



OPEN Evaluating the effect of mental health curriculum on secondary school students' mental health literacy and knowledge and attitude to mental illness

Batool Zeidabadi¹, Mahsa Khodayarian²✉, Reza Sadeghi² & Sara Jambarsang³

Enhancing the mental health literacy of students stands out as a crucial factor in mitigating social harm within society. This randomized controlled trial assessed the effectiveness of a mental health literacy program called the "Mental Health and High School Curriculum Guide," consisting of six modules (1) Understanding mental health and mental illness, (2) Stigma of mental illness, (3) Information about specific mental illnesses, (4) experiences of mental illness, (5) seeking and receiving support, and (6) the importance of positive mental health. Which was introduced in the first secondary schools in the southeastern region of Iran in 2023. There were 40 teachers and 562 students from 20 schools involved in the study and randomly divided in two groups of intervention and control groups. The levels of mental health literacy, knowledge, and attitudes towards mental illness were measured using a questionnaire in two control and intervention groups, both before and after the mental health curriculum was implemented. A two-day training workshop was initially conducted for the intervention group teachers to familiarize them with the mental health curriculum. Following this preparation, the teachers introduced and implemented the mental health literacy curriculum in their classrooms for the students. The results of the study showed that the intervention group showed notable improvements in mental health literacy, with mean scores rising from 81 ± 6.80 to 98 ± 9.23 , while the control group had no significant change ($p < 0.001$). Similar significant gains were observed in mental health knowledge and attitudes ($p < 0.001$). Mental health knowledge scores increased from 11.12 ± 4.31 to 18.42 ± 3.28 , and scores on mental disorders improved from 19.76 ± 5.26 to 22.60 ± 3.83 , with no significant changes in the control group ($p < 0.001$). Also, the results showed that after adjusting the influencing factors (gender, teacher, number of children in the family), mental health literacy ($p < 0.001$), mental health knowledge ($p < 0.001$), attitude to mental illness/disorders ($p < 0.002$) had a significant effect. The study revealed that students' mental health literacy, knowledge and attitudes were positively impacted by the classroom program.

Keywords Mental health literacy, Knowledge, Attitude, Mental disorders, Stigma, Help seeking

Early adolescence (11–14 years) marks a crucial period for the development and onset of mental health problems. Worldwide, mental disorders have a high prevalence, chronicity, and morbidity¹. Mental illness symptoms typically arise before the age of 14 in a significant number of individuals². International studies, including a meta-analysis across 27 countries, report a pooled prevalence of 13.4% for mental disorders among children and adolescents³. Recent epidemiological data reveal that 34.6% of individuals experience the onset of mental disorders by age 14, increasing to 48.4% by age 18⁴. A study examining mental health literacy in Southeast Asia, specifically in Afghanistan, revealed that the overwhelming majority of participants (99.1%) demonstrated low levels of mental health literacy⁵.

¹Department of Health Education & Health Promotion, School of Public Health, Social Determinants of Health Research Center, Shahid Sadoughi University of Medical Sciences, Yazd, Iran. ²Department of Public Health, Sirjan School of Medical Sciences, Sirjan, Iran. ³Departments of Biostatistics and Epidemiology, School of Public Health, Center for Healthcare Data Modeling, Shahid Sadoughi University of Medical Sciences, Yazd, Iran. ✉email: mahsa.khodayarian6@gmail.com

In Iran, 22.31% of adolescents were found to have mental disorders⁶. Numerous studies have revealed that mental health literacy serves as a reliable indicator of mental health status in adolescents^{7,8}. Adolescents with high levels of mental health literacy are less likely to experience psychological distress⁹. Mental health literacy has been defined as “knowledge and beliefs about mental disorders which aid their recognition, management, and prevention”¹⁰. A more recent definition of MHL includes four components¹¹: understanding how to obtain and maintain good mental health¹²; understanding mental disorders and their treatments¹³; decreasing the stigma associated with mental disorders; and¹⁴ enhancing help-seeking efficacy (i.e., knowing when and where to obtain evidence-based mental health care and possessing the competencies to enhance self-care)⁷. MHL proponents reason that obtaining adequate knowledge of how and when disorders develop and appraising the need for help increases help-seeking behaviors boosting the chance of receiving appropriate and effective treatment^{15,16}.

Increasing public knowledge is crucial to identifying and addressing mental disorders early on, especially within the field of mental health¹⁷. Studies have demonstrated that mental health literacy is a reliable indicator of adolescents’ mental well-being^{7,8} and enhancing mental health literacy (MHL) is found to combat excessively high rates of under treatment of mental illnesses. However, understanding current knowledge and attitudes towards mental illnesses is an important first step towards developing an evidence base and interventions to improve literacy.

The research on students mental health literacy revealed that 83.6% of students lack adequate understanding in this area¹⁸. The research on mental health literacy in schools revealed that students’ understanding and beliefs about mental disorders were minimal⁸.

An ever-growing body of evidence indicates that integrating mental health supports and services directly within the school setting is an effective delivery system for child mental health programming^{19,20}. Delivering mental health treatments in schools has substantial benefits, including improved access to care for far more children^{21–23}, improved adherence and participation in treatment²⁴, early problem identification, and diminished impacts of mental health conditions²⁵, decreased stigma among children and their families^{26,27}, and positive impacts on academic and psychosocial functioning²⁸.

Successful implementations of mental health curricula in countries such as Canada²⁹, Cambodia, Vietnam³⁰, Wales¹³, and Nicaragua³¹ have demonstrated significant improvements in mental health literacy, knowledge, and attitudes among high school students. These programs have also enhanced MHL among teachers, further supporting the value of integrating mental health education into school curricula³².

Despite the global recognition of the importance of school-based mental health interventions, empirical research on such strategies remains scarce in Iran. This study aims to address this gap by investigating how a mental health curriculum can enhance high school students’ knowledge, attitudes, and mental health literacy. By embedding a mental health curriculum resource (The Guide) into existing school practices, this research seeks to improve both teacher and student MHL concurrently. This approach offers the additional advantage of being easily integrated into the existing curriculum without requiring significant budgetary allocations.

In summary, improving mental health literacy among students is crucial for mitigating future social harm. Given that students spend a significant portion of their day in schools, addressing adolescent MHL within the educational system is a strategic and impactful approach. This study builds on international evidence to explore the potential of a school-based mental health curriculum in the Iranian context, aiming to contribute to the growing body of research on effective mental health interventions for adolescents.

Research hypotheses

1. The average mental health literacy scores of students differ between the test and control groups before and after the implementation of the educational program.
2. The average score of general mental health knowledge among students differs between the test group and the control group before and after the implementation of the educational program.
3. The average attitude score of students regarding mental disorders differs between the test and control groups before and after implementing the educational program.

Methods

The present study is a randomized controlled trial, aimed to explore the influence of a mental health curriculum on student’s mental health knowledge, mental health literacy as well as attitudes to mental illnesses/disorders. The study includes all adolescents in grade 8th and 9th year of first secondary schools (13 to 15 years old) selected through stratified random sampling from Sirjan city; a city in Kerman province in the southeast of Iran. Participants were selected through stratified random sampling, with schools randomly assigned to either the intervention or control group. Using the effect size and primary data of Nguyen, Dang²⁹ study and considering the first type error at the level of 0.05 and the power of 0.80, the sample size was calculated to be 281 students in each of the intervention and control groups. Finally, 562 students participated in the study. To be eligible, public schools in Sirjan City must be willing to implement the mental health literacy program for the mentioned graders and nominate two teachers to attend a two-day educational program with the required conditions. Exceptional schools (those catering to adolescents with learning disabilities or behavioral issues) and non-profit schools were excluded from the study. This study was according to CONSORT reporting guidelines, Schulz KF, Altman DG, Moher D, for the CONSORT Group. CONSORT 2010 Statement: updated guidelines for reporting parallel group randomised trials.

Upon receiving the code of ethics, permission, and letter of introduction from the Research Vice-Chancellor of Shahid Sadougi University of Medical Sciences, Yazd, the necessary arrangements were made with the education department of Sirjan city, and the list of first secondary schools was received. To ensure randomization, 20 schools were randomly assigned to either the intervention or control group using a random

number sequence. The enrollment quota for each school is set at a minimum of 28 students. Teachers were also randomly assigned to the intervention or control groups, with 20 teachers in each group. Unwilling teachers were excluded. After describing the objectives of, they were invited to collaborate as facilitators in this study and were asked to participate in a two-day training course for the MHL program. Figure 1 shows the process of conducting the study.

A school-based mental health literacy curriculum guide, developed and tested by Kutcher et al.³⁰ in Canada, has been translated and validated for use in Iran. This study utilized the translated version of the mental health curriculum guide. In evaluating the guide, the content validity index was measured at 0.92, and the Cronbach's alpha coefficient was 0.82.

The teachers in the intervention group took part in a two-day training course for the school-based MHL program, consisting of six modules (1) Understanding mental health and mental illness, (2) Stigma of mental illness, (3) Information about specific mental illnesses, (4) experiences of mental illness, (5) seeking and receiving support, and (6) the importance of positive mental health.

Moreover, they were provided with the materials and contents of the Persian MHL program along with PowerPoint presentations that included the instructional material for each module (Table 1). Additionally, instructional videos, motion graphics, and key learning points from educational materials were shared through social media platforms. Upon empowering the teachers, the mental health literacy curriculum was brought into the classrooms.

Before implementing the program, the Mental Health Literacy Scale (MHLS) and the mental health knowledge assessment tool were completed by the teachers. Following the pre-test, incorrect responses were recorded. After participating in the training workshop, the teachers once again completed the pre-test questionnaires.

Written consent was acquired from parents of students under 18 years old before the start of the educational program. Each student was given an identification code by the research team, which was then completed by teachers to uphold confidentiality and anonymity. This code was employed to evaluate the students, with the assurance given to participants that their information would remain confidential.

Three questionnaires of mental health literacy scale (MHLs), mental health knowledge questionnaire (MHKQ), and attitudes to mental illness questionnaire (AMIQ) were utilized to assess the control and intervention groups, providing a thorough understanding of various facets of mental health literacy. The pre-test was administered before classroom instruction, with the post-test carried out two months following the conclusion of the sixth module.

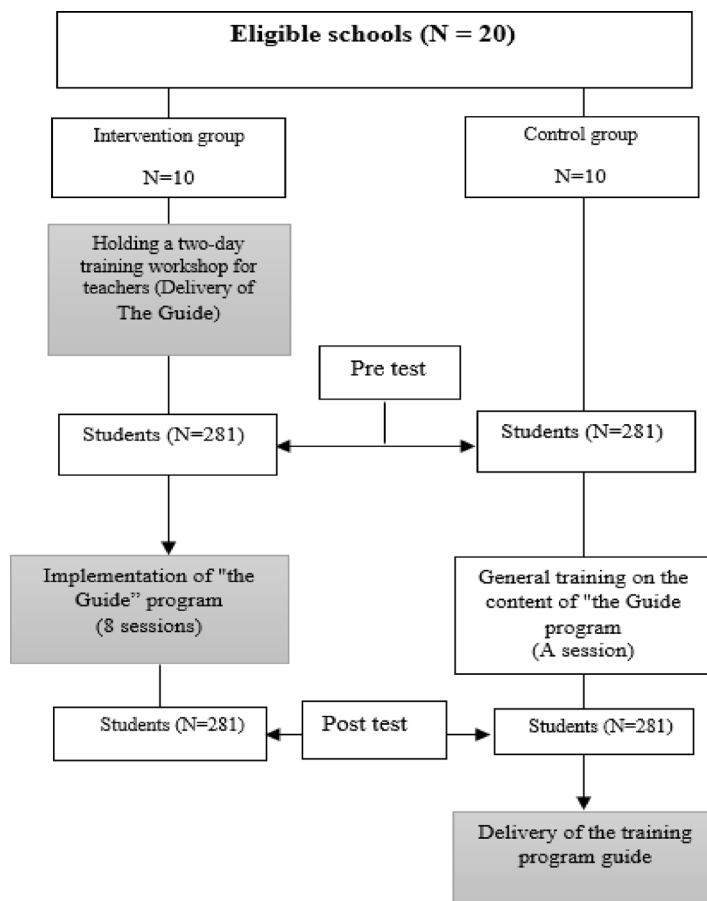


Fig. 1. Procedure of the study.

Module	Content
Understanding mental health and mental illness	Basics of mental health and mental illness Changes in brain function The impact of mental illness on a person's thinking, feelings, or behavior Causes of mental illnesses The necessity of learning about mental illness in adolescence
The stigma of mental illness	Definition of stigma Stigma, perceptions, and realities of mental illness Examining society's attitudes about mental illness What is effective in reducing stigma?
Information about specific mental illnesses	What happens when the brain gets sick? Common mental illnesses Understanding common mental disorders in teenagers Better results in the treatment and support of people with mental illness
Experiences of mental illness	The impact of mental illness on many aspects of a person's life Ways of communication between teenagers and parents Ways to understand teenagers and communicate with them
Seeking and receiving support	Treatment and recovery of mental illness The possibility of a person recovering from mental illness in getting help early Help-seeking strategies
The importance of positive mental health	Understanding the response to stress Challenging thinking Investigate useful strategies for modulating the intensity of the stress response

Table 1. School-based MHL training program.

Subsequent to the pre-test, an experienced teacher delivered the educational content of the school-based MHL program in a series of 8 sessions and was overseen by the research team with each module taught in in 60-min classes.

Out of all the modules, the third module was the most extensive and information-packed, hence needing additional teaching hours. Thus, this module was scheduled for three 50-min periods. The training incorporated interactive teaching strategies, such as group discussions, role-playing, and multimedia presentations, to enhance engagement and learning.

The trained research team, with the collaborative effort of teachers and students, introduced the main content of The Persian Guide educational program to the control group.

Following the assessment of the school-based MHL program, the Persian guide was subsequently presented to the teachers and students in the control group. The research procedure is depicted in Figure.

Questionnaires were utilized to collect data, which included the evaluation of socio-demographic characteristics, along with the “Mental Health Literacy Scale (MHLS)”, “Mental Health Knowledge Questionnaire (MHKQ)”, and “Attitudes to Mental Illness Questionnaire (AMIQ)”.

The mental health literacy scale (MHLS)

Due to the lack of appropriate instruments for measuring mental health literacy in the Iranian population, the modified version of MHLS with 29 items and six attributes can be considered a valid and reliable instrument for this purpose. The final version of the MHLS included a total of 29 items and six attributes of where to seek information (4 items), knowledge of self-treatment (2 items), ability to recognize disorders (8 items), attitudes that promote recognition or appropriate help-seeking behavior (10 items), knowledge of risk factors and causes (2 items), and knowledge of professional help available (3 items). The reliability of the tool was measured through the use of McDonald's omega coefficient and Cronbach's alpha coefficient, with values of 0.797 and 0.789, respectively³¹.

Ability to recognize disorders: This attribute consists of eight questions that were measured using a 4-point Likert scale (very unlikely, unlikely, likely, very likely). This attribute refers to “the ability to correctly identify features of a disorder, a specific disorder, or category of disorders”.

Knowledge of risk factors and causes: This attribute was measured with two questions and using a 4-point Likert scale (very unlikely, unlikely, likely, very likely). This attribute refers to “knowledge of environmental, social, familial or biological factors that increase the risk of developing a mental illness”.

Knowledge of self-treatment: was measured this attribute consists of two questions that were measured using a 4-point Likert scale (very unhelpful, unhelpful, helpful, very helpful). This attribute refers to “knowledge of typical treatments recommended by mental health professionals and activities that an individual can conduct”.

Knowledge of professional help available: This attribute was measured with three questions and using a 4-point Likert scale (very unlikely, unlikely, likely, very likely). This attribute refers to “knowledge of mental health professionals and the services they provide”.

Knowledge of where to seek information: This attribute consists of four questions that were measured using a 5–5-option Likert scale (strongly disagree, disagree, neither agree nor disagree, agree, strongly agree). This attribute refers to “knowledge of where to access information and capacity to do so”.

Attitudes that promote recognition or appropriate help-seeking behavior: This attribute consists of sixteen questions and was measured using a 5-option Likert scale [(strongly disagree, disagree, neither agree nor disagree, agree, strongly agree) or (definitely willing, probably willing, neither willing nor unwilling, probably unwilling, definitely unwilling)]. This attribute refers to “attitudes that impact the recognition of disorders and willingness to engage in help-seeking behavior”.

In this questionnaire, the lowest score is 35, the highest score is 160, and higher scores indicate a better MHL status. The validity and reliability of this questionnaire were evaluated in the O'Connor study. The internal consistency of this scale was measured by Cronbach's alpha (Cronbach's alpha = 0.90)³².

Mental health knowledge (MHKQ)

The mental health general knowledge questionnaire consists of 28 questions responded to on a 3-point scale ("True", "False", or "I don't know") based on the six modules of the guide.

The attitudes to mental illness questionnaire (AMIQ)

The Attitudes to Mental Illness Questionnaire consists of 8 questions including statements about mental disorders or people with a mental illness and asks respondents to express their level of agreement using a Likert scale (from "strongly disagree" to "strongly agree"). Mcluckie and Kutcher¹⁴ evaluated the mental health general knowledge questionnaire and attitudes to mental illness, and Cronbach's alpha 0/71 was confirmed³³.

The translation approach used in this study is based on the IQOLA standard procedure, which comprises translation phases, translation quality evaluation, reverse translation, and a comparison of the English and Persian versions by the guide's primary developers³⁴.

Following that, the questionnaire's validity was examined and approved by 12 experts. The reliability was assessed by having 30 participants complete the Persian version of the questionnaire twice, with a two-week interval between each completion.

In the translation process, two questions were modified and tailored to fit Iranian culture in the translation. The average content validity index (CVI) of the items was 0.88. Cronbach's alpha coefficient index of mental health knowledge questions and attitude to mental illness/disorders of students were obtained as 0.96 and 0.86, respectively. The Pearson correlation of the questions in the knowledge section was 0.93 and the attitude was 0.76, which are acceptable reliability coefficient.

Data analysis

To describe and analyze data, descriptive and inferential statistical methods were utilized. Qualitative variables were presented as frequency and percentage, while quantitative variables were presented as mean and standard deviation. This study assessed the normality of the data distribution by utilizing the Kolmogorov-Smirnov test. Paired t-test was used to compare the mean variables of mental health literacy and its dimensions and the knowledge and attitude of mental health in students. ANCOVA was used to compare the intervention and control groups by adjusting the effect of pre-test values. $P < 0.05$ was considered as a significant level. SPSS software (version 26) was used for analysis.

Results

562 high school students participated in this study, of which 369 (65.7%) were girls and 193 (34.3%) were boys. 437 (78.8%) had two children in their family and 58(20.7%) had three children in their family. The missing data related to the variable of number of children was 21 people. 21(7/5%) had history of mental illness and 69(24/6%) had visited a psychiatrist. 8 people did not respond to the variables of history of mental illness and visiting a psychiatrist. Table 2 presents the sociodemographic characteristics of the intervention and control groups before the intervention. There were no significant differences between the groups in terms of gender or family size ($p > 0.05$).

Using analysis of covariance (ANCOVA), the effect of the intervention on mental health knowledge, attitudes to mental illness/disorders, mental health literacy, and its dimensions were investigated by adjusting the initial value of variables in both groups. Baseline scores for mental health literacy, knowledge, and attitudes were compared between the intervention and control groups. No significant differences were found at baseline ($p > 0.05$), indicating that the groups were comparable before the intervention (Table 3).

The intervention group experienced a significant improvement in mental health literacy scores, increasing from a baseline mean of 81 ± 6.80 to a post-intervention mean of 98 ± 9.23 , with the control group showing no significant change ($p < 0.001$). Comparable gains were observed in mental health knowledge and attitudes, also

Demographic characteristics		Control group	Intervention group	p-value
		Frequency (%)	Frequency (%)	
Sex	Boys	167(3/45)	202(7/54)	0.002
	Women	114(1/59)	79(9/40)	
Number of children	One	25(9/8)	20(1/7)	0.021
	Two	228(4/81)	209(4/74)	
	Three and more	19(8/6)	39(9/13)	
History of mental illness	Yes	8(9/2)	13(6/4)	0.670
	No	270(4/96)	266(7/94)	
Visit a psychiatrist	Yes	30(7/10)	39(9/13)	0.701
	No	250(3/89)	238(7/84)	

Table 2. Demographic characteristics of high school students participating in the mental health literacy curriculum before intervention.

Variables	Intervention group		Control group		<i>p</i> -value*	Adjusted <i>p</i> -value**
	Pre-test	Post-test	Pre-test	Post-test		
	Mean (S.D)	Mean (S.D)	Mean (S.D)	Mean (S.D)		
Mental health literacy	81/81(9/23)	98/98(6/80)	80/14(9/76)	80/29(9/62)	< 0.001	< 0.001
Mental health knowledge	11/12(4/31)	18/42(3/28)	10/85(4/32)	10/69(4/20)	< 0.001	< 0.001
Attitudes to mental illness	19/76(5/26)	22/60(3/83)	20/18(5/09)	20/10(4/72)	< 0.001	< 0.002
Ability to recognize specific disorders	23/08(2/86)	26/35(2/93)	23/13(4/22)	22/82(3/25)	< 0.001	< 0.001
Knowledge of risk factors and causes	5/60(1/31)	6/38(1/12)	5/40(1/31)	5/39(1/40)	< 0.001	< 0.014
Knowledge of self-treatments	5/13(1/28)	6/30(1/16)	5/52(3/02)	5/09(10/22)	< 0.001	< 0.014
Professional help available	8/30(1/70)	9/81(1/38)	8/34(1/71)	80/32(1/68)	< 0.001	< 0.001
Where to seek information	13/50(3/69)	15/60(2/15)	12/40(3/34)	12/96(2/78)	< 0.001	< 0.001
Appropriate help-seeking behavior	26/12(7/65)	34/50(3/96)	25/33(7/47)	25/69(6/38)	< 0.001	< 0.001

Table 3. Comparison of the mean variables of mental health literacy and its dimensions, knowledge, and attitude to mental illness/disorders of students participating in the mental health literacy curriculum.

*Comparison of two intervention and control groups by adjusting the effect of pre-test values (Analysis of covariance test–ANCOVA). **Comparison of two intervention and control groups by adjusting the effect of pre-test values and sex, teacher, and number of children in the family (Analysis of covariance test–ANCOVA).

demonstrating statistical significance ($p < 0.001$). Specifically, mental health knowledge scores in the intervention group rose notably from 11.12 ± 4.31 prior to the intervention to 18.42 ± 3.28 afterward. Likewise, scores related to mental disorders showed a significant increase, improving from 19.76 ± 5.26 before the intervention to 22.60 ± 3.83 after its implementation, with the control group showing no significant change ($p < 0.001$).

The results of this test showed that the intervention had a positive impact on the mental health literacy of students, with the intervention group showing significantly higher levels than the control group. Additionally, following the intervention, there was a significant increase in students' mental health knowledge ($p < 0.001$). This means that the intervention led to a substantial enhancement in the intervention group's ability to recognize disorders, knowledge of causes and factors, knowledge of where to seek information, appropriate help-seeking behavior, knowledge of self-treatment, and knowledge of available professional help ($p < 0.001$). Also, the results showed that after adjusting the influencing factors of gender, teacher, and number of children in the family, the mental health literacy of students was significantly higher in the intervention group than in the control group. Furthermore, mental health knowledge remained significant even after accounting for influencing factors, showing a greater improvement in the intervention group ($p < 0.001$). Additionally, the attitude towards mental disorders had a notable impact after adjusting for these factors ($p < 0.002$).

After adjusting for influencing factors, several components of mental health literacy showed significant improvements: the ability to recognize disorders, appropriate help-seeking behavior, knowledge of available professional help, knowledge of where to seek information ($p < 0.001$), knowledge of causes and risk factors ($p < 0.014$), and knowledge of self-treatment ($p < 0.014$).

Figure 2 compares the mean mental health literacy scores of students in the intervention and control groups before and after the mental health curriculum. The mean pre-test score of mental health literacy in the intervention group was 81, which increased significantly to 98 two months after the educational intervention ($p < 0.001$). In contrast, the control group showed no significant change, indicating that the curriculum effectively improved students' mental health literacy.

Figure 3 illustrates the mean mental health knowledge scores of students in the intervention and control groups before and after the curriculum. The mean pre-test score of mental health knowledge in the intervention group was 11, which rose significantly to 18 two months post-intervention ($p < 0.001$). Again, the control group exhibited no notable change, highlighting the impact of the educational program on students' knowledge.

Figure 4 depicts the mean scores of students' attitudes toward mental illness/disorders in both groups before and after the intervention. The mean pre-test score of attitudes in the intervention group was 19, which increased significantly to 22 two months after the educational intervention ($p < 0.001$). The control group, however, showed no significant improvement, underscoring the positive influence of the curriculum on students' attitudes.

Discussion

The results of this study demonstrated that incorporating the school-based mental health curriculum outlined in the guide and having it delivered by classroom teachers can greatly enhance mental health literacy, students' understanding of mental health, and positively influence their attitudes toward mental disorders/illnesses. This study is the first to demonstrate the beneficial and lasting impact of a curriculum-based mental health literacy program on Iranian high school students. The findings indicate that students' mental health literacy can be significantly improved through the integration of a mental health curriculum delivered by classroom teachers, aligned with The Persian Guide, and embedded within the school curriculum. This approach does not rely on mental health professionals but on classroom teachers who employ established teaching methods, making it a sustainable and scalable model for promoting mental health awareness, early detection, and prevention among students.

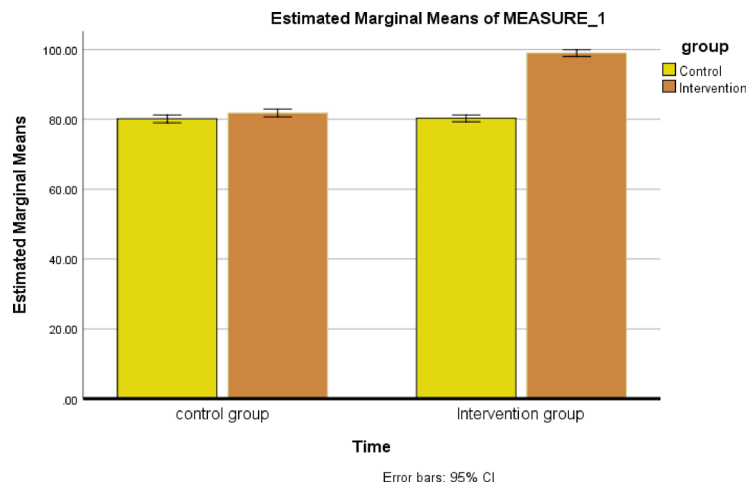


Fig. 2. Comparison of the mean achieved mental health literacy of students in the intervention and control groups before and after the mental health curriculum.

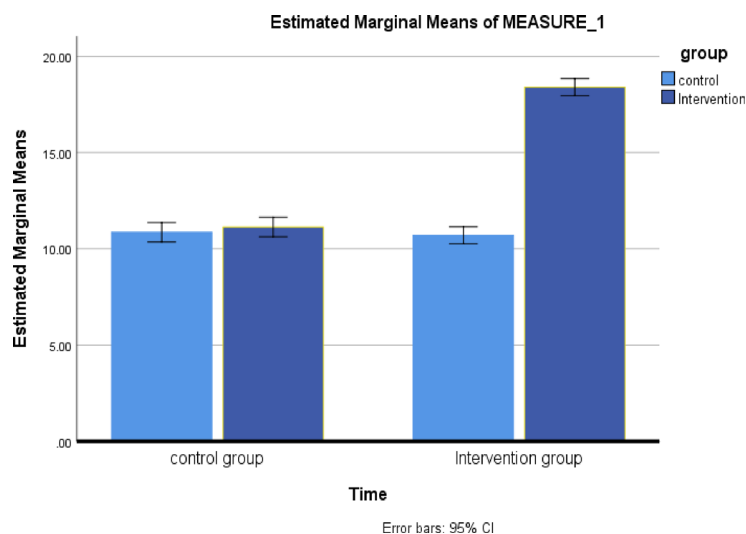


Fig. 3. Comparison of the mean achieved mental health knowledge of students in the intervention and control groups before and after the mental health curriculum.

Our results align with earlier research showing the positive outcomes of teacher training on students' use of mental health resources, resulting in notable changes in knowledge and attitudes toward stigma reduction^{30,35}. Specifically, our findings are consistent with studies conducted in Canada³³ and Southeast Asia²⁹, which also reported significant improvements in mental health literacy following school-based interventions. However, unlike previous studies that primarily focused on knowledge and attitudes, this study also examined broader dimensions of mental health literacy, including recognizing mental disorders, understanding causes and risk factors, and knowing where to seek professional help.

The Persian Guide significantly enhanced mental health literacy and its dimensions, including recognizing mental disorders, understanding causes and factors, knowing where to seek information, engaging in appropriate help-seeking behavior, self-treatment knowledge, and awareness of available professional help. Due to its brevity and simplicity, this tool can effectively assess mental health literacy levels and identify individuals with inadequate mental health literacy⁽³³⁾. By participating in this program, students acquired knowledge about mental health, mental illness, the significance of family communication, how to access suitable support, and how to prevent the proliferation of mental disorders in society. The program also led to a notable increase in mental health literacy and a decrease in stigmatized attitudes toward mental illness. These findings suggest that enhancing mental health knowledge can result in more positive attitudes toward mental illnesses³⁶.

While the majority of research on mental health curricula has focused on knowledge and attitudes, this study delved deeper into individuals' overall mental health literacy, covering various mental health components. For example, research on the OpenMinds program revealed no significant changes in students' attitudes toward helping others or themselves in terms of mental health literacy³⁷. Similarly, students enrolled in the InSciEd Out

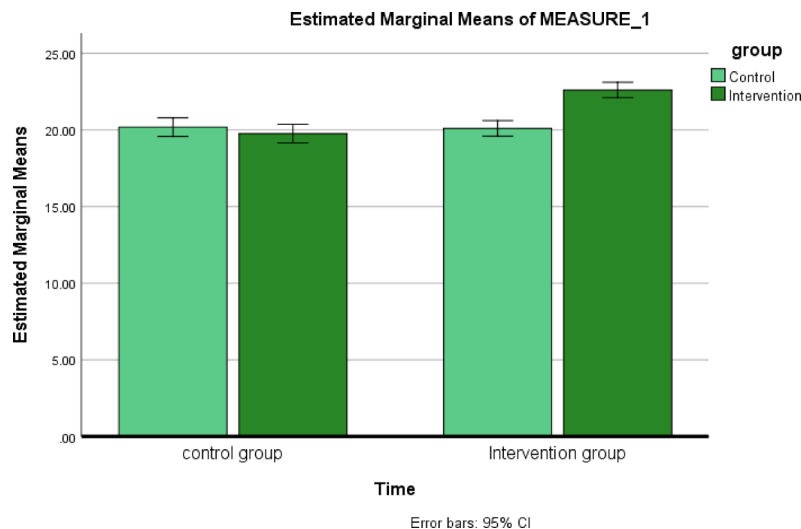


Fig. 4. Comparison of the mean achieved attitude to mental disorders of intervention and control group students before and after the mental health curriculum.

program showed only slight improvements in mental health literacy and small to moderate improvements in help-seeking behaviors³⁸. In contrast, our study demonstrated more comprehensive improvements, likely due to the integration of culturally adapted content and teacher-led delivery.

Strengths of the study

This mental health curriculum in Iran was carefully reviewed, focusing on cross-cultural and localization aspects. The characteristics of the students were examined based on their age and ethnic, cultural, and religious backgrounds. For example, materials that were not considered age-appropriate were either removed or modified, and more relevant topics were suggested. Due to the prominent role of the adolescent-family relationship in Iranian culture, it emphasized the importance of positive communication between parents and adolescents and how adolescents can better understand and communicate with their parents and vice versa. Due to the lack of access to complementary videos suitable for Iranian adolescents, Iranian videos were recommended in this guide. We have included a teacher's pack with this guide to simplify understanding while ensuring that the content remains accessible.

The comprehensive nature of the mental health curriculum yielded positive outcomes, showcasing the program's effectiveness and thoroughness. The extended training duration played a crucial role in boosting knowledge and attitudes toward mental illness, ultimately enhancing mental health literacy. Studies exploring various approaches to incorporating the guide in the classroom have revealed that educating teachers on its implementation, integrating it into the curriculum, and presenting it as a unified set yield positive results. A key advantage of this guide is the inclusion of self-study materials for teachers, enhancing their grasp of the subject matter and ensuring fidelity in program delivery. Educators who implemented the guide underwent a training program to become familiar with the material, which contributed to the program's success. The researchers plan to establish this guide as the nationwide standard for mental health education at the first secondary level in Iran.

Limitations and suggestions

One limitation of this guide is its extensive content, which may be challenging for students to fully grasp within a single academic year. To address this, the researchers recommend integrating the program into the high school curriculum over the first three years, allowing for more gradual and effective learning. Additionally, the self-reported nature of the questionnaires may have introduced response bias, and the sample size, while adequate, could be expanded in future studies to enhance generalizability.

Another consideration is the alignment of the curriculum with local cultural norms and values. While the Persian Guide was culturally adapted for Iranian students, further research is needed to explore potential cultural barriers that could affect the curriculum's effectiveness in other regions. For example, certain topics, such as stigma and help-seeking behaviors, may require additional cultural sensitivity when implemented in diverse contexts.

Implications for policy and practice

The findings of this study have significant implications for policy and practice. The program's success in improving mental health literacy among students and teachers suggests that it could be adapted for other regions with different educational structures. To scale this program nationally, policymakers should consider providing additional resources for teacher training and curriculum integration. Furthermore, future research should explore the long-term impact of the program on students' mental health outcomes and academic

performance. By addressing these areas, this program has the potential to become a cornerstone of mental health education in Iran and beyond.

Conclusion

The results of this study demonstrate that the mental health curriculum effectively enhanced mental health literacy among high school students, leading to significant improvements in their knowledge and attitudes toward mental health. By integrating this program into the school curriculum, schools can play a pivotal role in reducing stigma and encouraging students to seek help for mental health issues. The program's alignment with existing school routines and reliance on classroom teachers rather than external mental health professionals makes it a sustainable and scalable model for whole-school approaches. This approach not only enhances teachers' professional skills but also leverages the existing curriculum and resources, ensuring minimal additional costs.

To scale this program nationally, immediate steps should include piloting the curriculum in diverse regions of Iran, providing comprehensive teacher training, and securing policy support for its integration into the national curriculum. By addressing these steps, this program has the potential to become a cornerstone of mental health education in Iran, fostering a generation of students equipped with the knowledge and skills to prioritize their mental well-being.

Data availability

The data will be available from the corresponding author upon request.

Received: 13 July 2024; Accepted: 18 June 2025

Published online: 16 July 2025

References

- Patel, V., Flisher, A. J., Nikapota, A. & Malhotra, S. Promoting child and adolescent mental health in low and middle income countries. *J. Child Psychol. Psychiatry* **49**, 313–334 (2008).
- Patalay, P. & Fitzsimons, E. Development and predictors of mental ill-health and wellbeing from childhood to adolescence. *Soc. Psychiatry Psychiatr. Epidemiol.* **53**, 1311–1323 (2018).
- Polanczyk, G. V., Salum, G. A., Sugaya, L. S., Caye, A. & Rohde, L. A. Annual research review: A meta-analysis of the worldwide prevalence of mental disorders in children and adolescents. *J. Child Psychol. Psychiatry* **56**, 345–365 (2015).
- Solmi, M. et al. Age at onset of mental disorders worldwide: Large-scale meta-analysis of 192 epidemiological studies. *Mol. Psychiatry* **27**, 281–295 (2022).
- Mohammadi, A. Q., Johnston, L. & Ojha, K. Mental health literacy among Afghan adults: A community-based cross-sectional survey study in Herat city. *Razi Int. Med. J.* **3**, 36–43 (2023).
- Mohammadi, M. R. et al. Prevalence and correlates of psychiatric disorders in a national survey of Iranian children and adolescents. *Iran. J. Psychiatry* **14**, 1 (2019).
- Bjørnsen, H. N., Espnes, G. A., Eilertsen, M.-E.B., Ringdal, R. & Moksnes, U. K. The relationship between positive mental health literacy and mental well-being among adolescents: Implications for school health services. *J. Sch. Nurs.* **35**, 107–116 (2019).
- Wei, Y., McGrath, P. J., Hayden, J. & Kutcher, S. Mental health literacy measures evaluating knowledge, attitudes and help-seeking: A scoping review. *BMC Psychiatry* **15**, 1–20 (2015).
- Zhang, X., Yue, H., Hao, X., Liu, X. & Bao, H. Exploring the relationship between mental health literacy and psychological distress in adolescents: A moderated mediation model. *Prev. Med. Rep.* **33**, 102199 (2023).
- Goldney, R. D., Fisher, L. J., Wilson, D. H. & Cheok, F. Mental health literacy of those with major depression and suicidal ideation: An impediment to help seeking. *Suicide Life-Threat. Behav.* **32**, 394–403 (2002).
- Dray, J. et al. Improving adolescent mental health and resilience through a resilience-based intervention in schools: Study protocol for a randomised controlled trial. *Trials* **15**, 1–9 (2014).
- Amudhan, S. et al. Project SUMS (scaling up of mental health in schools): Design and methods for a pragmatic, cluster randomised waitlist-controlled trial on integrated school mental health intervention for adolescents. *BMC Public Health* **21**, 1–11 (2021).
- Simkiss, N. J., Gray, N. S., Kemp, A. H., Dunne, C. & Snowden, R. J. A randomised controlled trial evaluating the Guide Cymru mental health literacy intervention programme in year 9 (age 13–14) school pupils in Wales. *BMC Public Health* **23**, 1062 (2023).
- World Health Organization. *Global action plan on physical activity 2018–2030: More active people for a healthier world*. 101.
- Jorm, A. F. Mental health literacy: Empowering the community to take action for better mental health. *Am. Psychol.* **67**, 231 (2012).
- Kutcher, S., Wei, Y., Costa, S., Gusmão, R., Skokauskas, N., & Sourander, A. Enhancing mental health literacy in young people. *European child & adolescent psychiatry*, **25**, 567–569. (2016).
- Waldmann, T., Staiger, T., Oexle, N. & Rüsch, N. Mental health literacy and help-seeking among unemployed people with mental health problems. *J. Ment. Health* **29**, 270–276 (2020).
- Jafari, A., Sany, S. B. T. & Peyman, N. The status of health literacy in students aged 6 to 18 old years: A systematic review study. *Iran. J. Public Health* **50**, 448 (2021).
- Hogan, M. F. New Freedom Commission report: The president's New Freedom Commission: Recommendations to transform mental health care in America. *Psychiatr. Serv.* **54**, 1467–1474 (2003).
- Stephan, S. H., Sugai, G., Lever, N. & Connors, E. Strategies for integrating mental health into schools via a multitiered system of support. *Child Adolesc. Psychiatr. Clin.* **24**, 211–231 (2015).
- Burns, B. J. et al. Children's mental health service use across service sectors. *Health Aff.* **14**, 147–159 (1995).
- Rones, M. & Hoagwood, K. School-based mental health services: A research review. *Clin. Child. Fam. Psychol. Rev.* **3**, 223–241 (2000).
- Catron, T., Harris, V. S. & Weiss, B. Posttreatment results after 2 years of services in the Vanderbilt School-Based Counseling project. (1998).
- Jaycox, L. H. et al. Children's mental health care following Hurricane Katrina: A field trial of trauma-focused psychotherapies. *J. Trauma. Stress Off. Publ. Int. Soc. Trauma. Stress Stud.* **23**, 223–231 (2010).
- Weist, M. D., Myers, C. P., Hastings, E., Ghuman, H. & Han, Y. L. Psychosocial functioning of youth receiving mental health services in the schools versus community mental health centers. *Commun. Ment. Health J.* **35**, 69–81 (1999).
- Nabors, L. A. & Reynolds, M. W. Program evaluation activities: Outcomes related to treatment for adolescents receiving school-based mental health services. *Child. Serv. Soc. Policy, Res. Pract.* **3**, 175–189 (2000).
- Stephan, S. H., Weist, M., Kataoka, S., Adelsheim, S. & Mills, C. Transformation of children's mental health services: The role of school mental health. *Psychiatr. Serv.* **58**, 1330–1338 (2007).

28. Kase, C. et al. Educational outcomes associated with school behavioral health interventions: A review of the literature. *J. Sch. Health* **87**, 554–562 (2017).
29. Nguyen, A. J., Dang, H.-M., Bui, D., Phoeun, B. & Weiss, B. Experimental evaluation of a school-based mental health literacy program in two Southeast Asian nations. *Sch. Ment. Heal.* **12**, 716–731 (2020).
30. Kutcher, S., Wei, Y., McLuckie, A. & Bullock, L. Educator mental health literacy: A programme evaluation of the teacher training education on the mental health & high school curriculum guide. *Adv. School Ment. Health Promot.* **6**, 83–93 (2013).
31. Nejatian, M., Tehrani, H., Momeniyan, V. & Jafari, A. A modified version of the mental health literacy scale (MHLS) in Iranian people. *BMC Psychiatry* **21**, 1–11 (2021).
32. O'Connor, M. & Casey, L. The Mental Health Literacy Scale (MHLS): A new scale-based measure of mental health literacy. *Psychiatry Res.* **229**, 511–516 (2015).
33. McLuckie, A., Kutcher, S., Wei, Y. & Weaver, C. Sustained improvements in students' mental health literacy with use of a mental health curriculum in Canadian schools. *BMC Psychiatry* **14**, 1–6 (2014).
34. Bullinger, M. et al. Translating health status questionnaires and evaluating their quality: The IQOLA project approach. *J. Clin. Epidemiol.* **51**, 913–923 (1998).
35. Kutcher, S. & Wei, Y. School mental health literacy: A national curriculum guide shows promising results. *Educ. Can.* **54**, 22–26 (2014).
36. Milin, R. et al. Impact of a mental health curriculum on knowledge and stigma among high school students: A randomized controlled trial. *J. Am. Acad. Child Adolesc. Psychiatry* **55**, 383–391 (2016).
37. Patalay, P. et al. A pre-post evaluation of OpenMinds: A sustainable, peer-led mental health literacy programme in universities and secondary schools. *Prev. Sci.* **18**, 995–1005 (2017).
38. Yang, J., Lopez Cervera, R., Tye, S. J., Ekker, S. C. & Pierret, C. Adolescent mental health education InSciEd Out: A case study of an alternative middle school population. *J. Transl. Med.* **16**, 1–10 (2018).

Acknowledgements

We are very grateful to Sirjan Department of Education. And especially, we appreciate the teachers and students of Sirjan schools.

Author contributions

B.Z. conducted the investigation, conceptualization, methodology, data curation, analysis, data interpretation, and writing of the manuscript. M.K.H. R.S., and S.J., contributed to the methodology, data analysis, interpretation, and manuscript edition. All authors read and confirmed the final manuscript to be submitted to the current journal. All authors also decided to accept responsibility for all aspects of the work.

Funding

This study is financially supported by research and Vice President of Technology, Shahid Sadoughi University of Medical Sciences, Yazd, Iran.

Declarations

Competing interests

The authors declare no competing interests.

Ethical approval

The present study was approved by the ethics committee Yazd University of Medical Sciences (code: IR.SSU.SPH.REC.1402.089) was obtained.

Informed consent

This study was approved by the Ethics Committee of Yazd University of Medical Sciences (Ethics Code: IR.SSU.SPH.REC.1402.089). All methods were performed in accordance with the relevant guidelines and regulations, including the Declaration of Helsinki and local ethical standards for research involving human participants. Written informed consent was obtained from parents of students under 18 years old, and all participants were assured of the confidentiality and anonymity of their responses.

Additional information

Correspondence and requests for materials should be addressed to M.K.

Reprints and permissions information is available at www.nature.com/reprints.

Publisher's note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

Open Access This article is licensed under a Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International License, which permits any non-commercial use, sharing, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons licence, and indicate if you modified the licensed material. You do not have permission under this licence to share adapted material derived from this article or parts of it. The images or other third party material in this article are included in the article's Creative Commons licence, unless indicated otherwise in a credit line to the material. If material is not included in the article's Creative Commons licence and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this licence, visit <http://creativecommons.org/licenses/by-nc-nd/4.0/>.

© The Author(s) 2025