

Implementation of a Digital Questionnaire-Based Community Mental Health Screening System and Information Dashboard in the Bendosari Primary Healthcare Catchment Area

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ABSTRACT

Mental health is a critical component of public health; however, it remains underdetected and inadequately managed, particularly at the primary healthcare level. Following the COVID-19 pandemic, the prevalence of stress, anxiety, and depression has increased, while mental health literacy remains low and stigma persists. In the Bendosari Primary Healthcare catchment area, service coverage for severe mental disorders has not reached the national target, and structured data on community mental health conditions are lacking. This absence of systematic screening and data-driven monitoring limits the development of effective promotive and preventive programs. This community engagement project aimed to enhance mental health literacy, early detection, and monitoring capacity through the implementation of a digital screening system using the Self-Reporting Questionnaire (SRQ-20) and an information dashboard based on Google Data Studio. The method involved five integrated stages: community socialization, mental health and digital literacy training, technology implementation, mentoring and evaluation, and sustainability planning through the establishment of digital health cadres and standard operating procedures. The results demonstrated a 45.1% increase in participants' mental health literacy scores, with 75% of participants showing improvement. Digital screening coverage reached 68% of the target population. Screening results indicated 61.8% low risk, 26.5% moderate risk, and 11.7% high risk individuals. Additionally, a functional dashboard prototype and ten digital health cadres were successfully established. In conclusion, the integration of digital screening tools and data visualization effectively improves early detection, community awareness, and data-driven decision-making in primary mental healthcare, offering a scalable model for digital health transformation.

Keyword: Digital mental health screening; Community health informatics; Mental health literacy; Primary healthcare; Data-driven decision making.

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INTRODUCTION

Mental health is a fundamental component of overall well-being, influencing individuals' ability to cope with stress, maintain productivity, and participate in social life. Despite its importance, mental health problems remain underrecognized and underreported, particularly in primary healthcare settings. In the post-COVID-19 context, the prevalence of stress, anxiety, and depression has increased significantly, driven by socioeconomic pressures, lifestyle changes, and social vulnerability. However, mental health literacy in communities remains low, and stigma continues to hinder early help-seeking behavior. In many primary care areas, including the Bendosari Primary Healthcare catchment area, mental health services have not yet achieved optimal coverage, and structured data on emotional mental health conditions are still limited. The absence of systematic screening and monitoring systems leads to delayed identification and reactive rather than preventive interventions.

Previous studies have highlighted the potential of digital health technologies in improving early detection and monitoring of mental health conditions. Digital screening tools such as the Self-Reporting Questionnaire (SRQ-20), Patient Health Questionnaire (PHQ-9), and Generalized Anxiety Disorder scale (GAD-7) have been widely used for community-based mental health assessment. Additionally, the integration of health data into digital dashboards has been shown to enhance data visualization, facilitate evidence-based decision-making, and improve program planning in primary healthcare. Studies also indicate that community-based mental health literacy interventions can significantly increase awareness and reduce stigma when combined with participatory approaches. However, most existing implementations focus either on digital screening or health education separately, with limited integration into a comprehensive system that combines community empowerment, digital screening, and real-time data visualization at the primary healthcare level.

Based on this gap, the scientific novelty of this study lies in the integration of three key components: (1) community-based mental health literacy enhancement, (2) digital screening using SRQ-20, and (3) the development of a real-time mental health dashboard to support data-driven decision-making in primary healthcare. This integrated approach not only enables early detection but also provides structured, visualized data to guide promotive and preventive interventions. Furthermore, the involvement of digital health cadres and students through a community engagement framework strengthens the sustainability and scalability of the intervention.

The main problem addressed in this study is the low level of mental health literacy and the lack of utilization of information technology for systematic screening and monitoring of mental health in the community. It is hypothesized that the implementation of an integrated digital mental health screening and dashboard system can improve community literacy, increase early detection coverage, and support evidence-based planning in primary healthcare settings.

Therefore, this study aims to analyze the implementation and outcomes of a digital questionnaire-based mental health screening system integrated with an information dashboard to enhance mental health literacy, early detection, and data-driven monitoring in the Bendosari Primary Healthcare catchment area.

METHODS

This community engagement program was conducted in the Bendosari Primary Healthcare catchment area, specifically in RT 5 RW 12 Gabahan, Sukoharjo Regency, Indonesia. The target population included adult community members aged ≥ 15 years, local health cadres, and representatives of neighborhood leaders. A total of 50 community members were targeted, with 34 participants completing the digital screening process. The program also involved 10 selected individuals who were trained as Digital Health Cadres.

This program employed a combination of methods, including **community education, training, diffusion of science and technology (IPTEKS), simulation, and advocacy**. Community education was conducted through health promotion sessions, focus group discussions, and dissemination of educational materials to improve mental health literacy and reduce stigma. Training methods included hands-on sessions on the use of digital screening tools and dashboard systems. Diffusion of Ipteks was implemented through the introduction of a digital mental health screening system and a real-time dashboard. Simulation methods were applied to demonstrate how to use the digital system, while advocacy was conducted through continuous mentoring and stakeholder engagement to ensure sustainability.

The materials used in this program included: (1) the Self-Reporting Questionnaire (SRQ-20) adapted into a digital format using Google Forms (20 items, dichotomous responses), (2) a database managed using Google Sheets, (3) a dashboard developed using Google Data Studio (Looker Studio), and (4) educational materials such as leaflets, posters, and videos (at least five types). All tools were developed by the research team based on standardized instruments and publicly available platforms.

The implementation consisted of five stages: (1) socialization and baseline assessment, (2) mental health and digital literacy training, (3) deployment of digital screening and dashboard systems, (4) mentoring and evaluation, and (5) sustainability planning through the development of standard operating procedures and cadre empowerment. Data were collected through pre- and post-tests of mental health literacy, SRQ-20 screening results, and user feedback on the dashboard.

Data analysis was conducted using descriptive quantitative methods. Pre- and post-test scores were compared to assess literacy improvement, and screening results were categorized into low, moderate, and high risk. Program effectiveness was evaluated based on participation rates, literacy improvement ($\geq 70\%$ target), and system usability. This methodological framework provides a replicable model for implementing community-based digital mental health interventions in primary healthcare settings.

RESULT DAN DISCUSSION

Implementation of Mental Health Socialization and Education

The socialization and educational activities were successfully conducted in RT 5 RW 12 Gabahan, involving community members, health cadres, local leaders, and representatives from the Bendosari Primary Healthcare Center. A total of 32 participants attended the sessions and completed both pre-test and post-test assessments of mental health literacy.

The results showed a substantial improvement in participants' knowledge. The average pre-test score increased from 56.3 to 81.7 in the post-test, representing a 45.1% increase. Additionally, 75% of participants demonstrated improved scores after the intervention. This indicates that the target of achieving at least 70% improvement in mental health literacy was successfully met.

This improvement can be attributed to the use of participatory and contextual educational approaches, including interactive discussions, local case-based explanations, and the use of visual educational media. The involvement of community leaders and health cadres also enhanced engagement and trust, which are critical factors in addressing mental health stigma.

Implementation of Digital Mental Health Screening

The digital mental health screening system using the Self-Reporting Questionnaire (SRQ-20) was successfully implemented through a Google Forms platform. Out of 50 targeted adult residents, 34 individuals participated in the screening, resulting in a coverage rate of 68%, which exceeded the minimum target of 60%.

The screening results revealed the following distribution:

- Low risk: 61.8% (21 individuals)
- Moderate risk: 26.5% (9 individuals)
- High risk: 11.7% (4 individuals)

These findings indicate that while the majority of participants were categorized as low risk, a significant proportion of the community exhibited moderate to high risk of mental health problems, requiring further attention. The identification of these at-risk groups provides a critical foundation for targeted promotive, preventive, and referral interventions.

The relatively high participation rate suggests that digital screening tools are acceptable and feasible in community settings, particularly when supported by assistance from trained facilitators and simple user interfaces.

Development and Utilization of the Mental Health Dashboard

A prototype of a mental health monitoring dashboard was successfully developed using Google Data Studio (Looker Studio) and integrated with the screening database. The dashboard includes key features such as risk categorization visualization, screening trends, demographic filters, and summary indicators.

The dashboard functioned as an initial decision-support tool for both the community and healthcare providers. It enabled real-time visualization of mental health conditions, facilitating easier interpretation of data and identification of priority groups.

From the implementation, it was observed that the dashboard improved stakeholders' ability to understand aggregated data compared to traditional tabular formats. This aligns with previous findings that data visualization enhances decision-making efficiency in primary healthcare settings.

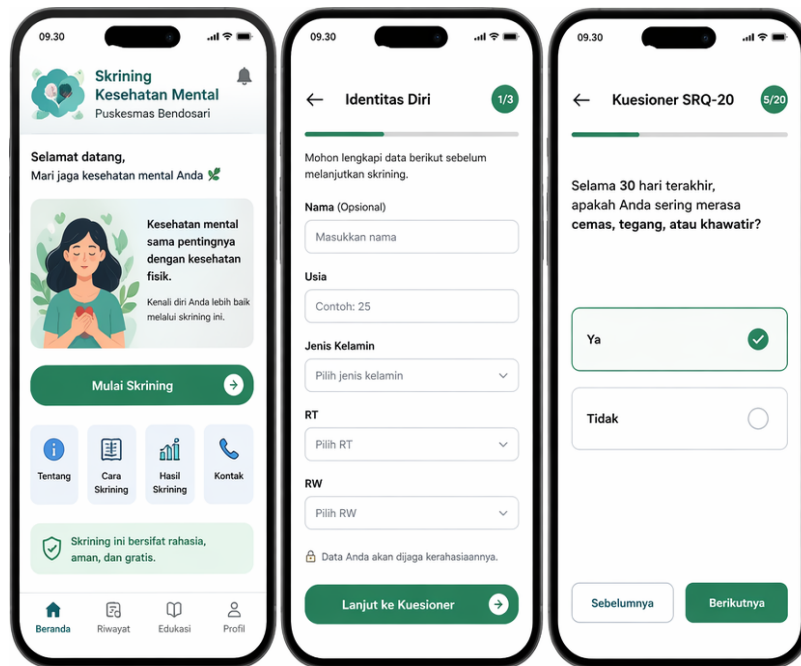


Figure 1. Mental health dashboard implementation and mobile screening application interface

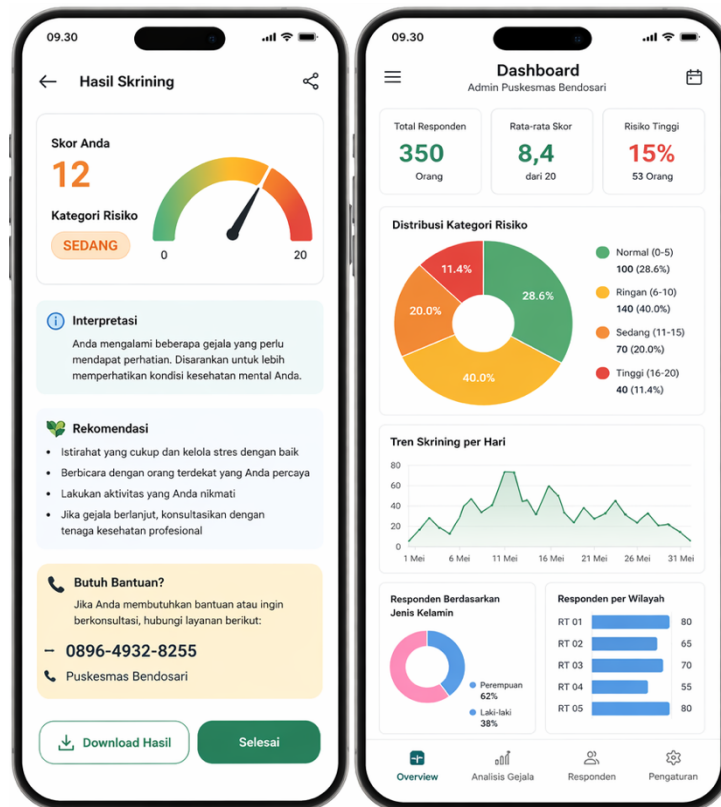


Figure 2. User screening results interface and admin monitoring dashboard view

Formation of Digital Health Cadres

A total of 10 Digital Health Cadres (Kader Digital Kesehatan) were successfully established and trained as part of the sustainability strategy. These cadres play essential roles in assisting community members with digital screening, supporting data entry, facilitating communication with healthcare providers, and promoting mental health awareness.

The presence of these cadres is a critical factor in ensuring the continuity of the program, particularly in addressing digital literacy gaps and maintaining community engagement.

Program Sustainability Outcomes

Several sustainability components were successfully achieved, including:

- Development of a draft Standard Operating Procedure (SOP) for conducting mental health screening at least twice per year
- Handover of the dashboard system to the Bendosari Primary Healthcare Center
- Establishment of an active WhatsApp support group for ongoing assistance
- Initial integration of the program into primary healthcare promotional activities

These outcomes indicate that the program has strong potential for long-term implementation and scalability to other communities.

Discussion

Effectiveness of Mental Health Literacy Intervention

The significant increase in literacy scores confirms that participatory education is effective in improving community understanding of mental health. The combination of simple language, culturally relevant examples, and visual media contributed to better knowledge retention.

This finding supports existing studies emphasizing that community-based education can reduce stigma and improve early recognition of mental health symptoms. Improved literacy is a crucial first step toward increasing help-seeking behavior and early intervention.

Digital Screening as a Tool for Early Detection

The achievement of 68% screening coverage demonstrates that digital tools can effectively increase access to mental health screening in community settings. The use of SRQ-20 in a digital format proved to be practical, efficient, and scalable.

This result reinforces previous evidence that digital health technologies can enhance early detection rates compared to conventional manual methods. However, the need for assistance among some participants highlights the importance of combining technology with human support.

Role of Dashboard in Data-Driven Decision Making

The implementation of the dashboard highlights its potential as a simple yet powerful decision-support system in primary healthcare. By transforming raw data into visual insights, the dashboard enables faster identification of trends and priority groups.

This aligns with the concept of evidence-based public health, where data utilization plays a central role in program planning and evaluation. The dashboard can serve as a foundation for more advanced health information systems in the future.

Implementation Challenges

Several challenges were identified during the program:

- Limited digital literacy among some participants
- Initial hesitation due to mental health stigma
- Dependence on assistance for using digital tools
- Need for further refinement of the dashboard for wider usability

These challenges suggest that digital interventions should always be accompanied by capacity-building efforts and community engagement strategies.

Implications and Future Development

The integration of digital screening, community education, and data visualization offers a comprehensive approach to mental health management in primary healthcare. This model can be expanded through:

- Periodic community-level screening programs
- Integration into national health information systems
- Expansion to other villages or districts
- Development of more advanced and automated dashboards

Overall, this program demonstrates that combining technology with community empowerment can significantly enhance mental health services, particularly in resource-limited primary care settings.

CONCLUSION

This study confirms that the implementation of an integrated digital mental health screening system combined with community-based education and an information dashboard effectively addresses the initial hypothesis and research objectives. The findings demonstrate that participatory mental health education significantly improved community literacy, as reflected by the substantial increase in post-test scores and the achievement of the $\geq 70\%$ improvement target. In addition, the use of a digital screening tool (SRQ-20) successfully increased early detection coverage to 68%, indicating that technology-based approaches are both feasible and acceptable in community settings. The identification of moderate- and high-risk individuals further highlights the importance of systematic screening in uncovering previously undetected mental health conditions. Moreover, the development and implementation of a real-time dashboard proved to be valuable in supporting data-driven decision-making at the primary healthcare level. The dashboard enabled clearer visualization of community mental health conditions and facilitated the identification of priority groups for intervention. The establishment of digital health cadres and the development of sustainability components, such as standard operating procedures and integration into primary healthcare programs, further strengthen the long-term potential of this model. In conclusion, the integration of digital screening, community empowerment, and data visualization represents an

innovative and effective approach to improving mental health literacy, early detection, and monitoring in primary healthcare settings. This model has strong potential for scalability and replication in other regions. Future recommendations include expanding the program to a larger population, integrating the system with national health information systems, enhancing dashboard features with automated analytics, and conducting longitudinal studies to assess long-term impacts on mental health outcomes. Additionally, further research is needed to explore strategies for reducing stigma and improving digital literacy to maximize the effectiveness of similar interventions.

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