



Heal Me UMP: A Smartphone-Based Mental Health Screening Application for Nursing Students

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<p>Track Record Article</p> <p>Revised: 01 January 2026 Accepted: 27 March 2026 Published: 31 March 2026</p> <p>How to cite : Basuki, S. P. H., Purwito, D., Amelia, V. L., Asiandi, & Fahmi, G. M. (2026). Heal Me UMP: A Smartphone-Based Mental Health Screening Application for Nursing Students. <i>Contagion : Scientific Periodical of Public Health and Coastal Health</i>, 8(1), 566–578.</p>	<p style="text-align: center;">Abstract</p> <p><i>Mental health disorders, such as depression, anxiety, and stress, significantly affect university students' academic engagement, particularly among health science students who face demanding academic and clinical workloads. In Indonesia, screening practices remain largely manual, limiting efficiency and timely intervention. This study developed a smartphone-based mental health screening application for nursing students using a Research and Development design with the Four-D model. The resulting Android application, Heal Me UMP, was tested among 129 fifth-semester nursing students. The app offers mental health screening, personalized activity recommendations, and daily reminders. User evaluations demonstrated strong acceptance in terms of usability, usefulness, and system quality (74.5%–78.5%). Content validity was excellent (S-CVI = 1.00), and reliability testing indicated high internal consistency (Cronbach's alpha = 0.97). These findings suggest that Heal Me UMP is a feasible, acceptable, and reliable digital tool for early detection of mental health problems among nursing students.</i></p> <p>Keywords: Digital mental health screening, smartphone application, mobile screening, nursing students, Indonesia</p>
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INTRODUCTION

Mental health disorders among university students, particularly depression, anxiety, and stress, are well-documented as impairing academic engagement and performance (Fauzi et al., 2021). Anxiety, in particular, has been closely linked to poor sleep quality, increasing the risk of insomnia by up to sevenfold among college students (Juwita, Angela, & Napitupulu, 2025). These challenges are especially pronounced among health science students, whose demanding academic and clinical responsibilities heighten vulnerability to psychological strain (Fauzi et al., 2021). Contributing factors such as low student engagement, inadequate sleep, and irregular dietary patterns further exacerbate these conditions (Ishimaru et al., 2023). Conversely, maintaining good mental health supports critical academic skills, including concentration and stress management, that are essential for student success (Garces, Fajardo, Villao, Caguana, & Esteves, 2023).

In response to these challenges, educational institutions are increasingly compelled to establish baseline data on student mental well-being and implement early detection mechanisms (Garces et al., 2023; Hendra, Heryanti, & Perdani, 2020). In Indonesia, however,

a major obstacle lies in the reliance on manual assessments. Even validated and reliable instruments such as the Indonesian version of the Depression Anxiety Stress Scale (DASS-21) (Muttaqin & Ripa, 2021; Nada, Herdiana, & Andriani, 2022) are typically administered in paper-based formats. This conventional approach is inefficient and restricts timely intervention, particularly when addressing the needs of large student populations.

Digital mental health services provide scalable, accessible, and integrated solutions to overcome existing barriers in student support (Zhong et al., 2023). Evidence indicates that IoT-based systems utilizing the DASS-21 instrument can effectively assess student mental health (Nagayo, Al Ajmi, Guduri, & Buradai, 2024), while mobile applications facilitate real-time data collection and continuous refinement through user-centered design (Funnell, Spadaro, Benacek, et al., 2022; Shahsavar & Choudhury, 2024). Nonetheless, persistent challenges remain, particularly regarding ethical considerations such as risk minimization, health literacy, and user empowerment in m-Health contexts (Istepanian, 2022). To address these issues, Heal Me UMP was developed as a context-specific application for nursing students, integrating with the Academic Information System (SIA), employing the validated DASS-21 instrument, and enabling structured institutional mental health screening.

To address these gaps, this study developed and trialed "Heal Me UMP," a smartphone-based mental health screening application specifically designed for nursing students at Universitas Muhammadiyah Purwokerto. Guided by a systematic Research and Development (R&D) approach using the Four-D model, the study pursued three objectives: (1) to create an Android application integrating the validated DASS-21 questionnaire; (2) to adapt the digital tool to the unique academic and clinical pressures faced by nursing students; and (3) to conduct a field test within the nursing study program to evaluate the prototype's feasibility.

METHODS

This study employed the Research and Development (R&D) method using the Four-D development model (Laurens & Laamena, 2020), which consists of four stages: Define, Design, Develop, and Disseminate (Figure 1). Data were collected from experts and respondents through Google Forms. The implementation steps are outlined as follows:



Figure 1. Four-D development model

Stage 1: Define

This stage involved a needs analysis, identification of the target population, and formulation of objectives and success indicators. Problems were identified through a preliminary study with nursing students at the Faculty of Health Sciences, Universitas Muhammadiyah Purwokerto.

Stage 2: Design

Activities included developing a conceptual framework in the form of a storyboard as the basis for the Android-based screening application (Figure 2). An intervention strategy was formulated by integrated validated and reliable mental health measurement tools, while evaluation methods were determined through the construction of instrument items to assess product quality.

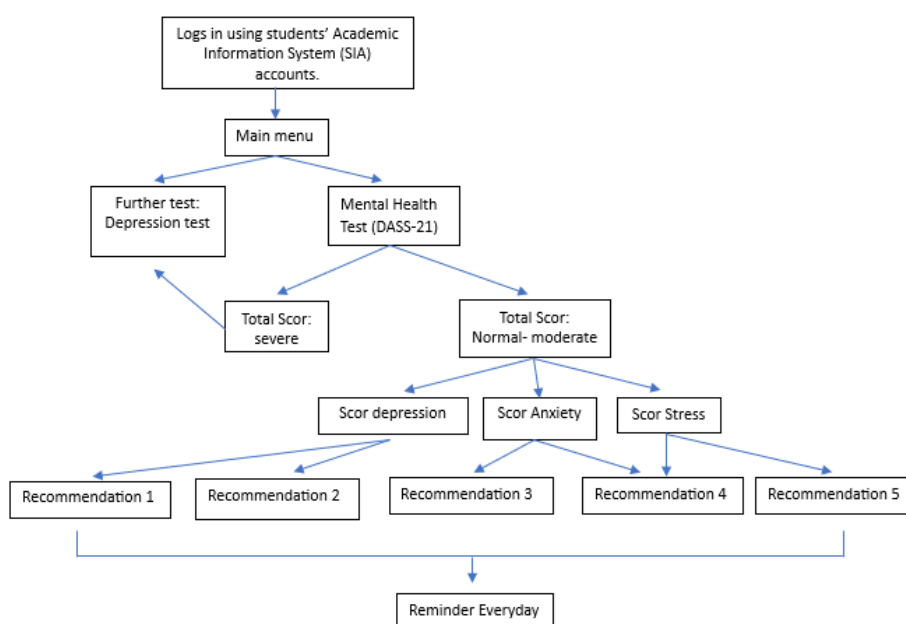


Figure 2. Workflow of App

Stage 3: Develop

The development stage produced a prototype with features such as mental health assessments, activity recommendations, reminders, and user history logs. Feasibility was evaluated through expert appraisal using the Content Validity Index (CVI), followed by usability testing with 12 nursing students and subsequent revisions. Reliability of the evaluation instrument was assessed using Cronbach's alpha with SPSS.

Stage 4: Disseminate

The dissemination phase involved a cross-sectional trial with 129 fifth-semester nursing students. Data were collected once via a Google Form distributed through WhatsApp to

evaluate user perceptions, acceptance, and initial feedback on Heal Me UMP. Participants were recruited through voluntary convenience sampling. A self-developed questionnaire measured feasibility, usability, usefulness, and user satisfaction, with validity established through expert appraisal and reliability confirmed using Cronbach's alpha.

RESULTS

Results of The Defining Stage

Based on a preliminary study conducted among 13 nursing students using closed and open-ended questionnaires, the majority of respondents reported having experienced symptoms of depression, anxiety, and stress.

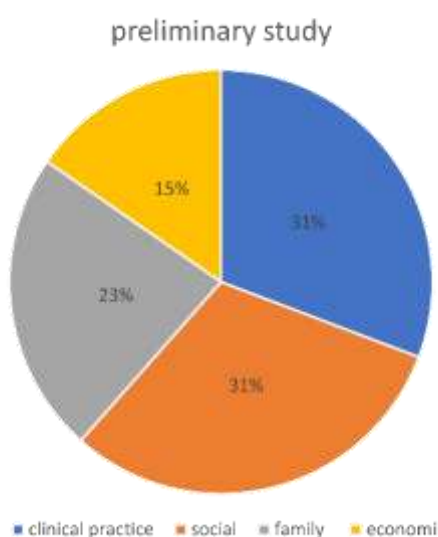


Figure 3. Preliminary study

The primary cause identified for these symptoms was the high academic demand, which encompassed coursework and clinical practice, compounded by social, economic, and familial factors.

Results of the Designing Stage

The workflow of the *Heal Me UMP* application begins with users downloading the app and logging in through their Academic Information System (SIA) account. After authentication, users complete the DASS-21 assessment, which generates categorized scores for depression, anxiety, and stress. Based on the results, the app provides personalized activity recommendations and daily reminders for up to one week or until reassessment. To safeguard confidentiality, data privacy is maintained through an anonymized administrator interface displaying only user scores without personal identifiers.

Expert Appraisal

The initial instrument consisted of 24 items, which were subsequently refined to 16 items following expert review. Content validation was carried out by a panel of seven experts, who were first given the opportunity to operate the application prior to conducting the assessment.

Table 1. Calculation Content Validity Index

	Ne	CVR	I-CVI	UA		
item 1	7	1.00	1.00	1.00		
item 2	7	1.00	1.00	1.00		
item 3	7	1.00	1.00	1.00		
item 4	7	1.00	1.00	1.00		
item 5	7	1.00	1.00	1.00		
item 6	7	1.00	1.00	1.00		
item 7	7	1.00	1.00	1.00	keterangan:	
item 8	7	1.00	1.00	1.00	0,80 - 1,00	very high
item 9	7	1.00	1.00	1.00	0,60 - 0,79	high
item 10	7	1.00	1.00	1.00	0,40 - 0,59	moderate
item 11	7	1.00	1.00	1.00	0,20 - 0,39	low
item 12	7	1.00	1.00	1.00	0,00 - 0,10	very low
item 13	7	1.00	1.00	1.00		
item 14	7	1.00	1.00	1.00		
item 15	7	1.00	1.00	1.00		
item 16	7	1.00	1.00	1.00		
		S-CVI/Ave	1.00			
		S-CVI/UA		1.00		

They then proceeded to evaluate its various aspects and provide recommendations for improvement. The results of the calculation of Content Validity Ratio (CVR), Item Content Validity Index (I-CVI), Scale Content Validity Index (S-CVI), and Scale Content Validity Index/Universal Agreement (S-CVI/UA) are attached in the table (Table 1).

Results of the Developing Stage

The *Heal Me UMP* screening application has been successfully developed and is available on the Play Store. It features mental health assessments for depression, anxiety, and stress, complemented by activity recommendations, reminders, and a history log. The application is integrated with the Student Academic Information System (SIA), allowing users to log in seamlessly without separate registration (Figure 4). Once logged in, users can access the main menu, which provides a range of mental health assessment features (Figure 5).



Figure 4. login user

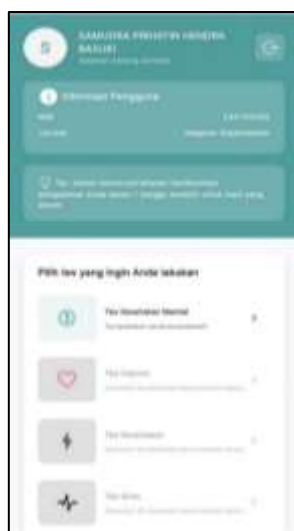


Figure 5. Main Menu



Figure 6. Result Score

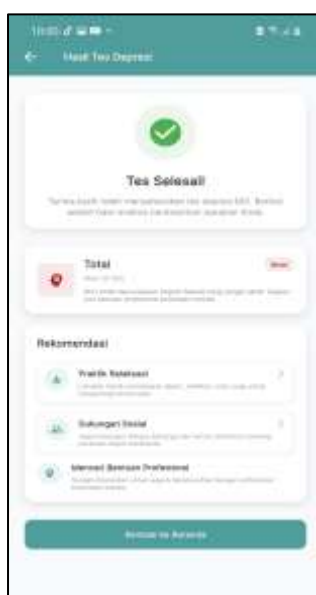


Figure 7. Recommendation

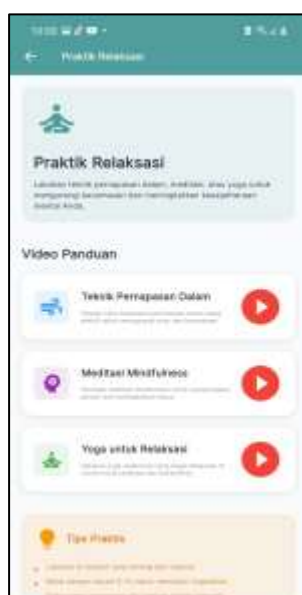


Figure 8. Recommendation



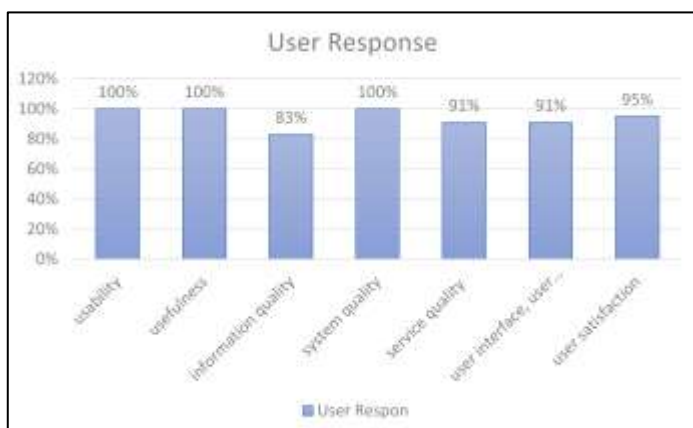
Figure 9. Further Test

Users can select a specific mental health test and complete it, after which the system generates a results score (Figure 6). Based on the score obtained, the application provides recommended activities designed to help maintain well-being or mitigate mental health concerns (Figures 7 and 8). When results indicate a serious level of concern, the system guides users toward pursuing further, more comprehensive evaluation (Figure 9).

Prototype Testing

Prototype testing was conducted to evaluate the effectiveness and user acceptance of the Heal Me UMP Android-based mental health screening application. The trial involved a small group of nursing students ($n = 12$) and focused on assessing the functionality of key

features, including the mental health screening test, depression assessment, recommendation system, and reminder function.



Figur 10. user response (prototype testing)

User evaluation was conducted using a 16-item questionnaire with a 4-point Likert scale (1 = Very Less to 4 = Excellent), covering usability, usefulness, information quality, system quality, security and privacy, UI/UX, and overall satisfaction. Results indicated excellent ratings across all domains, reflecting highly positive user responses and supporting the application's feasibility for broader dissemination (Figure 10 and Table 2).

Table 2. Criteria

Percentage range %	Criteria
81 - 100	Excellent
61 - 80	Good
41 - 60	Enough
21 - 40	Less
0 - 20	Very Less

→ **Reliability**

Scale: ALL VARIABLES

Case Processing Summary

		N	%
Cases	Valid	12	100.0
	Excluded ^a	0	.0
	Total	12	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
.971	16

Figure 11. Reliability of Cronbach's Alpha score

In addition to content validity testing using the Content Validity Index (CVI), the internal consistency reliability of the questionnaire was examined using Cronbach's Alpha based on data from prototype testing involving 12 respondents. The reliability analysis yielded a Cronbach's Alpha value of 0.97 (Figure 11), indicating excellent internal consistency and confirming that the instrument was reliable for evaluating usability, usefulness, system quality, and user satisfaction.

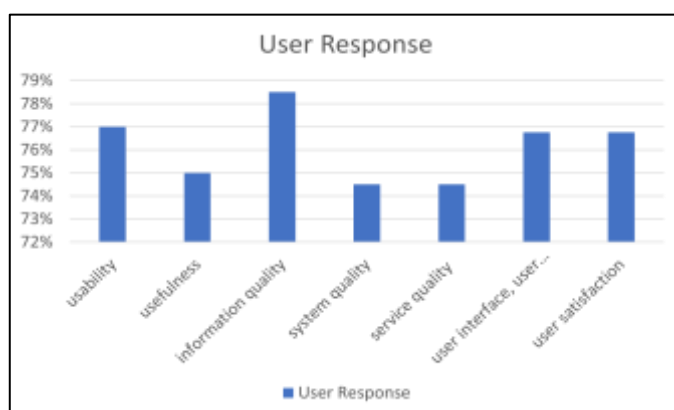
Table 3. Summary of Thematic Analysis of User Feedback (n = 129)

Theme	Subtheme	Representative User Comments
Ease of Use and Interface Design	Simple navigation and login	"The Heal Me ump application is easy to use and very flexible. "The application login is very easy."
Perceived Usefulness	Mental health awareness and self-reflection	"This app is very helpful for assessing mental health." "I can tell what symptoms I'm experiencing."
Feature Limitations	Limited features and inaccessible videos	"Features are still limited to use."; "Educational videos are not yet accessible."
Content and Measurement Needs	Additional educational materials and clearer questions	"Added material related to depression, anxiety, and stress. "The question is made even clearer."
System Quality and Accessibility	Technical stability and platform expansion	"When you first use the application, it gets an error." "Added to the App Store for use on iPhone."

Qualitative feedback from 129 respondents (Table 3) was analyzed using thematic analysis to complement quantitative findings. Overall, users reported that the *Heal Me UMP* application was easy to use, practical, and visually simple, reflecting good usability and acceptability. The application also enhanced awareness of mental health and helped users recognize symptoms of depression, anxiety, and stress. Nonetheless, respondents suggested several areas of improvement, including the addition of new features, expansion of educational content, enhancement of system stability and compatibility, and greater clarity and accuracy in screening items. These insights provide valuable guidance for further refinement and development of the application.

Result of Dissemination

The Android application "Heal Me UMP" was distributed to 129 students from the Nursing Science Study Program at Universitas Muhammadiyah Purwokerto as research respondents.

**Figure 12. User response to disseminate**

Participants rated the application as good across multiple critical domains, including usability (77%), usefulness (75%), information quality (78.5%), system quality (74.5%), service quality,

Table 4. Criteria

Percentage range %	Criteria
81 - 100	Excellent
61 - 80	Good
41 - 60	Enough
21 - 40	Less
0 - 20	Very Less

security & privacy (74.5%), user interface, user experience, design (76.5%), and user satisfaction (76.5%).

Table 5. Means and Standard Deviation

Domains	Question	Mean	SD
Usability	Q1, Q2, Q3	3.83	0.54
Usefulness	Q4, Q5	3.81	0.61
Information quality	Q6, Q7	3.73	0.58
System quality	Q8, Q9, Q10	3.58	0.72
Security & Privacy	Q11, Q12	3.68	0.66
UI/UX	Q13, Q14	3.73	0.60
User satisfaction	Q15, Q16	3.78	0.68

The evaluation of the *Heal Me UMP* application revealed generally positive user perceptions across multiple domains. Usability (3.83) and usefulness (3.81) scores indicate that the application is easy to operate and beneficial for independent mental health screening. Information quality (3.73) and UI/UX design (3.73) were also rated positively, reflecting adequate content and a user-friendly interface. In contrast, system quality received the lowest score (3.58), highlighting the need for improved performance and stability, while service quality (3.68) suggests that data security and privacy require further strengthening. Overall satisfaction was high (3.78), demonstrating that the application largely meets user expectations despite areas identified for enhancement.

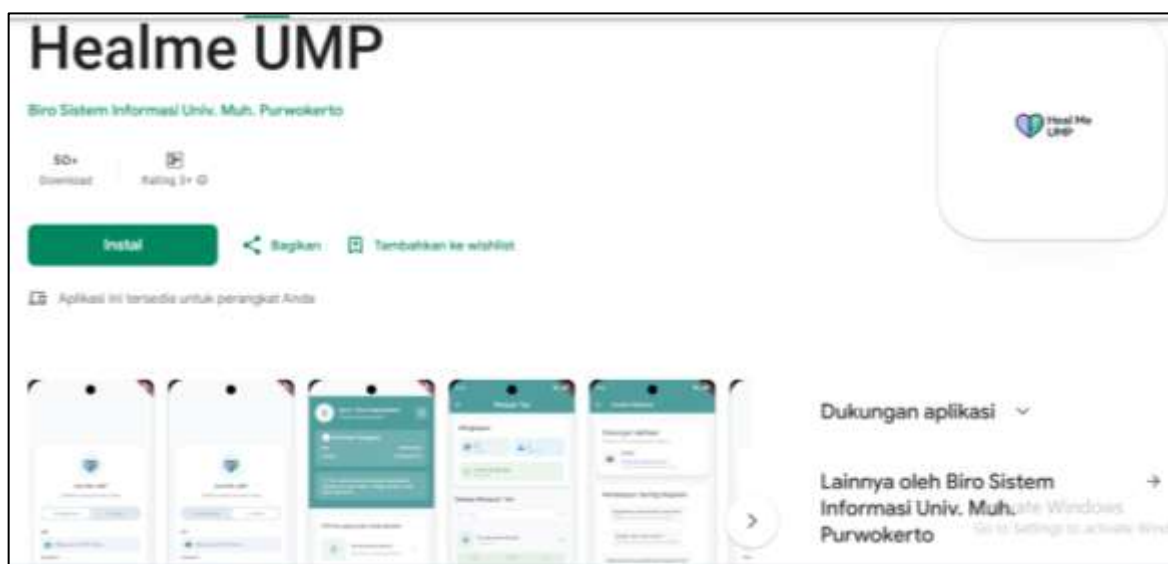


Figure 13. Heal Me UMP was published on the Google Play Store

The application has been officially published on the Google Play Store and is easily accessible for download by anyone using the keyword "Heal Me UMP" (Figure.13).

DISCUSSION

The development of *Heal Me UMP* addresses critical mental health challenges among nursing students, who often experience academic, clinical, and socio-economic stressors. This finding is consistent with prior studies reporting high levels of stress, anxiety, and depression among health science students (Fauzi et al., 2021), and with systematic reviews highlighting the urgent need for accessible interventions (Deng et al., 2021; Lin et al., 2024). Unlike generic mental health applications, *Heal Me UMP* is specifically tailored to the unique needs of nursing students, thereby enhancing its relevance and potential effectiveness (Shahsavari & Choudhury, 2024). Such contextualized approaches are essential, as evidence demonstrates that personalized digital mental health interventions yield more favorable outcomes.

From a design perspective, integration with the university's Academic Information System (SIA) simplifies user access and promotes adoption, thereby supporting effective implementation of digital health platforms (Loo et al., 2025). The application employs a closed-loop design, linking DASS-21 screening results with immediate, personalized activity recommendations in line with just-in-time adaptive interventions (JITAI), which provide timely and context-specific support (Nahum-Shani & Murphy, 2025). Furthermore, the built-in reminder system fosters sustained user engagement and encourages healthy behavior, contributing to the long-term effectiveness of digital interventions (Jaramillo Botero, 2024; Lu, Lin, Yu, & Hu, 2025; Arigo et al., 2019).

Content validity assessment through expert review and user testing produced highly positive results. The 16-item instrument was evaluated by seven experts using the Scale-Level Content Validity Index (S-CVI), achieving perfect scores for both S-CVI/Ave and S-CVI/UA (1.00), indicating complete agreement on item relevance (Said, Bujang, Buang, & Besar, 2022). These values surpass the minimum standards proposed by Polit (≥ 0.90 for S-CVI/Ave and ≥ 0.80 for S-CVI/UA), thereby confirming excellent content validity and supporting the instrument's suitability for subsequent measurement (Rokeman & Kob, 2024).

Feedback from student users highlighted the app's strengths in usability, system quality, and overall user experience. Compared with manual screening methods, the digital format was perceived as more efficient and accessible, reducing common barriers such as stigma, time constraints, and logistical difficulties, factors frequently cited in the literature as obstacles to early mental health intervention (Funnell et al., 2022). The preference for digital self-help tools also reflects a broader trend among younger populations, who, as digital natives, often favor technology-based support over traditional face-to-face services (Montagni et al., 2020; Pretorius et al., 2024).

Ethical considerations were incorporated through an anonymized administrator dashboard that displays only mental health scores, thereby ensuring student confidentiality and encouraging honest self-reporting. The application demonstrates strong potential for broader institutional adoption and longitudinal research. Future enhancements may include risk prediction and chatbot-based counseling, further strengthening its role as a digital mental health support tool. The integration of predictive analytics and machine learning could also expand its proactive capabilities (Jacobson & Chung, 2020; Hahn et al., 2017).

This study is limited by the absence of an effectiveness evaluation, which restricts causal inference, and by the lack of comprehensive psychometric validation of the instrument. Findings rely primarily on subjective perceptions rather than objective, longitudinal, or comparative data, and may also be affected by selection bias given the single institution sample. Future research should incorporate longitudinal and experimental designs, full psychometric testing, evaluation of sustained engagement, and comparisons with conventional tools, alongside investigations into strategies for sustainable implementation.

CONCLUSIONS

The digital format of Heal Me UMP was perceived as more efficient and accessible, helping to reduce common barriers such as stigma, time constraints, and logistical challenges. Findings indicate that the application is acceptable, usable, and feasible as a digital mental health screening and self-support tailored to nursing students. Its potential role as a campus-based digital support platform is promising; however, further research is needed to evaluate its effectiveness, long-term sustainability, and integration into institutional mental health services.

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