

## Effectiveness of Digital Interventions in Improving Knowledge and Attitudes of Adolescent Mental Health: A scoping review

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### ABSTRACT

**Keywords:** mental health education, adolescents, mental health disorders, knowledge.

Adolescent mental health is a critical issue that affects their quality of life and development. Digital interventions offer an innovative solution to enhance mental health literacy among adolescents. This article to identify the effectiveness of digital educational interventions in improving adolescents' knowledge and attitudes toward early detection of mental health issues. A scoping review was conducted using the PEOS framework. Literature searches were performed in PubMed and ScienceDirect databases for articles published between 2019 and 2024. A total of 15 articles were selected based on inclusion and exclusion criteria. Digital interventions, such as school-based applications and social media campaigns, enhanced mental health literacy and reduced stigma related to mental health. Several interventions also improved adolescents' abilities to recognize mental health symptoms and encouraged help-seeking behaviors. However, challenges such as low digital literacy and limited access remain significant barriers to implementation. Digital education effectively improves adolescents' knowledge and attitudes toward early detection of mental health issues. Culturally relevant approaches and stakeholder support are crucial for the program's sustainability.



### Introduction

Adolescence is a crucial time to develop social and emotional habits that are important for mental well-being. These habits include the practice of healthy sleep patterns; exercise regularly; develop problem-solving, problem-solving, and interpersonal skills; and learning to manage emotions. A protective and supportive environment in families, schools, and the wider community is essential.

Adolescent mental health has become a critical issue in contemporary society, with a significant impact on the quality of life and well-being of the younger generation. Lack of awareness about the importance of maintaining mental health and a lack of understanding of how to cope with stress and emotional distress often results in serious problems in adolescent development (Larasati et al., 2023).

Many factors affect mental health. The more risk factors adolescents experience, the greater the potential impact on their mental health.

Globally, it is estimated that 1 in 7 (14%) children aged 10–19 years have a mental health disorder(1), however, this disorder is largely unrecognized and untreated. It is

estimated that 3.6% of adolescents aged 10–14 years and 4.6% of adolescents aged 15–19 years experience anxiety disorders. Depression is estimated to occur in 1.1% of adolescents aged 10–14 years, and 2.8% of adolescents aged 15–19 years. Depression and anxiety have some of the same symptoms, including rapid and unexpected mood swings (WHO, 2021).

Knowledge about mental health needs to be possessed by adolescents to maintain their mental status (Febrianti et al., 2022). Adolescence is a period of rapid growth and development physically, psychologically/mentally and intellectually (Gintari et al., 2023).

Adolescence is a unique period because it is a transition period in which individuals undergo physical and psychological changes from a child to an adult. Health services for sick adolescents must be treated in two aspects, namely the treatment that they are still children with rights inherent in them with provisions on guardianship; and treatment as a figure who has reached adulthood with several rights that are beginning to accompany. Health services for adolescents are very complex and involve many health professionals and non-health professionals. Incorrect or inappropriate handling will have unpleasant consequences and can even have bad consequences for adolescent health. Problems that often arise in adolescents are the risk of mental/mental disorders in adolescents (Dewanto et al., 2023).

One of these changes occurred in his mental state. Changes in adolescence can lead to psychological and emotional problems. Intellectual development is a process that describes the social and psychological behavior of individuals and adolescents in a harmonious position in a larger and more complex social environment. For adolescents, it is a great challenge to continue to fulfill the tasks of intellectual development because the life conditions they have to live and face become increasingly broad and complex (Simangunsong et al., 2024).

Awareness of mental health needs to be realized by every individual to prevent various negative impacts that occur. The role of parents or the surrounding community, even health agencies, is very necessary in supporting and accompanying people who have health problems. Socialization of mental health needs to be implemented both in villages, schools and public service places. Assistance to people in need must be carried out to the maximum to reduce the number of people suffering from health disorders. With these various roles, it is hoped that adults and adolescents can understand the importance of maintaining mental health (Laksmi & Jayanti, 2023).

Low knowledge about mental health disorders and stigma are factors that hinder the search for help. Implementation of programs to increase knowledge and understanding of mental health disorders; increasing the individual's awareness of his or her mental health condition and having the awareness to seek help from the right professionals; and shaping perspectives and reactions to individuals with mental health disorders (Anisah, 2020).

Environment and lifestyle may be closely related to the mental health condition in a person. especially in adolescence. Which adolescence is a period when a person is

experiencing the process of finding his identity, so there needs to be self-control and sensitivity to psychological conditions. Mental health should be a problem that receives serious attention from the closest people to the sufferer. Mental health, especially in adolescents, is needed to develop in a healthy way, build strong social relationships, adapt to changes and face life's challenges. Which if mental health is disturbed, it can affect his survival. Signs can be seen such as looking unenthusiastic, decreased appetite, disturbed patterns/difficulty sleeping, and excessive anxiety or worry. This can interfere with the daily activities of a person who has a mental health disorder (Ningrum et al., 2022).

Mental health education is one of the main interventions used to address this problem. Therefore, understanding the effectiveness of digital interventions in increasing knowledge and attitudes about adolescent mental health is critical to guiding health policies and evidence-based interventions.

**Method**

The method used is a scoping review consisting of stages, namely: conducting a focusing review with the PEOS framework (Population, Exposure, Outcome and Study Design), conducting literature searching using relevant databases. Selecting relevant studies using inclusion and exclusion criteria; Conduct critical appraisal to assess the quality of literature, extract data, analyze and report result (Rahayu et al., 2020). The relevant publication period is limited to a five-year span between 2019 and 2024.

**Table 1**  
**PEOS Frame**

PEOS Components	Description
Population (P)	Teenager (ages 10-19)
Exposure (E)	Mental health digital education interventions
Outcome (O)	Knowledge and attitudes related to mental health (e.g. recognizing symptoms, seeking help)
Study Design (S)	All research methods (quantitative, qualitative, or mixed-methods)

**Eligibility Criteria**

**Table 2**  
**shows the inclusion and exclusion criteria**

Inclusion Criteria	Exclusion Criteria
Articles that discuss the effectiveness of digital interventions in increasing knowledge and attitudes about adolescent mental health	Articles that are not related to the effectiveness of digital interventions in improving knowledge and attitudes about adolescent mental health

Inclusion Criteria	Exclusion Criteria
Scientific and research articles	Non-scientific and non-research articles
Documents in English or Indonesian	Documents are not in English or Indonesian
Published in 2019-2024	Published outside 2019-2024
Available in full text	Not available in full text
Open access	Access not open
Quantitative, qualitative, experimental, and other research methods	Systematic review methods, literature reviews, or non-research methods

### Search Strategy

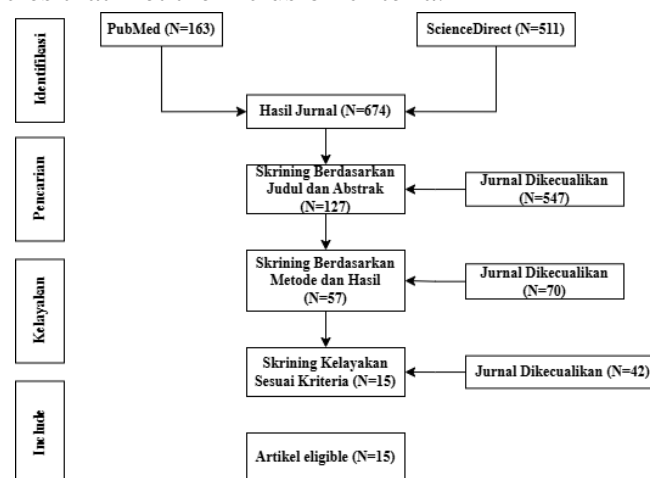
The electronic search was carried out using the final keyword: the influence of mental health education on adolescents can prevent the incidence of mental health disorders. The data source is PubMed, ScienceDirect. Using a combination of keywords: Mental Health Education, Adolescents, Mental Health Disorders, Mental Health Knowledge, Early Detection.

### Selection of the Study

The results obtained from the previous phase are collected and stored in a database to assist authors in researching titles and abstracts to ensure qualified articles. Eligible articles are then re-evaluated to eliminate any duplicates identified. Furthermore, the remaining articles are carefully reviewed to ensure that they meet the inclusion requirements.

### Data Extraction

After that, data is collected from papers that are eligible for inclusion in the research findings. This data includes information such as the author and year of publication, research objectives, data collection instruments, research techniques, and results. The extracted data is displayed descriptively without any additional analysis. Information was obtained from 15 articles that met the inclusion criteria.



**Figure 1**  
**Article Screening Process**

## Results and Discussion

Based on a search from three databases (pubmed, sciencedirect) found 674 articles, after reviewing 547 articles were excluded due to title and abstract, another 70 articles were excluded because they were adjusted to the method and results, due to non-conformity with the criteria. The study obtained 15 articles related to the effectiveness of digital interventions in increasing knowledge and attitudes about adolescent mental health. The details of the content of the article can be seen in the following table.

**Table 2**  
**Effectiveness of Digital Interventions in Increasing Knowledge and Attitudes Regarding Adolescent Mental Health**

Title, Author, Year	Aims	Sample Size	Methods	Result
Adolescents receive digital mental health support in schools: A co-design and feasibility study of a school-based app for adolescents in the UK (Hugh-Jones et al., 2022)	Co-designing and testing the feasibility of school-organized self-help digital interventions for adolescents who show early symptoms of deteriorating mental health.	31 teenagers (15-17 years old)	Co-design of web applications (MindMate2 for teens, Partner2U for parents), feasibility testing in schools, assessment of candidate outcomes, and cost-effectiveness analysis.	The app is well received by users, with recruitment, retention, and measurement completion targets achieved. The Strength and Difficulty questionnaire was identified as the most sensitive measure of outcome. Cost-effectiveness analysis was carried out exploratory. The application was declared feasible as a low-burden school-based resource for adolescents, and refinement is required before the phase 2 randomized controlled trial.
Adolescent evaluation of online mental health prevention programs for high school students: A formative	Outlines <a href="#">Formative Evaluation</a> to student perspectives and feedback regarding the OurFutures: Mental Health program, with special attention to insights for future	762 Australian junior high school students	Mixed method evaluation survey, Quantitative items assessing program satisfaction, relevance, and perceived	Most students rate the OurFutures: Mental Health program as good or excellent (60%), and 69% feel the program will help them deal with future problems.

Title, Author, Year	Aims	Sample Size	Methods	Result
study with a mixed method (Bailey et al., 2023)	iterative program design and implementation		benefits were summarized and qualitative data were analyzed using deductive thematic analysis.	However, only 49% feel the storyline is relevant to their lives, 38% are likely to use skills from the program, and 29% would recommend it. Men and students at risk of depression or anxiety enjoy the program more. The qualitative findings show positive aspects and several areas for improvement.
Self-Appreciation Project: A Social Media Exploration Study for Adolescent Mental Health Promotion (Wishart et al., 2022)	This study aims to examine how individuals, especially adolescents, engage with mental health promotion campaigns through social media (Instagram and Twitter) using the Self Appreciation Project (SAP) campaign.	There are a total of 488 followers, consisting of 392 on Instagram and 92 on Twitter.	SAP's campaign used 43 infographic-style posts on Instagram and Twitter, which contained statistics, research on mental health, self-harm behaviors, and self-care strategies to improve self-efficacy.	Followers on Instagram are more interested in positive advocacy content, while on Twitter there is no clear preference. Hashtags and promotions help attract followers, but engagement in discussion in the comments section is low. The study did not assess the real impact of the content shared.
Exploring Adolescents' Attitudes Towards Mental Health Applications: A Simultaneous Mixed Method Study (Høgstad et al., 2024)	This study aims to explore adolescents' attitudes towards mental health apps, as well as the perceived benefits of mental health apps	183 teenagers	Mixed method studies	As many as 30% (56/183) of adolescents in the quantitative study have used mental health applications. More than half of the respondents (77/126, 61.1%) reported that they would use a mental health app if they had a mental health problem as well as that they found mental health apps

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				<p>sufficient or very useful (114/183, 62.3%).</p> <p>Availability was the most frequently reported benefit of mental health apps (107/183, 58.8%).</p> <p>The possibility of costs related to mental health apps is the most frequently cited obstacle in their use (87/183, 47.5%).</p> <p>The findings from the interviews also point to the importance of the availability of mental health apps and their credibility and potential to give teens autonomy when seeking mental health advice and help.</p>
Implementation of Digital Mental Health Clinics in Secondary Schools: Evaluation of Functionality and Effectiveness (Xu et al., 2023)	The purpose of this study is to evaluate the functionality and effectiveness of the school digital mental health clinic created by the Chinese psychiatric hospital and given to high school students for trial.	100 students	Evaluate Functionality and Effectiveness	<p>DMHC (Digital Mental Health Clinic) provides essential mental health services that are tailored to the needs of students. The clinic offers free virtual counselling to students from three schools, thus removing economic barriers to getting treatment. With support from leading national mental health facilities, DMHC connects students directly with qualified</p>

Title, Author, Year	Aims	Sample Size	Methods	Result
				professionals via audio or video calls to address issues such as learning difficulties, interpersonal relationships, and emotional distress. Popular resources include mini-course videos on emotional support, self-development, and family relationships. DMHC operates effectively outside of business hours, helping to deal with crises, including helping three high-risk students through direct intervention.
Digital Intervention for Adolescent Depression (MoodHwb): Evaluation of the Feasibility of a Mixed Method (Bevan Jones et al., 2020)	Evaluate the feasibility, acceptance, and potential impact of a co-designed and theory-based digital intervention program, MoodHwb.	44 adolescents and 31 parents	Mixed methods approach (quantitative and qualitative) to evaluate programs and assessment processes	A total of 44 adolescents and 31 parents or caregivers participated, with 36 adolescents (82%) and 21 caregivers (68%) completing a follow-up questionnaire. A total of 19 adolescents and 12 caregivers were interviewed, as well as 13 professionals from various disciplines participated in focus groups. The main themes include design, content, and integration of programs in the lives of teenagers.



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Title, Author, Year	Aims	Sample Size	Methods	Result
				Participants rated the intervention as engaging, easy to use, and comprehensive. The "Self-Help" and "Mood Monitor" sections were very helpful, as well as improving depression literacy in adolescents (difference in mean scores: 1.7, 95% CI 0.8-2.6; $P<.001$ ) and caregivers (1.3, 95% CI 0.4-2.2; $P=.006$ ). MoodHwb is feasible and accepted as a potential early intervention for adolescents, families, and caregivers in a variety of services. Randomized controlled trials are required for further evaluation.
Implementing the Peer Advocate Mental Health Digital Intervention Program for Ohio Teens: A Descriptive Pilot Study (Albritton et al., 2021)	The purpose of this study is to investigate a pilot digital mental health training program (Be Present) for young people, in particular to describe its impact on youth behavioral outcomes and user engagement, as well as identify high-risk youth in the early phases of prevention.	65 teenagers	Descriptive analysis	A total of 65 teenagers participated, and 54 completed the pretest and posttest surveys. The majority of participants were white non-Hispanic women. There was an increase in referrals to mental health services and social support, but no change in self-efficacy, knowledge, or sources of strength.

Title, Author, Year	Aims	Sample Size	Methods	Result
				About two-thirds completed all training modules, although engagement declined. Female participants dominated the recipients of high-risk messages. This program promises to be a peer-based digital mental health support. Despite its limitations such as a small sample and no control group, these results show potential and provide important insights for further development.
Integrating digital interventions with clinical practice in youth mental health services (Cross et al., 2023)	Integrating digital technology with clinical practice promises to improve access and improve care in the context of high demand for services and limited capacity.	A digital platform	Outlines the emerging research in the integration of digital tools in clinical care, known as blended care, and provides case examples of mental health technology platforms currently in use, summarizes findings regarding emerging technologies such as virtual reality, and outlines real-world implementation challenges and	Recent evidence suggests that the mixed treatment approach is clinically effective and improves service efficiency. Specialized technologies for adolescents such as moderated online social therapy (MOST) achieved a range of positive clinical and functional outcomes, while new technologies such as virtual reality have strong evidence in anxiety disorders, and collect evidence in psychotic conditions. The implementation

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Title, Author, Year	Aims	Sample Size	Methods	Result
			potential solutions.	science framework shows promise in helping to address common challenges faced in real-world adoption and sustainable use.
The Effect of Mobile and Web Apps (Thought Spots) on Mental Health Aid Seeking among College Students and College Students: A Randomized Controlled Trial (Wiljer et al., 2020)	The purpose of this study was to examine the impact of Thought Spot on mental health and help-seeking intentions, behaviors, attitudes, self-stigma, and self-efficacy among high school students in Canada.	481 students	A 2-armed randomized controlled trial	A total of 481 students were randomized into two groups: 240 to usual care, and 241 to the intervention group. There were no significant differences in help-seeking intentions between the usual care and intervention groups over 6 months ( $F_{2,877}=0.85$ ; $P=.43$ , $f=0.04$ ). Both groups demonstrated similar increases in formal help-seeking intentions at 3 and 6 months ( $F_{2,877}=23.52$ ; $P<.001$ , $f=0.21$ ). Compared with males, females sought more help from formal resources (OR 1.86; 95% CI 1.22 to 2.83, $P=.001$ ). Females were less likely to seek help from informal sources than males (OR 0.80; 95% CI 0.22 to 0.73, $P<.001$ ).
Digital Mental Health Interventions for Youth in Rural South	His research identified the prospects and challenges in implementing	93 people	Data was collected through questionnaires. Thematic and	Mental health education is still low, with only 22% of participants having received

Title, Author, Year	Aims	Sample Size	Methods	Result
Africa: Prospects and Challenges for Implementation (Mindu et al., 2023)	mobile-based mental health interventions for young people in the Ingwaluma area.		descriptive analysis was carried out on qualitative and quantitative data.	mental health education before. About 50% of participants had found a mental health app, but none had ever used it; 87% of participants had internet access; 60% prefer to use social media to contact health workers; and 92% stated that the use of digital applications can improve mental health literacy among young people. Barriers to accessing digital mental health interventions were identified as high data costs, restrictive religious beliefs, limited privacy, lack of native language on most digital platforms, low digital literacy, and complicated user interfaces.
Gaming is my way to recovery: A Systematic Coverage Review of Digital Gaming Interventions for the Treatment and Promotion of Young People's Mental Health	This review identifies the literature on videogame interventions for young people, ages 12-29, and maps data on game use by those with mental health and substance use problems, focusing on evidence of gaming's capacity to support treatment in	49 studies that tested 32 digital games	Review methodology is used to identify and assess relevant studies	The findings support the potential for the integration of digital games in youth services based on the results of the study, user satisfaction, relatively high retention rate of the program, and the potential usefulness of most games for the treatment or

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Title, Author, Year	Aims	Sample Size	Methods	Result
(Ferrari et al., 2022)	young people's mental health services; how stakeholders are involved in developing or evaluating the game; and potential hazards and identified ethical solutions.			promotion/prevention of mental health. Most of the research included feedback from stakeholders, and engagement ratings were very high for seven games. Potential hazards were not discussed in this study. This review provides an important initial repository and evaluation of videogames for use in clinical settings relating to adolescent mental health.
What's wrong with everyone?": The effectiveness of digital media mental health literacy campaigns for young people (Curran et al., 2023)	The study examined the impact of the "What's Up with Everyone?" campaign on young people's mental health awareness.	71 sample	Complete a single-sample, pre-post experiment to measure changes in knowledge, attitudes, confidence, and stigma about mental health struggles, as well as seeking help for mental health before and after exposure to animation.	Paired t-tests and single-sample t-tests showed that knowledge, attitudes, confidence, and willingness to seek support increased at the post-test time. There was also a significant decrease in stigma against depression after watching the animation. Sustained long-term investment in campaigns like "What's with Everyone?" seems necessary given its impact on mental health awareness, seeking help, and stigma.
Jointly developing a Mental Health and Wellbeing	Discussing developed, highlighting participatory and co-	40 participants	Research from interviews and surveys informed the	Good mental health and well-being is more than just the absence of disease.

Title, Author, Year	Aims	Sample Size	Methods	Result
Chatbot with and for Youth (Grové, 2020)	design processes with young people who are key stakeholders to benefit from these digital tools.		creation of Chabots' personality and character design.	Focusing on positive coping and building resilience is important in building a holistic approach to wellness, which addresses young people's physical and psychological experiences. It is clear that young people who are aware of mental health literacy and well-being have implications for promoting healthy well-being and early prevention of mental health disorders. The implication of this project is the potential for technology-based support to close the health care gap and offer quality support and resources for young people through the types of media that are often used by young people.
The Impact of Digital Mental Health Interventions on Perceived Stress and Rumination in Adolescents Aged 13 to 17: A Randomized Controlled Trial (Boucher et al., 2024)	The purpose of this study was to examine the short-term effects of self-guided digital mental health interventions (DMHI) designed for adolescents on the perception of stress and rumination (i.e., rumination).	303 participants	Decentralized randomized controlled trials	There was a greater significant improvement in the intervention conditions for perceived stress (intervention: $B = -1.50$ ; 95% CI $-1.82$ to $-1.19$ ; $P < .001$ and control: $B = -0.09$ ; 95% CI $-0.44$ to $0.26$ ; $P = .61$ ), rumination (intervention: $B = -0.84$ ; 95% CI $-1.00$

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				to $-0.68$ ; $P < .001$ and control: $B = -0.30$ ; 95% CI $-0.47$ to $-0.12$ ; $P = .001$ ), and loneliness (intervention: $B = -0.96$ ; 95% CI $-1.2$ to $-0.73$ ; $P < .001$ and control: $B = -0.38$ ; 95% CI: $-0.64$ to $-0.12$ ; $P = .005$ ) during the 12-week study period. Happify for Teens was effective in reducing stress, rumination, and loneliness felt among teens for 12 weeks when compared to a waitlist control group. Our data reveals the potential benefits of DMHI for adolescents, which could provide a more measurable, stigma-free, and cost-effective alternative to school-based programs.
Examining the Feasibility of Implementing Digital Mental Health Innovations in Hospitals to Support Adolescents Experiencing Suicide Crisis: An Interview Study with Youth and Healthcare Workers	This qualitative study explores the potential benefits, barriers, and collective actions needed to integrate digital therapies for suicidal stress management in adolescents into routine practice in hospitals. Addressing this knowledge gap is an important first step in designing digital	29 interviews	Using the Normalization Process Theory framework	Analysis of 29 interviews ( $n=17$ , 59% of young people and $n=12$ , 41% of hospital staff) resulted in 4 themes mapped into 3 constructs of Normalization Process Theory related to coherence development, cognitive participation, and collective action.

Title, Author, Year	Aims	Sample Size	Methods	Result
(Rheinberger et al., 2023)	innovation and implementation strategies that enable uptake and integration.			Overall, digital innovation is seen as a useful complement, but not as a substitute for in-person clinical services. The timing of delivery of services is also important, with agreements that digital therapy can be delivered to patients while they are waiting to be assessed or shortly before being discharged. Staff training to improve digital literacy is considered key to implementation, but there are some different views on the level of staff assistance needed to support young people to engage with digital innovation.

### Characteristics of Studies by Region

Studies come from different regions, such as the United Kingdom, Norway, Australia, China, South Africa, Canada, and the United States.

### Study Characteristics Based on Study Type

1. Mixed Method: Combines quantitative surveys and interviews, such as the studies of Hugh-Jones et al., Høgstad et al., and Bailey et al.
2. Experimental (Randomized Controlled Trial): Used to evaluate the intervention as conducted by Boucher et al., Bevan Jones et al., and Wiljer et al.
3. Descriptive and Qualitative: For example, Mindu et al. explored the challenges of digital implementation in a descriptive manner, while Rheinberger et al. used interviews to understand innovation in hospitals.

### Characteristics Based on Study Quality

1. Experiments with statistical power: for example, Boucher et al. Reports significant data with clear parameters.



2. Interviews or descriptive approaches without controls: some studies such as Rheinberger et al. Only dig into perceptions without experimental tests.
3. A relevant but small sample: Albritton et al. Having a small sample that affects the generalization of results.

This study aims to understand how digital interventions play a role in improving adolescents' knowledge and attitudes towards early detection of mental health. This study refers to the results of various studies that show the effectiveness of application-based digital interventions, online campaigns, and other innovative technologies.

### **Knowledge Enhancement through Digital Media**

Application- and digital platform-based interventions consistently show significant potential in improving mental health literacy among adolescents. For example, research by Hugh-Jones et al. (2022) shows that the MindMate2 app, designed to support adolescents with early symptoms of mental health disorders, is well received in the UK. This app not only improves teens' understanding of mental health but is also cost-effective because it uses school resources. Similarly, the OurFutures program in Australia, evaluated by Bailey et al. (2023), notes that most students find the program relevant and beneficial, although there are still obstacles in the relevance of the storyline to their lives.

In contrast, Mindu et al. (2023) show low mental health literacy in rural South Africa, with only 22% of adolescents having ever received formal education about mental health. However, the study also highlights that digital applications have the potential to fill the gap, provided that barriers such as internet data costs and digital literacy can be overcome.

### **Changing Attitudes through Digital Intervention**

Attitude change is an important indicator of the success of mental health interventions. Research by Boucher et al. (2024) noted a significant reduction in stress and rumination felt by adolescents after participating in the Happify for Teens digital program for 12 weeks. The program provides stigma-free and cost-effective resources, making it a viable alternative to school-based services.

Research by Wiljer et al. (2020) in Canada also shows that the Thought Spot app encourages an increase in students' intention to seek formal mental health-related help. This is relevant to the findings by Rheinberger et al. (2023), who note that digital technology can be a useful complement in hospital services for adolescents experiencing suicidal pressure. However, the study also emphasizes the importance of staff training to support the effective integration of these technologies.

### **Challenges of Digital Technology Implementation**

Obstacles in the implementation of digital technology are diverse, especially in geographical, cultural, and social contexts. In China, Xu et al. (2023) implemented a digital mental health clinic (DMHC) in high schools, which successfully provided virtual counseling services to students. These resources overcome economic barriers and demonstrate high effectiveness in dealing with students' emotional problems. However, constraints such as low digital literacy were also reported by Mindu et al. (2023) and

Høgstad et al. (2024), who found that mental health apps must be accessible and relevant to attract adolescents consistently.

In addition, Ferrari et al. (2022) identified the potential of videogames as a means of promoting mental health. Although digital games have a high user retention rate, the study noted a lack of discussion regarding potential dangers, such as game addiction or misinformation.

### **Technology Integration**

The blended care approach, as highlighted by Cross et al. (2023), offers a combination solution of digital technology and clinical practice to address the limited capacity of mental health services. The study demonstrates the effectiveness of virtual reality (VR) in dealing with adolescent anxiety disorders, although its implementation requires significant investment in training and technology.

### **Conclusion**

Digital interventions have proven to be effective in increasing knowledge and attitudes of early detection of adolescent mental health. Nevertheless, the success of this program depends on relevant design, wide accessibility, and ongoing support from stakeholders. Barriers such as digital literacy, local culture, and economic constraints require special attention to ensure the sustainability of the program. Further studies focusing on long-term evaluations are urgently needed to strengthen the evidence of the effectiveness of these technologies in a variety of contexts.

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