

Improving maternal mental health through digital-based social support

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ABSTRACT

Pregnant women are vulnerable to various mental health issues, such as anxiety, depression, and excessive stress. These conditions are often exacerbated by a lack of social support and negative stigma, which discourage pregnant women from seeking help. If left unaddressed, mental health problems can negatively impact both maternal and fetal health, including increased risks of pregnancy complications and developmental disorders in the fetus. To address these challenges, a digital-based program was developed to provide social support and enhance the mental health of pregnant women. This community service initiative also included mental health education and relaxation training to help maintain psychological well-being among pregnant women. The evaluation results showed significant improvements across all assessed aspects. The total score increased from 5.5 in the pretest to 8.0 in the posttest. Knowledge of mental health increased from 5.5 to 8.0, strategies for maintaining mental health improved from 5.2 to 8.2, and understanding how to seek help rose from 5.3 to 8.1. Additionally, knowledge of relaxation techniques increased from 5.1 to 8.3, while the ability to apply these techniques independently improved from 4.9 to 8.0. These findings demonstrate that the digital-based program is effective in helping pregnant women address mental health challenges and improve their psychological well-being.

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1. INTRODUCTION

Mental health issues in pregnant women often receive less attention compared to physical health. Mental disorders are frequently not considered serious, despite their potentially harmful effects. Pregnancy is a crucial period marked by significant changes in a woman's physical, hormonal, and psychosocial aspects, which can trigger emotional or psychological disorders (de Carvalho et al., 2022). According to the World Health Organization (WHO), the global prevalence of depression is higher in women (4.6 percent) compared to men (2.6 percent). Approximately 10 percent of pregnant women and 13 percent of postpartum women experience mental health disorders, particularly depression, with higher rates in developing countries: 15.6 percent during pregnancy and 19.8 percent postpartum (WHO, 2018). In Indonesia, maternal mortality ranks as the second highest in ASEAN. According to the 2020 Population

Census, the maternal mortality rate reached 189 per 100,000 live births. Data from the Maternal Perinatal Death Notification (MPDN) showed an increase in maternal and infant deaths, from 4,005 in 2022 to 4,129 in 2023. Infant mortality also rose from 20,882 in 2022 to 29,945 in 2023. These figures indicate that maternal health issues require serious attention from various stakeholders. Pregnant women face numerous risk factors such as a history of mental illness, unwanted pregnancies, substance or alcohol use, low educational levels, financial burdens, and unemployment. Hormonal changes during pregnancy can also trigger symptoms of anxiety and depression, impacting various aspects (de Carvalho et al., 2022). Studies (Eastwood et al., 2017; Gelaye et al., 2016; Ibanez et al., 2015) have shown that emotional disorders during pregnancy can negatively affect the baby, leading to impaired fetal development, preterm birth, low birth weight, and emotional disturbances in the child after birth. Therefore, it is crucial to enhance the knowledge and awareness of pregnant women and their support systems regarding mental health. Unfortunately, mental health knowledge among pregnant women remains low (Ariasih et al., 2023), despite the fact that adequate understanding can facilitate appropriate mental health care and intervention.

Posyandu is one type of Community-Based Health Efforts, which are managed and coordinated from, by, for, and with the community in order to implement health development. The goal is to empower the community and make it easier for them to access basic health and social services, which will help to reduce maternal and infant mortality rates more quickly. Posyandu can play a crucial role in providing basic health services, including mental health support for pregnant women. As a community mental health counseling center, Posyandu plays a significant role. Posyandu can assist the community in preserving their mental health by offering counseling services and educating them about mental health. As an extension of the local health centers, posyandu supports the National Population and Family Planning Board (BKKBN) program in addressing maternal health issues.

According to BPS Kaltim data, there are 677 posyandu in Samarinda. This community service program partnered with Posyandu Bumi Citra Lestari, located in the Lok Bahu area of Samarinda. The posyandu currently serves 127 households, including pregnant women, breastfeeding mothers, women of reproductive age, and toddlers. The services provided to pregnant women include prenatal check-ups, nutritional monitoring, consultations on delivery preparation, and breastfeeding guidance. Breastfeeding mothers receive supplements beneficial during the breastfeeding period. The posyandu also offers contraceptive (family planning) services. The primary goal of this posyandu is to raise community awareness about health to achieve a healthy and prosperous society. Posyandu's cadre as extensions of healthcare workers who interact directly with the community, play a vital role in possessing the knowledge and skills to educate the public (Muharyani et al., 2023; Triyanto et al., 2023)

The posyandu's cadre consists of six housewives with a high school educational background, without specific expertise in maternal and child health, though they have participated in educational activities from the local health centers on maternal and child health. Posyandu cadres offer services such as registration, providing maternal health services including mid-upper arm measurements, weight monitoring, which are recorded in the inspection assistance card and the maternal and child health (KIA) book. The results are interpreted by the cadres and communicated to the pregnant women, followed up by healthcare professionals. Posyandu cadres also conduct counseling and education on pregnancy danger signs, monitor and assist pregnant women, detect at-risk pregnancies, and make home visits.

Based on data from the Central Bureau of Statistics of East Kalimantan, the number of pregnant women in Samarinda is 14,209. According to the posyandu's records, community participation in posyandu activities is positive, with a stable and increasing number of visits. The monthly visits of pregnant women range from 5 to 10 individuals. Of the pregnant women visiting, 50 percent reported health complaints, including mental health concerns: 40 percent experienced sleep disturbances, 30 percent reported fatigue, 25 percent felt a lack of motivation, and 35 percent experienced excessive anxiety. Anxiety is often related to concerns about fetal health, delivery processes, and bodily changes. Posyandu cadres have encountered cases of baby blues syndrome, characterized by mood swings, frequent crying, excessive sadness, irritability, anxiety, reluctance to touch the baby, low self-confidence, sleep disturbances, and headaches. In such situations, posyandu cadres often feel unable to provide optimal

support. The current challenges faced by the Bumi Citra Lestari posyandu cadres include: (1) Inadequate knowledge about mental health, despite the need for this expertise to support pregnant women facing mental health issues and to conduct promotive and preventive efforts; (2) A lack of accessible facilities and infrastructure for mental health promotion and a limited network for rapid access to basic services or Psychological First Aid (PFA); (3) Insufficient cross-program and cross-sectoral collaboration related to mental health.

The primary objective of this digital-based social support program is to provide structured education and assistance to pregnant women and posyandu cadres regarding mental health during the perinatal period. The program is designed to enhance mental health literacy among pregnant women and strengthen the capacity of posyandu cadres to detect, understand, and manage mental health issues that may arise during pregnancy and postpartum (Tendean, 2023).

Through this program, pregnant women are expected to increase their awareness of the importance of mental health during the perinatal period, including the ability to recognize early signs of mental health disorders. According to recent literature reviews, technology-based interventions that support healthcare strategies have shown positive outcomes (Pierce et al., 2023). These technologies facilitate faster access to healthcare services, reduce patient concerns, decrease symptoms of anxiety and depression, and assist in managing pregnancy risks (de Carvalho et al., 2022). Moreover, posyandu cadres, as community health facilitators, will receive in-depth knowledge of maternal mental health, enabling them to offer effective support and reduce the risk of negative stigma. This is crucial to ensuring that pregnant women receive timely and appropriate care (Bedaso et al., 2021; Wang et al., 2023)

The program also emphasizes practical skills development in addressing mental health challenges. Participants will be equipped with knowledge of relaxation techniques, stress management methods, and guidelines for seeking professional help when needed. As a result, both pregnant women and posyandu cadres will have a clearer understanding of the actions they can take to support the psychological well-being of pregnant women and their families. The aim of this community service activity is to increase the knowledge of pregnant women about the importance of mental health and provide simple training on the first handling of mental health problems that occur in pregnant women.

2. METHODS

The community service program is carried out using the method of psychoeducation on mental health and relaxation training to improve the psychological health of pregnant women. This activity also includes discussions and engaging games to spark enthusiasm among the participants. Through this program, the Service Team aims to assist Posyandu cadres and pregnant women in facing various mental health challenges. Additionally, in the psychoeducation session, the Service Team also introduced the Bumil Sejahtera (bumilsejahtera.com) application. This app offers several features to help maintain the mental health of pregnant women, such as informative articles on physical and emotional changes, stress management tips, and a mental health questionnaire for initial screenings. The online counseling feature allows pregnant women to consult directly with psychologists or counselors via chat or video, providing quick and practical access to professional support. Furthermore, there is a community forum where pregnant women can share experiences and support one another, as well as daily tips for maintaining mental and physical balance.

The facilities used for the implementation of the education, training, and services supporting the improvement of mental health for pregnant women include: laptops, LCD projectors, LCD screens, tables, chairs, banners, and X-Banner posters containing tips for maintaining the mental health of pregnant women. There were 50 participants in attendance, and the event was held on Tuesday, December 12, 2024, at the Posyandu Bumi Citra Lestari. The proposed methods to address issues in improving Posyandu services in terms of mental health and providing facilities to support mental health services is in Table 1.

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Table 1. The implementation stages

Stage 1. Problems Identification	
Activity	This identification process is carried out through intensive discussions with Posyandu cadres regarding the development of Posyandu services. partners and the team collaboratively formulate comprehensive and applicable solutions
Objective	recognizing existing issues in mental health services at Posyandu, including understanding specific needs and gaps in mental health support facilities
Implementation time	First week of July 2024
Stage 2. Application Development	
Activity	The team begins with intensive discussions on system modeling, design, and application content, collaboratively planned with the assistance of relevant experts
Objective	This feedback allows the team to refine the application to meet the expectations and needs of its users, thereby enhancing the effectiveness of mental health services for pregnant women.
Implementation time	Third week of July 2024
Stage 3. Psychoeducation	
Activity	The team leader coordinates the overall implementation of the activities, while faculty members provide expertise and facilitate discussions. Student team members assist with documentation and administrative tasks to ensure smooth execution. Partner participation is essential, as they provide the venue, organize participants, and support the event.
Objective	Mental Health Psychoeducation is conducted to enhance the knowledge and understanding of Posyandu cadres, pregnant women, and their spouses regarding mental health, fostering awareness of its importance.
Implementation time	Third week of October 2024
Stage 4. Application Socialization	
Activity	Socialization of Mental Health and Launch of the Mental Health Application to the community involves inviting local residents and stakeholders, including government agencies, to introduce the community health companion application.
Objective	the goal is to encourage the community to embrace the application as a valuable resource for improving mental health outcomes, creating a more supportive environment for those in need.
Implementation time	Third week of October 2024
Stage 5. Relaxation Method Workshop	
Activity	This relaxation method workshop aims to equip pregnant women with relaxation techniques that are easy to learn and can be practiced independently at home.
Objective	the workshop trains posyandu (community health center) cadres with similar relaxation skills so that they can effectively guide pregnant women in their communities.
Implementation time	Third week of October 2024
Stage 6. Evaluation	
Activity	This evaluation encompasses the enhancement of participants' knowledge, the utilization of the application and relaxation techniques independently, levels of satisfaction, and the social impact in supporting mental health.
Objective	The evaluation program aims to assess the effectiveness of the socialization and training of the Bumil Sejahtera application and relaxation methods for pregnant women and community health cadres.
Implementation time	Third week of October 2024

Problems Identification

The Problem Identification stage is an initial step aimed at recognizing existing issues in mental health services at Posyandu, including understanding specific needs and gaps in mental health support facilities. This identification process is carried out through intensive discussions with Posyandu cadres regarding the development of Posyandu services. These discussions serve to identify encountered issues, understand the expectations of partners, and determine potential solutions that the implementing team

can provide. Active participation from partners in this program is crucial, as they play a role in providing information about the problems faced and the desired solutions. In this process, partners and the team collaboratively formulate comprehensive and applicable solutions, ensuring that efforts to enhance mental health services at Posyandu can be achieved optimally.

Application Development

The team begins with intensive discussions on system modeling, design, and application content, collaboratively planned with the assistance of relevant experts. The application content includes key features such as mental health articles specifically for pregnant women, providing practical and educational information; a mental health screening test to help users recognize their emotional states; and counseling services that allow users to receive psychological support from professionals. Additionally, the app includes relaxation audio tools to assist in stress management, and an interactive discussion forum where users can share experiences and support each other.

The Service Team is responsible for designing the application's content, including health articles, mental health tips, screening tools tailored to the needs of pregnant women, and the design of an online application to ensure it is user-friendly and intuitive. Partners actively participate in this process, providing input and feedback on the content and design before the app's launch. This feedback allows the team to refine the application to meet the expectations and needs of its users, thereby enhancing the effectiveness of mental health services for pregnant women.



Figure 1. Discussion with Posyandu cadres

Psychoeducation

Mental Health Psychoeducation is conducted to enhance the knowledge and understanding of Posyandu cadres, pregnant women, and their spouses regarding mental health, fostering awareness of its importance. During the psychoeducation session, the entire team worked collaboratively to implement the activity. Each member played a specific role, such as serving as a presenter, moderator, master of ceremonies (MC), or handling event documentation. This division of roles ensured that every aspect of the activity was well-organized and executed effectively. Partner participation is essential, as they provide the venue, organize participants, and support the event. During this session, the mental health application is also introduced, helping to familiarize participants with its purpose and functionality, and promoting its use as an accessible mental health resource for the community.

Application Socialization

Socialization of Mental Health and Launch of the Mental Health Application to the community involves inviting local residents and stakeholders, including government agencies, to introduce the community health companion application. This event serves as an important opportunity to raise awareness about the application's features and its role in enhancing mental health support services. During the socialization, engaging presentations and live demonstrations are offered to illustrate how the application can be effectively used by community members to access mental health resources, seek assistance, and participate in meaningful conversations about mental well-being. The participation of

stakeholders, particularly representatives from government institutions, plays a vital role in fostering collaboration and ensuring the long-term sustainability of mental health initiatives. By bringing together diverse community members and stakeholders, this socialization effort aims not only to inform but also to reduce stigma surrounding mental health issues. Ultimately, the goal is to encourage the community to embrace the application as a valuable resource for improving mental health outcomes, creating a more supportive environment for those in need.

Relaxation Method Workshops

This relaxation method workshop aims to equip pregnant women with relaxation techniques that are easy to learn and can be practiced independently at home. By learning these techniques, pregnant women are expected to continue the therapy consistently, helping them manage stress and improve mental well-being throughout their pregnancy. Additionally, the workshop trains posyandu (community health center) cadres with similar relaxation skills so that they can effectively guide pregnant women in their communities. One of the key techniques introduced is positive affirmation relaxation, which supports pregnant women in fostering positive thinking to enhance mental health. Furthermore, the Bumil Sejahtera app provides relaxation music readily accessible within the app, allowing pregnant women to engage in relaxation exercises at any time, further supporting their mental well-being.

Evaluation

The evaluation program aims to assess the effectiveness of the socialization and training of the Bumil Sejahtera application and relaxation methods for pregnant women and community health cadres. This evaluation encompasses the enhancement of participants' knowledge, the utilization of the application and relaxation techniques independently, levels of satisfaction, and the social impact in supporting mental health. Through surveys and feedback, this evaluation identifies benefits, challenges, and recommendations for further development, thereby enhancing support for the mental health of pregnant women and the capacity of community health centers in the future.

3. RESULTS AND DISCUSSION

Results

The initial step involved identifying problems through discussions to explore the various challenges faced by pregnant women and posyandu cadres. This dialogue involved both pregnant women and health cadres. The results of the discussions revealed that many pregnant women experience stress and anxiety related to the physical and emotional changes that occur during pregnancy. Such feelings of anxiety are often driven by concerns regarding fetal health, the delivery process, and their capabilities as prospective mothers. Posyandu cadres also expressed challenges in providing adequate support to pregnant women, as they felt they lacked sufficient knowledge about mental health, which hindered their ability to offer appropriate information and assistance.

In addition to discussions, problem identification was also based on daily records maintained at the posyandu. These records included data on visits by pregnant women, reported complaints, and observations regarding the psychological conditions of these women. In some instances, pregnant women experiencing mental health issues were more likely to miss routine health check-ups. This data underscores the necessity for more targeted interventions to address mental health concerns. The outcomes of this problem identification serve as a critical foundation for the development of community service programs.

The team decided to develop an application to provide pregnant women with essential knowledge and social support. The goal is to create a user-friendly platform that facilitates easy access to information and resources tailored to their needs. The application will include features that allow pregnant women to engage with educational content on mental health, nutrition, and overall wellness during pregnancy.

Moreover, the application will serve as a hub for updating activities organized by posyandu cadres and facilitate communication among users. This means that users can stay informed about upcoming events, workshops, and support groups, fostering a sense of community among pregnant women. The application aims to empower its users by enhancing their understanding of pregnancy-related issues while also providing a platform for social interaction and mutual support. By integrating these functionalities, the application strives to create a holistic support system that promotes both knowledge acquisition and emotional well-being for pregnant women.

The implementation of the application is divided into two main user roles: the counselor and the end-users, which include pregnant women, postpartum mothers, and the general public. For counselors, the application features a registration interface, allowing them to create accounts, as well as a profile page where they can edit their names and passwords, with options to log out or return to the main menu. Additionally, counselors can register new clients (conseele) by entering their full name, spouse's name, date of birth, phone number, and address, with a registration button to save this information to the database. The counseling results and recommendations are recorded in a dedicated section where counselors can input issues and provide suggestions, with options to save or return to the counseling page.

For the end-users, the application offers functionalities such as user registration, mental health education, mental health tips, initial mental health screening, and online counseling. The user registration interface enables pregnant women and postpartum mothers to create their accounts. The mental health education section provides essential articles tailored to the needs of these users, while the tips section offers practical advice for maintaining mental well-being, including relaxation techniques. The initial mental health screening allows users to fill out a questionnaire to assess their current mental health status, with immediate feedback on their results. Finally, users can register for online counseling by submitting their concerns and directly chatting with the available counselor. This comprehensive approach aims to enhance mental health support and accessibility for pregnant and postpartum women.



Figure 2. Main view of the website (<https://bumilsejahtera.com/index.php>)

After the development of the social support application for pregnant women, a socialization event was held to introduce the application's features to pregnant women, the community, and posyandu (integrated healthcare center) cadres. This socialization aimed to provide a comprehensive understanding of the application's benefits, including access to counseling models, mental health services, and information on prenatal care that supports maternal and fetal well-being.

The participants responded enthusiastically, especially after an ice-breaking session was conducted to create a relaxed atmosphere. Participants were particularly interested in the counseling feature, which allows pregnant women to receive psychological support conveniently. Additionally, the application enables posyandu cadres to update the latest activities or information, which can be accessed directly via the web by pregnant women and their families. This feature enhances posyandu's involvement and brings information closer to the community, enabling a more effective and integrated support system for pregnant women.

Despite the enthusiasm, some participants initially expressed hesitancy in using the online counseling feature due to unfamiliarity with this method. To address these concerns, the team explained

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that the application also offers an option for in-person counseling through an appointment system, allowing participants who are more comfortable with face-to-face interaction to receive the support they need.



Figure 3. Application socialization
Figure 4. Psychoeducation

The PKM team conducted psychoeducation as a preventive and promotive intervention to enhance participants' understanding of mental health and foster behaviors that support mental health maintenance, particularly among pregnant women. Following this psychoeducation program, participants demonstrated a significant increase in their knowledge of mental health concepts and management strategies. This improvement was reflected in the statistically significant difference between pretest and posttest results.

This increase in knowledge is expected to encourage proactive behaviors in maintaining mental well-being, including the ability to detect early signs or symptoms of potential mental health issues. This is particularly important for pregnant women, who tend to be more vulnerable to psychological stress, to help them maintain emotional balance, which can positively impact their health and fetal development.

Additionally, for posyandu cadres, the psychoeducation provides foundational material that can be utilized to educate the wider community on the importance of mental health. As such, these cadres can serve as change agents within their communities, contributing to the collective increase in mental health awareness and the importance of its maintenance.

In this PKM activity, relaxation methods were also introduced. The relaxation exercises aim to help pregnant women calm themselves when facing stressful or anxiety-inducing situations during pregnancy. The relaxation method taught uses an affirmation model, where pregnant women are encouraged to repeat positive statements to enhance calmness and self-confidence. Additionally, pregnant women have the option to practice relaxation independently using audio guides available on the Bumil Sejahtera app, allowing them to engage in self-soothing whenever needed.

Following the relaxation exercises, participants reported positive responses, including feelings of greater calm, improved ability to manage anxiety, and increased confidence in facing the challenges of pregnancy. This method is intended not only to support them in managing current stress but also to equip them with stress management skills that will be beneficial throughout pregnancy and postpartum.

The benefits of this relaxation method extend to posyandu cadres as well. Through the relaxation training provided to pregnant women, the posyandu cadres gain additional knowledge and skills to support the mental health of the mothers. They can assist pregnant women in practicing affirmation techniques and guide them in using the audio relaxation tools available on the Bumil Sejahtera app.

As community health agents, the posyandu cadres' knowledge of relaxation methods enables them to play a more active role in supporting pregnant women. This also strengthens community trust in posyandu as a source of support not only for physical health but also for mental health. The cadres are better prepared to offer assistance in situations that require emotional support, benefiting not only pregnant women but also other family members in need of calm and reassurance.



Figure 5. Relaxation

The PKM program was evaluated using both pretest and posttest assessments, each consisting of five aspects, alongside participant feedback. These assessments were administered via Google Forms, which were accessed online by the participants. This approach allowed for convenient and efficient data collection, enabling participants to complete the forms remotely at their own pace. The use of an online platform ensured that the evaluation process was easily accessible to all participants, regardless of location, and helped streamline data gathering for analysis. The comparison between the pretest and posttest scores reveals significant improvements in participants' understanding and application of mental health concepts and relaxation techniques. The total score for all aspects increased from 5.5 in the pretest to 8.0 in the posttest, demonstrating an overall enhancement. Specifically, participants showed notable gains in knowledge of mental health (5.5 to 8.0), strategies for maintaining mental health (5.2 to 8.2), and how to seek help for mental health issues (5.3 to 8.1). Additionally, there was an improvement in their understanding of relaxation techniques (5.1 to 8.3) and their ability to apply these techniques independently (4.9 to 8.0). These results highlight the program's success in empowering participants with the tools and knowledge to better manage their mental health and stress. The results can be clearly seen in the Table 2.

Table 2. Post-test and pre-test evaluation results

Aspect Assessed	Average Pre-test Score	Average Post-test Score	Improvement
Knowledge of Mental Health	5.5	8.0	+2.5
Strategies for Maintaining Mental Health	5.2	8.2	+3.0
How to Seek Help When Facing Mental Health Issues	5.3	8.1	+2.8
Knowledge of Relaxation Techniques	5.1	8.3	+3.2
Application of Relaxation Techniques (measured techniques: deep breathing, progressive muscle relaxation, and meditation)	4.9	8.0	+3.1
Total Score for All Aspects	5.5	8.0	+2.5

Participant feedback was predominantly positive, with many expressing appreciation for the practical guidance and supportive environment fostered by the program. Specifically, participants valued the relaxation techniques and audio-guided resources available in the application, which they found beneficial for self-management. Suggestions for future PKM initiatives included requests for expanded application features, such as more interactive content, regular mental health workshops, and additional opportunities for in-person counseling. These insights underscore the necessity for ongoing program development to deepen participant engagement and sustain support for mental health during pregnancy.

Discussion

The development of the Bumil Sejahtera application as part of this community service program (PKM) represents an innovative approach to supporting mental health and well-being among pregnant

women through digital technology. A digital-based application will enhance posyandu efficiency by streamlining data recording and reporting, ensuring accuracy and uniformity, and providing real-time access for better supervision and management.

This application provides easy access to information on mental health during pregnancy for expectant mothers, posyandu cadres, and healthcare providers within community health settings. Key features, such as counseling options and guided audio relaxation, are designed to assist pregnant women in managing anxiety and raising awareness of the importance of mental health. This technology-based innovation is particularly relevant, given the rapid advancements in digital health tools that have shown to significantly improve patient engagement in managing their own health (Davis et al., 2022; Lau et al., 2024; Pierce et al., 2023).

The significance of mental health during pregnancy has been increasingly recognized in various studies, which reveal that pregnant women are vulnerable to anxiety, stress, and depressive symptoms. These concerns not only affect maternal well-being but also have an impact on fetal development (Salehi et al., 2020). Interventions such as psychoeducation and relaxation techniques have proven effective in helping pregnant women manage stress and anxiety (Sudaryanti et al., 2021). Psychoeducation functions as a preventive intervention, providing both pregnant women and posyandu cadres with an understanding of the importance of mental health and how to maintain emotional well-being (Wang et al., 2023; Yuen et al., 2022). Through the psychoeducation component of this PKM program, pregnant women not only gained knowledge about factors affecting their mental health but also developed proactive behaviors for maintaining their well-being.

Furthermore, the relaxation techniques taught, specifically the affirmation model, offer a simple and practical method for helping pregnant women achieve calmness during stressful situations. Relaxation and positive affirmations are supported by scientific evidence for their effectiveness in promoting a sense of calm and reducing anxiety levels (Zenouzi et al., 2024). The Bumil Sejahtera app provides audio relaxation guides accessible at any time, allowing pregnant women to engage in independent relaxation exercises. These exercises serve as useful tools for anxiety management during pregnancy, which, as research suggests, have direct benefits for maternal well-being and long-term positive effects on child health (Mueller & Grunwald, 2021).

For posyandu cadres, this program provides essential knowledge and skills to support the mental health of pregnant women. The psychoeducation and relaxation training equips them to serve as more competent health agents within the community, functioning not only as providers of physical health services but also as supporters of mental health. Having trained posyandu cadres enables the program's sustainability, as they can educate and guide pregnant women in applying relaxation techniques, offer emotional support, and encourage them to use the application's features. Research by (Bedaso et al., 2021) highlights that support from community health cadres significantly enhances access and success rates for community-based mental health programs.

Overall, this PKM program makes a meaningful contribution to supporting the mental health of pregnant women through a combined approach of technology-based tools, psychoeducation, and relaxation techniques. These interventions address the limitations of access to mental health services for pregnant women and strengthen the role of posyandu cadres in supporting community mental health.

4. CONCLUSION AND RECOMMENDATIONS

In conclusion, this PKM program is effective in supporting the mental health and well-being of pregnant women. This can be seen from the results of the evaluation that has been carried out. Descriptive analysis of the test scores revealed a notable increase in the mean score, from 5.5 in the pretest to 8.0 in the posttest, indicating a significant improvement in participants' understanding and awareness of mental health topics following the intervention. This increase suggests that the psychoeducation and relaxation techniques were effective in enhancing knowledge and confidence in managing mental health. Furthermore, Participant feedback was predominantly positive, with many expressing appreciations for the practical guidance and supportive environment fostered by the program. These initiatives provide

pregnant women with practical tools for managing stress and increasing mental health awareness, while also equipping cadres to deliver consistent, informed support.

The limitations of this PKM program include several key challenges. First, there were infrastructure constraints, particularly a lack of access to digital devices and reliable internet connectivity in certain areas, which hindered the optimal use of the Bumil Sejahtera application. Second, the duration of the training sessions was relatively short, limiting participants' ability to fully comprehend and practice relaxation techniques independently. This may have affected the depth of understanding and the sustainability of the intervention's impact. Lastly, participant engagement faced obstacles, as not all individuals could attend the entire series of activities due to competing responsibilities or mobility challenges, particularly for pregnant women and community health cadres. These limitations highlight areas for improvement to ensure greater inclusivity, accessibility, and long-term effectiveness in future implementations. To address these limitations, several recommendations can be implemented to enhance the program's effectiveness and sustainability. First, providing adequate infrastructure support, such as digital devices, internet hotspots, or offline access to the Bumil Sejahtera application, can improve accessibility for participants in underserved areas. Second, extending the program's duration and incorporating follow-up sessions can allow participants to deepen their understanding and consistently apply the relaxation techniques. Supplementary materials, such as video tutorials, could also support continuous learning. Third, adopting a hybrid training model that combines online and offline sessions can accommodate participants with mobility or scheduling constraints while ensuring practical skills are effectively delivered. Finally, fostering collaborations with other health initiatives, such as maternal and child health programs, can expand outreach and integrate mental health support into broader community health strategies. These actionable steps can serve as a foundation for improving future PKM programs, ensuring greater inclusivity and impact.

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Improving maternal mental health through digital-based social support

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