

## Evaluating the Effectiveness of the Cerdas App and its Interventions in Addressing Mental Health Issues (Depression, Anxiety, and Stress) Among Adolescents

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### ABSTRACT

**Background:** Adolescent mental health issues are on the rise, posing significant concerns due to their impact on learning effectiveness and the need for focused attention. To address these challenges, innovative tools are required to detect and mitigate mental health problems among adolescents. One such innovation is the CERDAS application.

**Purpose:** This study evaluated a web-based assessment using the CERDAS App, which combines three interventions: mental health education, the butterfly hug technique, and expressive writing in addressing depression, anxiety, and stress among adolescents.

**Methods:** This research employed a Research and Development (R&D) approach with a quasi-experimental design, specifically a one-group pretest-posttest method. A total of 94 adolescents were selected through purposive sampling from a high school in Banda Aceh, Indonesia. The Depression Anxiety Stress Scales (DASS)-21, Indonesian version, was used as the questionnaire within the CERDAS application. Data collection began with a pretest administered via the CERDAS App. Adolescents identified as experiencing mental health problems (depression, anxiety, or stress) were provided with interventions including mental health education, butterfly hugs, and expressive writing. Data were analyzed using univariate analysis for frequency distribution and bivariate analysis with the Wilcoxon test.

**Results:** The Wilcoxon test revealed significant improvements in the mental health status of adolescents (depression, anxiety, and stress) following the interventions, with p-values of 0.002, 0.008, and 0.001, respectively.

**Conclusion:** The CERDAS application and its interventions demonstrate effectiveness in identifying and reducing adolescent mental health problems, including depression, anxiety, and stress. Consequently, the CERDAS App and its interventions is recommended as a practical tool for adolescents to enhance their mental well-being.

**Keywords:** adolescents, butterfly hug, expressive writing, mental health, website assessment

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## BACKGROUND

### Adolescent Mental Health

Mental health is a growing concern worldwide, affecting individuals in both developed and developing countries, including Indonesia. Globally, adolescent mental health is a growing concern, with the World Health Organization (WHO) reporting that 14% of adolescents (10-19 years-olds) experience mental health conditions, yet many remain undiagnosed (World Health Organization, 2024). According to the Indonesian Ministry of Health (2024), the incidence rate of mental health issues among individuals aged 15 years and older in Indonesia is 6.1%. Similarly, the Indonesian National Adolescent Mental Health Survey (I-NAMHS) conducted in 2022 reported that one in three adolescents (34.9%), or approximately 15.5 million Indonesian adolescents, experience at least one mental health issue (Center for Reproductive Health, University of Queensland, 2022).

Mental health is vital and influential in various aspects of human life, including physical, psychological, spiritual, social, and educational dimensions (Ayuningtyas & Rayhani, 2018). Adolescents with good mental health are more likely to approach problems with confidence and resilience. In contrast, those with mental health challenges may exhibit lethargy, a lack of motivation, and stress, which can negatively impact their learning activities (Gautam et al., 2024).

If adolescent stressors remain unaddressed, they can lead to various physical, emotional, social, and educational problems. Encouraging awareness of mental health, especially in schools, is crucial considering that mental health issues begin to emerge early in childhood and adolescence (Choi, 2023). Promotive and preventive efforts are crucial to prevent mental health issues, one of which can be achieved through early detection of mental health problems to receive prompt and appropriate interventions (Natalia & Anggraini, 2022). Mental health screening for adolescents, especially school-aged children, is a strategic target for the implementation of health programs (Trisnowati et al, 2024). Promoting mental health awareness in schools is very important because it is related to the improvement of positive mental health status among adolescents (Estherita, 2021). Through preventive and promotive actions, students can develop the awareness and knowledge necessary regarding mental health issues. This enables them to actively manage their mental health positively and seek help for any mental health issues they may experience (Purwanta et al, 2024).

### The CERDAS Application

This study utilized a web-based application to conduct initial adolescent mental health screenings. The application, known as the CERDAS App (Check Emotion Regulation for Depression, Anxiety, and Stress), facilitates the detection of mental health issues and is accessible via <https://cerdas.usk.ac.id/>. The CERDAS App was developed by Nenty Septiana and her team in 2024 from Universitas Syiah Kuala, Banda Aceh, Indonesia.



Figure 1. CERDAS App.

The CERDAS application is an innovative tool designed to assist adolescents in detecting mental health problems and increasing their awareness of the importance of mental health knowledge. Understanding mental health issues is crucial, as it helps ensure that adolescents receive appropriate interventions to address their mental health challenges (East & Havard, 2015; Magee et al., 2018). This application is web-based, allowing users to access it anytime without the need to download or install software. It is specifically made to monitor and provide support for adolescent mental health issues within school environments, aiming to prevent an increase in cases related to stress, anxiety, and depression.

The CERDAS app has several components, such as the DASS-21 questionnaire, which contains 21 items with 4 answer choices. Users can start the screening by clicking the “start” button, followed by filling out personal biodata, and answering all the questions displayed on the website. The screening can be submitted if the user has answered all the questions according to their feelings. The screening results will reveal three mental health issues, namely depression, anxiety, and stress, indicating whether the user falls into the categories of normal/mild/moderate/severe or very severe. In addition, there are recommendations based on the assessment results. The CERDAS app also provides consultation services with psychologists who are directly connected to the WhatsApp number of the psychologist handling the user's issues. This feature enables adolescents with mental health concerns to seek immediate help without requiring prior appointments.

### **Interventions for Mental Health Issues**

#### **Butterfly Hug**

Several intervention techniques can address mental health issues, one of which is the butterfly hug technique. The butterfly hug is a non-pharmacological method that helps individuals relax and calm themselves, particularly useful in reducing anxiety, stress, and other negative emotions (Sharma, 2021). The technique has been shown to reduce discomfort, lower stress hormone levels, boost self-confidence, and improve emotional well-being (Girianto et al., 2021). Research by Pristianito et al. (2022) demonstrated the butterfly hug's effectiveness in alleviating anxiety and shortness of breath, helping high school students in Surakarta relax during anxiety episodes.

The butterfly hug, or butterfly movement, is a self-hugging technique that provides tranquility and significantly reduces tension, anxiety, and stress. It can be performed anywhere by anyone (Jarero et al., 2014). Lazzaroni (2021) found that anxiety decreased following the butterfly hug intervention, with participants reporting a reduction in anxiety levels from mild and moderate to normal. In addition, participants with severe to very severe anxiety also showed significant improvements after the intervention. This technique can also be adapted for individuals with disabilities. Mirza et al. (2021) conducted a butterfly hug session for hearing-impaired individuals using sign language, which led to positive reactions such as happiness, smiling, and joyful physical expressions.

#### **Expressive Writing**

This technique, grounded in emotional disclosure theory, helps individuals process trauma by writing about distressing experiences, which helps individuals process their thoughts and emotions (Pennebaker & Smyth, 2016). Pennebaker & Smyth (2016) suggested that allowing individuals to write about their emotional struggles can lead to significant improvements in both immune and psychological functions. Lestari & Eliyanti (2014) showed that expressive writing therapy is an effective intervention for depression, anxiety, and stress, as it encourages individuals to reflect on and express their deepest emotions. According to Qonitatin et al. (2022), writing about traumatic events is related to reduced long-term health issues and beneficial psychological effects. Similarly, Rusidi et al. (2022)

demonstrated that expressive writing helped reduce communication anxiety in students. Hirai et al. (2012) observed that expressive writing significantly reduced trauma symptoms among psychology students at a university in Texas. Additionally, Baikie et al. (2012) reported that expressive writing interventions resulted in reductions in anxiety, depression, and stress symptoms in participants diagnosed with mood disorders.

The butterfly hug and expressive writing interventions are currently not available in the CERDAS application features, but the CERDAS application will be developed further, including adding features such as simple interventions to address mental health issues.

## **OBJECTIVE**

Since its establishment, an important question has persisted: How effective is the CERDAS app in addressing adolescent mental health problems? Therefore, this study aimed to assess the effectiveness of the CERDAS app in reducing mental health issues among adolescents. Additionally, the study evaluated this effectiveness by examining the use of interventions such as mental health education, the butterfly hug technique, and expressive writing for adolescents experiencing mental health challenges.

## **METHODS**

### **Design and Samples**

The study used a quasi-experimental design involving a one-group pretest-posttest approach (Dahlan, 2011). Measurements of mental health indicators, which are depression, anxiety, and stress, were taken both before and after the intervention using the CERDAS app, which has been usability tested. The difference between the pretest and posttest results was considered the effect of the intervention (Anggraeni & Saryono, 2013).

Purposive sampling was used with 94 adolescents who met the inclusion criteria. Participants were 3rd-year students at one of the junior high schools in Banda Aceh, Indonesia, that is SMAN 5. They are from 17-18 years old, owned a mobile phone and were proficient in using it, and were willing to participate in the entire intervention process from start to finish. Sample sizes were determined using Cohen's Table (1998) with a t-test power of 0.95, a significance level of 0.05, and an effect size of 0.50. The sample size was based on the nursing research guidelines, which suggest a range of 0.20–0.40 (Polit & Beck, 2012). The principle behind this study is that the effect size ( $d$ ) is 0.3, power is 0.8, and  $\alpha$  is 0.05, so the sample size is 85 respondents. To avoid an insufficient sample size due to impairment, the sample size increased by 10% to 94 respondents. Data collection was conducted between July and August 2024 at SMAN 5 Banda Aceh, Indonesia.

### **Research Instrument**

The questionnaire utilized in the CERDAS application is the Indonesian version of the Depression Anxiety Stress Scales (DASS)-21, comprising 21 items scored on a Likert scale (Ifdil et al., 2022).

### **Data Collection**

This research began with the development of the CERDAS application using the waterfall model, which includes analysis, design, implementation, testing, and maintenance (Saravanos & Curinga, 2023). The model was modified to meet the specific requirements of this study. The process was followed by a pretest to assess the mental health status of respondents, focusing on depression, anxiety, and stress. Respondents identified as experiencing one or more mental health issues, such as depression, anxiety, or stress, ranging from mild to severe, were provided with interventions over three weeks. In the first week, respondents received mental health education; in the second week, they practiced the butterfly hug technique; and in the third week, they engaged in expressive writing activities.

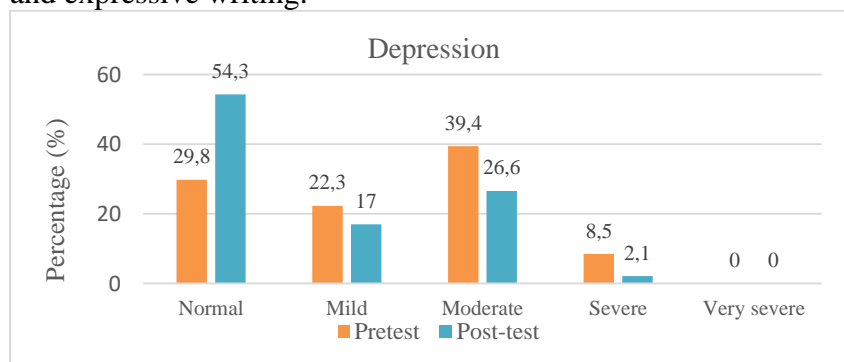
A posttest was conducted four weeks after the intervention to evaluate changes in the participants' mental health status. Additionally, the CERDAS application includes a consultation feature, enabling adolescents to easily access psychological support and seek help for mental health challenges.

**Data Analysis**

Data analysis was conducted using univariate and bivariate tests. Univariate analysis was employed to describe the characteristics of each research variable through frequency distribution (Swarjana, 2016). Bivariate analysis, utilizing the Wilcoxon test, was carried out to examine differences in the levels of depression, anxiety, and stress among adolescents before and after the CERDAS interventions, which included mental health education, the butterfly hug technique, and expressive writing (Dahlan, 2011). This research was approved by the Health Research Ethics Commission of the Faculty of Nursing, Universitas Syiah Kuala, under ethical certificate number 113003110624.

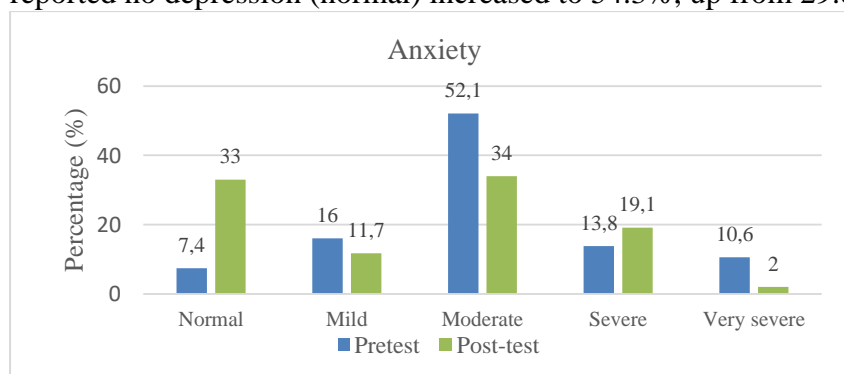
**RESULTS**

This study found differences in mental health issues (depression, anxiety, and stress) before and after interventions, which comprised mental health education, the butterfly hug, and expressive writing.



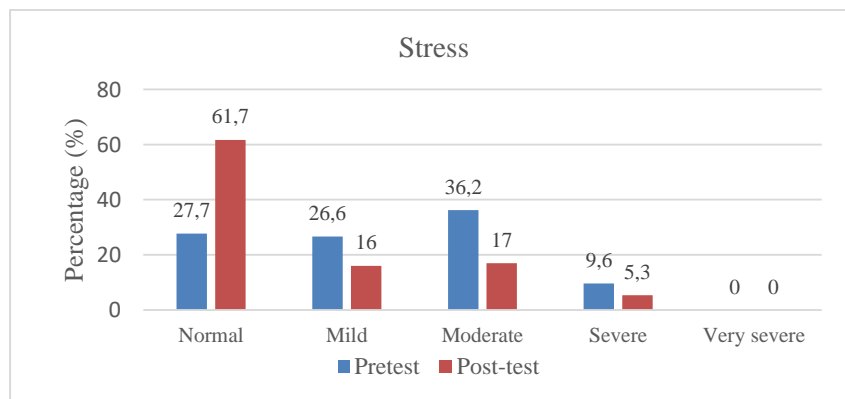
**Graph 1.** Adolescents depression levels before and after intervention.

Graph 1 shows that the highest level of depression among adolescents was moderate (39.4%). After the intervention, this decreased to 26.6%, while the percentage of respondents who reported no depression (normal) increased to 54.3%, up from 29.8%.



**Graph 2.** Adolescents anxiety levels before and after intervention

Basen on graph 2, the level of anxiety among adolescents was moderate, with 52.1% in this category, but after the intervention, it decreased to 34%.



**Graph 3.** Adolescents stress levels before and after intervention

Graph 3 shows that the level of stress was moderate, with 36.2% of adolescents reporting moderate stress, which decreased to 17% after the intervention, while the percentage in the normal category increased to 61.7%, up from 27.7%.

**Table 1.** Differences in levels of depression, anxiety, and stress before and after intervention mental health education, the butterfly hug technique, and expressive writing

Category	Levels	Pre-test		Post-test		p-value
		f	%	f	%	
Depression	Normal	28	29.8	51	54.3	0.002
	Mild	21	22.3	16	17.0	
	Moderate	37	39.4	25	26.6	
	Severe	8	8.5	2	2.1	
	Very severe	0	0	0	0	
	Total	94	100	94	100	
Anxiety	Normal	7	7.4	31	33	0.008
	Mild	15	16.0	11	11.7	
	Moderate	49	52.1	32	34	
	Severe	13	13.8	18	19.1	
	Very severe	10	10.6	2	2	
	Total	94	100	94	100	
Stress	Normal	26	27.7	58	61.7	0.001
	Mild	25	26.6	15	16.0	
	Moderate	34	36.2	16	17.0	
	Severe	9	9.6	5	5.3	
	Very severe	0	0	0	0	
	Total	94	100	94	100	

Table 1 shows that the data analysis using the Wilcoxon test revealed significant differences in depression, anxiety, and stress levels before and after the intervention, which included mental health education, the butterfly hug technique, and expressive writing, with p-values of 0.002, 0.008, and 0.001, respectively.

**DISCUSSION**

Based on the research results, the CERDAS application proved to be effective in reducing adolescent mental health problems, including depression, anxiety, and stress, with significant differences observed before and after the CERDAS intervention (p=0.002, p=0.008, p=0.001). The CERDAS application serves as a mental health screening tool that

incorporates the DASS-21 questionnaire, which helps identify depression, anxiety, and stress disorders. The research by Sutanto et al. (2022) suggest that web-based tools for assessing adolescent mental health can enhance the screening efficiency process, providing real-time results and valuable information about common mental health issues such as depression, anxiety, and stress. Other research also shows that stress management screening applications are effective for mental health care in groups of patients with depression and anxiety (Kamilah et al, 2021). This is supported by D'Alfonso's (2020) research, which shows that screening application technology is beneficial as a development of predictive, detection, and treatment solutions for mental health care.

These applications also offer adolescents a means to identify mental health symptoms independently, which is particularly beneficial for those who may be unwilling to meet with healthcare professionals face-to-face. Similarly, Zaman & Natalia (2023) found that mental health applications empower adolescents to recognize their symptoms without needing direct consultation. The CERDAS application is designed to help adolescents easily detect mental health issues like depression, anxiety, and stress, offering convenient access at any time and from anywhere. This is supported by research from Mutashim & Asriningtias (2023), who noted that web-based screening applications allow adolescents to conduct screenings anytime and anywhere, with no associated costs. Furthermore, these applications facilitate consultations with psychologists, providing a convenient and affordable way for adolescents to seek help.

Online counseling can be recommended as one of the effective media for mental health issues in adolescents. Considering that teenagers are familiar with information and communication technology, online counseling can be used as a counseling medium for individuals who face barriers in face-to-face counseling, such as time constraints, anxiety, and negative emotions (Rickwood et al, 2013). Online counseling also serves as a youth-friendly mental health service with advantages in features not available to clients in face-to-face counseling. Online counseling offers ease of access, flexibility, security, and comfort for users who fall into the adolescent category (Sosialita, 2023).

Adolescent mental health is a significant concern, with over 50% of high school students experiencing mental health issues, despite adolescence being a critical period for mental well-being (Suswati et al., 2023). Adolescent mental health is crucial for their psychosocial development (Stuart, 2013). Based on the results of the screening, adolescents showing symptoms of depression, anxiety, or stress in the mild to severe range were provided with interventions, including mental health education, the butterfly hug technique, and expressive writing.

These interventions were devised to address adolescents' particular mental health concerns while also promoting emotional well-being. Lazzaroni (2021) found that the butterfly hug technique helps release anxiety and stress. The provision of the Butterfly hug therapy intervention makes a person relaxed, instills a sense of confidence and safety, releases feelings of joy and sadness, alleviates pain, and reduces anxiety levels, thereby leading to a decrease in anxiety (Zaini, 2019). Similarly, the expressive writing technique has been shown to be effective in reducing psychological distress. Pennebaker & Smyth (2016) argued that expressive writing leads to significant improvements in both immune and psychological functions. In line with this, studies by Qonitatin et al. (2022) and Rusidi et al. (2022) suggest that writing about traumatic or distressing experiences can result in positive psychological benefits, including long-term reductions in health problems such as anxiety, depression, and stress.

Furthermore, mental health education plays a crucial role in raising awareness and

providing adolescents with the knowledge and tools to manage their mental health effectively. Education about mental health is an effort to enhance the knowledge and mindset of society regarding mental health issues (Kurniawan & Sulistyarini, 2017). Mental health education for adolescents can increase knowledge and understanding of mental health, which impacts the mental health of adolescents (Lestarina, 2021). The findings point to the critical importance of initiating early mental health care and providing comprehensive assistance for adolescents in psychological distress. They enable the adolescents to better cope with emotional struggles and enhance their overall well-being. Early intervention in the field of mental health is carried out as an effort to prevent or delay the onset of psychological disorders. When applied systematically, early intervention has proven to have high accessibility, is well-received by adolescents and young adults, and produces significant positive impacts with high cost efficiency (McGorry et al, 2018). While results are promising, the absence of a control group limits causal inferences. Future randomized controlled trials are necessary to validate these findings.

## CONCLUSION

The results of this study indicate that the CERDAS application and its interventions (butterfly hug and expressive writing) is effective in reducing mental health problems in adolescents, especially depression, anxiety, and stress, with differences between the pre-test and post-test for depression, anxiety, and stress ( $p$ -value= 0.002; 0.008; 0.001). These findings show that there were positive and significant changes in adolescents' mental health following these interventions, evidenced by post-test data indicating a decrease in depression, anxiety, and stress levels. This suggests that when mental health problems are identified early in adolescence, appropriate interventions can be implemented promptly, helping adolescents regain productivity in their lives.

This present study focused on a specific population, which may limit the generalizability of the findings to other adolescent groups or regions. Future research could explore the long-term effects of the CERDAS app and its interventions on mental health outcomes, incorporating follow-up assessments beyond the post-test period. Furthermore, expanding the study to incorporate qualitative methods, such as interviews, could offer more in-depth understanding of adolescents' experiences with the CERDAS app and the effectiveness of its interventions. This study supports the integration of school-based digital mental health interventions like CERDAS to support national adolescent mental health strategies.

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## CONFLICTS OF INTEREST

We declare there is no conflict of interest in this study.

## REFERENCES

- Anggraeni, D., & Saryono. (2013). *Metodologi penelitian kualitatif dan kuantitatif dalam bidang Kesehatan [Qualitative and quantitative research methodology in health]*. Nuha Medika.
- Ayuningtyas, D., Misnaniarti., & Rayhani, M. (2018). Analisis situasi kesehatan mental pada



- masyarakat di Indonesia dan strategi penanggulangannya [Analysis of the mental health situation in society in Indonesia and strategies to overcome it]. *Jurnal Ilmu Kesehatan Masyarakat*, 9(1), 1–10. <https://doi.org/10.26553/jikm.2018.9.1.1-10>.
- Baikie, K. A., Geerligs, L., & Wilhelm, K. (2012). Expressive writing and positive writing for participants with mood disorders: An online randomized controlled trial. *Journal of Affective Disorders*, 136(3), 310–319. <https://doi.org/10.1016/j.jad.2011.11.032>
- Center for Reproductive Health, University of Queensland, & J. B. H. S. of P. H. (2022). *Indonesia – National Adolescent Mental Health Survey (I-NAMHS): Laporan Penelitian*.
- Cho, S. M., & Shin, Y. M. (2013). The promotion of mental health and the prevention of mental health problems in child and adolescent. *Korean Journal of Pediatrics*, 56(11), 459–646.
- Dahlan, S. M. (2011). *Statistik untuk kedokteran dan kesehatan*. Salemba Medika.
- D'Alfonso, S. (2020). AI in mental health. *Current Opinion in Psychology*, 36(2), 112-117.
- East, M., & Havard, B. (2015). Mental health mobile apps: From infusion to diffusion in the mental health social system. *JMIR Ment Health*, 2(1), e10. <https://doi.org/doi:10.2196/mental.3954>.
- Estherita, N. A. (2021). Literasi kesehatan mental positif pada remaja dan dewasa awal. *Anal J Magister Psikologi UMA*, 13(2), 93-104.
- Gautam, S., Jain, A., Chaudhary, J., Gautam, M., Gaur, M., & Grover, S. (2024). Concept of mental health and mental well-being, it's determinants and coping strategies. *Indian J Psychiatry*, 66(Suppl2), S231–S244. [https://doi.org/doi:10.4103/indianjpsychiatry.indianjpsychiatry\\_707\\_23](https://doi.org/doi:10.4103/indianjpsychiatry.indianjpsychiatry_707_23).
- Girianto, Romadhon, P. W., Widayati, D., & Agusti, S. S. (2021). Butterfly hug reduce anxiety on elderly. *Jurnal Ners Dan Kebidanan*, 8(3), 295–300. <https://doi.org/10.26699/jnk.v8i3.ART.p295-300>.
- Hirai, M., Skidmore, S. T., Clum, G. A., & Dolma, S. (2012). An investigation of the efficacy of online expressive writing for trauma-related psychological distress in hispanic individuals. *Behavior Therapy*, 43(4), 812–824. <https://doi.org/doi.org/10.1016/j.beth.2012.04.006>.
- Ifdil, I., Syahputra, Y., Fadli, R., & Fitria, L. (2022). The depression anxiety stress scales (DASS-21); an Indonesian validation measure of the depression anxiety stress. *COUNSEDU: The International Journal of Counseling and Education*, 5(4), 205–215. <http://dx.doi.org/10.23916/0020200536840>.
- Indarjo, S. (2009). Kesehatan jiwa remaja [Adolescent mental health]. *Jurnal Kesehatan Masyarakat*, 5(1), 48–57.
- Indonesian Ministry of Health. (2024). *Laporan tematik survei kesehatan indonesia tahun 2023: Potret Indonesia sehat [Indonesian health survey thematic report 2023: Portrait of a healthy Indonesia]*.
- Jarero, Nacho, I., & Lucina, A. (2014). The EMDR therapy butterfly hug method for self-administer bilateral iberoamerican. *Journal of Psychotrauma and Dissociation*, 11(5), 1–7.
- Kamilah, R. R., & Saputri, F. A. (2021). Efektivitas aplikasi untuk gangguan kesehatan mental. *Farmaka*, 19(1), 54-61.
- Kurniawan, Y., & Sulistyarini, I. (2017). Komunitas Sehati (Sehat Jiwa dan Hati) sebagai intervensi kesehatan mental berbasis masyarakat. *INSAN: Jurnal Psikologi dan Kesehatan Mental*, 1(2), 1-12. <https://doi.org/10.20473/jpkm.v1i22016.112-124>.
- Lazzaroni, E. (2021). Coronavirus disease 2019 emergency and remote eye movement

- desensitization and reprocessing group therapy with adolescents and young adults: Overcoming lockdown with the butterfly hug. *Frontiers in Psychology*, 12(8), 1–9. <https://doi.org/doi.org/10.3389/fpsyg.2021.701381>.
- Lestari, M. A., & Eliyanti. (2014). Efektivitas penggunaan teknik menulis ekspresif dalam mereduksi stres siswa kelas X SMA. *Pedagogi Jurnal Penelitian Pendidikan*, 1(11), 12–19. <https://doi.org/10.25134/pedagogi.v3i1.397>.
- Lestarina, N. N. W. (2021). Pendampingan remaja sebagai upaya peningkatan kesehatan mental remaja di desa Laban Gresik. *Jurnal Pengabdian Kepada Masyarakat ITK (PIKAT)*, 2(1), 1–6. <https://doi.org/10.35718/pikat.v2i1.332>.
- McGorry, P. D., & Mei, C. (2018). Early intervention in youth mental health: progress and future directions. *National Library of Medicine*, 21(4), 182–184. DOI: 10.1136/ebmental-2018-300060.
- Magee, J. C., Adut, S., & Brazill, K. (2018). Mobile app tools for identifying and managing mental health disorders in primary care. *Curr Treat Options Psych.*, 5, 345–362. <https://doi.org/10.1007/s40501-018-0154-0>.
- Martin, G. & Pear, J. (2015). *Behavior Modification*. New Jersey: Pearson.
- Mirza, R., Lubis, A., Siagian, S. F., Simamora, S., & Sitohang, Y. (2021). Pelatihan regulasi emosi untuk meningkatkan subjective well-being pada penyandang tunarungu di Kota Binjai. *Jurnal Ilmiah Bimbingan Konseling Undiksha*, 12(1), 21–30. <https://doi.org/DOI:10.23887/jjbk.v12i1.32009>.
- Mutashim, H. H., & Asriningtias, Y. (2023). Rancang bangun aplikasi skrining kesehatan mental remaja berbasis web. *Jurnal Ilmiah Teknik Informatika Dan Sistem Informasi*, 12(3), 1830–1840.
- Natalia, S., & Anggraeni, S. (2022). Skrining kesehatan anak sekolah sebagai upaya deteksi kesehatan sejak dini. *Journal of Community Engagement in Health*, 5(1), 47–50. <https://doi.org/10.30994/jceh.v5i1.340>.
- Pennebaker, J. W., & Smyth, J. M. (2016). Opening up by writing it down: How expressive writing improves health and eases emotional pain. The Guilford Press.
- Priyanto, A., Tyas, R. H., Muflikha, I., Ningsih, A. F., Vanath, I. L., & Reyhana, F. N. (2022). Deep breathing dan butterfly hug: Teknik mengatasi kecemasan pada siswa MAN 2 Surakarta. *Kontribusi: Jurnal Penelitian Dan Pengabdian Kepada Masyarakat*, 3(1), 36–46. <https://doi.org/doi.org/10.53624/kontribusi.v3i1.127>.
- Purwanta., Sudiro, S. F., Koeswardani, H. H. V. (2024). Upaya deteksi permasalahan kesehatan mental siswa di SMPN 2 Kismantoro dengan alat skrining perilaku Strength and Difficulties Questionnaire. *Jurnal Parikesit*, 2(2), 438–445. <http://doi.org/10.22146/parikesit.v2i2.12260>.
- Qonitatin, N., Widyawati, S., & Asih, G. Y. (2022). Pengaruh katarsis dalam menulis ekspresif sebagai intervensi depresi ringan pada mahasiswa. *Jurnal Psikologi Undip*, 9(1), 1–9. <https://doi.org/10.14710/jpu.9.1>.
- Rickwood, D., & Dowling, M. (2013). Online counseling and therapy for mental health problems: A systematic review of individual synchronous interventions using chat. *Journal of Technology in Human Services*, 31(1), 1–21.
- Rusidi, D., Anas, M., & Sinring, A. (2022). The application of expressive writing technique to reduce communication anxiety for student of MAN 2 Parepare. *Jurnal Psikologi Pendidikan*, 1(1), 1–9.
- Saravanos, A., & Curinga, M. X. (2023). Simulating the software development lifecycle: The waterfall model. *Applied System Innovation*, 6(6), 108. <https://doi.org/10.3390/asi6060108>.

- Sosialita, T. D. (2023). Efektivitas konseling online pada kesehatan mental remaja. *GUIDENA: Jurnal Ilmu Pendidikan, Psikologi, Bimbingan dan Konseling*, 13(1), 69-80. DOI: <http://dx.doi.org/10.24127/gdn.v12i2.6424>.
- Stuart, G. W. (2013). *Principles and practice of psychiatric nursing (10th ed.)*. Elsevier.
- Suswati, W. S. E., Budiman, M. E. A., & Yuhbaba, Z. N. (2023). Kesehatan mental pada remaja di lingkungan sekolah menengah atas wilayah urban dan rural Kabupaten Jember. *Jurnal Keperawatan Jiwa (JKJ): Persatuan Perawat Nasional Indonesia*, 11(3), 537–544.
- Sutanto, S., Amiruddin, D., & Nugraha, G. (2022). Rancang bangun aplikasi skrining kesehatan mental remaja berbasis web di RSUD Dr. Dradjat Prawiranegara dengan menggunakan metode analytic hierarchy process (AHP). *Journal of Innovation And Future Technology (IFTECH)*, 4(1), 29–38. <https://doi.org/10.47080/iftech.v4i1.1813>.
- Swarjana, I. K. (2016). *Statistik kesehatan*. Andi Offset.
- Trisnowati, H., Handayani, L., Listiyani, E., Fajeria., Novianingrum, I. R., & Putra, S. M. P. (2024). Edukasi dan deteksi dini kesehatan mental remaja di SMK Farmasi Yogyakarta. *Humanism: Jurnal Pengaduan Masyarakat*, 5(3), 326-340.
- World Health Organization. (2024). Mental health of adolescents. <https://www.who.int/news-room/fact-sheets/detail/adolescent-mental-health>.
- Zaini, M. (2019). *Asuhan keperawatan jiwa masalah psikososial di pelayanan klinis dan komunitas*. Jakarta: Deepublish.
- Zaman, N. K., & Natalia, N. (2023). Rancang bangun aplikasi skrining kesehatan remaja di lingkungan pendidikan kota Sukabumi. *Prosiding SEMNASTERA (Seminar Nasional Teknologi Dan Riset Terapan)*, 5, 409–412.