Health Literacy, Hosseini et al[45], 2025, Iran	140	15-19	RCT	1
Advocates for all youth, Dadematthews et al[46], 2025, United States	80	11-13	Pilot study	2
School-based health literacy intervention, Khanal et al[47], 2025, Nepal	468	13-19	Quasi-experimental	2

*LoE: Level of evidence; RCT: Randomized controlled trial; Included because it presents results that include the adolescent group in the age group of 10 to 12 years

Most of the studies were published in the last five years, with 40% of the studies (n=14) published between 2021 and 2025. The most common study type was the Randomized Clinical Trial (RCT) (n=23), followed by quasi-experimental studies (n=7). The studies included participants aged 10 to 19 years. Within this group, the most common age range was 12 to 15 years.

The most frequently assessed dimension of health literacy was mental health literacy, with 19 programs; general health literacy was the focus of six programs, while media literacy—including initiatives combined with public health—was identified in three interventions. Dimensions of oral health (n=2), sexual and reproductive health (n=1), public health emer-

gencies (n=1), drug use prevention (n=1), nutrition (n=1), and physical activity and exercise (n=1) were also observed.

Among the definitions used, the classic definition of mental health literacy[21,31,33] was the most common, followed by the integrated model of health literacy[48] (n=3) and the tripartite model of health literacy[35] (n=3); six interventions did not specify a theoretical framework. Participatory approaches were the most frequent, including group discussions (n=15), videos and multimedia (n=12), and group activities (n=11). Simulations (n=5) and case studies (n=2) were also used. Lectures and presentations were less common (n=4) and were always combined with dynamic methods.

The interventions were implemented by teachers (n=15), researchers (n=11), and health professionals, including school nurses (n=2), psychologists or mental health professionals (n=3), physicians (n=1), and dentists (n=1), among others. Some programs involved a combination of different professionals.

To assess health literacy levels, the studies primarily used questionnaires developed by the authors themselves (n=12) and validated instruments, such as the Health Literacy Scale for School-Age Children[6,44,47], the Knowledge and Attitudes to Mental Health Scales[26-27], and vignette-based assessments[21,31,33], each used in three distinct studies. Other instruments such as the Health Literacy Measure for Adolescents[30], Test of Oral Health Literacy in Adults[45], Adolescent Health Literacy Evaluation Scale under Public Health Emergencies[40], The Sexual Health Literacy[34], QuALiSMental[33], Health Literacy KSE Survey[24], Adolescent Depression Knowledge Questionnaire[22], Mental Health Literacy Questionnaire[30,37], Mental Health First Aid[28], the Depression Literacy Scale[22], and the Health Literacy Scale for Children[44] were also used.

Most studies reported positive results in health literacy and other assessed dimensions. There were significant improvements in knowledge, recognition of emotional states, and the intention to help peers ($p<0.001$)[20,24,34]. Some studies showed improvements in mental health literacy at the post-test and follow-up ($p<0.05$)[6], including recognition of anxiety ($p<0.001$), and use of prevention and self-help strategies ($p<0.01$)[33]. Gains were also observed in sexual literacy ($p<0.05$)[34] and in all dimensions of mental health literacy ($p<0.001$)[27], with immediate and sustained effects on literacy regarding depression ($p<0.001$; $p<0.01$)[31-33].

The duration and design of the interventions ranged from one-time 45-minute seminars to programs lasting up to 24 weeks. The methodologies combined traditional approaches with digital resources, such as apps, interactive video games, and e-learning; a description of the programs is provided in Figure 3.

Program and format description	Main results
Mental Health Awareness Workshops[14]: two one-hour workshops, with videos and discussion.	Increase in protective attitudes ($p<0.001$).
MasterMind[15]: six weeks with 80-minute sessions, peer teaching.	Increased engagement.
In Our Own Voice[16]: 60-minute session based on narrative, video and discussion.	No immediate improvement in mental health literacy ($p=0.27$), with an increase in follow-up ($p<0.03$).
Mental Health for Everyone[17]: three days of workshops with active methodologies.	Increased symptom recognition ($p<0.001$).
HeadStrong[18]: 10 hours of activities integrated into the curriculum.	Increased mental health literacy ($p<0.05$), with no effect on seeking help.
The Guide[19]: six curricular modules with videos and self-directed learning.	Increased knowledge and attitudes ($p<0.001$).
The Curriculum Guide[20]: six curricular hours with videos and simulations.	Increased knowledge ($p<0.001$).
Contact Interventions[21]: one-day intervention: education compared to contact with volunteer.	Education group with improved mental health literacy ($p=0.01$) and contact group with no improvement ($p=0.3$).
Adolescent Depression Awareness Program[22]: 2-3 three-hour meetings with videos and activities.	Increased literacy in depression ($p<0.001$), with no effect on stigma reduction.
Media Literacy Intervention[23]: 12 sessions with seminars and meetings with experts.	Decrease in pro-doping attitudes ($p=0.008$).
Health Literacy for Kids[24]: school seminar + practical activities.	Positive results with parents and teachers[49].

(the Figure 3 continue in the next page...)

Program and format description	Main results
Kids SIPsmartER[25]: six classes with teach-back, interactivity and parental involvement.	Increased media health literacy (p<0.01).
Short Mental Health Literacy Program[26]: unique educational session with animated film and discussion.	Increased knowledge and help (p<0.001).
Finding Space for Mental Health[27]: two 90-minute sessions with songs, videos and dynamics.	Increased literacy in mental health (p<0.001).
Teen Mental Health First Aid[28]: three workshops with dramatization and videos.	Increase in the intention to help (p<0.01).
Problem-Based Learning Health Literacy[29]: four workshops with problem-based learning.	Increased health literacy (p<0.001).
Help Out a Mate[30]: 45-minute seminar with games, discussion and "Man Card".	Increased mental health literacy (p<0.01), with no effect on seeking personal help.
Mind Your Head[31]: six one-hour lessons with videos and active learning.	Increased mental health literacy (p<0.01), with no change in self-reported well-being.
Drug-Use Prevention[32]: 10 sessions (45 minutes) for 6 months with debates, games and films.	Increased health literacy (p<0.001), with no improvements in attitudes or behavioral control.
Promotion of Mental Health Literacy[33]: 4-8 Psychoeducational workshops.	Increased mental health literacy (p<0.01).
Health Education Program[34]: interactive animation and meetings with researchers for 24 weeks.	Increased sexual health literacy (p<0.05).
LifeLab[35]: two to three week curriculum with "hands-on".	Increased health literacy. Participants began to evaluate their lifestyles more critically.
Moving Stories[36]: videogame 3D + contact with a person with experience in depression.	Decreased personal stigma (p<0.04), with no effect on mental health literacy components (p>0.05).
StresSOS[37]: eight face-to-face and online modules with participatory exercises.	Increased knowledge about mental health (p<0.001), and reduced stress only among adolescents with pre-existing problems.
Sanita[38]: three lessons (50 minutes) with brainstorming, videos and action plan.	Increased knowledge about mental illness (p<0.001), with no change in help-seeking behavior.
Protection Motivation Theory based Intervention[39]: Four sessions with active learning.	Increased oral health literacy (p<0.05).
The Guide Cymru[40]: six course modules with videos and self-directed learning.	Increased mental health literacy (p<0.001).
Healthy Together[41]: 12 weekly lessons with simulations.	Increased emergency care literacy (p<0.014).
Improving Mental Health Literacy Among Children and Young People in Indonesia[42]: 13 participatory curricular offices.	Slight increase in mental health literacy (p<0.001),
Web-based education program grounded on health literacy[43]: E-learning program with six modules over ten weeks.	Increased health literacy (p<0.05).
Health Literacy Education[6]: four educational workshops with case studies.	Increased health literacy at the post-test and at the three-month follow-up (p<0.05).
Motivational Interviewing and Health Education[44]: six sessions with motivational interviewing and videos.	Increased health literacy (p<0.001) and physical exercise behaviors.
Oral Health Literacy[45]: four sessions (45 minutes) with demonstrations.	Increased oral health literacy (p<0.001).
Advocates For All Youth[46]: six 30-minute sessions applied by volunteers.	Good adherence/acceptance. Low engagement in the mindfulness module.
School-based health literacy intervention[47]: digital learning with face-to-face sessions.	Improved overall literacy (p<0.001), with no impact on exercise behavior (p>0.05).

Figure 3 – Description of the programs and main results (n=35). Botucatu, SP, Brazil, 2025

Neutral or unexpected results were reported; in Moving Stories[36], there was a decrease in confidence in offering help after six months (p<0.001) and no effect on mental health literacy components (p>0.05). The Sanita program[38] showed no improvement in stigma after three months (p=0.158), and the Mental Health Awareness Workshops[14] reported a decline in the retention of positive attitudes after six months. Improving Mental Health Literacy Among Children and Young People in Indonesia[42] demonstrated minimal changes in literacy after the intervention, and In Our Own Voice[16] showed no immediate effect one week after the session (p=0.27) despite a delayed improvement after four weeks.

Discussion

The programs and interventions included in this review focused on mental health literacy and were developed in high-income countries in Europe and North America. Program outcomes were predominantly positive, with significant impacts on health literacy levels, knowledge, stigma, and behavior change[6,41]. Most studies were classified as level two or three evidence, as they were clinical or quasi-experimental trials—designs that provide greater robustness for intervention recommendations.

Observou-se uma lacuna de intervenções escolares com abordagem do letramento em saúde como um construto universal[2,4], entendido como um conjunto integrado de habilidades aplicáveis a diferentes domínios da saúde, e não restrito a temas específicos. Semelhantemente, foram escassas intervenções fundamentadas em modelos integrados[48] que articulam de forma progressiva as dimensões funcional, interativa e crítica, permitindo acessar, compreender, avaliar e aplicar informações em saúde.

A gap was observed in school-based interventions that approach health literacy as a universal construct[2,4], understood as an integrated set of skills applicable to different health domains, and not restricted to specific topics. Similarly, there were few interventions based on integrated models[48] that progressively articulate the functional, interactive, and critical dimensions, enabling the access, understanding, evaluation, and application of health information.

Nevertheless, some initiatives, although focused on mental health, have incorporated broader health dimensions, such as LifeLab, which included the activity "Me, My Health, and My Children's Health," adopting a more comprehensive and intergenerational perspective[35].

The geographical gap in the identified studies, evidenced by the absence of Brazilian interventions, points to a limitation in national scientific output on health literacy programs targeting adolescents. Despite established national school health policies, health literacy remains a relatively new field in the Brazilian context, currently in the process of being integrated, as evidenced by its recent inclusion by the Federal Nursing Council among the duties of nurses in the school setting[50].

The integration of health literacy into the curriculum has been adopted in some programs, with positive results[19,22,27]. Its inclusion in the school curriculum facilitates the incorporation of health topics into adolescents' daily lives, helps combat stigma, and constitutes a sustainable strategy that is easily managed by the school community and cost-effective[21,32,36].

The most commonly used teaching strategies were active and participatory. The programs employed methods such as group discussion, role-playing, and problem-based learning, incorporating engagement techniques and gamification. Digital and media resources are well-received by adolescents, increasing interest and performance, with visually appealing formats proving particularly effective[29]; this age group tends to benefit from dynamic formats[26,42].

Interventions were implemented by trained teachers in one-third of the programs; teacher training is a central approach for the sustainability and scalability of the programs, while collaboration with health professionals (psychologists, nurses, and dentists) enhances the quality of the content[35]. Projects such as Health Literacy for Kids[16] also studied the effects of the programs on teachers' health literacy levels, strengthening the framework of complex interventions involving students, teachers, and family members[50].

School nurses participated in implementing interventions in the programs "Promoting Mental Health Literacy"[33] and Improving Mental Health Literacy Among Children and Young People in Indonesia[42], both of which yielded positive results, highlighting their key role in adapting these initiatives to the students' reality. Their care contributes to reducing low literacy levels among adolescents[6] and to the continuity and strengthening of interventions[19].

The collaborative development of interventions was highlighted in Lifelab[35] and in the School-based

health literacy intervention[47], aligned with the concept of co-production, codesign, which involves end--users from the identification of needs through to development and evaluation. Educational interventions tend to be more effective when they are "designed and implemented within the educational system, not imposed on it"[35:17].

The Optimising Health Literacy and Access (OPHELIA) process, created to guide co-production, was applied in Lifelab[35] and Health Literacy for Kids[24]; it is a model for creating interventions based on principles of equity, collaborative participation, and valuing local knowledge, including needs assessment and the development of tailored actions.

The duration of the interventions proved to be a determining factor in the effectiveness and sustainability of the outcomes. Short interventions yielded immediate gains in knowledge comparable to those of longer programs[26,30], but with less retention over time, despite the initial awareness. In contrast, longer programs favored greater retention and more consistent changes[32,34]. These findings suggest that brief exposures may be insufficient to modify health literacy in the long term, while longer-lasting strategies, such as curricular integration, promote sustainability.

Unexpected and neutral effects were also reported in the interventions, and some failed to achieve positive results in the expected domains of literacy[21,36]. These findings, although isolated, indicate the variability of results and underscore the complexity of promoting mental health literacy among adolescents.

Challenges were identified in implementing school-based interventions, such as difficulty in training teachers due to lack of time or institutional support[24,26], low engagement among adolescents due to demotivation or lengthy questionnaires[22,35], absence of a supportive school environment[44], limited family participation[25], and sustainability challenges when there is dependence on external partnerships [26]. It is recommended that future interventions be co-produced with the school community and implemented by actors within the local context, thereby promoting relevance and continuity.

Theoretical models of health literacy and behavior adoption—which assess an individual's intention to act, should be used in the design of interventions, and these interventions should incorporate the school curriculum and involve school stakeholders, such as teachers and school health professionals, in their implementation.

The studies evaluated in this review indicate that health literacy interventions in the school setting yield favorable results in adolescents' health behaviors. The findings point to the strengthening of school programs as a sustainable strategy for promoting health literacy. Future studies should investigate the long-term effectiveness of these interventions and their adaptation to different sociocultural and educational contexts.

Study limitations

A limitation of this review is the lack of a robust assessment of the methodological quality of the primary studies; although the data were extracted and categorized, no in-depth critical analysis was conducted regarding the robustness of each intervention in terms of statistical significance, which may influence the conclusions regarding the strength of the evidence.

Contributions to practice

The study offers contributions to the field of nursing, particularly by highlighting the potential of school nurses as strategic agents in promoting health literacy and implementing sustainable school programs. The leading role of nurses in this context fosters integration between health and education, strengthens intersectoral practices, and contributes to the development of adolescents who are more critical, autonomous, and capable of making informed decisions about their health.

Conclusion

It was observed that most programs focused on mental health literacy; general aspects of literacy should be incorporated into the school curriculum, and programs should be developed collaboratively, with public involvement.

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Authors' contributions

Study conception and design; data analysis and interpretation; drafting the manuscript and/or providing critical review of the intellectual content; final approval of the version to be published: **Pimentel SM, Silva JB, Nunes DCM, Avila MAG**. Responsibility for all aspects of the work, ensuring that issues related to the accuracy or integrity of any part of the manuscript are properly investigated and resolved: **Pimentel SM**.

Data Availability

The authors state that all the information supporting the results is described in the body of the article.

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