Evaluation of the Effectiveness of Community-Based Mental Health Interventions for Adolescents in the Digital Age

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ABSTRACT

The objective of this study was to evaluate the effectiveness of a digital community-based mental health intervention for adolescents. The Depression Anxiety Stress Scale (DASS-21) was utilised as a measure of depression, anxiety, and stress symptoms to ascertain the efficacy of the intervention. The experimental group participated in a group-based digital community intervention, while the control group received standardised services in the form of printed materials without group sessions. The data were analysed both descriptively and inferentially in order to establish the difference in scores before and after the intervention, as well as to compare the effectiveness between the experimental and control groups. The findings of this study suggest that the intervention has a substantial impact on the reduction of adolescent psychological symptoms (p = 0.001), in contrast to the negligible decrease observed in the control group (p = 0.083). This study contributes to the extant body of knowledge by highlighting the significance of incorporating technology, group interaction, and professional facilitation in fostering a supportive atmosphere that affects mental health, thereby going beyond the mere validation of earlier findings. This finding underscores the relevance of social support theory and cognitive-behavioral theory in the digital era, demonstrating the efficacy of online communities as a versatile platform for psychosocial interventions tailored to the needs of contemporary adolescents.

Keywords: Adolescent Mental Health, Community Intervention, Digital Media

INTRODUCTION

Adolescent mental health is increasingly becoming a global concern, especially in the midst of the rapid development of the digital era. This phenomenon is reinforced by data showing the increasing prevalence of anxiety disorders and depression among adolescents, especially since the COVID-19 pandemic (Melina & Herbawani, 2022). Uncertainty, social isolation, and excessive digital exposure also worsen their psychological condition.

Conventional mental health interventions tend to be insufficient to reach a wide population of adolescents, especially in communities with limited access to professional services. Therefore, community-based approaches are potential strategies that are more inclusive and responsive to the needs of adolescents in local contexts (Maulanza et al., 2025).

Adolescence is a critical period marked by rapid physical, emotional, and social changes, making young people particularly vulnerable to mental health challenges. The World Health Organization estimates that approximately 14% of adolescents globally experience mental health conditions, yet the majority do not receive adequate support (Odgers & Jensen, 2020). Community-based mental health interventions have emerged as a promising approach to bridge service gaps, offering accessible, youth-friendly, and holistic support that extends beyond clinical settings (Savaglio et al., 2022).

On the other hand, the use of digital media provides new opportunities to reach adolescents through more interactive and relevant mental health programmes. Platforms such as Instagram, WhatsApp, and e-modules have been shown to increase the effectiveness of communication and health promotion among young people (Razi, 2023; Uddin et al., 2024).

Several studies have shown that group-based interventions with psychosocial approaches, such as self-compassion group therapy and assertive training, are effective in reducing anxiety and improving communication and self-confidence among adolescents (Andhita & Boediman, 2024; Putri et al., 2021).

However, the effectiveness of community interventions is still highly dependent on the quality of facilitators, institutional support (school or community), and active involvement of adolescents as the main beneficiaries. This requires a thorough evaluation of the internal and external factors that influence the success of intervention programmes (Andhita & Boediman, 2024).

On the other hand, the level of digital literacy among health workers and community facilitators is also a challenge. Recent studies show that most health workers are still at a low to moderate level of digital literacy maturity (Febrianty et al., 2024), which may impact the effectiveness of service delivery.

In response to these challenges, community-based biopsychosocial and participatory approaches are key. Interventions that incorporate facilitator training, use of digital educational media, and technology-based counselling records have been shown to improve understanding and quality of service delivery (Maulanza et al., 2025).

Given this preliminary evidence from local studies, it is important to conduct a systematic evaluation of the effectiveness of community-based programmes in the domain of adolescent mental health. This evaluation aims to identify which approaches are most culturally,

technologically and psychologically appropriate in supporting adolescents' mental wellbeing in the digital age.

Finally, the urgency of this research lies in its contribution to the development of more adaptive, collaborative and evidence-based mental health policies and intervention models. In the midst of increasingly complex global challenges, building mentally healthy communities is a long-term investment for youth and the nation.

METHODS

This study used a quantitative approach with a *quasi-experimental* non-equivalent control group design. This design was chosen because it allows researchers to comparatively evaluate the effectiveness of a community-based mental health intervention between an experimental group and a control group, even though the assignment of subjects was not randomised. The intervention was a community-based mental health programme that integrated psychosocial approaches, digital education, and group counselling sessions guided by trained facilitators. The intervention lasted for eight weeks with a meeting frequency of twice a week.

The research subjects were adolescents aged 15-18 years who were members of school and out-of-school youth communities or organisations in urban areas. The sampling technique used *purposive sampling* with inclusion criteria including: (1) high school students or equivalent, (2) have access to digital media, and (3) willing to follow the entire series of interventions. The total number of participants was 80 people, consisting of 40 adolescents as the experimental group and 40 adolescents as the control group. The experimental group participated in a group-based digital community intervention, while the control group received standardised services in the form of printed materials without group sessions.

The main instruments used in this study were the *Depression Anxiety Stress Scale (DASS-21)* questionnaire and the *Self-Compassion* scale which have been standardised and validated previously in the Indonesian context. Measurements were taken twice, before the intervention (*pre-test*) and after the intervention (*post-test*). To evaluate the effectiveness of the intervention, data were analysed using parametric statistical tests *paired sample t-test* and *independent sample t-test* to see the difference in scores before and after the intervention as well as comparison between groups.

In addition to quantitative measurements, this study was also complemented by participatory observation and limited interviews with facilitators and intervention participants as supporting data. The qualitative data was analysed descriptively to gain an in-depth understanding of the group dynamics, adolescents' acceptance of the digital method, as well as the constraints of program implementation in the field. A data triangulation approach was used to increase the validity of the research results.

Research ethics were maintained by ensuring all participants gave informed consent after receiving a full explanation of the research objectives and procedures. Confidentiality of data was maintained by anonymising all participants, and the study obtained ethical clearance from the university ethics committee.

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RESULTS

This study aimed to evaluate the effectiveness of a digital community-based mental health intervention for adolescents using the DASS-21 instrument as a measure of depression, anxiety, and stress symptoms. Data were analysed descriptively and inferentially to determine the difference in scores before and after the intervention, and to compare the effectiveness between the experimental and control groups.

Table 1 presents the results of descriptive statistics showing the mean DASS-21 scores in each group before and after the intervention. Next, Table 2 presents the results of the *paired sample t-test* to see significant changes in each group. Finally, Table 3 presents the results of the *independent sample t-test* to compare the scores between the experimental and control groups, both at pre-test and post-test, to measure the effectiveness of the intervention comparatively.

Table 1. Descriptive Statistics of DASS-21 (Depression, Anxiety, Stress) Scores in Experimental and Control Groups Before and After the Intervention

Group	Time	n	Mean	SD
Experiment (Digital Community Intervention)	Pre-test	40	29,75	5,84
	Post-test	40	17,10	4,92
Control (No Intervention)	Pre-test	40	30,12	6,20
	Post-test	40	27,85	5,97

The results of the descriptive analysis in Table 1 show a significant decrease in DASS-21 scores in the experimental group after being given a digital community-based mental health intervention for eight weeks. The mean score of the experimental group decreased from 29.75 (SD = 5.84) to 17.10 (SD = 4.92), reflecting an improvement in the participants' psychological state, particularly in the aspects of depression, anxiety, and stress.

In contrast, the control group that did not receive the intervention showed a relatively small decrease in scores, from 30.12 (SD = 6.20) to 27.85 (SD = 5.97). This indicates that the changes in the control group were likely due to non-intervention external factors or natural fluctuations in emotional state.

Thus, the digital community intervention was descriptively proven to reduce negative mental health symptoms in adolescents. Next, inferential statistical tests (e.g. *paired sample t-test* and *independent sample t-test*) will be used to statistically test the significance of these differences.

Table 2. Paired Sample t-Test Results in Experimental and Control Groups

Group	Comparison	Mean (Pre - Post)	t	Sig. (2-tailed)
Experiment	Pre-test vs Post-test	12,65	10,98	0,000
Control	Pre-test vs Post-test	2,27	1,78	0,083

The results of the *paired sample t-test* showed that in the experimental group, there was a statistically significant decrease in DASS-21 scores after the digital community-based intervention (mean difference = 12.65; $t = 10.98$; $p < 0.001$). This indicates that the intervention programme was effective in reducing symptoms of depression, anxiety and stress in adolescents.

In contrast, the control group that did not receive the intervention showed a statistically insignificant difference in scores (mean difference = 2.27; t = 1.78; p = 0.083). This suggests that the change in scores was most likely not a result of the treatment, but rather other factors outside the intervention.

This finding supports the conclusion that the digital community-based mental health intervention had a significant positive impact on adolescents' psychological state.

Table 3. Independent Sample t-Test Results of DASS-21 Scores Between Groups

Comparison	Mean (Experiment)	Mean (Control)	t	df	Sig. (2-tailed)
Pre-test	29,75	30,12	0,28	78	0,781
Post-test	17,10	27,85	9,13	78	0,000

The results of the *independent t-test* on the pre-test scores showed no significant difference between the experimental and control groups (p = 0.781). This indicates that the initial psychological conditions of the participants in both groups were equivalent and valid for comparison.

In contrast, the test results on the post-test scores showed a highly significant difference between the two groups (p < 0.001), where the experimental group had significantly lower DASS-21 scores following the intervention. This proves that the digital community intervention significantly reduced negative mental health symptoms compared to no intervention.

Thus, these findings support the hypothesis that structured, collaborative, and digital-adaptive community-based interventions are effective in improving adolescents' mental well-being.

Table 4. Frequency Distribution of Changes in DASS-21 Scores in the Intervention and Control Groups

Group	Significant Improvement	No Improvement	Total
Intervensi	35 (87,5%)	5 (12,5%)	40
Control	10 (25%)	30 (75%)	40
Total	45	35	80

Note: Significant improvement is defined as a decrease in the DASS-21 score of ≥10 points based on the average difference in scores between the experimental groups.

The Chi-Square test showed a highly statistically significant relationship between the treatment group (digital community intervention) and significant improvement in adolescent psychological symptoms based on DASS-21 scores (χ^2 = 31.56; p < 0.001). This means that adolescents who received the intervention were more likely to experience significant improvement than those who did not receive the intervention.

These results reinforce previous findings from t-test analyses, which showed that group-based digital community interventions are effective in reducing symptoms of depression, anxiety, and stress in adolescents. Additionally, the Chi-Square analysis strengthens the evidence that the effectiveness of the intervention is not only demonstrated by a decrease in mean scores but also by the proportion of adolescents who experienced clinically significant improvement.

DISCUSSION

The results of this study indicate that digital community-based mental health interventions have a significant impact on reducing symptoms of depression, anxiety, and stress in adolescents. A substantial decrease in DASS-21 scores was observed in the experimental group, from 29.75 to 17.10 ($p < 0.001$), in contrast to a non-significant decrease in the control group (from 30.12 to 27.85; $p = 0.083$), indicating the intervention's real effectiveness. An independent t-test on post-test scores further supported these findings, showing a highly significant difference between groups ($p < 0.001$).

Theoretically, the effectiveness of this intervention can be explained through the Social Support Theory framework, which states that social support, both directly and through digital media, plays a role in reducing emotional stress by increasing feelings of connectedness and social meaningfulness (Yue et al., 2023). In this context, digital communities serve as a medium that strengthens interpersonal support networks among adolescents. Additionally, the intervention approach aligns with Cognitive Behavioral Theory, which emphasises the importance of cognitive and behavioural changes in responding to psychological stress (Marrero et al., 2016). Through reflective, educational, and interactive activities within the digital group, adolescents are given space to re-structure maladaptive thought patterns and develop healthier coping strategies.

The basic assumption of the intervention phase is that active involvement in a digital community group can improve self-regulation and self-compassion, two important aspects of managing mental health. This phase relies on meaningful social interaction, feedback, and psychological empowerment through trained facilitators. In contrast, in the control stage, the assumption held is that passive information provision (printed materials) alone is sufficient to have an impact, which has not been proven to be significant. This difference underscores the importance of participatory and social elements in every mental health intervention for adolescents.

These findings are supported by various studies highlighting the importance of social interaction within a community context. For example, Putri et al. (2021) demonstrated that gratitude interventions in psychosocial community groups significantly reduced negative emotions (Putri et al., 2021). Suryani et al. (2024) added that the use of digital media, such as reminder messages, also increased participant engagement and therapy effectiveness (Suryani et al., 2024). Research by Wulandari et al. (2024) and Haya & Ardani (2024) also demonstrates the effectiveness of community-based approaches in improving understanding, independence, and adaptive behaviour(Haya & Ardani, 2024; Wulandari et al., 2024).

Conversely, a study by Fitriani et al. (2024) that applied mindfulness training without community support found that anxiety reduction was not significant ($p = 0.109$). This reinforces the assumption that structured social support is a key element of intervention success, not merely the techniques or materials presented (Fitriani et al., 2024).

However, generalisation of the results must be limited. The assumption that digital communities are always effective is only relevant in urban contexts with adequate technological access. Digital inequality, individual preferences for online interaction, and digital literacy levels are limiting variables for intervention effectiveness. Additionally, the use of the DASS-21

instrument as the sole measurement tool assumes that symptoms of depression, anxiety, and stress sufficiently represent the psychological condition of adolescents. However, variables such as resilience, family support, or self-confidence are also important and have not been included.

Thus, a more comprehensive methodological approach, such as mixed methods, is needed to capture the full psychological complexity of adolescents. Further research that integrates quantitative and qualitative dimensions and considers social and cultural contexts will strengthen the external validity of the developed intervention model.

CONCLUSIONS

The results of this study provide fresh perspectives on how well digital community-based mental health interventions for teenagers work. A continuous and statistically significant drop in DASS-21 scores in the experimental group relative to the control group suggests that this strategy is highly successful in lowering symptoms of stress, anxiety, and depression. This achievement highlights the applicability of social support theory and cognitive-behavioral theory in a digital setting and shows that online communities can be a useful and flexible platform for psychosocial interventions catered to the requirements of today's teenagers.

This study adds to the body of knowledge by highlighting the significance of incorporating technology, group interaction, and professional facilitation in fostering a supportive atmosphere that affects mental health, going beyond simply validating earlier findings. Nevertheless, this intervention's efficacy is situational and cannot be entirely generalized. Prior research has demonstrated that methodological flaws, a lack of social connection, or restricted access to technology are frequently the cause of negligible results. The quality of implementation, active participant participation, and the preparedness of digital infrastructure are therefore critical to the effectiveness of interventions.

As a result, this study creates chances for the creation of evidence-based, inclusive, and sustainable intervention strategies. It is strongly advised that more research be conducted with a mixed-methods approach and a larger population scope in order to investigate additional contextual factors that affect the efficacy of interventions. This will allow for the development of more thorough and adaptable strategies for enhancing adolescent mental health in the digital age.

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