

Engineering a Human-Centred Web Platform for Supporting Postpartum Mental Health in Mothers of Children with Special Needs

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Postpartum mental health among mothers of children with special needs is a critical yet often overlooked issue, particularly in low- and middle-income settings. This study aims to develop an interactive web platform using a Human-Centered Design (HCD) approach, incorporating multimedia educational content to support maternal mental well-being. Building on a previous phase involving preliminary user data collection and prototype development, the current phase focused on functional web system development, multimedia content production, and early-stage evaluation of user experience and perception. The methodology included user needs assessment through Focus Group Discussions, agile-based system development, and the creation of educational content in various formats, including interactive videos, audio-based infographics, and microlearning modules. A limited user trial was conducted in Pekanbaru involving 80 mothers of children with special needs. Evaluation methods included SUS, TAM, system logs, and interaction heatmaps. Preliminary findings indicate that the HCD approach supported positive perceived usability, user comfort, and platform engagement. The multimedia content showed high engagement, particularly on stress management and emotional support topics. The platform achieved a SUS score of 84, indicating good to excellent usability, with an average session duration of 9 minutes and 43 seconds. However, this phase did not measure clinical mental health outcomes or long-term effectiveness using validated psychological scales. The resulting prototype is technically ready for broader field evaluation and provides a foundation for developing a more integrated and adaptive digital mental health support platform for mothers of children with special needs in Indonesia and similar developing contexts.

Keywords: postpartum mental health; special needs children; Human-Centered Design; multimedia education; web platform

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I. INTRODUCTION

Postpartum mental health has emerged as a significant public health concern, particularly among mothers of children with special needs (CWSN), a demographic that often experiences intensified psychological distress. In Indonesia, the issue remains substantially under-addressed within mainstream healthcare policies and mental health interventions (Nuryana, 2025). Mothers raising CWSN frequently face persistent emotional challenges, time constraints, physical exhaustion, social isolation, and economic burdens. These factors contribute to an elevated risk of chronic stress, anxiety disorders, burnout, and postpartum depression (Ardiani *et al.*, 2020; Nurfurqoni *et al.*, 2024). The intensity of caregiving responsibilities often displaces personal well-being, resulting in long-term consequences on maternal health and child development.

Research consistently highlights the importance of psychosocial support as a protective factor against these mental health risks. Interventions such as peer support groups, professional counselling, and stress-reduction programs have demonstrated efficacy in reducing depressive symptoms and improving coping mechanisms among mothers (Alaedein & Al-Sharaa, 2020). However, in Indonesia, especially in rural and peri-urban areas, access to such support remains limited due to infrastructural gaps, financial barriers, geographic isolation, and enduring societal stigma surrounding mental health issues (Putri *et al.*, 2024; Sverdlik, 2011).

Comparatively, ASEAN countries and other low- and middle-income countries (LMICs) face similar challenges but have also undertaken diverse strategies to improve maternal mental health support. A comprehensive review across ASEAN nations reveals substantial variation in maternal depression prevalence and highlights significant gaps in integrated mental health services, especially in lower-middle-income countries like Indonesia, Myanmar, and Cambodia (Prom *et al.*, 2022). While countries like Singapore and Thailand have implemented integrated mental health care into primary services, many others struggle with workforce shortages and limited infrastructure. In LMICs broadly, integrating perinatal mental health care into routine maternal health services has shown promise in improving outcomes, leveraging

community health workers, peer mentors, and mobile health technologies adapted to local contexts and resource availability. Such adaptive interventions often address psychosocial risk factors compounded by gender-based violence, low social support, and economic hardship (Hong & Buntup, 2023).

In Malaysia, mothers expressed positive perspectives on mobile health (mHealth) interventions designed for postpartum mental health care, emphasising the importance of culturally sensitive content, local language, and inclusion of spiritual and social support features, which are vital in resource-limited settings common across ASEAN LMICs. These findings resonate with experiences in Indonesia and underscore the potential for technology-enabled psychosocial support tailored to cultural and infrastructural realities (Kamarudin *et al.*, 2024).

Therefore, while Indonesia faces significant barriers to maternal mental health support like other ASEAN LMICs, lessons from regional interventions stress the effectiveness of integrated care models and culturally adapted mHealth solutions that can overcome geographic and societal challenges. Such comparisons reinforce the urgency and guide pathways for expanding psychosocial support availability and accessibility for mothers in Indonesia's underserved areas.

In response to these challenges, digital health innovations have gained traction as promising alternatives to extend mental health support beyond conventional healthcare settings. The proliferation of internet connectivity and smartphone usage, even in lower-income communities, presents an opportunity to design scalable interventions tailored to marginalised populations. Web-based mental health applications have shown encouraging outcomes in previous studies. For example, O'Mahen *et al.* (2013) demonstrated that internet-based behavioural activation interventions significantly alleviated depressive symptoms in postpartum women. Likewise, Chan *et al.* (2024) emphasised that digital platforms tailored to the specific needs of users yield higher engagement and more sustainable outcomes.

Despite this potential, a critical limitation of existing digital mental health tools is their lack of user-centred design. Many platforms are developed with minimal input

from target users, resulting in low adoption rates, reduced trust, and poor usability (Van Velsen *et al.*, 2022; Vial *et al.*, 2022). For mothers of CWSN, who often experience emotional fragility, technological unfamiliarity, and limited time, systems that fail to align with their realities are unlikely to offer meaningful support. This highlights the importance of Human-Centered Design (HCD), which actively involves end-users throughout development to ensure solutions are relevant, empathetic, and context-sensitive (Göttgens & Oertelt-Prigione, 2021).

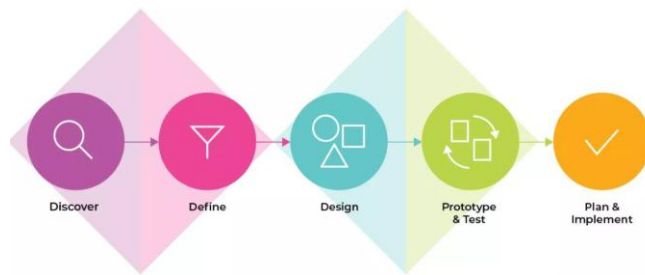


Figure 1. Human-Centered Design Method
(Trisnadoli *et al.*, 2025)

This study builds upon a previous phase involving preliminary user research to identify user personas, emotional challenges, and content preferences among postpartum mothers of children with special needs (CWSN). Based on these findings, a basic prototype was developed to visualise early design concepts, which was then evaluated through direct user feedback. These insights now inform the current research phase, which focuses on creating a comprehensive interactive web platform grounded in Human-Centered Design (HCD) principles. The platform offers mental health education through diverse multimedia formats, such as short-animated videos, reflective audio, narrative infographics, and gamified quizzes, explicitly tailored to the needs of mothers of CWSN.

Aligned with these objectives, the present study successfully designed and developed a web-based application prototype using the HCD methodology to support the mental well-being of postpartum mothers in Pekanbaru. The findings reveal that these mothers commonly face multiple mental health challenges, including stress, anxiety, and social isolation. These conditions highlight the urgent need for solutions that provide emotional support and practical assistance. In response, the application integrates essential features such as a moderated

online community space, access to curated mental health resources, and interactive relaxation tools, all developed based on user preferences.

The development process was conducted iteratively through three refinement phases. Each phase focused on enhancing specific aspects of the system, ranging from interface structure and colour schemes to language accessibility and visual consistency. User feedback was continuously gathered and incorporated at every stage, resulting in a functionally relevant and intuitively designed prototype. Evaluation using HCD indicators showed that the application achieved strong usability scores and provided a positive user experience (UX), particularly regarding navigation, emotional engagement, and perceived usefulness.

This implementation represents a state-of-the-art digital solution for addressing maternal mental health needs. It offers a theoretical contribution by reinforcing the importance of participatory and user-centred design methods in healthcare technology development. As a replicable model, this research supports creating empathetic, inclusive, and accessible mental health technologies, especially for underserved populations. The application is expected to reduce psychological distress, foster social connectedness, and strengthen the caregiving capacity of mothers. Future directions include scalability testing, impact evaluation over time, and wider deployment to ensure the sustainability and broader applicability of the system's benefits (Trisnadoli *et al.*, 2025).

To support user engagement and ensure accessibility, the platform was built using modern web technologies such as React.js or Vue.js for front-end development and Node.js or Laravel for the back-end. User behaviour is monitored through integrated analytics tools, such as heatmaps and system logs, to inform continuous improvement. Multimedia content was developed using tools like Adobe Premiere, Canva, and AI-powered voiceovers, ensuring consistent quality and efficient production workflows.

The key expected outcomes of this research include: (1) a responsive and user-validated web platform; (2) a collection of contextually relevant mental health educational content; and (3) a documented, replicable design methodology suitable for similar digital interventions. Beyond these

practical outcomes, the study offers broader implications for developing inclusive, data-informed, and socially responsive digital mental health ecosystems in Indonesia and other comparable settings.

II. MATERIALS AND METHOD

This study employed a Research and Development (R&D) approach integrated with the Human-Centered Design (HCD) framework and Agile Development principles. The methodology was designed to support the iterative development of a web-based platform and multimedia educational content for postpartum mothers of children with special needs (CWSN). The development process involved target users, psychologists, content creators, system developers, and representatives from mother support communities.

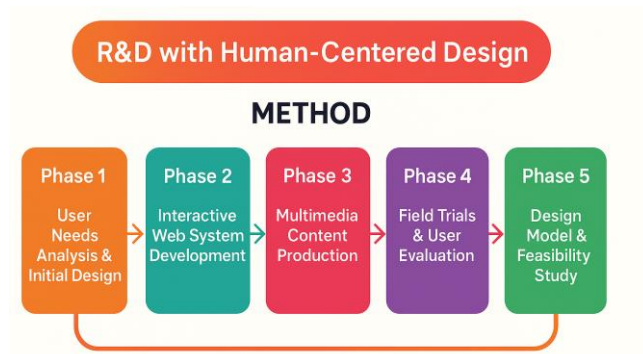


Figure 2. Research Methodology

The research was conducted in five phases. Phase 1 focused on user needs analysis through Focus Group Discussions (FGDs), interviews with domain experts, persona development, user journey mapping, and content preference identification. Phase 2 involved the design and development of the interactive web platform using a modular and scalable architecture. Phase 3 focused on producing and integrating multimedia educational content. Phase 4 consisted of limited field trials and user evaluation. Phase 5 involved formulating a design model, feasibility study, and roadmap for future deployment.

A limited user trial was conducted in Pekanbaru, involving 80 mothers of children with special needs. The participants were selected based on specific inclusion and exclusion criteria. The inclusion criteria were mothers of children with special needs, active members of mother support

communities, access to smartphones and the internet, and willingness to participate in the study. The exclusion criteria included mothers diagnosed with severe psychiatric disorders, inability to use smartphones or the internet, and refusal to provide consent.

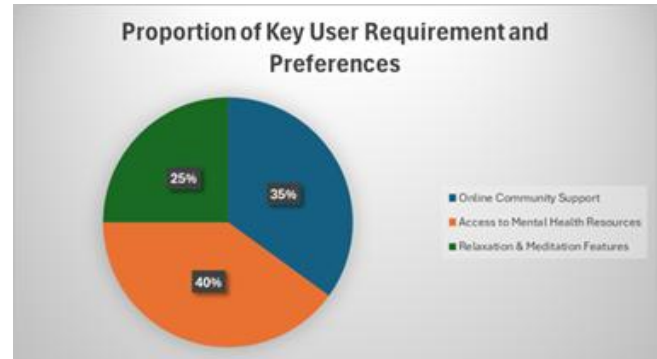


Figure 3. Proportion of Key User Requirements and Preferences (Trisnadoli *et al.*, 2025)

Table 1. Survey Results

User Need / Feature	Description
Online Community Space	Users stressed the need for a supportive online community to reduce feelings of isolation and foster social connection.
Access to Mental Health Resources	Users requested reliable and practical resources, such as self-care articles, parenting tips for CWSN, and access to counselling services.
Relaxation and Meditation Features	Relaxation tools, including breathing exercises and guided meditation, were essential for reducing daily stress and emotional burden.

The evaluation focused on system usability, technology acceptance, user engagement, and content perception. The System Usability Scale (SUS) was used to measure usability, while the Technology Acceptance Model (TAM) was used to assess perceived usefulness and perceived ease of use. User engagement was analysed using system logs, access frequency, session duration, content preferences, clickstream data, and heatmaps. Qualitative feedback was collected through reflective interviews and focus group discussions.

As this phase focused primarily on system development, usability, and early-stage user engagement, clinical mental health outcomes were not measured as the main endpoint. Therefore, no pre- and post-intervention depression, anxiety, or stress scale comparison was conducted in this phase. Future evaluation will incorporate validated mental health instruments such as the Edinburgh Postnatal Depression Scale (EPDS), Depression Anxiety Stress Scales (DASS-21), Patient Health Questionnaire-9 (PHQ-9), or Perceived Stress Scale (PSS) to assess psychological outcomes before and after platform use.

Descriptive statistics were used to summarise usability and acceptance outcomes, including mean scores, standard deviation, minimum and maximum values, and user engagement metrics. In future large-scale trials, inferential statistical tests such as paired sample t-tests or Wilcoxon signed-rank tests will be applied to examine changes in mental health outcomes before and after intervention exposure.

Table 2. Participant Characteristics, Inclusion, and Exclusion Criteria of User Evaluation

Category	Details
Number of Participants	80 mothers from Pekanbaru
Trial Location	Pekanbaru, Indonesia
Age Range	20–40 years
Education Level	40% high school, 45% undergraduate, 15% postgraduate
Parity	55% primiparous, 45% multiparous
Socioeconomic Status	30% low income, 50% middle income, 20% high income
Inclusion Criteria	Mothers of children with special needs; active members of mother support communities; access to smartphone and internet; willingness to participate
Exclusion Criteria	Diagnosed with severe psychiatric disorder; inability to use smartphone or internet; declined consent

III. RESULT AND DISCUSSION

A. Results

The second year of this study completed the main development phases, including user needs validation, interactive web system development, multimedia content production, and limited user trials. The implementation of the Human-Centered Design approach was useful in aligning the system design, content structure, and interaction flow with the needs of postpartum mothers raising children with special needs.

The interactive web platform met the planned functional and technical requirements. The system was developed using a modular architecture with React.js for the front-end, Node.js for the back-end, and MongoDB as the database. The main features included a personalised user dashboard, multimedia learning modules, moderated online discussion forum, reflective journaling tools, content recommendation system, and user behaviour tracking module. The platform also followed mobile-first design principles and passed cross-device compatibility testing.

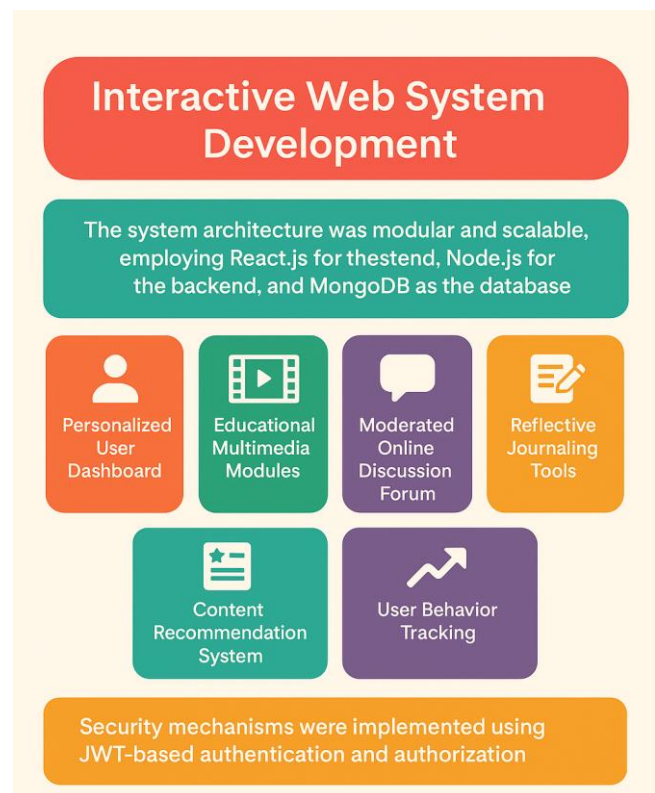


Figure. 4 Interactive Web System Architecture

Basic security mechanisms were implemented through JWT-based authentication, user authorisation, and structured user data management. User behaviour data were collected in anonymised and aggregated form to support ethical usage monitoring and system improvement. However, a comprehensive privacy risk assessment, including data retention policy, consent management, access control matrix, and incident mitigation strategy, will be developed in the next implementation phase.



Figure 5. Developed Web Page Previews

Seven multimedia educational content packages were produced and integrated into the platform. The content covered stress management, self-relaxation, family

communication, social support, emotional resilience, parenting with empathy, and emotional literacy. The content formats included short-animated videos, narrative infographics, reflective audio, and interactive microlearning modules with quizzes. To strengthen academic rigour, each content topic was aligned with relevant theoretical or evidence-based foundations, including stress coping theory, social support theory, emotional regulation, family communication, resilience-building approaches, and psychoeducational intervention principles.

A limited user trial was conducted with 80 mothers in Pekanbaru. The System Usability Scale showed an average score of 84, indicating a good to excellent level of usability. Users reported that the platform was easy to navigate, visually comfortable, and emotionally relevant to their daily experiences. The video modules and peer discussion forum were the most frequently accessed features, indicating strong user demand for practical information and social support spaces.

Table 3. Multimedia Content and Evidence-Based Foundation

No.	Content Topic	Description	Theoretical / Evidence-Based Foundation
1	Managing Daily Stress with Confidence	Provides simple strategies to manage daily stress using relatable animated scenarios, breathing techniques, and grounding exercises.	Stress and coping theory; psychoeducation for stress management
2	Self-Relaxation for Busy Moms	Introduces guided relaxation techniques tailored for mothers of CWSN, including calming audio and visualisation practices.	Relaxation response theory; mindfulness-based stress reduction
3	Communicating with Your Family Effectively	Demonstrates communication strategies between mothers, partners, and children to reduce conflict and build emotional understanding.	Family systems theory; interpersonal communication theory
4	You Are Not Alone: Building Support Networks	Encourages mothers to connect with others in similar situations and highlights peer support.	Social support theory; peer-support intervention model
5	From Overwhelmed to Empowered	Helps mothers recognise burnout and develop resilience through affirmations and goal-setting exercises.	Resilience theory; cognitive-behavioural coping strategies
6	Parenting with Empathy and Patience	Provides practical parenting approaches that support both the child and the mother.	Positive parenting framework; emotional coaching
7	Understanding and Accepting Emotions	Educates mothers on identifying, accepting, and managing emotions, constructively.	Emotional regulation theory; emotional literacy approach

Usability Assessment

Limited trial involving mothers of CWSN



Figure. 6 Evaluation Results

System analytics showed an average session duration of 9 minutes and 43 seconds. This result suggests that users were willing to spend time exploring the educational content and interacting with the platform. However, the current evaluation remains limited to usability, acceptance, and engagement outcomes. It does not yet provide evidence of clinical effectiveness or measurable improvement in depression, anxiety, stress, or other mental health indicators.

Table 4. Summary of Usability and Engagement Evaluation

Evaluation Aspect	Result	Interpretation
Number of participants	80 mothers	Limited community-based trial
Trial location	Pekanbaru	Urban community setting
SUS score	84	Good to excellent usability
Most accessed features	Video modules and peer discussion forum	High interest in practical content and peer support
Average session duration	9 minutes 43 seconds	Strong early-stage engagement
Mental health outcome measurement	Not conducted in this phase	To be included in future longitudinal evaluation
Statistical testing of intervention impact	Not conducted in this phase	Planned for future large-scale trials

B. Discussion

The results indicate that the developed platform has strong technical and social readiness for broader field evaluation. From a technical perspective, the modular architecture allows future feature expansion, content updates, and integration with other digital health systems. The use of a mobile-first approach also supports accessibility for users with different levels of digital literacy.

The positive usability score and engagement metrics suggest that the HCD approach was effective in creating a platform that was relevant, accessible, and acceptable to the target users. The inclusion of mothers in the design and testing process helped ensure that the content, interface, and features reflected their emotional needs, caregiving realities, and technology-use patterns.

Nevertheless, the findings should be interpreted with caution. The current study focused on short-term usability, user perception, and engagement rather than clinical effectiveness. Although users responded positively to the platform, the present findings cannot yet confirm improvements in maternal mental health outcomes. No pre- and post-intervention assessment was conducted using validated mental health scales such as EPDS, PHQ-9, DASS-21, or PSS. Therefore, claims of effectiveness should be limited to usability, acceptance, and engagement at this stage.

A broader statistical analysis of intervention impact is also not yet available. Future studies should collect baseline and follow-up data to measure changes in depression, anxiety, stress, emotional resilience, and perceived social support. If the data are normally distributed, paired sample t-tests may be used to compare pre- and post-intervention scores. If the data are not normally distributed, Wilcoxon signed-rank tests may be more appropriate. Effect size analysis should also be included to determine the practical significance of the intervention.

In addition, long-term effectiveness has not yet been established. The current evaluation only reflects short-term user experience and engagement among participants in Pekanbaru. Future longitudinal studies should include follow-up measurements after three and six months of platform use. These studies are important to determine whether continued exposure to the platform contributes to

sustained psychological benefits, stronger social support, and improved coping capacity among mothers of children with special needs.

Privacy and ethical data management also require further strengthening. Although the platform already includes JWT-based authentication and anonymised usage data collection, a more detailed risk assessment is needed before broader deployment. Future development should include a privacy risk matrix, informed consent mechanism, data retention policy, user access control, data encryption protocol, and incident response procedure. These measures are essential because the platform deals with sensitive mental health-related information.

The study also has implications for integration with national digital health systems. The platform may be explored for future interoperability with SATUSEHAT, Digital Puskesmas, or other national health information systems. Technical integration should consider standardised APIs, secure authentication, consent-based data exchange, data interoperability, and alignment with national health data governance. In the long term, this integration could support community-based maternal mental health monitoring and evidence-based intervention planning.

Compared with digital maternal mental health initiatives in ASEAN and other low- and middle-income countries, this platform contributes a culturally adapted and community-based model. Similar contexts often face barriers such as limited access to mental health professionals, stigma, geographic distance, and low digital health literacy. Therefore, a human-centred, multimedia-based, and community-supported platform may offer a practical approach for extending mental health support to underserved populations.

IV. CONCLUSION

This study successfully developed an interactive web platform and multimedia educational content to support the mental health needs of postpartum mothers raising children with special needs. The use of Human-Centered Design enabled the development process to be participatory, user-oriented, and responsive to the emotional and practical realities of the target users.

The platform demonstrated strong usability and positive early-stage engagement among participants in Pekanbaru. The System Usability Scale score of 84 indicates that users perceived the system as easy to use, accessible, and relevant. The average session duration and frequent access to video modules and peer discussion forums also suggest that users were interested in the educational and social support features provided by the platform.

However, this study has several limitations. The current phase did not measure clinical mental health outcomes using validated instruments. Therefore, the findings cannot yet confirm whether the platform improves depression, anxiety, stress, or other psychological conditions. The study also did not include statistical testing of intervention impact or long-term follow-up assessment. In addition, the field trial was limited to participants in Pekanbaru, which may limit the generalisability of the findings to other urban, peri-urban, and rural communities.

Future studies should conduct larger and more diverse field trials involving communities beyond Pekanbaru, including peri-urban and rural areas. These studies should include validated mental health scales such as EPDS, PHQ-9, DASS-21, PSS, or MSPSS. Pre- and post-intervention measurements should be conducted to evaluate changes in mental health outcomes, perceived stress, emotional resilience, and social support. Statistical testing and effect size analysis should also be included to strengthen the evidence of effectiveness.

Longitudinal evaluation is also recommended to assess the platform's long-term impact. Follow-up assessments after three and six months of use would provide stronger evidence regarding sustained engagement and psychological benefit. Furthermore, future development should include a detailed privacy risk assessment and mitigation strategy to ensure responsible management of sensitive user data.

For broader implementation, collaboration with local governments, Puskesmas, health professionals, civil society organisations, and user communities is essential. The platform should also be explored for technical integration with national digital health systems, such as SATUSEHAT or Digital Puskesmas, through secure API standards, consent-based data exchange, and interoperable health data structures. With further validation and integration, this

platform has the potential to become a scalable and inclusive digital mental health support model for mothers of children with special needs in Indonesia and similar ASEAN or low- and middle-income contexts.

V. ACKNOWLEDGEMENT

The authors would like to express their sincere gratitude to the Ministry of Higher Education, Science, and Technology of the Republic of Indonesia (KEMDIKTISAINTEK) for funding this, and to Politeknik Caltex Riau for support and facilitating the publication.

VI. REFERENCES

- Agarwal, R, Gao, G, DesRoches, C & Jha, A 2010, 'The digital transformation of healthcare: Current status and the road ahead', *Information Systems Research*, vol. 21, no. 4, pp. 796–809.
- Alaedein, JM & Al-Sharaa, FK 2020, 'The effect of group counseling in reducing parental stress and depression in Jordanian mothers of children with autism', *International Journal of Education and Practice*, vol. 8, no. 3, pp. 518–535.
- Ardiani, A, Soemanto, RB & Murti, B 2020, 'Meta-analysis: The association between social support and postpartum depression', *Journal of Maternal and Child Health*, vol. 5, no. 6, pp. 641–650, doi:10.26911/thejmch.2020.05.06.04.
- Chan, WH 2024, 'Examining gamification affordances for intrinsic satisfaction needs in tourist engagement activities on digital platforms in Hong Kong', *Tourism and Hospitality Research*, doi:10.1177/14673584241299565.
- Ghosh, AK & Sharma, K 2021, 'Community health informatics: Empowering community-based health systems through technology', *Journal of Health Informatics in Developing Countries*, vol. 15, no. 1.
- Göttgens, I & Oertelt-Prigione, S 2021, 'The application of human-centered design approaches in health research and innovation: A narrative review of current practices', *JMIR mHealth and uHealth*, vol. 9, no. 12, article e28102.
- Hong, SA & Buntup, D 2023, 'Maternal depression during pregnancy and postpartum period among the Association of Southeast Asian Nations (ASEAN) countries: A scoping review', *International Journal of Environmental Research and Public Health*, vol. 20, no. 6, article 5023, doi:10.3390/ijerph20065023.
- Kamarudin, SS, Idris, IB, Ahmad, N & Sharip, S 2024, 'Exploring Asian maternal experiences and mHealth needs for postpartum mental health care', *Digital Health*, vol. 10, article 20552076241292679, doi:10.1177/20552076241292679.
- Mohr, DC, Zhang, M & Schueller, SM 2017, 'Personal sensing: Understanding mental health using ubiquitous sensors and machine learning', *Annual Review of Clinical Psychology*, vol. 13, pp. 23–47.
- Mutya, MF 2022, 'Hubungan kecerdasan emosi dan kecemasan pada ibu hamil di Kota Yogyakarta', *Batanang: Jurnal Psikologi*, vol. 1, no. 2, pp. 106–122.
- Naslund, JA, Aschbrenner, KA, Marsch, LA & Bartels, SJ 2016, 'The future of mental health care: Peer-to-peer support and social media', *Epidemiology and Psychiatric Sciences*, vol. 25, no. 2, pp. 113–122.
- Nurfurqoni, FA, Hastuti, D, Sunarti, E & Riany, YE 2024, 'The influence of family function, social support, and infants' health on mothers' postnatal depression in three months after birth', *Psikohumaniora: Jurnal Penelitian Psikologi*, vol. 9, no. 2, pp. 287–302, doi:10.21580/pjpp.v9i2.22877.
- Nuryana, Z 2025, 'Addressing the policy gap between adolescent mental health and school systems in Indonesia', *Asian Journal of Psychiatry*, 20 May, article 104543.
- O'Mahen, HA, Woodford, J, McGinley, J, Warren, FC, Richards, DA, Lynch, TR *et al.* 2013, 'Internet-based behavioral activation—Treatment for postnatal depression (Netmums): A randomized controlled trial', *Journal of Affective Disorders*, vol. 150, no. 3, pp. 814–822.

- Prom, MC, Denduluri, A, Philpotts, LL, Rondon, MB, Borba, CPC, Gelaye, B & Byatt, N 2022, 'A systematic review of interventions that integrate perinatal mental health care into routine maternal care in low- and middle-income countries', *Frontiers in Psychiatry*, vol. 13, article 859341, doi:10.3389/fpsyt.2022.859341.
- Putri, A, Hartono, R & Nabila, S 2024, 'Examining health disparities in access to mental health services in urban and rural areas', *IJHSB*, vol. 1, no. 1, pp. 6–10.
- Sverdlik, A 2011, 'Ill-health and poverty: A literature review on health in informal settlements', *Environment and Urbanization*, vol. 23, no. 1, pp. 123–155.
- Trisnadoli, A & Lestari, I 2024, 'Evaluasi efektivitas pengujian prototipe aplikasi kesehatan untuk monitoring ibu hamil di Provinsi Riau', *Jurnal Pendidikan Kesehatan*, vol. 4, no. 2, pp. 132–137.
- Trisnadoli, A, Lestari, I, Winda, D & Utari, MD 2024, 'Evaluation of the prototyping method implementation in mobile application development for maternal health monitoring', in *International Conference on Education, Science, Technology and Health (ICONESTH)*, pp. 1172–1179.
- Trisnadoli, A, Mutya, MF & Winda, D 2025, 'Designing a web-based application using human-centered design to enhance postpartum mental health support for parents of children with special needs', *ABEC Indonesia*, 16 January, pp. 346–353.
- Ulyana, F & Levandani, AA 2025, 'Arsitektur berbasis kesehatan mental: Menciptakan ruang yang mendukung kesehatan emosional', *Realisasi Ilmu Pendidikan Seni Rupa dan Desain*, vol. 2, no. 1, pp. 84–102.
- Van Velsen, L, Ludden, G & Grünloh, C 2022, 'The limitations of user- and human-centered design in an eHealth context and how to move beyond them', *Journal of Medical Internet Research*, vol. 24, no. 10, article e37341.
- Vial, S, Boudhraâ, S & Dumont, M 2022, 'Human-centered design approaches in digital mental health interventions: Exploratory mapping review', *JMIR Mental Health*, vol. 9, no. 6, article e35591.
- Winda, D, Trisnadoli, A & Mutya, MF 2023, 'Pengaruh video edukasi hypnobirthing untuk mengatasi tokophobia pada wanita usia produktif', *Psyche 165 Journal*, pp. 93–98.
- World Health Organization 2020, *Guidance on digital mental health interventions*, World Health Organization, Geneva.
- Wozney, L, Huguet, A, Bennett, K, Radomski, AD, Hartling, L, Dyson, MP *et al.* 2021, 'Usability, engagement, and effectiveness of digital mental health interventions in women: Systematic review', *Journal of Medical Internet Research*, vol. 23, no. 5, article e18061.