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Exploring digital health literacy and its effects on adolescent mental health: A systematic review

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Abstract

Background: Adolescent mental health is a growing global concern, with limited mental health literacy (MHL) and the spread of misinformation on digital platforms contributing to poor outcomes. Digital Mental Health Literacy (DMHL), an extension of MHL, emphasizes the ability to access, evaluate, and use online mental health information responsibly.
Purpose: To examine the levels and characteristics of DMHL among adolescents, its association with mental health outcomes, and the effectiveness of digital interventions in improving DMHL.
Method: The review followed PRISMA guidelines and identified 208 studies from electronic databases, of which 3 met the inclusion criteria. The included studies employed quantitative and mixed-method designs, focusing on social media-based curricula, narrative digital applications, and cross-sectional assessments using validated tools.
Results: Findings indicate that well-designed digital interventions can significantly improve DMHL and psychosocial outcomes, especially among female adolescents and those with prior psychological issues. Improvements in mental health literacy were associated with increased help-seeking behavior, self-efficacy, and quality of life. However, gaps in critical health literacy persist, as adolescents often rely on superficial heuristics and external validation to assess information credibility. Sociocultural factors, including family involvement and gender norms, Influence intervention outcomes.
Conclusion: This review underscores the potential of digital media to promote adolescent mental health literacy and highlights the importance of integrating critical thinking, emotional skills, and family-based support into intervention design. A holistic and contextually grounded approach is essential to ensure long-term effectiveness and to build psychological resilience among adolescents in the digital era.

Keywords: Adolescents; Digital Mental Health Literacy (DMHL); Mental Health Literacy (MHL); Social Media.

INTRODUCTION

Mental health issues have become an increasingly urgent global concern, particularly with the rising prevalence of mental disorders among adolescents and young adults. According to a report by the World Health Organization (WHO), approximately one in seven adolescents worldwide experiences a mental disorder, with depression, anxiety, and behavioral disorders being the leading causes of disease burden in this age group (World Health Organization, 2021). Mental health problems that arise during adolescence, if left unaddressed, can have significant long-term impacts. Internalizing and externalizing disorders at ages 11–17 are closely associated with reduced mental health, life satisfaction, and physical and psychological quality of life in young adulthood. Additionally, individuals who experience mental health issues during adolescence are more likely to suffer from eating disorders, delays in establishing stable relationships, and a higher risk of having unplanned children. These findings highlight that failure to manage mental disorders from an early age can disrupt individuals' daily functioning and lower their

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overall quality of life (Thom, Mauz, Peitz, Kersjes, Aichberger, Baumeister, & Hölling, 2021).

Social stigma and low mental health literacy have proven to be significant barriers preventing adolescents and young adults from seeking professional help. Research shows that individuals with low levels of mental health literacy tend to have high self-stigma, which in turn decreases their intention to seek psychological assistance (Kartikasari, 2019). The stigma surrounding mental health disorders severely hampers adolescents from seeking the necessary support and care, increasing the likelihood that mental health issues will persist into adulthood (Kalluru, Mamilla, Valisekka, Mandyam, Martinez, Posani, & Borgharkar, 2023). Enhancing mental health literacy (MHL) is a crucial strategic step to address this issue. The concept of MHL, first introduced by Jorm (2015) includes knowledge of mental disorders, the ability to recognize symptoms, awareness of available mental health services, and positive attitudes toward help-seeking and stigma reduction. Adequate MHL enables individuals to understand and manage their psychological conditions independently and fosters empathy within a more supportive social environment concerning mental health issues (Wei, Sha, McWeeny, Johal, Easton, Baxter, & Carr, 2024; Furnham & Sjokvist, 2017).

Despite having extensive access to information through the internet and social media, adolescents often accept circulating content at face value without filtering its accuracy. Research journals indicate that excessive social media use among adolescents not only contributes to anxiety, stress, and depression but also normalizes negative behaviors due to exposure to content not always grounded in scientific evidence. Adolescents tend to use social media for self-validation and entertainment, resulting in more frequent exposure to psychologically unhealthy content, even though educational materials are available (Thursina, 2023). A study notes that health misinformation on social media risks worsening adolescents' understanding of mental disorders and delaying seeking professional help (Starvaggi, Dierckman, & Lorenzo-Luaces, 2024). The COVID-19 pandemic exacerbated this problem, amplifying the spread of misinformation on social media, which further influenced adolescents' behaviors in seeking mental health information (Laato, Islam, Islam, & Whelan, 2020). Although many adolescents access health-related content through social media, they often lack the skills to assess the credibility of the information they encounter (Ban, Kim, & Seomun, 2024).

In this context, Digital Mental Health Literacy (DMHL) emerges as an increasingly relevant concept. DMHL is an extension of MHL that emphasizes the ability to search for, understand, evaluate, and use digital mental health information critically and responsibly (Claggett, Petter, Joshi, Ponzio, & Kirkendall, 2024). Adolescents, as a generation raised with digital technology, spend significant time on platforms such as TikTok, Instagram, and YouTube, which serve as primary sources of health-related information, including mental health (Ulfa, 2024). Nevertheless, their limited understanding of how to evaluate the credibility of digital information and their low awareness of algorithm-driven content personalization make them vulnerable to disinformation (Foster, Saidinejad, Duffy, Hoffmann, Goodman, Monuteaux, & Li, 2023). Therefore, digital health literacy is essential for adolescents to assess the reliability of digital health information they access (Taba, Allen, Caldwell, Skinner, Kang, McCaffery, & Scott, 2022).

Moreover, today's adolescents face increasingly complex social dynamics, including peer pressure, academic demands, and the pursuit of personal identity. These challenges are exacerbated by intensive exposure to social media content, which often portrays idealized and unrealistic images. Digital interactions such as appearance comparisons, trolling, and social expectations on online platforms have been shown to contribute to body image disturbances, increased anxiety, and emerging symptoms of depression among adolescents (Khalaf, Alubied, Khalaf, Rifaey, Alubied, & Rifaey, 2023). Within this context, mental health literacy plays a pivotal role. Adolescents with high levels of mental health literacy tend to exhibit stronger psychological resilience, which helps them adaptively cope with psychosocial stressors and reduces the risk of psychological disorders. Research also indicates that the positive influence of mental health literacy on reducing psychological distress is fully mediated by psychological resilience, particularly among adolescents with lower subjective socioeconomic status, who are generally more vulnerable to psychological stress (Veldman, Altenburg, Chinapaw, & Gubbels, 2023). Adolescents with higher self-

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efficacy in digital health literacy are better equipped to manage social and psychological pressures (Taba et al., 2022). Therefore, the objectives of this systematic review are to WHO analyze the level and characteristics of Digital Mental Health Literacy (DMHL) among adolescents (Kartikasari, 2019).

Although adolescents increasingly rely on digital information sources for health-related issues, they are often poorly educated in assessing the credibility of such information. This underscores the need for digital education interventions to improve mental health literacy among adolescents (Wei et al., 2024). School-based interventions that teach mental health literacy skills are effective in enhancing adolescents' understanding of mental disorders and guiding them to access and evaluate health information more wisely. A training program focused on assessing the credibility of health information sources can improve adolescents' information filtering, enhance resilience to misinformation, and help them avoid unreliable sources (Zeidabadi, Khodayarian, Sadeghi, Jambarsang, & Mohseni, 2024). Therefore, interventions involving adolescents in the design process may improve the effectiveness of such programs while empowering youth to become active agents of change in their mental health.

RESEARCH METHOD

The literature review used PRISMA guidelines. Data extracted from included studies included sample size, demographic characteristics, quantitative instruments used to measure Digital Mental Health Literacy (DMHL), and key findings regarding the relationship between DMHL and mental health outcomes among adolescents. Data were analyzed descriptively to provide a comprehensive overview of DMHL among adolescents and its impact on their psychosocial well-being. This approach allows for deeper insights into how DMHL can be integrated into digital-based interventions to improve adolescent mental health.

The initial literature search identified 208 unique references deemed relevant according to pre-defined inclusion criteria. After removing duplicates, 187 articles were screened based on their titles and abstracts. Of these, 56 articles were excluded for not meeting the inclusion criteria. Next, 131 articles were selected for full-text review. Of this pool, 75 articles were excluded for various reasons, including inappropriate study settings, inadequate reporting of barriers or facilitators, or use of irrelevant populations.

Of the remaining articles, 26 were assessed for methodological quality; a total of 18 studies were excluded due to methodological deficiencies. After further assessment, three studies were ultimately included in the final review. A critical assessment of the included studies indicated that their methodological quality was moderate, with some limitations, primarily related to inadequate procedures.

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RESEARCH RESULTS

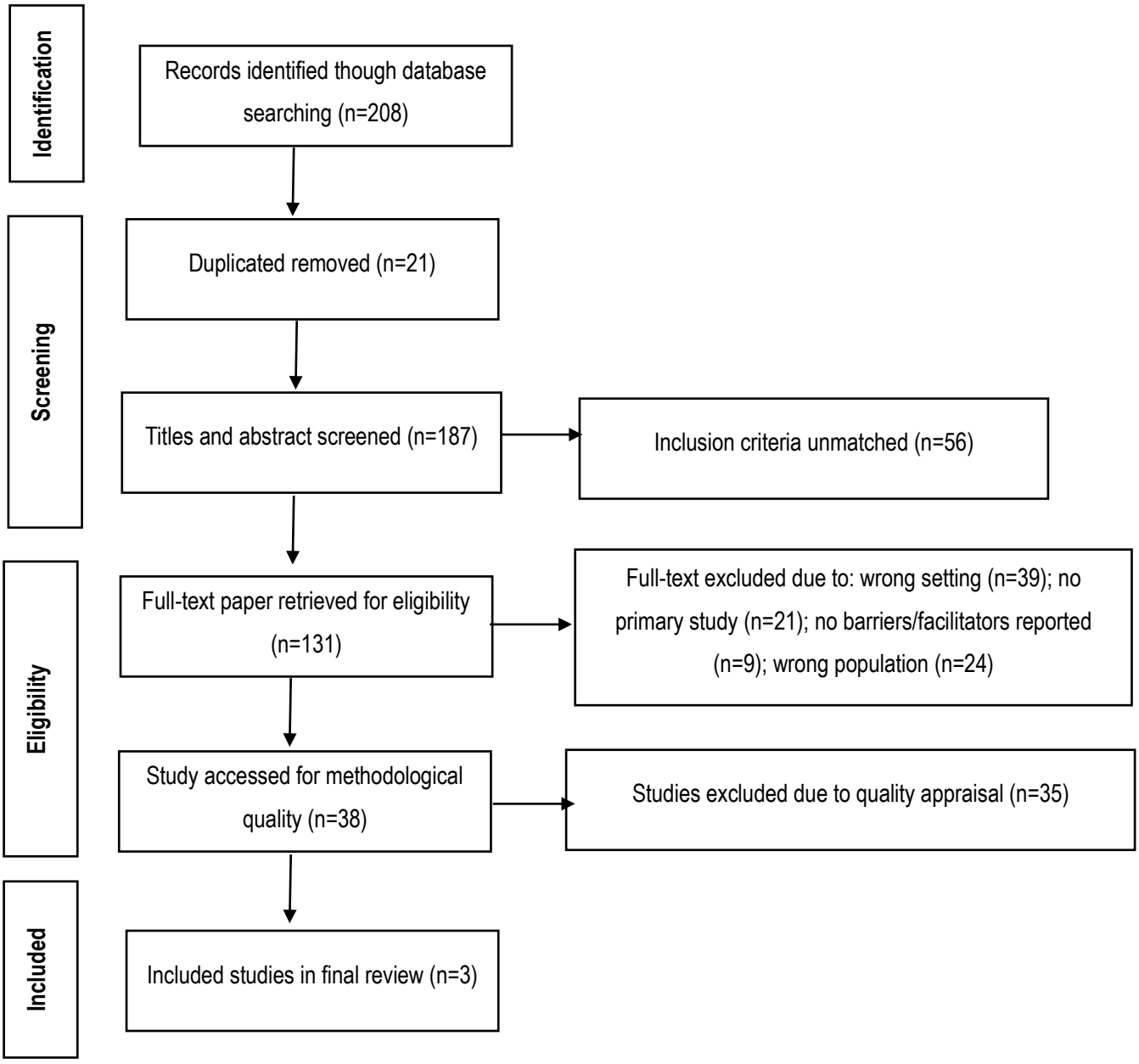


Figure of PRISMA Flowchart

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Table 1. Critical Appraisal of Included Studies

Author	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8
(Hassen et al., 2022)	Y	Y	Y	Y	Y	Y	Y	Y
(Brooks et al., 2023)	Y	Y	Y	Y	U	N	Y	U
(Taba et al., 2022)	Y	Y	Y	N	N	N	Y	U

Table 2. JBI Critical Appraisal Checklist Criteria

JBI	Critical Appraisal Checklist Criteria
Q1	Were the criteria for inclusion in the sample clearly defined?
Q2	Were the study subjects and the setting described in detail?
Q3	Was the exposure measured validly and reliably?
Q4	Were objective, standard criteria used for measurement of the condition?
Q5	Were confounding factors identified?
Q6	Were strategies to deal with confounding factors stated?
Q7	Were the outcomes measured validly and reliably?
Q8	Was an appropriate statistical analysis used?

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Table 3. Article Data Mapping Results

(Author)(Country)	Study Design	Method	Technique	Key Phenomenon	Population	Data Analysis
(Hassen et al., 2022) (India)	Quasi-experimental	Quantitative	Questionnaire	Use of social media with a focus on DMHL (Digital Mental Health Literacy)	Adolescents aged 15–19 years	Cohen's d, Hedges' g
(Brooks et al., 2023) (UK)	Mixed methods	Quantitative, Qualitative	Questionnaire, Interview	Digital applications as tools to improve mental health literacy among children and adolescents	Children and adolescents aged 11–15	Mean, Stdev, Change Score, TFA
(Taba et al., 2022) (Australia)	Mixed methods	Quantitative, Qualitative	Questionnaire, Interview	Differences between adolescents' perceived and actual ability to evaluate and use online health info	Adolescents aged 12–17 years	eHEALS, SCT

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DISCUSSION

A systematic review of three primary studies focusing on interventions to improve mental health literacy among adolescents revealed varied outcomes regarding statistical effectiveness and implementation dynamics. All three studies employed quantitative approaches, with two utilizing mixed methods to capture dimensions not fully accessible through statistical instruments alone. The quantitative outcomes in each study were influenced by contextual factors, instrument sensitivity, participant engagement, and the intervention approach used.

The first study demonstrated the strongest statistical results. It employed a quasi-experimental design, comparing pre- and post-intervention outcomes between an intervention group of adolescents who received mental health literacy training via social media platforms and a control group that received no intervention. The intervention was implemented over six weeks through Facebook and Telegram, with materials delivered via text summaries, visuals, and group discussions. The analysis showed that the increase in mental health literacy in the intervention group was significantly greater than in the control group, with effect sizes ranging from Cohen's d = 0.429 to 0.767 (moderate to large category). Moreover, the difference-in-differences analysis revealed a score increase of 0.348 (95% confidence interval [CI]: 0.154–0.542), with $p < 0.001$. These findings suggest that contextually designed social media-based interventions can be effective, particularly in areas with limited access to formal psychosocial services, such as Ethiopia. The program's success was further supported by high participant engagement and the material's cultural relevance. Additionally, the participant profile, which was predominantly composed of individuals from age groups with lower literacy levels, amplified the intervention's potential impact (Hassen et al., 2022).

In contrast to the first study, the second study evaluated the IMPeTUs intervention, a narrative-based digital application for children and adolescents in Indonesia. This intervention aimed to improve mental health literacy, particularly in understanding anxiety and depression, and promoting self-management. The evaluation was conducted as a multi-site case study across eight different locations in Java, involving 78 participants aged 11–15 years. Using an adapted literacy scale, quantitative data were collected through pre- and post-test assessments. However, the results indicated minimal statistical change in literacy scores. The researchers explained that one contributing factor was the mismatch between the measurement tool and the intervention mechanism, where the scale tended to assess explicit cognitive aspects. At the same time, the narrative-based application primarily influenced affective and perceptual levels. Furthermore, most participants did not exhibit active psychological disorders, making behavioral changes in help-seeking or psychological risk awareness less prominent numerically. Nevertheless, qualitative data gathered through interviews and focus groups with children, parents, and facilitators indicated that the program was well received. Participants reported improved understanding of the difference between daily stress and mental disorders, greater comfort in discussing emotions, and increased confidence in recognizing when to seek help. Thus, while the statistical impact was limited, the intervention proved effective in areas not captured by quantitative instruments, which are crucial in fostering long-term psychological resilience (Brooks et al., 2023).

The third study focused on the relationship between self-efficacy and digital health literacy among adolescents in Australia. Employing a cross-sectional mixed-methods design, the study involved 21 participants aged 12–17. The primary instrument used was the eHEALS scale, which measures participants' perceived ability to access, appraise, and utilize online health information. The average eHEALS score was 3.68 out of 5, indicating a relatively high level of self-confidence in accessing and applying digital health information. However, through simulated information-search tasks and follow-up interviews, it was found that many participants relied on superficial, uncritical strategies for evaluating information, such as relying on website domains or visual design as indicators of credibility. Many failed to cross-check sources, references, or content accuracy, and some even reported experiencing anxiety from consuming misleading information. This gap between perceived and actual skill suggests a dissonance between self-efficacy and critical literacy, leaving adolescents vulnerable to health misinformation, particularly on unmoderated social media platforms. The study highlights that, despite being digital natives, adolescents still require formal training that emphasizes critical thinking skills in digital contexts,

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not merely technical proficiency or access (Taba et al., 2022).

Findings from various intervention studies indicate that digital mental health literacy (DMHL) among adolescents can be significantly enhanced through contextual and targeted digital approaches. The survey in the first study provided strong evidence that social media-based interventions can substantially improve digital mental health literacy (DMHL). The intervention group in this study demonstrated significant improvements in mental health literacy, with effect sizes (Cohen's d and Hedges' g) ranging from 0.429 to 0.767, which fall into the medium to large effect category. The most significant improvement was observed among the subgroup of 15–17-year-old girls, with a Cohen's d of 2.042, indicating a large effect. This suggests that digital interventions that align with adolescents' communication styles and gender-specific characteristics can have a more profound impact on their understanding and engagement with mental health issues (Hassen et al., 2022).

The importance of tailoring approaches to adolescent characteristics is also reflected in the second literature study, conducted through the IMPeTUs program in Indonesia. This program used digital storytelling and facilitated discussions to engage children and adolescents aged 11–15. Although quantitative results showed small increases, participation and acceptance of the program were very high. Adolescents reported that the app content felt relevant, engaging, and easy to use, and helped them understand topics such as anxiety and depression. They also demonstrated increased understanding of symptom recognition, causes, and self-management techniques. This reinforces the idea that numerical changes alone do not determine the effectiveness of digital interventions; rather, emotional engagement and personalized content also drive changes in attitudes and awareness (Brooks et al., 2023).

However, challenges in strengthening Digital Medical Health Literacy (DMHL) remain significant. A third literature study revealed that although adolescents demonstrated high levels of self-efficacy in accessing and using online health information, with a mean eHEALS score of 3.7 (SD = 0.5), many had not fully developed critical evaluation skills. They often relied on simple heuristics, such as website domains (.gov/.org), as indicators of credibility and rarely validated content in depth. Information was often obtained opportunistically from social media platforms like TikTok and Instagram, rather than through structured and active searches. This gap between perceived confidence and actual competence indicates a high risk of exposure to misinformation if not addressed through improved critical literacy (Taba et al., 2022).

These findings align with the WHO (2021) report, which emphasizes that DMHL is not merely about access to technology but also includes critical thinking, contextual understanding, and socio-emotional awareness. In a digital era saturated with unverified information, adolescents require interventions that provide knowledge and train them to filter, assess, and apply information wisely (World Health Organization, 2021).

In addition to age and cultural background, gender also plays a vital role in determining responses to DMHL interventions. Female adolescents tend to be more open to seeking help for mental health issues, although the intention to seek help is relatively balanced between genders. However, girls generally exhibit more positive attitudes toward seeking professional help compared to boys, who are often constrained by masculine norms and social stigma. This suggests that self-stigma and masculinity expectations are key barriers for boys in accessing mental health services. Therefore, DMHL interventions must consider gender differences in both communication strategies and content representation (Wahto & Swift, 2016; Cox, Trapp, & McLean, 2025; Sheikh, Payne-Cook, Lisk, Carter, & Brown, 2025).

Furthermore, family involvement is a critical element in the success of digital interventions. Applications that engage parents in monitoring and problem-solving processes tend to yield better outcomes among adolescents with mental health challenges (Welsh, McIntosh, Vuong, Cloud, Hartley, & Boyd, 2024). Digital platforms that enable family collaboration can enhance social support, service accessibility, and emotional engagement. In collectivist cultures such as Indonesia, family involvement not only aids in information delivery but also creates a safe space for emotional exploration and help-seeking behavior (Vanhelst, Beghin, Coopman, Labreuche, Djeddi, Gottrand, & Ley, 2022).

The Relationship Between DMHL and Adolescent Mental Health Conditions

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Improvements in mental health literacy achieved through digital interventions have been shown to impact adolescent mental health positively. This study supports the notion that increased DMHL can directly influence enhanced knowledge, attitudes, and perspectives on mental health, thereby motivating behavioral changes such as improved self-efficacy and the intention to seek help when needed. Adolescents with better mental health literacy tend to be more proactive in seeking help and are more capable of recognizing mental health problems they may be experiencing. This leads to more positive behavioral changes in addressing their mental health concerns, such as the willingness to talk to parents or healthcare professionals and to take earlier preventive action (Brooks et al., 2023).

This study also indicates that digital interventions have a positive effect on quality of life and family adaptability among participants who had previously experienced mental health issues. For instance, among the 78 participants involved, 19 who reported prior mental health problems showed greater improvements in measures of quality of life and family adaptability compared to those without such issues. The effect sizes for changes in quality of life ranged from Cohen's *d* = 0.429 to 0.767, indicating significant effects; however, the small sample size among individuals with mental health issues may limit the generalizability of these findings. This suggests that while interventions can offer benefits, small sample sizes may constrain our understanding of their broader population impact, particularly among individuals with existing mental health problems (Brooks et al., 2023).

The research also reveals that although adolescents actively seek health information online, they often rely on parents or medical professionals to act on the information they find. Findings indicate that 76% of participants searched for information on abdominal pain, 76% on bloating, and 71% on weight loss. However, despite this active search behavior, most only took action after receiving parental or professional validation. This demonstrates that although their digital health literacy may be reasonably strong, adolescents still depend on external confirmation before making health-related decisions. It underscores the need to enhance critical health literacy, particularly in evaluating the credibility and relevance of online health information they encounter, as much of it may be inaccurate or inapplicable to their condition (Taba et al., 2022).

The social media intervention implemented in this study demonstrates that evidence-based mental health curricula can significantly improve mental health literacy. The effectiveness of the intervention varied by individual factors, such as gender and age, with girls aged 15–17 showing the most significant gains in mental health literacy. The program was also rated as acceptable, feasible, and appropriate, with more than 80% of participants reporting satisfaction. However, the intervention faced challenges related to limited digital resources and internet access among some participants, which could affect the overall success of the intervention (Hassen et al., 2022).

The IMPeTUs intervention, which involved multiple stakeholders including children, parents, professionals, and game designers, aimed to enhance participants' understanding of mental health by addressing topics such as depression and anxiety, and by providing group discussions for deeper learning. The study findings revealed that more than 80% of participants rated the intervention highly satisfactory and relevant to their needs. The intervention also had wider positive effects not only on adolescents but also on parents and facilitators involved in the process, highlighting the importance of cross-stakeholder collaboration in designing and delivering effective intervention programs (Brooks et al., 2023).

To achieve long-term success, however, it is crucial to develop critical health literacy skills among adolescents. While many adolescents use effective search strategies, they often rely on basic heuristics that are not always sufficient for assessing the credibility of health information. For example, 95% of participants reported cross-checking information for accuracy. While this suggests that they are accustomed to using multiple sources to verify health information, further education in interpreting and understanding more complex and critical health content is still needed to reduce the risk of misinformation and support more accurate health decision-making (Taba et al., 2022).

Based on findings from the studies analyzed, improvements in Digital Mental Health Literacy (DMHL) among adolescents have had positive and significant effects on their understanding and management of mental health. Research reviewed in this review found that digital interventions, such as game-based applications and immersive storytelling,

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can enhance adolescents' understanding of mental health issues. In the intervention groups, improvements in mental health literacy were higher than those in control groups, with effect sizes indicating substantial impact, for example, Cohen's *d* = 2.042 among girls aged 15–17 (Hassen et al., 2022). These findings underscore the importance of using digital platforms to increase knowledge about depression and anxiety among adolescents. However, challenges remain in achieving significant change in mental health symptoms before and after the interventions.

Furthermore, findings indicate that although adolescents actively seek health information online, they still rely on external validation from parents or healthcare providers before acting on the information they find. Approximately 76% of participants in the third literature review searched for symptoms such as abdominal pain, bloating, and weight loss, but most only acted after consulting with their parents or healthcare providers (Taba et al., 2022). This suggests that despite their relatively high digital literacy, adolescents continue to rely on external guidance to confirm the information they access. This indicates a gap in critical health literacy, namely the ability to independently and thoroughly assess the validity of online health information (World Health Organization, 2021).

Various digital interventions have also shown positive effects on mental health outcomes, although some of these effects are more pronounced among individuals with pre-existing mental health conditions. For example, in the IMPeTUs program, participants with pre-existing psychological disorders reported greater improvements in quality of life than those without such conditions (Brooks et al., 2023). This highlights the importance of tailoring interventions to individual needs. Furthermore, family involvement and the involvement of local facilitators, as noted in Brooks' study, are key factors in fostering a safe and accepting environment for participants to openly discuss mental health issues (Brooks et al., 2023). Interestingly, other studies suggest that immersive content such as augmented reality (AR) games designed to facilitate social connection and build real-world relationships can also increase adolescents' sense of belonging and psychological empowerment. Participation in games designed to address mental health topics positively influenced adolescents' willingness to share and form healthy social networks (Sun, Wang, & Zhang, 2025). These findings align with broader recommendations that resilience-based interventions, such as coping skills training and emotional problem-solving education, should be integrated into core curricula, as they have been shown to strengthen adolescents' psychological resilience and emotional preparedness for life challenges (Diel, Schröter, Frewer, Jansen, Robitzsch, Gradl-Dietsch, & Bäuerle, 2024).

Overall, this review's findings indicate that digital media interventions have great potential for enhancing adolescent mental health literacy. However, long-term success will depend on the concurrent development of critical health literacy, family-based approaches, and in-depth social-emotional skill training.

CONCLUSION

Based on a synthesis of studies, digital interventions show strong potential to enhance Digital Mental Health Literacy (DMHL) among adolescents. Platforms such as game-based applications, immersive storytelling, and augmented reality have proven effective in fostering adolescents' understanding of mental health issues such as anxiety and depression. This effectiveness is particularly evident among female adolescents and participants with a history of psychological problems, who demonstrated significant improvements in both literacy and quality of life.

However, the effectiveness of digital interventions has not been uniformly distributed. Many adolescents rely on external validation from parents or healthcare professionals when evaluating health information they encounter online. This indicates a gap in critical health literacy, posing a challenge amid rapid technological advancement. Additionally, the success of digital interventions is highly influenced by socio-emotional factors, including family involvement, the quality of social relationships, and cultural context. Interventions that engage families and strengthen coping and resilience strategies are more effective in creating safe and supportive environments where adolescents can learn and communicate about mental health.

Therefore, the development of digital mental health interventions for adolescents must be holistic, focusing not only on providing information but also on building evaluative capacity, social support, and long-term emotional skills. Such efforts will not only

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enhance digital literacy but also reinforce the psychological resilience of younger generations in an increasingly complex and demanding era.

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