

The Effects of a School-Based Mental Health Program on Students' Knowledge, Behavior, and Depression: A Quasi-Experimental Study in Four Indonesian High Schools

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Abstract

Schools play a crucial role in promoting the mental health of children and adolescents. This study aimed to examine the effectiveness of a mental health program by evaluating changes in knowledge, behavior, and mental health outcomes of students before and after the intervention. The study employed a pre-and-post-test quasi-experimental approach in four selected high schools in Bogor. It evaluated changes in knowledge, behavior, and mental health outcomes of students pre-and-post the intervention. The study assessed mental health literacy, anti-bullying education, and creating a positive school environment. Data were collected in July and October 2019, with 476 out of 495 students completing both pre- and post-tests. In the intervention group, there was an improvement in knowledge, as evidenced by a decrease in the risk of “having a lack of knowledge” from the pre-test (OR = 1.8, 95% CI [1.2, 2.6], $p = .004$) to the post-test (OR = 1.2, 95% CI [0.9, 1.8], $p = .284$). During the pre-test period, students in the intervention schools had a higher risk of experiencing bullying (OR = 1.4, 95% CI [0.9, 2.3], $p = .133$). However, after the intervention, their risk of being bullied decreased (OR = 0.9, 95% CI [0.6, 1.6], $p = .810$). The risk of having no peer support also decreased from OR = 1.6, 95% CI [0.5, 5.8], $p = .467$ to OR = 1.1, 95% CI [0.3, 4.3], $p = .933$. The condition of depression in the intervention group improved, with an OR = 1.0, 95% CI [0.6, 1.8], $p = .924$ at the pre-test and an OR = 0.8, 95% CI [0.4, 1.6], $p = .511$ at the post-test. These findings underscore the significance of initiatives focused on improving student mental health.

Keywords

Adolescents; bullying; depression; mental health; school-based intervention

Introduction

Adolescence is a transition period when mental health problems may arise for the first time. Research shows that the peak age of onset for all mental disorders is 14.5, while for stress disorders, it is 15.5 (Solmi et al., 2022). Globally, the prevalence of depression among adolescents has increased from 24% between 2001 and 2010 to 37% between 2011 and 2020, with the Asia region being one of the highest rates (Shorey et al., 2022). According to the 2018 national survey, it was found that 6.2% of individuals aged 15 to 24 in Indonesia experienced depression (Indonesia Ministry of Health, 2019a).

The identification and appropriate management of mental health concerns among adolescents is crucial to prevent negative impacts on their personal, social, and communal lives. The Global Burden of Disease (GBD) 2019 highlighted that mental health problems are a significant cause of disability (Ferrari et al., 2022) and health burden among individuals aged between 15 and 19 years (Guthold et al., 2021). Poor mental health in adolescence may also hamper education (Breslau et al., 2011) and increase the likelihood of future unemployment (Mousteri et al., 2019). Furthermore, neglecting adolescent mental health can result in severe long-term consequences, including limiting opportunities for adolescents to lead meaningful and happy lives as adults, as well as broader societal effects such as increased rates of unemployment, substance addiction, poor health outcomes, high crime rates, and increasing violence (Patel et al., 2013). In low- and middle-income countries, mental health issues like anxiety and depression can impair daily functioning and physical health, increase mortality, and undermine productivity and sustainable development (Ferrari et al., 2014).

Numerous initiatives for mental health programs have been developed, focusing on schools. According to Herrman et al. (2005), schools are a focal point for supporting children's and adolescents' mental health (Herrman et al., 2005). The Indonesian government has also designed school mental health programs, as outlined in Law Number 18 of 2014, emphasizing the importance of promotional efforts to address mental health issues. These mental health programs can be introduced in schools by creating a supportive teaching and learning environment that encourages the development of life skills related to mental health, which are tailored to the learners' stage of development. This approach will help foster students' mental health growth and well-being (UNESCO, 2022).

Schools can play a crucial role in addressing mental health issues in adolescents. The BPS-Statistics Indonesia data showed that Indonesia had over 5 million senior high school students (Central Bureau of Statistics, 2020). As students spend most of their time in school, mental health management becomes crucial. Several studies in Indonesia have shown a significant prevalence of mental health issues among Indonesian students. An analysis of the 2010 Riskesdas data showed that 7.7% of students aged 15–18 experienced psychological distress (Suryaputri et al., 2013). Additionally, the Global School-Based Health Survey (GSHS) found that 46.0% of students reported feeling lonely (*sometimes, almost always, and always*), 42.2% experienced excessive anxiety, 5.2% expressed suicidal thoughts, and 20.6% had been bullied within the last 30 days (World Health Organization, 2015).

Previous studies have demonstrated various school-based mental health management efforts. One effective approach is school-based health promotion, which has been shown to significantly improve mental health and well-being (Karyani, 2016). For example, a study showed that providing knowledge on mental health disorder, especially depression, increase

awareness of depression and help-seeking behavior (Ruble et al., 2013). Furthermore, a review of 29 intervention studies highlighted the positive impact of school-based mental health promotion across various domains, including coping skills, help-seeking abilities, social skills, emotional regulation, and the reduction of symptoms related to depression and anxiety (O'Connor et al., 2018). A study conducted in school indicates that close relationships between students, school staff, and peer friends improve student's subjective well-being and mental health (Moore et al., 2018). Additionally, another school-based study confirmed that peer support effectively reduces suicidality (Hart et al., 2020). Several reviews have also concluded that anti-bullying school interventions are highly likely to succeed (Fraguas et al., 2021; Gaffney et al., 2021).

In Indonesia, intervention studies intended to promote mental health are still relatively new, and the adaptation of evidence-based recommendations for mental health intervention and promotion in the educational system has not been extensively explored. The current study promotes collaboration between health systems, schools, students, peers, and parents to enhance mental health-related factors. Bronfenbrenner's bioecological theory regarding school-based interventions stated that children's development, related to mental health conditions and personal characteristics, is influenced by their interactions with their environment (Bronfenbrenner & Ceci, 1994). This interaction includes support from family, friends, and peers, as well as the school environment (microsystems), mesosystems such as school policies, rules, and staff development, exosystems such as a shared whole-school vision, and the school board, and macrosystems such as general mental health policies that affect the area in which they reside (Allen et al., 2016).

Thus, this study aims to assess changes in student's knowledge, behavior, and mental health status before and after intervention in selected schools. The study also observes the implementation process of the intervention. Since most school-based mental health programs are well-known in developed countries, this study can provide critical insights for practitioners, policymakers, and academics for implementing mental health programs, particularly in the Indonesian context.

Materials and method

The study implemented a quantitative research design incorporating a pre-test and post-test quasi-experimental approach. This study was conducted in two regions: Bogor City and Bogor Regency. The Indonesia National Health Survey (Riskesdas) has reported that mental health problems were prevalent in West Java. In particular, Bogor City has a population where 4.2% of the residents experienced depression, and 9.3% experienced psychological distress, as measured by the SRQ-20 (Indonesia Ministry of Health, 2019a). Similarly, according to measurement by SRQ-20, 10.4% of Bogor Regency residents experienced depression, and 16.3% reported psychological distress (Indonesia Ministry of Health, 2019b). Therefore, the study was conducted in four high schools: two in Bogor City and two in Bogor Regency. Each region had one intervention and one non-intervention school.

The schools were selected through a purposive sampling technique involving local authorities in Bogor Regency and Bogor City. The selection criteria include the number of students, completeness of school facilities such as school buildings and teachers, general learning outcomes in schools, and a willingness to collaborate. The chosen schools were not the top-performing high schools in town.

The study population included all students from the tenth and eleventh grades in the selected high schools, with the sample consisting of randomly selected students who were willing to participate and did not have serious communication problems. Meanwhile, students from Grade 12 were not included in this study since they were preparing for national exams. Upon selecting the schools, the research team implemented a randomized sampling technique to obtain a list of primary and backup samples comprising students in Grades 10 and 11. The minimum sample of the study from the calculation was 148 students for both the case and control groups. As a result, the study's sample size comprised 160 students in both the case and control groups.

Several primary samples had to be replaced with backup samples from the same grade because some students refused to participate in the study, were unwell, changed schools, or could not attend data collection sessions. Prior to data collection, students and their parents were informed about the research and willingly signed the informed consent to participate in the study.

The study intervention

In this study, the program was a universal intervention emphasizing collaboration among students, teachers, families, school leaders, and *Puskesmas* [community health center]. The program included the following components: (1) meetings with school leaders and parents; (2) training courses for teachers, school leaders, mental health program supervisor at *Puskesmas*, parents, and peer counselors; (3) monitoring and evaluations for teachers and school leaders; and (4) handbooks and guidelines distribution for teachers, school leaders, and mental health program supervisor at *Puskesmas*.

The interventions in this study were based on 'Pedoman Sekolah Sejahtera' (the School Well-being Guidance), created in 2017 by the Center for Public Mental Health, Faculty of Psychology, Universitas Gadjah Mada (UGM). Our study also utilized the Ministry of Health training module to prevent mental health problems in children and adolescents by enhancing life skills. The 'Sekolah Sejahtera' guidelines encompass 13 modules to implement mental health support in schools. These modules cover topics such as mental health and early detection of mental health problems, referral systems, psychological first aid in school, policy development, increasing parental involvement, building effective communication with adolescents, guidance for parents in supporting adolescents, fostering appreciation, promoting positive discipline, micro-counseling for adolescents, conducting class meetings, addressing bullying, and student supervision. The 'Sekolah Sejahtera' approach has previously been implemented in selected public junior and senior high schools in Yogyakarta, Indonesia.

Moreover, the Ministry of Health's module consists of seven main modules within the life skills guideline. These modules focus on providing guidelines for teachers to improve students' mental health status, implementing social skills training for students, enhancing self-esteem, managing stress, recognizing and coping with emotions, handling peer pressure, and resolving conflicts. The Life Skill Guideline from the Ministry of Health has also been applied and trained in several public high schools in Jakarta, Indonesia. We adapted both guidelines during this research, considering similarities in participant profiles during implementation. Expert input was sought to select appropriate modules considering research objectives, research participants, training time, and budget constraints.

The intervention was conducted for three months and covered all school aspects. Before the interventions, psychiatrists and psychologists held capacity development workshops for three groups: school administration (teachers and leaders), parents, and peer counselors. The workshops were conducted over seven days: four days for teachers and school management, one day for parents, and two days for peer counselors. Peer counselors acted as student representatives who served as initial support for fellow students. Detailed materials are provided in Table 1.

In addition to capacity building, educational materials such as leaflets and posters were provided to the intervention schools. However, this intervention was only intended to increase mental health-related knowledge and behavior. On the other hand, the non-intervention schools did not receive any intervention and continued with their regular activities.

Meetings with school leaders, teachers, and parents

As part of the mental health program in schools, a systematic approach was taken to implement mental health intervention for three target groups: school management, teachers, and parents. Separate meetings were organized for each group to introduce the concept of mental health research in schools and discuss how to create a school environment that promotes students' mental health. The meetings with school leaders and teachers were conducted for three hours and were attended by 40 participants from each school. A similar meeting was conducted for parents on the same day (2-hour meeting) and was attended by 50 parents from each intervention school. On the other hand, non-intervention schools also received dissemination about the study without emphasizing intervention procedures. The dissemination activity was conducted to obtain informed consent from the parents of the children who participated in the study.

After the dissemination, a mental health team comprised of school leaders, counseling teachers, and homeroom teachers. This team was crucial in supporting the research and involving stakeholders' engagement. Furthermore, the researchers evaluated the current school policies and added relevant mental health resources as necessary. The parents of all selected samples were invited, but not all could attend. For those who could not attend the meetings, the researchers sent invitations and consent forms to participate in the research for their children. After the parents signed the informed consent forms, their children would submit them. The school counselor then collected the consent forms.

Workshops for teachers, school leaders, mental health supervisors at Puskesmas, parents, and peers

In the intervention group, school leaders, teachers, and mental health supervisors at Puskesmas received four workshops (12-hour meetings) comprising practical and theoretical aspects of mental health promotion in the school setting. Tools and materials for implementing mental health activities in school were also provided. Details about the intervention procedures can be found in Table 1.

Table 1: Workshops for Teachers, School Leaders, Mental Health Supervisors at Puskesmas, Parents, and Peer Counselors in Intervention Schools

Intervention goal	Intervention component	Duration of intervention	Audience
Workshops for school management, teachers, and mental health supervisors at Puskesmas	Workshops on mental health in schools comprise various topics, including: Digital literacy Increasing self-esteem and self-confidence Managing emotions Stress coping mechanism Mental health services in schools Communication with parents Overcoming peer pressure Conflict resolution Drugs, cigarettes, alcohol, pornography, games Follow up session	Four days (Six hours per day)	<i>n</i> = 75 school management and teachers. <i>n</i> = 4 mental health supervisors from Puskesmas
Workshop for parents	Mental health concept and literacy at school Definition and early detection of mental health Adolescent development and the way to communicate with adolescents through appreciation The development of psychopathology in the family The role of fathers in parenting The secret of strong families Digital literacy Follow up plan	One day (Eight hours)	<i>n</i> = 52 parents
Workshop for peer counselors	Introduction, roles of peer counselor in schools, and mutual relationships Self-development of peer counselors Feelings and empathy Listening skills Responding skills Problem-solving Early detection of mental health disorders Peer counselor ethics and referral flow Follow-up discussion	Two days (Six hours per day)	<i>n</i> = 75 selected students
Implementation of mental health programs in schools	Disseminating mental health knowledge to school management, students, and parents who did not attend the workshop. Providing mental health education materials in CDs and posters to the schools. Conducting mental health-related activities for students, such as a class competition to create anti-bullying posters. Developing a problem-solving network with nearby Puskesmas.	-	-

Monitoring and evaluations for teachers and school leaders

After the workshops ended, the researcher supervised the school to observe the program implementation. The purpose of these monitoring activities was to assess the effectiveness of the intervention and to identify potential areas for improvement in future implementations. Additionally, the monitoring system was designed to identify ongoing mental health needs or emerging issues among students and ensure they received timely support. Three monitoring sessions were conducted with distinctive objectives.

During monitoring activities, feedback sessions were conducted with teachers, school counselors, peer counselors, and students to discuss the pre-test results. The pre-test results provided insights into students' overall mental health and potential contributing factors. Other activities involved establishing a clear referral system to identify students requiring additional or specialized mental health services beyond what the school could provide. This referral system ensures a smooth transition to external mental health professionals. Detailed descriptions of each step, including monitoring and follow-up actions, as well as barriers and challenges, are reported in Appendix 1.

Measures

The study instruments were adapted from existing questionnaires. The instrument selection was made after a careful consultation with experts. These adapted instruments included a questionnaire from the Global School-Based Health Survey (GSHS) for assessing bullying and a single-item measure for peer support. The Patient Health Questionnaire Nine-Items (PHQ-9) was used to assess depression.

Statistical validity and reliability tests were conducted to validate the measurement methods and instruments used in this study. The results indicated a high level of reliability with alpha Cronbach's value exceeding 0.90 for the PHQ instrument. However, alpha Cronbach's value for attitude and knowledge related to mental health items in the questionnaire was low. Therefore, the mental health-related knowledge questionnaire was revised by conducting a thorough review with experts.

Mental health-related knowledge

The level of knowledge was assessed using 18 question items with "true-false" answers. These questions covered common characteristics of mental health, factors related to mental health, the stigma experienced by people with mental disorders, and knowledge of seeking treatment or mental health-related services. The instrument was adapted from a previously validated pre and post-test questionnaire on mental health school-based research in Canada (Kutcher et al., 2013). The questionnaire adaptation involved discussions with experts to decide which questions to include in this research. Each question was scored as 1 for a correct response and 0 for an incorrect answer, resulting in a possible overall score of 18. The total knowledge score was converted to a letter grade ranging from zero to one hundred. If students answered at least 70% of the questions, they were classified as having sufficient knowledge. The alpha Cronbach's coefficients obtained during the instrument trial indicated inadequate findings ($\alpha < .5$). Consequently, revisions were made to enhance the narrative of each item.

Experience of being bullied

Bullying experience was assessed using the question, "Over the last 30 days, how often have you been harassed?" (World Health Organization, 2015). Students were categorized as having experienced bullying if they reported at least one day of harassment. The reliability of this measure in the study was 0.989.

Having no peer support

This condition was examined using the question, "Over the last 30 days, how often have most of your friends in the school been kind and helpful?" (World Health Organization, 2015). Students who answered 'never' or 'rarely' were categorized as having no peer support. In this study, the reliability of having no peer support was 0.998.

Mental health condition

The students' depression levels were assessed using the Indonesian version of the PHQ-9 instrument, which had been previously validated in the Indonesian language (Hall et al., 2021). The PHQ-9 is an instrument that covers cognitive, emotional, and somatic dimensions (Bianchi et al., 2022). This screening tool is commonly used to identify depressive symptoms and consists of nine questions that assess mental health-related symptoms experienced within the past two weeks. Responses to these questions were recorded on a Likert scale, ranging from 'never' to 'almost always,' with each response scored from 0 (*never*) to 3 (*almost always*). The maximum possible score on the PHQ-9 is 27, and a score exceeding 10 indicates depressive symptoms (Kroenke et al., 2001).

The data collection was conducted twice, for pre-intervention in July 2019 and post-intervention in October 2019. Students completed the study questionnaire independently using a mobile phone or computer via the Survey Monkey online application. The online application was utilized for its convenience, cost-effectiveness, and reduction of potential entrance bias. This activity was undertaken exclusively in schools. The researchers provided students with a schedule for data collection via their teachers. Students then gathered in a designated hall or meeting room with a capacity of 30–40 students. Researchers were present at each school to assist students during the data collection. Each student completed the study questionnaire once. The process took no more than 30 minutes.

Statistical analysis

The categorical data in the intervention and non-intervention schools were presented using frequency distributions. Additionally, the numerical scores of students' knowledge were averaged at pre-test and post-test for each school type. At the pre-test, the mental health-related knowledge scores showed a normal data distribution and a t-test analysis was conducted to compare the two independent groups. In contrast, the post-test scores for mental health-related knowledge did not show a normal data distribution, and the Mann-Whitney test was employed to compare the intervention and non-intervention groups. Furthermore, generalized estimating equations (GEE) analysis was utilized to identify variations in indicators between intervention and non-intervention schools at pre-test and post-test. The research data were analyzed using Stata version 15.

Ethical consideration

Written informed consent forms were provided to both parents and students. The explanation document comprehensively outlined the study's objectives, potential benefits, associated risks, and the assurance of data confidentiality. This ensured that participants could voluntarily participate without any pressure. Moreover, the Ethics Committee of the National Institute of Health Research and Development, Indonesia Ministry of Health, approved this study with letter No. LB. 02.01/2/KE.106/2019.

Results

During the pre and post-test, 476 out of the initial 495 students completed the study instruments. Among these participants, 231 (48.5%) were from the intervention group, while 245 (51.5%) belonged to the non-intervention group. The average age of the students was 15.48 (\pm *SD* 0.7) years, with no significant difference between the intervention students (15.5 years) and the non-intervention students (15.5 years). As shown in Table 2, there were no significant differences in the characteristics between the intervention and non-intervention students.

Table 2: Sample Characteristics

Characteristic	Overall		Intervention	Non-intervention	<i>p</i>
	%	<i>N</i>	<i>n</i> (%)	<i>n</i> (%)	
Gender					
Male	40.1	191	100 (43.3)	91 (37.1)	.203
Female	59.9	285	131 (56.7)	154 (62.9)	
Age (years)					
14	6.1	29	17 (7.4)	12 (4.9)	.136
15	46.2	220	101 (43.7)	119 (48.6)	
16	41.2	196	92 (39.8)	104 (42.4)	
17	6.5	31	21 (9.1)	10 (4.1)	
Grade					
10	56.7	270	131 (56.7)	139 (56.7)	1.000
11	43.3	206	100 (43.3)	106 (43.3)	
Live with					
Father and mother	82.6	393	183 (79.2)	210 (85.7)	.124
One of the parents (father/mother)	12.6	60	33 (14.3)	27 (11.0)	
Grandparents/other family/others	4.8	23	15 (6.5)	8 (3.3)	
Birth order					
First	36.1	172	85 (36.8)	87 (35.5)	.706
Second	33	157	72 (31.2)	85 (34.7)	
Third and more	30.9	147	74 (32.0)	73 (29.8)	
History of chronic diseases					
No	94.3	449	220 (95.2)	229 (93.5)	.404
Yes	5.7	27	11 (4.8)	16 (6.5)	

Characteristic	Overall		Intervention	Non-intervention	<i>p</i>
	%	<i>N</i>	<i>n</i> (%)	<i>n</i> (%)	
History of injury					
No	87.2	415	202 (87.4)	213 (86.9)	1.000
Yes	12.8	61	29 (12.6)	32 (13.1)	
School location					
Regency	49.8	237	114 (49.2)	123 (50.2)	.925
City	50.2	239	117 (50.6)	122 (49.8)	

Demographics

According to Table 2, most respondents from both the intervention and non-intervention schools were female. Most students in both groups were aged 15 and 16 years old. The percentage of tenth and eleventh-grade students was the same in both groups. The percentage of living with a father and mother was higher in the non-intervention compared to the intervention groups. Additionally, intervention and non-intervention groups had a higher percentage of firstborn students. The intervention group had a higher percentage of students without chronic diseases and injuries. Furthermore, the intervention and non-intervention groups had an equal distribution of students residing in the city and the regency.

The average of student's knowledge scores can be seen in Table 3. The findings indicated that the intervention schools' scores increased from 67.4 to 68.1, while the non-intervention schools' scores declined from 69.1 to 68.6.

Table 3: The Mental Health-Related Knowledge Score

Knowledge score	School type				Test for differences <i>p</i>
	Intervention		Non-intervention		
	Mean	± <i>SD</i>	Mean	± <i>SD</i>	
Pre	67.4	8.6	69.1	9.2	.0015
Post	68.1	8.7	68.6	9.2	.1829

Table 4: Prevalence and Odds Ratio of Knowledge, Behavior, and Depression Status

Variable	Prevalence				Odds Ratio (OR)					
	Intervention		Non-intervention		Pre-test			Post-test		
	<i>n</i> (%)		<i>n</i> (%)		Intervention	Non-intervention	<i>p</i> value	Intervention	Non-intervention	<i>p</i> value
	Pre-test	Post-test	Pre-test	Post-test	OR (95% CI)			OR (95% CI)		
Lack of knowledge	161 (69.7)	145 (62.8)	139 (56.7)	142 (58.0)	1.8 (1.2, 2.6)	1	.004	1.2 (0.9, 1.8)	1	.284
Experience of being bullied	46 (19.9)	34 (14.7)	36 (14.7)	38 (15.5)	1.4 (0.9, 2.3)	1	.133	0.9 (0.6, 1.6)	1	.810
Having no peer support	6 (2.6)	4 (1.7)	4 (1.6)	4 (1.6)	1.6 (0.5, 5.8)	1	.467	1.1 (0.3, 4.3)	1	.933
Depression	28 (12.1)	19 (8.2)	29 (11.8)	24 (9.8)	1.0 (0.6, 1.8)	1	.924	0.8 (0.4, 1.6)	1	.511

Mental health knowledge, being bullied, having no peer support, and depression

Table 4 shows the differences in percentages between the pre-test and post-test regarding mental health knowledge, experiences of bullying, the absence of peer support, and indicators of depression in intervention and non-intervention schools. In the intervention schools, there was a decrease in the percentage of students lacking knowledge, dropping from 69.7% in the pre-test to 62.8% in the post-test. In contrast, there was a slight increase in non-intervention schools, with the percentage rising from 56.7% to 58.0%.

Furthermore, the percentage of students experiencing bullying in the intervention schools decreased from 19.9% in the pre-test to 14.7% in the post-test. However, there was a slight increase in non-intervention schools, rising from 14.7% to 15.5%.

Additionally, intervention schools experienced a decline in the proportion of students reporting having no peer support, moving from 2.6% in the pre-test to 1.7% in the post-test. In contrast, the percentage of students without peer support in the non-intervention schools remained constant at 1.6% for both the pre-test and post-test.

Regarding the depression indicator, it decreased in the intervention group, dropping from 12.1% in the pre-test to 8.2% in the post-test. Similarly, the depression indicator decreased from 11.8% in the pre-test to 9.8% in the post-test in non-intervention schools.

The effectiveness of the intervention can be assessed through the odds ratios (OR) obtained from the GEE analysis. In the pre-test, the intervention schools had a higher risk of lacking knowledge (OR = 1.8, 95% CI [1.2, 2.6], $p = .004$). However, in the post-test, the risk of lacking knowledge in the intervention schools decreased (OR = 1.2, 95% CI [0.9, 1.8], $p = .284$). Furthermore, the intervention school had a 1.4 times higher risk of being bullied on the pre-test (OR = 1.4, 95% CI, [0.9, 2.3], $p = .133$). However, there was an improvement in the post-test, suggesting that children at intervention schools were less likely to be bullied than students in non-intervention schools (OR = 0.9, 95% CI [0.6, 1.6], $p = .810$).

Regarding students having no peer support, the intervention schools also showed improvement. In the pre-test, students in intervention school had a 1.6 times higher risk of having no peer support (OR = 1.6, 95% CI [0.5, 5.8], $p = .467$). However, in the post-test, the risk decreased (OR=1.1, 95% CI [0.3, 4.3], $p = .933$). Related to depression, both groups had the same risk of experiencing depression at the pre-test (OR = 1.0, 95% CI [0.6, 1.8], $p = .924$). However, an improvement was observed in the post-test, where the intervention schools had better protection against depression than the non-intervention schools (OR = 0.8, 95% CI [0.4, 1.6], $p = .511$).

Discussion

Based on feedback from school leaders, teachers, parents, and students, the program positively impacted mental health in school. This study demonstrated that mental health interventions improved students' mental health knowledge and mental health status, as well as a reduced likelihood of experiencing bullying and having no peer support, although not significantly. The result aligns with another study conducted in China that found no

significant effect on depression symptoms post-intervention (Lai et al., 2016). Another study in Chile showed different results that there was no evidence of a substantial difference in mean depression ratings between the intervention and control groups with universal school-based depression intervention (Araya et al., 2013). A recent systematic review and meta-analysis on school-based mental health interventions for adolescents in Low-Middle Income Countries (LMIC) found no significant difference in standardized mean outcomes for depression between intervention and non-intervention. This review included 39 RCT and non-RCT studies published between 2007 and 2022 (Grande et al., 2023).

The study's results differed from a study conducted in Canada, where the mental health curriculum effectively increased mental health knowledge and reduced student stigma (Milin et al., 2016). In the United States, mental health prevention programs, namely Youth Aware of Mental Health (YAM), improved mental health literacy among students (Lindow et al., 2020). A systematic review using universal school-based mental health programs also showed that each study revealed a degree of improvement (Salerno, 2016). Another study indicated that interventions increased students' knowledge about depression and improved help-seeking behavior (Ruble et al., 2013).

Additionally, this study showed a decrease in students' perceptions of lacking peer support, representing that social support for students in schools is available. The findings suggest emerging positive relationship experiences in schools, which could later contribute to optimism and positive mental health. Another study demonstrated that being immersed in a school environment with a favorable mutual relationship can positively impact children's current and future mental health (Oberle et al., 2018). Furthermore, a study involving students with developmental disabilities showed that school-based mental health programs could improve perceptions of social support, such as friendships and good relationships with teachers (Katz et al., 2020).

A systematic review involving 622 study reports of school-based mental health interventions showed that the program effectively reduced school bullying (Farrington & Ttofi, 2009). Another study using a meta-analysis of hundreds of studies in anti-bullying programs showed that bullying was effectively reduced by 19% to 21% (Gaffney et al., 2019). However, other studies showed different results; a study using intervention with the *COREMatters* program showed a higher score in self-esteem and overall school climate but did not significantly decrease the bullying behaviors scale (Cipra & Hall, 2019). These findings align with the results of a systematic review, indicating that not all school-based interventions to reduce bullying are successful; most observed reductions in bullying cases were modest in scale (Evans et al., 2014). In Indonesia, school-based interventions in Pancasila (State Philosophy) education, as a component of moral and religious education within the curriculum and cultural activities, can potentially prevent bullying in schools (Noboru et al., 2021).

The differences in the results of this study compared to other studies may be related to methodological criteria such as differences in the types and providers of interventions and variations in the frequency of interventions (Grande et al., 2023; Zhang et al., 2023). Additionally, providing follow-up interventions may impact more pronounced differences in study outcomes (Gaffney et al., 2019). The type of intervention provided had an impact on the measured study outcomes. Interventions generally utilized Cognitive Behavioral Therapy (CBT) and yielded a better effect size than other methods (Zhang et al., 2023). However, in this study, a developed mental health module and life skills that were previously used in Indonesia were employed. Another factor related to the variation in intervention providers,

each with their strengths and weaknesses, is noteworthy. Typically, interventions are delivered by teachers who have undergone prior training or certified clinicians (psychologists). Teachers are closely connected with students, providing added value in delivering the material. Teachers also play a role in the early detection of students with mental health issues.

While many previous studies have shown significant relationships, the number of publications with non-significant results is limited. This is related to publication bias tendencies, where the 'file drawer effect' phenomenon exists (Cheung & Slavin, 2016). Therefore, this study also provides updates and findings that may be useful for developing adolescent mental health interventions in the future.

There is a promising opportunity to incorporate mental health education into schools in Indonesia by integrating it into the existing program called Upaya Kesehatan Sekolah (UKS) [School Health Efforts]. Another viable approach is establishing a referral system connecting schools with health centers to effectively address student mental health issues. Furthermore, considering Indonesia's implementation of the regional autonomy policy, successful implementation can be achieved by developing more detailed policies at the regional level.

Study strengths and limitations

This study provides a significant contribution to the field of mental health in educational institutions, particularly in the context of Indonesia, where such research is limited. Firstly, the design of this study employs a pre-post intervention and non-intervention design, which is still rarely utilized in Indonesian school-based research. Secondly, this study may catalyze raising awareness among educational institutions about the necessity of implementing mental health policies in schools. Thus, the initiative creates channels for formal communication and collaboration between schools and primary healthcare services to facilitate referrals for students with mental health concerns.

Despite its strengths, the study does have several limitations. First, the intervention workshop was conducted only for four days, while each module (Prosperous School and Life Skills) ideally should have been delivered in seven days. To address this issue, the research team prioritized the most important topics to ensure that essential subject matter was still covered. Second, the interventions were conducted for only three months, a relatively short duration, to expect significant changes in students' knowledge and mental health conditions. The duration of the intervention was due to the time given by the school due to the school's class schedule and exams. The research team addressed this limitation by closely monitoring the implementation of the intervention. Third, although there was an increase in scores at the post-intervention stage, it was not statistically significant. A previous study showed that substantial benefits were not observed until 12 months after interventions and may persist for up to 36 months (Gillham et al., 2007).

Conclusion

The school-based intervention in school had improved students' knowledge, behavior, and mental health conditions, although insignificant. Schools have become crucial settings for students to access mental health support, but various aspects can be further enhanced to

ensure the success of mental health programs within schools. Therefore, school-based mental health policies must be reinforced and defined, particularly about delineating the division of authority between the Ministries of Education and Health.

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Appendix

Appendix 1: Monitoring and Evaluation in Intervention Program

Activities after workshop	Time	Content	Follow-up action taken by the school	Barrier and Challenge
Monitoring I	Three weeks after the workshop	The presentation of pre-test results in both intervention schools serves the purpose of enabling schools to promptly take action or follow up on the findings from the pre-test assessment.	The response from the pre-test results was that the School Environment Introduction Period would also include materials related to mental health. Meanwhile, in another intervention school, a mental health awareness presentation is planned to be conducted during the school meeting of subject teachers. In addition, the counseling guidance teacher has taken the initiative to organize a poster contest to stop bullying.	Insufficient time to deliver mental health materials. The issue was addressed by requesting additional time for the previous lesson.
Monitoring II	Three weeks after first monitoring	Explore the opportunities for cooperation in referring students with mental health problems from the school to health facilities.	The school management was introduced to the health facilities (primary health care or Puskesmas), which has opened up the possibility of making referrals when students encounter mental health issues.	Puskesmas do not have sufficient health resources to conduct continuous visits and screenings for mental health in schools. Additionally, Puskesmas has limited mental health professionals available in case schools require services for severe mental health disorders.
Monitoring III	Three weeks after the second monitoring	Additional examination of the activities implemented by intervention schools to improve mental health programs	At one of the intervention schools, teachers offered psychological interventions to students exhibiting suicidal ideation through personalized communication and support. Additionally, teachers have been actively identifying students with mental problems and referring them to Puskesmas due to concerns about potential mental health issues. Educators have been increasingly expressing verbal and material appreciation to students in class who demonstrate positive behavior.	The teachers were unable to take students with suicidal ideation to Puskesmas due to the requirement for parental permission. The students with mental problems were taken to Puskesmas and received psychiatric treatment (with the psychiatrist visiting three times a year at Puskesmas). However, the referral was only initiated once due to cost-related issues. Unfortunately, some teachers still prefer to discipline students through physical punishment and harsh words because they believe it to be more audible and effective.

Activities after workshop	Time	Content	Follow-up action taken by the school	Barrier and Challenge
Evaluation	After three months of workshop	The intervention's implementation process evaluation includes feedback from schools, public health clinics, and the Ministry of Health.	Overall, the school accepting the mental health program	There is a need for regulations, teacher capacity building, and enhancements to the referral system for healthcare facilities.