

“EmosiAn”: An android-based application for handling students with mild depression in MAN 1 Yogyakarta

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ABSTRACT Stressors from school and inappropriate friendships could lead to depression among teenagers, and possibly to attempts at suicide if not treated properly. To meet this need, there is a peer counsellor service, which is an extracurricular activity at school, called the Centre for Youth Information and Counseling / Pusat Informasi dan Konseling Remaja (PIK-R) Exalta. However, only a few students have used this service. This was due to a situational barrier that happened in direct counselling. This study aimed to detect mild depression and evaluate the implementation of the EmosiAn application (app) in handling mild depression among students. This study used secondary data from Program Kreativitas Mahasiswa Pengabdian Masyarakat (PKM-M)/ Student Creativity Program-Community Services conducted from Augustus to October 2020 at MAN 1 Yogyakarta. A total of 126 students voluntarily filled out the Patient Health Questionnaire-9 (PHQ-9), and 47 (37.3%) showed mild depression. Among 27 students and 5 peer counsellors then agreed to participate. The EmosiAn app was designed based on their problems, and had two interfaces for the administrator (peer counsellor) and the user (student). The app contained a diagnosis of depression using PHQ-9, daily journal, chat and reading the relevant articles. Before using the app, both peer counsellors and students attended zoom-online training. There was an increase in peer counsellors' knowledge ($p=0.000$) and students ($p= 0.002$) before and after the webinar. All participants could use the EmosiAn app and felt its benefits after two weeks of implementation. There were 40% of students who experienced a reduction of their depression level. Problems encountered during its usage could be resolved by fixing and refining the app. EmosiAn is a user-friendly application used by PIK-R Exalta to detect and care for students with mild depression. Further development is needed for wider used in the future.

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1. Introduction

Depression is one of the psychosocial problems faced by adolescents. Data from Riskesdas 2018 showed that the prevalence of depression among adolescents aged 15-24 years reaches 6.2% in Indonesia, while in Yogyakarta, it reaches 5.5%.¹ Symptoms of a teenager experiencing depression include loss of interest,

lack of energy, and decreased activity. Depression is a condition where a person experiences constant sadness and loses interest in what they usually do for at least two weeks.² Depression can be caused by stressors from school and social interactions. One of the causes of depression is bullying.³ This bullying can be mocking, isolating, and calling names, which are often done by teenagers and can slowly lead to depression.

Depression in adolescents can result in impaired learning achievement, and if not handled properly,

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it can lead to attempts at suicide.⁴ Therefore, early detection of depression and appropriate treatment can prevent more severe and life-threatening conditions. One of the ways to treat depression in adolescents is the peer counsellor program. A pilot study in Leipzig found that peer-counsellor played an essential role in handling inpatient depression.⁵

Madrasah Aliyah Negeri (MAN) - a government-owned Islamic Senior High School - 1 Yogyakarta has an extracurricular activity called the Centre for Youth Information and Counseling / Pusat Informasi dan Konseling Remaja (PIK-R) Exalta. The PIK-R Exalta provided a peer-counselling forum for the student in the school environment. Based on information obtained from the chief officer of the PIK-R Exalta 2019/2020 period, several problems were found because of bullying. However, only a few students (11 people a year) take advantage of the counselling. This gap was because face-to-face counselling meetings have not been very popular for various reasons. Based on preexisting research by Kessler *et al.* (2001), a person suffering from depression does not seek immediate treatment or help because there are situational obstacles. These situational barriers include discomfort, long treatment times, and worry about the stigma of others.⁶

In order to overcome those problems, PIK-R Exalta planned to use web-based online consultation. However, lack of human resources became the main obstacle; consequently, the program has not been launched yet. Based on the identification of these problems, the Program Kreativitas Mahasiswa Pengabdian Masyarakat (PKM-M)/ Student Creativity Program-Community Services team took the initiative to form an Android-based application that aims to facilitate PIK-R Exalta in early detection of mild depression, online counselling tools, and monitoring of depression that occurs in students of MAN 1 Yogyakarta. This internet-based intervention is one way to offer a series of practical counselling and efforts to reduce existing situational barriers. A previous study showed an internet and application-based gratitude intervention in reducing rapidly negative thinking (RNT) and other mental health outcomes, such as anxiety, depression and insomnia, both short- and long-term.⁷

This application is named EmosiAn, a user-friendly display with various features needed by PIK-R and students based on their needs. The available features include a depression screening feature using the Patient Health Questionnaire (PHQ) - 9, a chat feature that was used for online communication and counselling with PIK-R Exalta, a daily journal column for students to express their feelings and causes, and an article reading column to add insights into depression. Accordingly, the PKM-M team conducted community service activities in MAN 1 Yogyakarta using the EmosiAn application to handle mild depression. Using the EmosiAn application could facilitate peer-counsellor and students of MAN 1 Yogyakarta in early detection of mild depression and provide online care for those that needed it. Therefore, this study aimed to detect mild depression among high school students using EmosiAn application and evaluate the implementation of EmosiAn application in handling mild depression among high school students.

2. Methods

This study used secondary data from Program Kreativitas Mahasiswa-Pengabdian Masyarakat (PKM-M) that was conducted from August 2020-October 2020 in MAN 1 Yogyakarta. This PKM-M program enrolled 27 students with mild depression and five peer counsellors to use the EmosiAn application in two weeks of implementation.

This activity started with a screening of depression among students using the PHQ-9 questionnaire. The level of depression was categorized as normal/minimal (0-4), mild depression (5-9), moderate depression (10-14), moderately severe depression (15-19), and severe depression (20-27). This study only included students who expressed mild symptoms that a peer counsellor could manage. At the same time, people experiencing moderate to severe depression should seek help from professionals.

Due to the COVID-19 pandemic situation, all activities were done online. A total of 126 students of class X and XI of MAN 1 Yogyakarta volunteered to participate in depression screening using the PHQ-9 questionnaire. Based on the screening result,

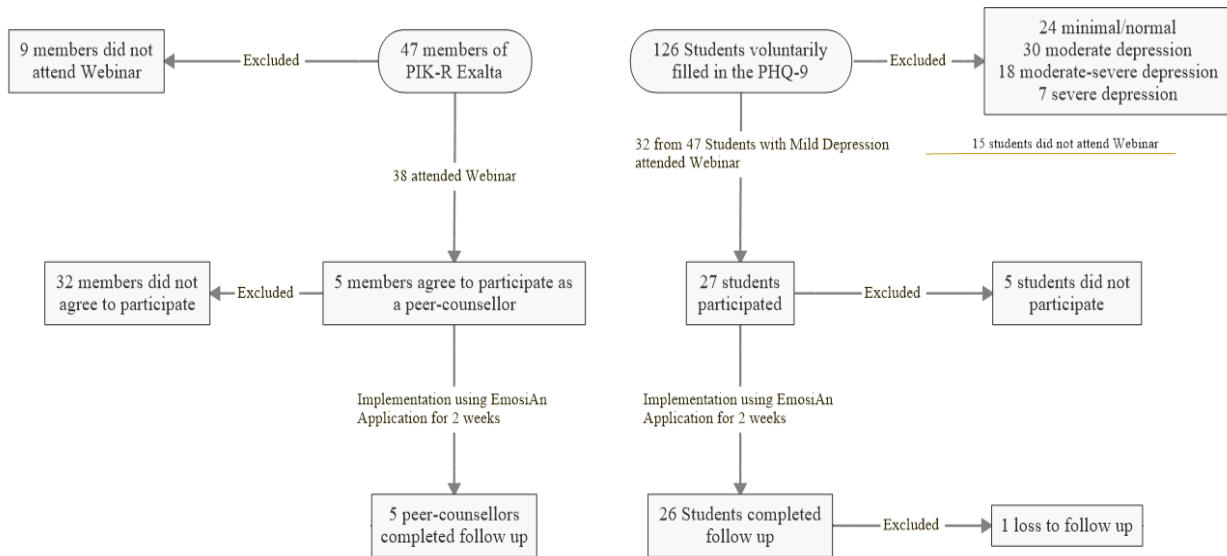


Figure 1. Subject that participated in this study flowchart.

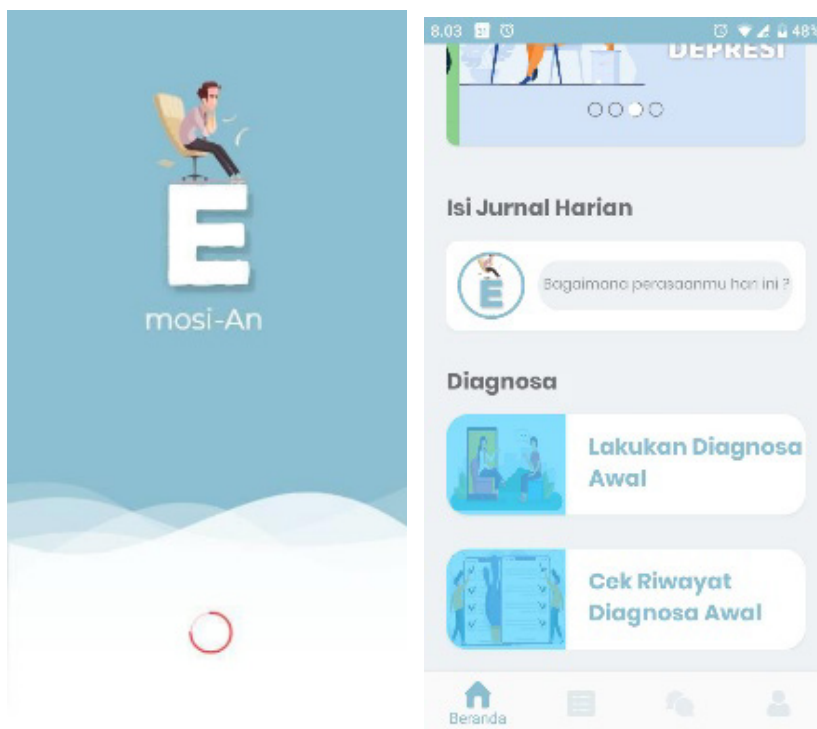


Figure 2. Start screen and home application.

students categorized with mild depression offered to participate in this activity. In addition, 32 students took part in a Webinar explaining depression and the use of EmosiAn applications; furthermore, 27 students were willing to participate in the

implementation of EmosiAn for two weeks (Figure 1).

On the other hand, 38 of 47 members of the PIKR Exalta attended the webinar. Only five people in PIK-R Exalta were willing to become peer counsellors and participated for two weeks of implementation.

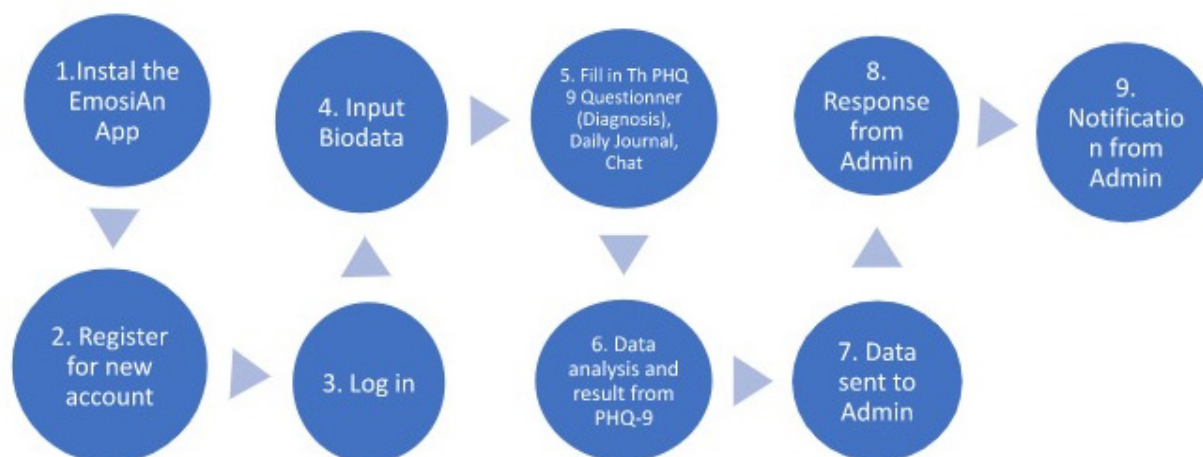


Figure 3. Application workflow.

The Webinar training for counsellors included an introduction to depression, how to handle it and how to use the EmosiAn application as a peer-counsellor. The Peer-counsellor who monitored the Emosi-An application used by students, reminded the students those had lower engagement, evaluated the level of depressive using PHQ-9, responded to daily journal and gave consultation via chat platform.

For two weeks, both students and peer counsellors used the EmosiAn application. Students filled in what they felt in the daily journal every day, filled out the PHQ-9 questionnaire on the diagnosis feature, and conducted online counselling via the chat feature. There was also an article reading feature to add insight and could be developed as needed. Likewise, the peer counsellor read the daily journal and responded to the student counselling in the chat feature.

EmosiAn is an android-based application for detecting and caring for depression among students in MAN 1 Yogyakarta. In the EmosiAn application, there are two sides of the user interface, namely administrators and participants. Participants in this program were students with a screening result of mild depression symptoms, while the administrator was a peer counsellor (member of the PIK-R Exalta). There were several features in EmosiAn application (Figure 2), i.e., the feature of diagnosis (using PHQ-

9 to detect depression), the feature of the chat (for online counselling with PIK-R Exalta), the feature of participant daily journal to express their feeling and the related cause, and the feature of article reading to give additional insight about depression and its preventive. The application design and workflow shown in figure 3.

The primary outputs of this activity were identifying students who suffered from mild depression using PHQ-9 and evaluating the benefits of EmosiAn in reducing depression levels among students. This study also assessed the differences in knowledge before and after the webinar online using a Google Form quiz. In addition, the paired t-test / Wilcoxon signed-rank analysis was employed. Moreover, a phone-based and direct interview were done to evaluate the implementation, detect some obstacles to solve and willingness to use the application. This data were recorded, transcribed verbatim, and analyzed with an open code.

This study was ethically approved by the Committee of Ethics for Health Research, Faculty of Medicine Universitas Islam Indonesia No 38/Ka.Kom. Et/70/KE/XII/2020.

3. Result

The study found that the use of the Emosi-An app could detect mild depression among students and

Table 1. PHQ-9 Depression score among students at baseline and after two weeks of implementation.

PHQ-9 depression score	Baseline	Two weeks
Minimal/normal	-	11
Mild	27	9
Moderate	-	6
Loss to follow up	-	1
Total	27	27

those with good engagement had a better reduction in depressive symptoms. The initial survey using the PHQ-9 questionnaire that involved 126 students from MAN 1 found the depression level of the students, as shown in Figure 4. There were only 20% students of students who had no/minimal depression, while the rest had depression from mild to severe.

A total of 32 students who showed mild depression from PHQ-9 screening attended the online seminar, and 27 among them voluntarily joined this activity. The online seminar using Zoom Cloud meeting (Webinar) was conducted separately for students and members of PIK-R Exalta. This online seminar informed students about depression and the use of the app. At the same time, similar topics were adjusted to peer counsellors, including how to do counselling. Figure 5 shows the pre and post-test results between students and the member of the PIK-R Exalta. Based on Figure 5, the knowledge level of both student and peer increased at post-test (after webinar session). The mean differences for student and peer groups were significant with $p=0.002$ and $p=0.000$, respectively.

After two weeks of using the application, the 27 participants who had mild depressive symptoms at baseline had changed their depressive level. There were 11 (40,7%) participants who experienced a decrease in minimal depression, while the rest remained at the same level and increased to a moderate level. This information can be found in Table 1.

Other findings showed that the students could use all features in the application independently. For example, they used the diagnostic feature to examine their depressive conditions; Students wrote what they felt and worried about in daily journal;

and Students consulted their problem with PIK-R Exalta as their peer in chat feature as well, as they had valuable insight from several articles provided.

Students and peer counsellors experienced the benefit of EmosiAn. Based on videocall interviewed student expressed their feeling while using EmosiAn :

"...I am delighted to use it, I can chat to a counsellor" (Student 1).

"... it is good when we feel insecure, we can communicate and ask help from chat feature.." (Student 2).

The peer counsellor /PIK-R Exalta will make this application their program next year.

"I am very grateful with this application. PIK-R Exalta will be a home for a student to tell their story".

Several obstacles arose during the implementation, such as time constraints of counsellors to respond to student chats, the lack of interest in some students for counselling, and the confusion of some students to express their feelings. However, after having the evaluation meeting between PIK-R Exalta and PKM-M team, there were several possible solutions to solve the problems, such as sharing the counsellor's burden per student, inviting and reminding students to be more active in expressing their complaints in the application, and increasing the choice of emotions in the application so that it is more varied than before.

4. Discussion

From the initial survey taken before the program launched, it was found that most students (80%) had depressive symptoms, varied from mild to severe. Similar findings were found from a previous study of 709 university students in Indonesia during pandemic COVID-19, where 72% were found to have symptoms of mild depression.⁸ A study that included 450 healthcare students from Jordan found 33.8% had borderline depression and 26.2% had abnormal depression.⁹ This result was relatively high compared to a previous study that assessed the mental health of 1,027 medical students at any stage of education, fresh graduate, and internship doctor in Indonesia

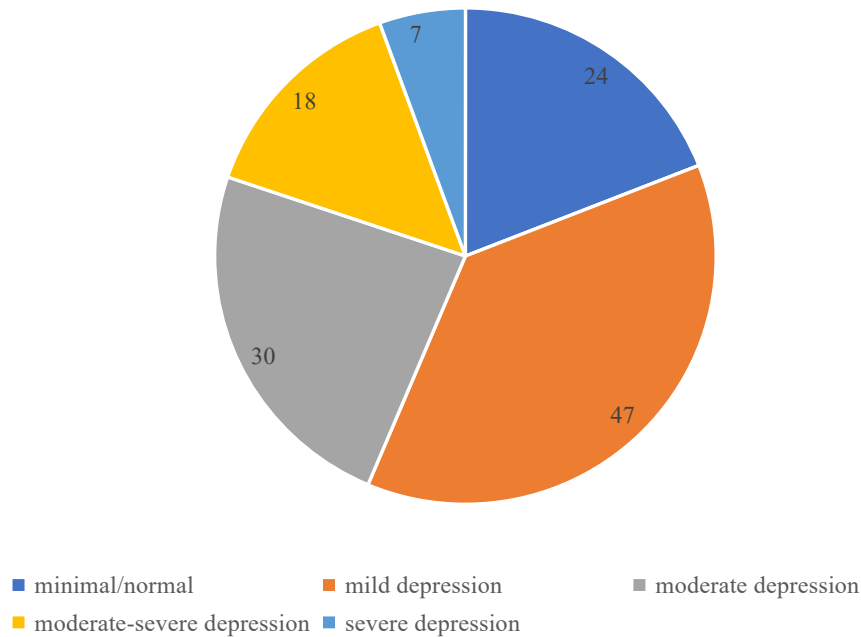
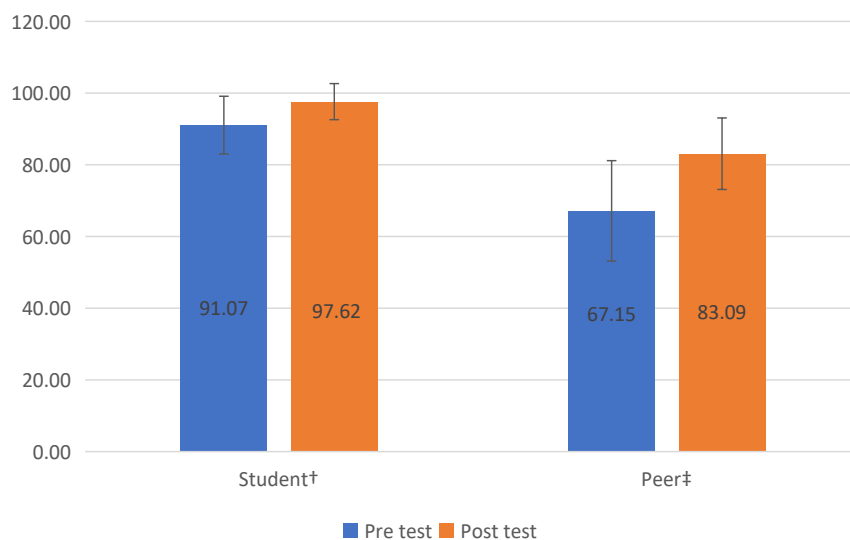


Figure 4. Depression level of the student at the initial survey.



Note: Error bars indicated standard deviation

†Wilcoxon signed-rank test, $p=0.002$

‡Paired t-test, $p=0.000$.

Figure 5. Knowledge of student and peer counsellors before and after the online seminar.

during the COVID-19 pandemic and found 16.8% had depression.¹⁰ A previous study showed three major impacts of the COVID-19 pandemic to suburban society Yogyakarta, i.e. psychological, social, and economical. The psychological impact included negative emotions that arise due to psychosomatic

symptoms, fear of losing loved ones, stereotypes and anxiety concerning contracting COVID-19 infection, limited social interaction in the community, and strict travel restrictions. Individual coping and family support were needed in the current situation.¹¹ Since the pandemic emerged there are several mental

problems that are more common, and it is necessary to identify the depressive symptoms among the students, so that proper treatment/intervention can be done early.

Based on the pre and post-test results, there was an increase in the mean knowledge of participants about depression. Online education was adequate for increasing the students' learning, especially during the pandemic condition. Almost all students (96%) and peer counsellors (100%) joined the activity until the end of the program. During online sessions, which needed to be attractive and interactive, these pre and post-test methods effectively increased student engagement and helped in evaluating the programs.

Peers played an essential role in detecting and giving consultation.⁵ However, even before the COVID-19 pandemic, very few students came to face-to-face consultation. In this study, the EmosiAn application could help students and peer counsellors communicate in an android-based application. Both students and peers expressed their convenience when using the EmosiAn application. A previous study using the Smartteen, a computer app based on Cognitive Behavioral Therapy (CBT), effectively reduced depressive symptoms in Indian adolescents.¹² Similar findings from randomized controlled trials showed that transdiagnostic internet-CBT, mindfulness-enhanced internet-CBT and online mindfulness were more efficacious than usual care in reducing symptoms of anxiety and depression.¹³ In addition, gratitude interventions using Internet applications could reduce anxiety and depression.⁷ These results were associated with functional impairment at post-treatment¹³ and reducing risk factor (repetitive negative thinking).⁷ Interestingly, the results could be maintained at 3-months follow-up^{7,13} and 6-months follow up.⁷ This Internet-based application also had several advantages such as increased resources and more time-efficient intervention for therapists.^{7,12}

This study found that 40% of students with mild depression could reduce their level to normal. However, this effect varied and seemed to have a relationship with the frequency of using the app. Students who remained in mild depression or moderate depression have more rare application

usage than those who became minimal/normal. Therefore, the admin /peer counsellor could give feedback for the student to fill in the EmosiAn routinely when they needed it. A previous study about the feasibility of an Internet-based mental-health intervention at the Universitas Gadjah Mada students required well educated and fast Internet with enough bandwidth.¹⁴ Several obstacles during the implementation should be solved within the peer counsellor and feedback from students/users. Thus, routine monitoring and evaluation were needed to manage these programs. It was essential to pay more attention to the unresponsive students as they might face more problems due to no Internet or more developed depressive symptoms. This application could give such information; thus, peers, teachers or parents could give proper intervention.

To the best of our knowledge, this was one of the limited studies that revealed the use of mobile app to deal with mild depression among students during the pandemic. This study encourages the role of peer counselor and the importance of daily interactions with students while using the app. Students were at risk for depression, especially during online learning due to the pandemic. Since there were many obstacles in conducting face-to-face consultations, therefore the use of the EmosiAn app must be more socialized and expanded.

This study had several limitations since depressive symptoms among students were only defined from PHQ-9 rather than a professional examination by faculty in psychiatry. However, as shown in the previous studies, PHQ-9 was appropriate for detecting and monitoring depression in diverse populations (African American, Chinese American, Latino, and non-Hispanic), and populations with good literacy levels.^{15,16} The PHQ-9 seemed to be similarly sensitive but might be less specific for younger patients than older patients; a cut-off score of 10 or above could be used regardless of age.¹⁷ A preexisting study said there was a 20% inconsistency between the SRQ20 and PHQ-9¹⁸; however, another study revealed PHQ-9 was a reliable and valid measure of depression severity.¹⁹ Therefore, this study used PHQ-9 in the EmosiAn app to screen and monitor depressive symptoms of the students.

As discussed in the earlier study, regarding the Internet / online based interventions, there was a possibility of self-referral and only highly-motivated students participated in the study.¹⁴ Thus, it might not represent the actual situation.

Despite its benefits and ease to use, the EmosiAn app needed to be upgraded following several conditions and more users engaged for better experiences and giving feedback. Hopefully, this app could be implemented widely both for students as well as a peer counsellor.

5. Conclusion

EmosiAn app was useful to detect mild depression among high school students and had advantages for the peer-counselor to help the students with mild depression symptoms. Likewise, for students, this app can be used to share complaints and measure depression independently. This application has been successfully used by PIK-R Exalta and 27 students of MAN 1 Yogyakarta found it helpful for early detection and management of mild depression in students of MAN 1 Yogyakarta.

Several obstacles arose during the implementation, such as time constraints of counsellors to respond to student chats, the lack of interest in some students for counselling, and the confusion of some students to express their feelings. Therefore, better app development is needed to support its distribution if it is to be implemented in all schools in Yogyakarta. In addition, PIK-R Exalta can apply peer counsellor working hours to be more optimal and publish apps continuously in the environment of MAN 1 Yogyakarta.

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Conflict of interests

The authors have no conflicts of interest associated with the material presented in this paper.

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