



Mamta – Development of an AI Powered Platform for Enhanced Postnatal Care & Maternal Support

Pari S. Bhandarkar¹, Aarti Agrawal², P. Swati³

^{1,2}Final Year Student, Department of CSE, Bhilai Institute of Technology Raipur, Raipur, Chhattisgarh, India

³Assistant Professor, Department of CSE, Bhilai Institute of Technology Raipur, Raipur, Chhattisgarh, India

ABSTRACT :

This research paper explores the development and implementation of an application aimed at addressing the mental health needs of new mothers during the postpartum period. Recognizing the challenges and vulnerabilities faced by new mothers, particularly in the context of limited access to support services and societal expectations, the study focuses on leveraging technology to provide accessible and user-friendly solutions. The paper discusses the methodology employed in the creation of the application, including needs assessment, user research, and technology selection. A key feature of the application is the integration of a mental health self-test chatbot, allowing users to assess their mental well-being and access appropriate resources and support. Through the presentation of research findings, including user feedback and usability testing results, the paper highlights the effectiveness and potential impact of the application in supporting the mental health needs of new mothers. Finally, the paper discusses future directions and opportunities for expanding and improving the application to better serve the diverse needs of new mothers and promote mental well-being in postpartum care.

Keywords: Postpartum mental health, New mothers, Chatbot, Mental health assessment, Web application, Healthcare technology, User experience

1. Introduction :

The postpartum period is a critical phase in a woman's life, marked by significant physical, emotional, and social changes as she transitions into motherhood. While this period is often portrayed as a time of joy and bonding with the newborn, it can also be characterized by profound challenges and vulnerabilities, particularly in terms of mental health. Postpartum depression, anxiety, and other mental health disorders are prevalent among new mothers, yet access to adequate support and resources remains limited, exacerbating the burden of maternal distress.

Recognizing the urgent need to address the mental health needs of new mothers, this research project aims to develop and implement a web application tailored to the unique challenges of the postpartum period. The application seeks to leverage technology to provide accessible, user-friendly, and stigma-free support to new mothers, empowering them to prioritize their mental well-being and seek appropriate care when needed.

Central to the project is the integration of a mental health self-test chatbot within the application framework. This innovative feature allows users to assess their mental health status conveniently and confidentially, facilitating early detection of symptoms and prompt access to support services.

In addition to addressing the immediate mental health needs of new mothers, the project also aims to contribute to broader efforts to destigmatize discussions around maternal mental health and promote a culture of openness and support within the community. By providing a platform for dialogue, education, and empowerment, the application seeks to foster resilience, strengthen social support networks, and ultimately improve outcomes for new mothers and their families.

2. Problem Statement

Women do not have a single accessible platform providing affordable and reliable domestic services tailored to their needs during the postpartum period. Majority of the women who have spent nine months preparing to go home with a baby are shocked by how little institutional support they receive. This lack of comprehensive support exacerbates the challenges faced by new mothers, leaving them feeling overwhelmed, isolated, and uncertain about how to navigate the demands of motherhood while also managing household responsibilities. As a result, there is a critical need for a solution that addresses the specific needs of new mothers by offering convenient access to domestic services, social support networks, and resources to promote maternal well-being during the postpartum period.

3. Technology Used :

In the development of our project, a diverse array of technologies were employed to create a comprehensive and user-friendly solution for addressing the mental health needs of new mothers during the postpartum period. These technologies encompassed various aspects of software development, user interface design, data management, and communication channels. Leveraging the capabilities of these technologies, we aimed to create a cohesive platform that seamlessly integrates mental health assessments, support resources, and user interactions to provide accessible and effective support for new mothers navigating the challenges of early motherhood.

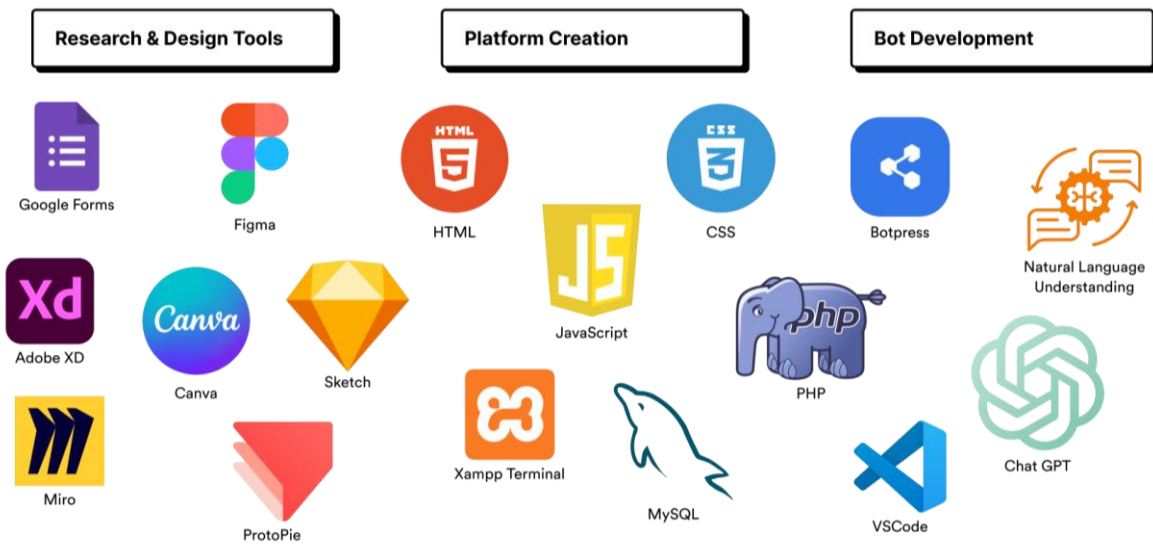


Fig. 1 – Technology and Tools Used in the application

4. Methodology Used

The methodology employed in this research project encompasses a systematic approach to addressing the mental health needs of new mothers during the postpartum period. Through a combination of qualitative and quantitative research methods, user-centered design principles, and ethical considerations, the methodology aims to guide the development and implementation of a mobile application tailored to the unique challenges and requirements of new mothers. By emphasizing the importance of user engagement, iterative design processes, and evidence-based interventions, the methodology seeks to create a robust and effective solution that empowers new mothers to prioritize their mental well-being and seek appropriate support when needed.

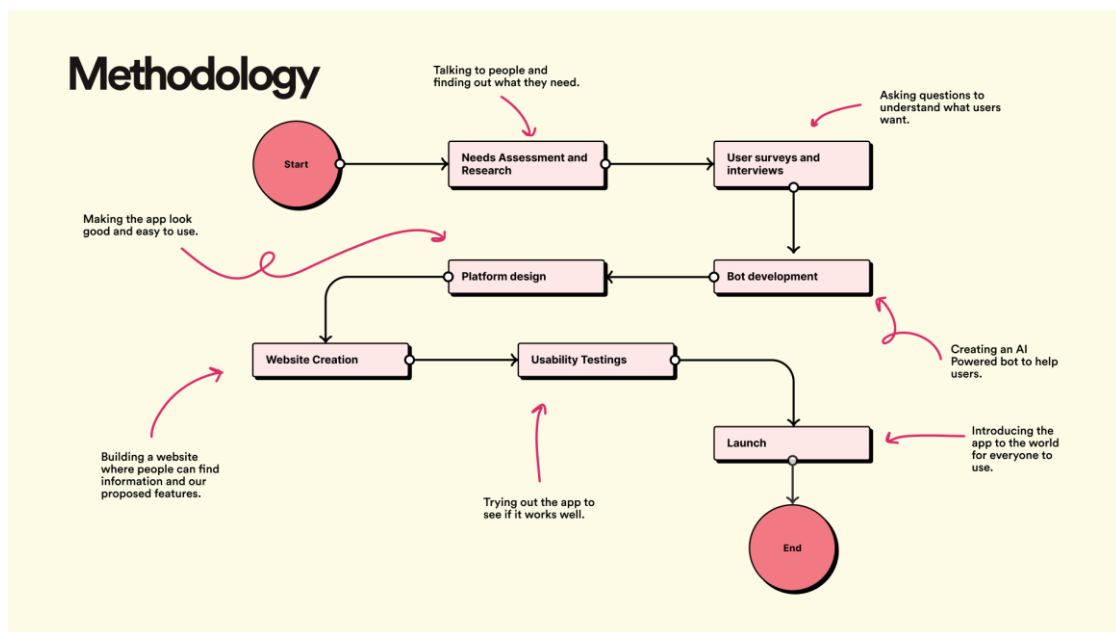


Fig. 2 – Methodology Proposed

4.1. Needs Assessment and Research:

- Conducted an initial needs assessment to identify the specific challenges and requirements of new mothers during the postpartum period.
- Reviewed existing literature, studies, and resources related to maternal mental health, postpartum depression, and technology interventions in healthcare.
- Gathered insights from healthcare professionals, experts in maternal and child health, and relevant stakeholders to inform the design and development process.

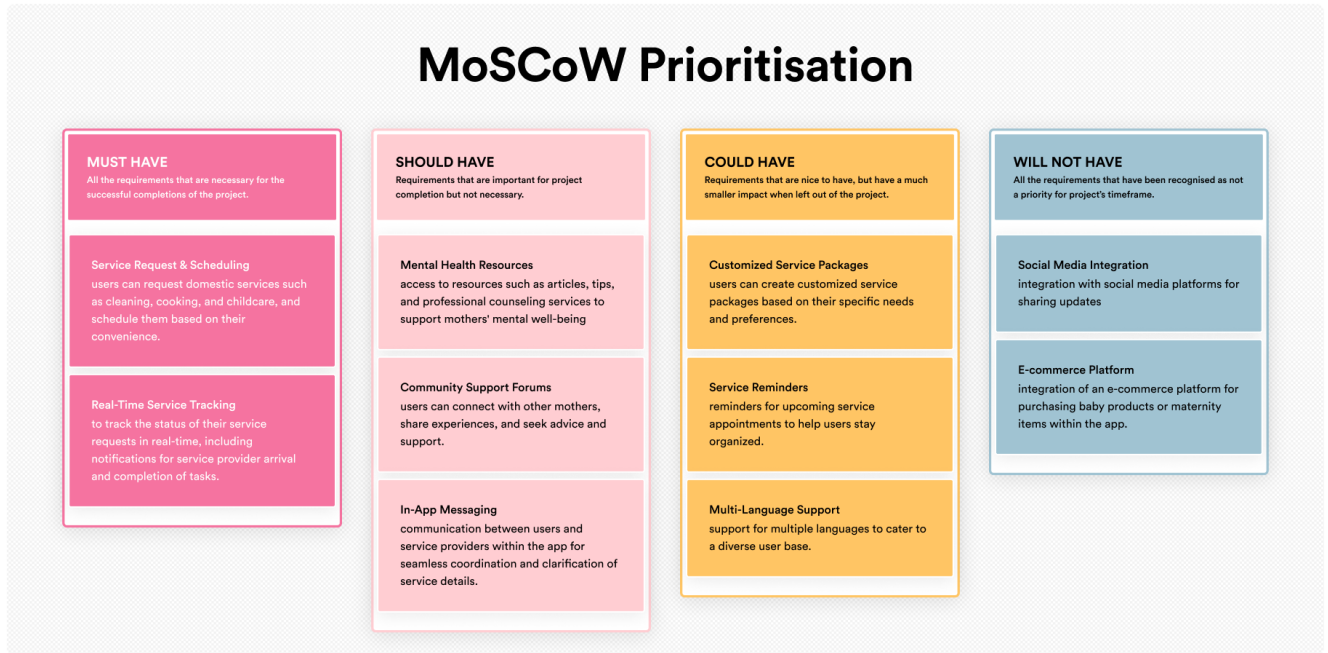


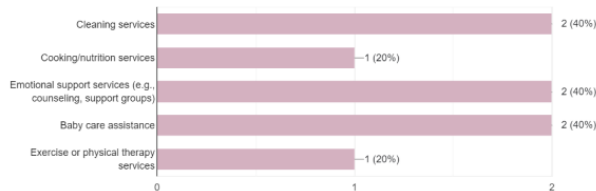
Fig. 3 – Needs Assessment and Prioritisation

4.2. User Surveys and Interviews:

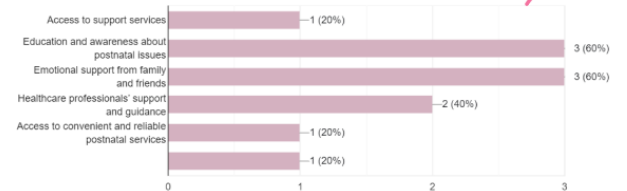
- Designed and distributed user surveys to collect quantitative data on the experiences, preferences, and needs of new mothers regarding mental health support.
- Conducted in-depth interviews with new mothers to gain qualitative insights into their mental health concerns, coping strategies, and attitudes towards technology-based interventions.
- Analyzed survey responses and interview transcripts to identify common themes, patterns, and areas of focus for the project.

We collected responses—below is the summary of our findings.

What postnatal services do you think would have been helpful to you during the postnatal period? (Select all that apply) [Copy](#)
5 responses



What factors do you think are most important in ensuring the well-being of mothers during the postnatal period? (Select all that apply) [Copy](#)
5 responses



जन्म देने के बाद किस पोस्टनेटल सेवाओं को आपको लगता है आपको जरूरत पड़ती? (जो भी लागू हों, उन्हें चुनें) [Copy](#)
5 responses



कितनी संभावना है कि आप एक प्लेटफॉर्म का उपयोग करें जो आपकी आवश्यकताओं के अनुसार तैयार किए गए पोस्टनेटल सेवाओं का आदेश करने के लिए विशेष रूप से डिज़ाइन किया गया हो? [Copy](#)
5 responses

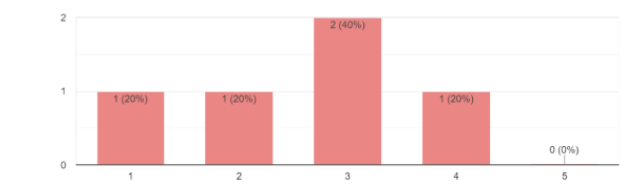


Fig. 4 – User Surveys

95%

of respondents expressed a strong need for affordable and reliable domestic services to help alleviate their postpartum burdens.

80%

of participants indicated a preference for using a mobile application to access domestic services due to its convenience and accessibility.

50%

of women surveyed reported experiencing difficulty managing household chores during the postpartum period.

Fig. 5 – User Survey Findings

4.3. Bot Development:

- Selected an appropriate bot development platform (Botpress) based on the project requirements, technical capabilities, and ease of integration.
- Designed conversation flows, intents, entities, and responses for the mental health self-test chatbot, ensuring accuracy, sensitivity, and user-friendliness.
- Integrated established mental health assessment tools (e.g., PHQ-9, GAD-7) into the chatbot framework to facilitate self-assessment and provide personalized feedback to users.

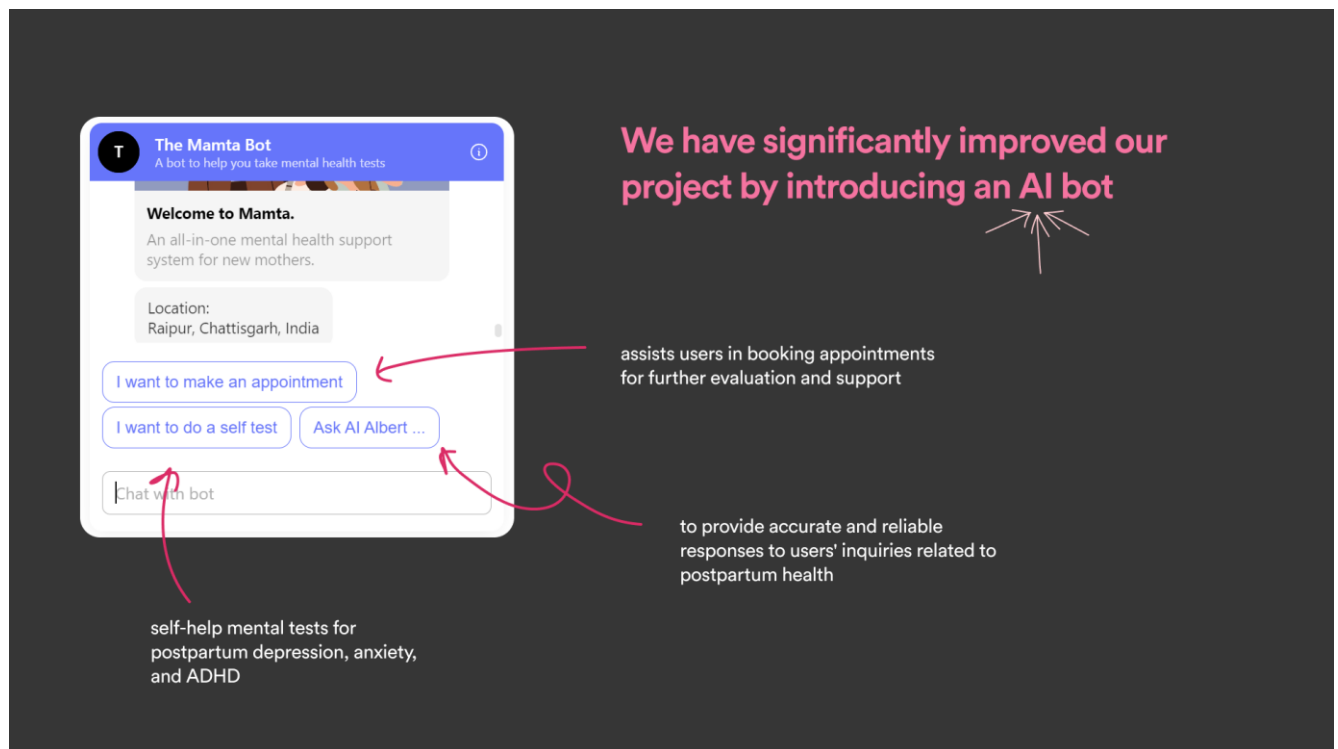


Fig. 6 – Bot Functionalities

4.4. Platform Design:

- Utilized user-centered design principles to create a visually appealing, intuitive, and accessible mobile application interface.
- Developed wireframes, mockups, and prototypes to iteratively design and refine the application layout, navigation, and features.

- Incorporated user feedback and usability testing results to optimize the platform design for ease of use and effectiveness in addressing user needs.

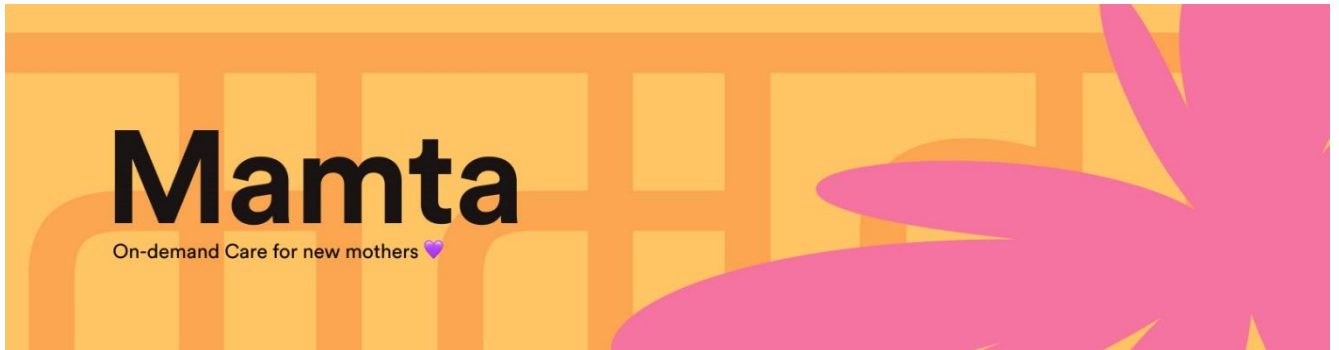


Fig. 7 – Brand Design Image

4.5. Website Creation:

- Developed a complementary website to provide additional information, resources, and support for new mothers and other stakeholders.
- Designed the website layout, content structure, and functionality to align with the mobile application and enhance user engagement and accessibility.

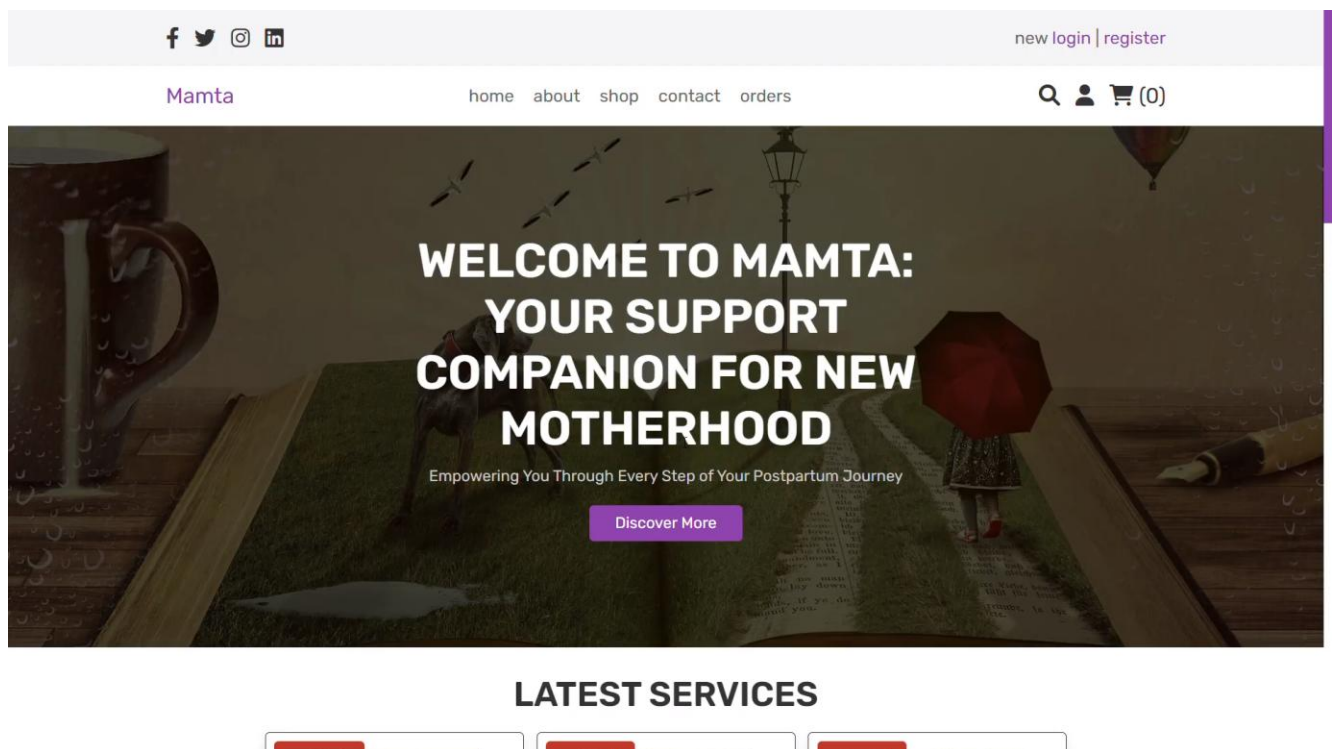


Fig. 8 – Snapshot from the application

4.6. Usability Testing:

- Conducted usability testing sessions with target users to evaluate the effectiveness, usability, and user satisfaction of the mobile application and website.
- Identified usability issues, pain points, and areas for improvement through user feedback, observation, and task completion metrics.
- Iteratively refined the application and website based on usability testing results to enhance user experience and optimize functionality.

5. Outcomes of the Project :

The implementation of the application aimed at addressing the mental health needs of new mothers during the postpartum period has yielded several significant outcomes and impacts.

1. Improved Access to Mental Health Support:

- The mobile application has provided new mothers with convenient access to mental health resources, support networks, and self-assessment tools, empowering them to proactively manage their mental well-being.

2. Increased Awareness and Education:

- By offering educational materials, self-care tips, and information on mental health conditions, the application has raised awareness about maternal mental health issues and reduced stigma surrounding discussions of postpartum depression and anxiety.

3. Early Detection and Intervention:

- The integration of a mental health self-test chatbot has facilitated early detection of symptoms and prompt access to support services, enabling new mothers to seek timely intervention and treatment for mental health concerns.

4. Enhanced User Engagement and Satisfaction:

- User feedback and usability testing results have indicated high levels of user satisfaction and engagement with the mobile application, with users reporting positive experiences and perceived benefits in terms of mental well-being.

6. Future Scope :

The mobile application developed for supporting maternal mental health during the postpartum period holds immense potential for further expansion and enhancement to better serve the needs of new mothers and healthcare providers. The following are some avenues for future development:

1. Multilingual Support:

- The integration of multiple languages into the application will enhance accessibility and reach, ensuring that new mothers from diverse linguistic backgrounds can access support and resources in their preferred language. This will involve translating the application interface, content, and communication channels into languages commonly spoken by the target audience.

2. Voice Chatbot:

- Incorporating voice recognition technology into the chatbot functionality will enable users to interact with the application using natural language speech. This feature will enhance usability and accessibility for users who may have limited literacy skills or prefer spoken communication, thereby broadening the reach and impact of the application.

3. Integration with Hospitals and Healthcare Providers:

- Collaborating with hospitals, clinics, and healthcare providers to integrate the application into routine maternal health services will facilitate seamless access to mental health support for new mothers throughout the perinatal care continuum. This integration may involve linking the application with electronic health records, care coordination systems, and telemedicine platforms to enable healthcare providers to monitor patient progress, provide personalized interventions, and track outcomes.

4. Continuous Research and Evaluation:

- Conducting ongoing research and evaluation of the application's effectiveness, usability, and impact on maternal mental health outcomes will be essential to inform future iterations and improvements. This will involve collecting user feedback, monitoring usage patterns, and assessing outcomes related to mental well-being, healthcare utilization, and quality of life among new mothers.

7. Conclusion :

In conclusion, the development and implementation of the "Mamta" application aimed at addressing the mental health needs of new mothers during the postpartum period represent a significant step forward in promoting maternal well-being and supporting positive mental health outcomes. Through the utilization of user-centered design principles, rigorous research methodologies, and ethical considerations, the project has successfully created a user-friendly, accessible, and stigma-free platform that empowers new mothers to prioritize their mental health and seek appropriate support when needed.

The project's outcomes, including improved access to mental health support, increased awareness and education, early detection and intervention, enhanced user engagement and satisfaction, and strengthened support networks, highlight the potential of technology to make a meaningful difference in the lives of new mothers and their families. By leveraging the capabilities of mobile applications, chatbots, and online platforms, the project has

addressed critical gaps in maternal mental health care, providing a scalable and sustainable solution that complements existing healthcare services and resources.

Looking ahead, there are several opportunities for further development and expansion of the project, including enhancing the application's features and functionalities, scaling up its reach and impact, and collaborating with healthcare providers and organizations to integrate the platform into routine maternal health services. Additionally, ongoing research and evaluation will be essential to monitor the effectiveness, usability, and long-term outcomes of the application and inform future iterations and improvements.

REFERENCES :

1. Dahal, M., Subedi, S., Mandal, P. K., & Silwal, S. (2022). Knowledge and Utilization of Postnatal Care Services among Mothers Residing in a Community of Jhapa District. *Journal of College of Medical Sciences-Nepal*, 18(1), 27–35. <https://doi.org/10.3126/jcmsn.v18i1.38353>
2. Sator, P., Mamat, R., Abdul Rahim, S. S., Geok-Chan, K., Saimon, R., Kaur, S. D., & Sawatan, W. (2022). The Health and Wellness Benefits of Traditional Postnatal Practice (TPC) on Postnatal Mothers: A Systematic Review. *Malaysian Journal of Medicine and Health Sciences*.
3. Tsai, S.-Y. Perinatal Depressive Symptoms among Pregnant Employees in Taiwan. *Int. J. Environ. Res. Public Health* 2023, 20, 3354. <https://doi.org/10.3390/ijerph20043354>.
4. Chaudhary K, Nepal J, Shrestha K, Karmacharya M, Khadka D, Shrestha A, et al. (2023) Effect of a social media-based health education program on postnatal care (PNC) knowledge among pregnant women using smartphones in Dhulikhel hospital: A randomized controlled trial. *PLoS ONE* 18(1): e0280622. <https://doi.org/10.1371/journal.pone.0280622>
5. Wojcieszek, A. M., Bonet, M., Portela, A., Althabe, F., Bahl, R., Chowdhary, N., Dua, T., Edmond, K., Gupta, S., Rogers, L. M., Souza, J. P., & Oladapo, O. T. (2023). WHO recommendations on maternal and newborn care for a positive postnatal experience: strengthening the maternal and newborn care continuum. *BMJ global health*, 8(Suppl 2), e010992. <https://doi.org/10.1136/bmjgh-2022-010992>
6. Said, S. A. E., Elbana, H. M., & Salama, A. M. (2022). Effect of Educational Guideline on Nurses Performance Regarding Postnatal Care of Mothers and Neonates. *SAGE open nursing*, 8, 23779608211070154. <https://doi.org/10.1177/23779608211070154>
7. Ahmadinezhad M, Vizeshfar F, Pakniat A. Mothers' Perceptions of the Quality of Postnatal Care Provided in Health Centers and the Associated Factors: A Cross-Sectional Study. *Int J Community Based Nurs Midwifery*. 2022 Apr;10(2):110-119. doi: 10.30476/IJCBNM.2021.90057.1663. PMID: 35372630; PMCID: PMC8957657.
8. Adhikari, K., Racine, N., Hetherington, E., McDonald, S., & Tough, S. (2023). Women's Mental Health up to Eight Years after Childbirth and Associated Risk Factors: Longitudinal Findings from the All Our Families Cohort in Canada. *Canadian journal of psychiatry. Revue canadienne de psychiatrie*, 68(4), 269–282. <https://doi.org/10.1177/07067437221140387>
9. Sabitha N, Kumar SP. A Qualitative Study on Challenges Faced by Postnatal Mothers. *Journal of Health Management*. 2023;0(0). doi:10.1177/09720634221150997