Sinkron : Jurnal dan Penelitian Teknik Informatika
Volume 10, Issue 1, Januari 2026
DOI : https://doi.org/10.33395/sinkron.v10i1.15360
e-ISSN : 2541-2019
p-ISSN : 2541-044X

Digital Transformation of Toddler Posyandu Services via an Android-Based Application

Harsono [1)*], Mulyono[2)], Rinayati[3)]
[1,2,3)]Universitas Widya Husada Semarang, Indonesia
[1)]harsono@uwhs.ac.id, [2)]mulyono@uwhs.ac.id , Rinayati@uwhs.ac.id

Submitted : 22 Sep, 2025 | **Accepted** : Oct 21, 2025 | **Published** : Jan 02, 2026

Abstract: Posyandu, short for Integrated Service Post, is a community-based health facility in Indonesia that provides various health services for mothers and children under five. Posyandu Balita as a community-based health service holds an essential role in improving maternal and child health in Indonesia. Nevertheless, the dependency on manual documentation frequently causes delays in reporting immunization, incomplete records, and limited access for parents to monitor child growth. This study sought to design and assess an Android-based Posyandu Balita application by applying a Research and Development model combined with the System Development Life Cycle approach. The development process covered several phases: needs analysis, system design, application construction, pilot implementation, and evaluation through the Technology Acceptance Model. The pilot, which involved 10 health cadres and 10 parents, revealed that the application reduced data loss, facilitated more accurate immunization tracking, and encouraged stronger parental involvement. Functional testing indicated that the main features—digital medical records, reminder notifications, and growth chart visualization—worked consistently as intended. Based on Technology Acceptance Model analysis, perceived usefulness and perceived ease of use significantly shaped users' behavioral intention to utilize the system (perceived usefulness = 61%, perceived ease of use = 58%). Moreover, the level of parental compliance in child health monitoring increased, where 85% of parents actively accessed the digital platform compared to only 40% before the trial. Overall, the results demonstrate that mobile health applications developed with user-centered approaches can improve the effectiveness and efficiency of community-based services. The Posyandu Balita application is a promising innovation to support Indonesia's digital health transformation. Further research is required to examine large-scale implementation, integration with national health information systems, and strategies for long-term sustainability.

Keywords: Community Health, Toddler Posyandu, Android-based Application, Mobile Health, Technology Acceptance Model

INTRODUCTION

Community-based health initiatives such as the Integrated Health Post (Posyandu) have become essential in supporting maternal and child health services in Indonesia. Posyandu, short for **Integrated Service Post**, is a community-based health facility in Indonesia that provides various health services for mothers and children under five. These centers provide growth monitoring, immunization, nutrition counseling, and preventive care. However, the continued reliance on paper-based documentation leads to issues including reporting delays, incomplete records, and difficulties in accessing reliable child health information (Rinawan FR, Prasetya TW, 2021)(Knop MR, Wensing M, Hahne J, 2024). Such limitations reduce the effectiveness of Posyandu and limit parental involvement in the monitoring of their children's development. With the increasing penetration of smartphones, mobile health (mHealth) solutions present an opportunity to strengthen efficiency, accuracy, and information accessibility within community-level health programs (GE Currie1, 2, C McLeod2, 2024)(Noha M. Ibrahim, Hanan S. Ez-Elarab, Mohamed Momen, 2023)

The global literature demonstrates significant progress in the use of android-based mobile technologies for healthcare delivery. For instance, mobile applications designed for well-baby clinics have shown high usability and improved adherence to immunization schedules(Marije Geldof, Nina Gerlach, 2023). Similarly, digital vaccination systems with integrated reminder functions allow parents to follow immunization schedules more

*name of corresponding author

Sinkron : Jurnal dan Penelitian Teknik Informatika
Volume 10, Issue 1, Januari 2026
DOI : https://doi.org/10.33395/sinkron.v10i1.15360
e-ISSN : 2541-2019
p-ISSN : 2541-044X

consistently, while enabling health workers to track children's records in real time (Mekonnen ZA, Gelaye KA, Were MC, 2021). Evidence from randomized controlled trials also indicates that automated text messages and app-based notifications improve the timeliness and completeness of vaccination coverage in low-resource settings(Novrianda D, Fitriani R, 2023). These results highlight the potential of mobile applications to support public health goals by combining digital record-keeping with proactive reminder features.

Despite encouraging findings, many digital health solutions in Indonesia remain at a pilot stage or focus mainly on web-based information systems or educational platforms. Few applications are specifically tailored for Posyandu daily operations, particularly for toddler services, that integrate multiple functions such as digital health records, immunization reminders, and parental access to children's health histories (Ferdous TE, Biswas T, 2024). This indicates a research gap, as current solutions rarely provide cadres and parents with tools that directly facilitate routine operations at Posyandu. Addressing this gap is essential to ensure that technological interventions are not only available but also practical and adaptable to community health contexts.

This study aims to develop an Android application for Posyandu *Balita* through a **Research & Development (R&D)** process using the **System Development Life Cycle (SDLC)** framework. By adopting SDLC, the development stages—from needs assessment to interface design, system implementation, and pilot testing—can be conducted systematically and iteratively to meet user requirements. Involving health cadres, parents, and local healthcare workers during the design phase will help ensure that the application reflects actual field conditions and user needs.

The evaluation phase applies the **Technology Acceptance Model (TAM)** to assess user perceptions. TAM suggests that two main constructs—*perceived usefulness* and *perceived ease of use*—determine technology adoption (Rouidi M, Sarrab M, Al-Khanjari Z, 2022). Extensions of TAM and the **Unified Theory of Acceptance and Use of Technology (UTAUT)** also emphasize the role of social influence and facilitating conditions in shaping behavioral intention to use new technology (Tetik G, Kaya S, 2024)(Rakibul Hoque, 2017). Using these frameworks provides a comprehensive approach to measure the acceptance and feasibility of the proposed Posyandu application among cadres and parents.

The research objectives are: to design and develop an Android-based application to overcome the limitations of manual data recording at Posyandu, to evaluate its functionality and accuracy through a small-scale pilot, and to measure user acceptance based on TAM constructs. Technically, the application is expected to reduce administrative workload and improve the accuracy of child health data. Socially, it is expected to promote active parental engagement, ensure compliance with immunization schedules, and enhance the integration of child health records at the community level. If the application proves effective and well-accepted, it could be recommended for nationwide implementation as part of Indonesia's digital transformation of community-based health services.

LITERATURE REVIEW

Toddler Posyandu as a Community Health Service

Toddler Posyandu is a community-based health service in Indonesia focusing on child growth monitoring, immunization, nutrition, and maternal-child health. This model has proven effective in improving immunization coverage and enhancing community involvement in primary healthcare(Desta Islamiati, 2024). However, the reliance on manual paper-based systems often results in reporting delays and data loss. With the growing demand for digital transformation, Posyandu is expected to adopt technological solutions to strengthen service effectiveness

Digital Transformation in Healthcare

Digital transformation in healthcare includes the adoption of mobile applications, electronic medical records, and big data analytics to support clinical decision-making. In developing countries, mobile health *(*mHealth*)* has demonstrated significant improvements in data accuracy, patient compliance, and healthcare access. In Indonesia, digitalization efforts are reinforced through the Indonesia Health Services (IHS*)* strategy, which promotes interoperability across the national health data system(Kemenkes RI, 2023). This provides opportunities for integrating Posyandu applications with broader health information infrastructures.

Mobile Health (mHealth) and Its Application in Child Monitoring

mHealth applications for child health monitoring have been developed in various countries. In India, an Android-based immunization tracking system was shown to improve the accuracy of vaccination records and reduce immunization dropouts(Patel, A., Singh, V., & Sharma, 2021). Similarly, in Nigeria, SMS and mobile reminder systems increased parental attendance at immunization sessions by up to 30% (Chisom Obi-Jeff1 , Cristina Garcia, Funmi Adewumi, Tobi Bamiduro, Winnie David & Wonodi, 2022). These findings suggest that similar approaches in Indonesia could yield comparable outcomes in enhancing child health services.

*name of corresponding author

Sinkron : Jurnal dan Penelitian Teknik Informatika
Volume 10, Issue 1, Januari 2026
DOI : https://doi.org/10.33395/sinkron.v10i1.15360
e-ISSN : 2541-2019
p-ISSN : 2541-044X

Acceptance of Health Technologies: TAM and UTAUT

The Technology Acceptance Model (TAM) highlights that adoption of technology is influenced by perceived usefulness (PU) and perceived ease of use (PEOU). Meanwhile, the Unified Theory of Acceptance and Use of Technology (UTAUT) emphasizes additional factors such as social influence and facilitating conditions (Venkatesh, V., Thong, J. Y. L., & Xu, 2012)(Venkatesh, V., Thong, J. Y. L., & Xu, 2012). Recent evidence in digital health adoption shows that support from health cadres and the simplicity of application design are key determinants of successful mHealth implementation (Alam, Mohammad Zahedul & Hoque, Md. Rakibul & Hu, Wang & Barua, 2020). Therefore, applying TAM and UTAUT is relevant in assessing the adoption and sustainability of a Posyandu application.

METHOD

This research applies the **Research and Development (R&D)** approach as the overarching methodology. R&D is commonly employed in health informatics and mobile technology innovation because it allows the creation, testing, and refinement of prototypes that are directly aligned with user requirements (Rahmadiana, M., Helmerhorst, H., Riper, H., Karyotaki, E., & van Ballegooijen, 2022). In this study, the R&D method is integrated with the **System Development Life Cycle (SDLC)** framework, which provides a structured process for system creation. SDLC has been recognized as a reliable model for healthcare application development since it enables sequential phases starting from problem identification up to evaluation, ensuring both technical quality and user satisfaction (Nasution, A. H., Sari, D. P., & Sihombing, 2023).

Rationale for Method Selection

The selection of R&D combined with SDLC is grounded in evidence from prior studies. A large-scale evaluation of mHealth interventions for maternal and child health reported that systematic development frameworks improve the feasibility and effectiveness of digital health innovations (Itai Chitungo,Malizgani Mhango,Elliot Mbunge, Mathias Dzobo, Dzinamarira, Godfrey Musuka, 2021). In addition, the hybrid action research for Posyandu applications in Indonesia indicated that the iterative stages of development allowed continuous adjustments based on field conditions and user feedback. Similarly, health information systems built through SDLC demonstrate better scalability and integration in community-based services compared to ad hoc development(Sari, Y. P., & Pratama, 2024). These findings provide a strong justification for adopting this combined methodology in the current study

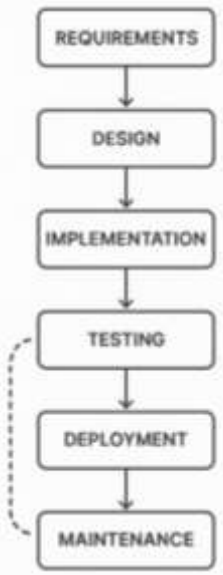


Fig 1 System Development Life Cycle (SDLC)

Data Sources and Collection

Data were collected using both **secondary and primary sources** to ensure comprehensive coverage.

a. **Secondary data** were obtained from a literature review of peer-reviewed articles published within the last five years (2020–2025) focusing on mHealth adoption, mobile application development for child health, and health information system acceptance. These studies guided the identification of essential features and informed the theoretical foundation of the study(Yizhi Liu,Xuan Lu, Gang Zhao, Chengjiang Li, 2022).
b. **Primary data** were gathered through field surveys and interviews. Structured questionnaires were distributed to Posyandu cadres and parents of toddlers, while semi-structured interviews were conducted with local

*name of corresponding author

Sinkron : Jurnal dan Penelitian Teknik Informatika
Volume 10, Issue 1, Januari 2026
DOI : https://doi.org/10.33395/sinkron.v10i1.15360
e-ISSN : 2541-2019
p-ISSN : 2541-044X

healthcare workers. The survey sought to capture user experiences with the existing manual recording system, while interviews provided deeper insights into contextual challenges and expectations for digital solutions. A triangulation strategy was employed to enhance the validity of findings by comparing responses across different stakeholder groups(Stoumpos & Fotis Kitsios, 2023)

Table 1 Example of System Functionality Evaluation Questionnaire

No	Statement					
	Child Registration & Data Input	**SD**	**D**	**N**	**A**	**SA**
1	The process of registering children on the app went smoothly					
2	The child data I entered was saved correctly without any errors					
3	The registration process is quite fast					
	Immunization Feature	**SD**	**D**	**N**	**A**	**SA**
4	The application can display immunization schedules correctly					
5	The immunization reminder feature helps me keep track of my schedule					
6	The immunization data input process is easy to do					
	Growth Chart Feature	**SD**	**D**	**N**	**A**	**SA**
7	The childs growth chart is clear and easy to understand					
8	The weight and height data entered are displayed correctly on the graph					
9	Growth charts help me understand my childs health					
	Cadre Dashboard (for cadres only)	**SD**	**D**	**N**	**A**	**SA**
10	The dashboard displays complete data on toddlers.					
11	The toddler data search feature works well.					
12	The dashboard helps me compile Posyandu reports.					
	Overall Satisfaction	**SD**	**D**	**N**	**A**	**SA**
13	Overall, the application runs according to its intended functions.					
14	I rarely experience errors or disruptions when using the application.					
15	I am satisfied with the functionality of this application system.					

Table 2 Example of TAM Evaluation Questionnaire

No	Statement					
	Perceived Usefulness	**SD**	**D**	**N**	**A**	**SA**
1	This application helps me complete tasks faster.					
2	This application improves efficiency in health data recording					
3	This app makes my work as a cadre/parent more effective.					
4	This application provides tangible benefits in children's health services.					
5	Overall, this application is useful for supporting Posyandu activities.					
	Perceived Ease of Use	**SD**	**D**	**N**	**A**	**SA**
6	This application is easy to learn.					

*name of corresponding author

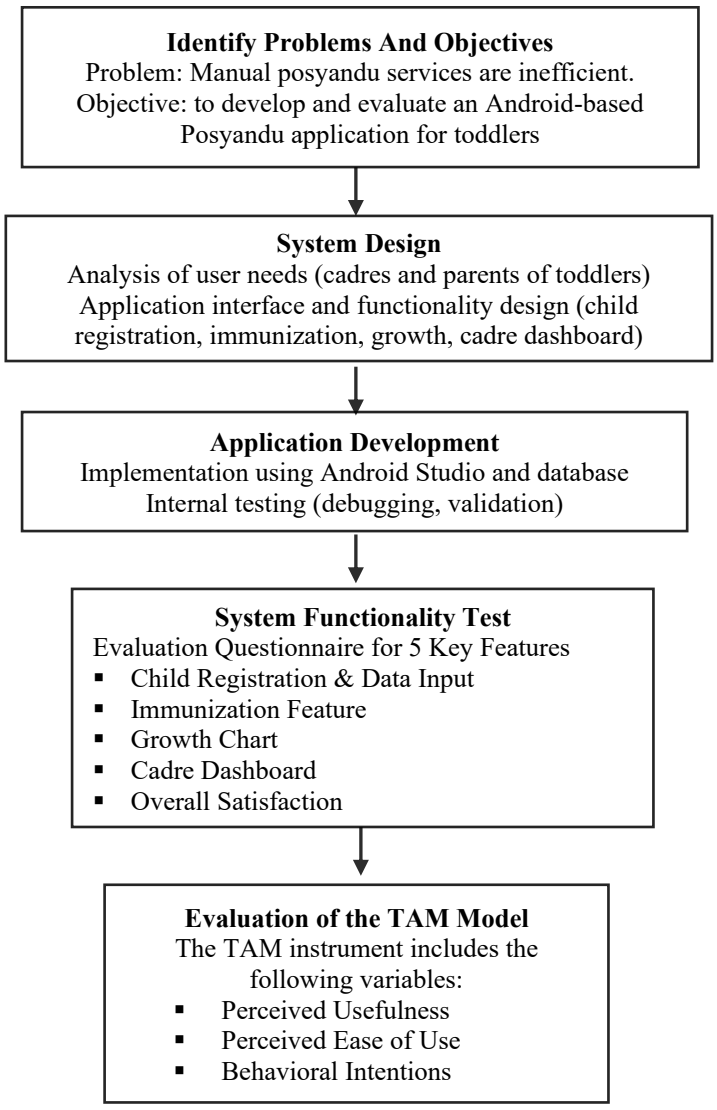
Sinkron : Jurnal dan Penelitian Teknik Informatika
Volume 10, Issue 1, Januari 2026
DOI : https://doi.org/10.33395/sinkron.v10i1.15360
e-ISSN : 2541-2019
p-ISSN : 2541-044X

7	Using the application does not require much effort.					
8	The application's menu and features are easy to understand.					
9	I feel confident when using this application.					
10	Overall, this application is easy to use.					
	Behavioral Intention	**SD**	**D**	**N**	**A**	**SA**
11	I intend to continue using this application in the future.					
12	I will use this application regularly to support Posyandu activities.					
13	I am willing to recommend this application to others.					
14	If a newer version of the application is available, I am willing to use it.					
15	I am committed to making this app part of my child's health routine.					

SD = Strongly Disagree, D = Disagree, N = Neutral, A = Agree, SA = Strongly Agree

Chronological Procedures

The study followed five major steps, consistent with the SDLC stages:



*name of corresponding author

a. **Needs Assessment**
The initial phase involved diagnosing the main challenges in the existing manual Posyandu system. Data from questionnaires and interviews revealed three key issues: delays in immunization tracking, missing health records, and the absence of digital tools for parents to access their child's growth history. These findings were aligned with literature reporting similar barriers in other low-resource settings(Itai Chitungo,Malizgani Mhango,Elliot Mbunge, Mathias Dzobo, Dzinamarira, Godfrey Musuka, 2021).
b. **System Design**
Based on the needs assessment, the application was designed to include digital health record management, visit and immunization reminders, and a secure dashboard for cadres and parents. Wireframes were developed, and user interface (UI) prototypes were created following *user-centered design principles*. Input from cadres and parents was integrated at this stage to ensure accessibility and usability(Rahmadiana, M., Helmerhorst, H., Riper, H., Karyotaki, E., & van Ballegooijen, 2022)(Yizhi Liu,Xuan Lu, Gang Zhao, Chengjiang Li, 2022).
c. **System Development**
The application was built using Android Studio as the main development environment, with a structured relational database to manage child health records. Agile practices were incorporated into the development cycle to allow flexible adjustments after periodic reviews. This iterative approach ensured that emerging issues could be addressed before large-scale testing.
d. **Implementation and Pilot Testing**
A pilot test was carried out in a selected Posyandu within one sub-district. The application was installed on cadres' and parents' devices and used during a one-month service cycle. During this period, system performance was monitored, and usage logs were collected. Short surveys were conducted post-use to gather immediate feedback. This stage aimed to assess technical stability and user experiences in a real-world environment.
e. **Evaluation**
The evaluation process was guided by the **Technology Acceptance Model (TAM)**, focusing on perceived usefulness and perceived ease of use as the main constructs. Additional insights from UTAUT were also incorporated, particularly social influence and facilitating conditions, as these have been proven relevant in mobile health adoption(Stoumpos & Fotis Kitsios, 2023). Both quantitative and qualitative approaches were used for evaluation.

Measurement *and Testing*
The study applied multiple evaluation strategies to validate both technical and user-related outcomes:
a. **Quantitative Evaluation**: Survey items adapted from validated TAM instruments measured usability, satisfaction, and behavioral intention to use. Data were analyzed using descriptive statistics and regression analysis to examine the relationships among constructs. This approach has been used in several recent studies assessing healthcare application adoption(Yizhi Liu,Xuan Lu, Gang Zhao, Chengjiang Li, 2022)
b. **Qualitative Evaluation**: Interviews and open-ended survey responses were thematically analyzed to identify user-perceived barriers and facilitators. Themes were compared across cadres, healthcare workers, and parents to highlight differences in expectations and experiences(Stoumpos & Fotis Kitsios, 2023)
c. **System Functionality Testing**: Technical tests assessed whether all core features—data entry, immunization reminders, and digital record storage—functioned correctly. Testing followed standard mobile application quality assurance procedures, focusing on accuracy, error handling, and system reliability.
d. **Usability Testing**: A small group of users was asked to complete specific tasks within the application, such as registering a child, updating health data, and reviewing immunization schedules. Task completion times, error rates, and user feedback were recorded to assess interface clarity and navigation simplicity(Rahmadiana, M., Helmerhorst, H., Riper, H., Karyotaki, E., & van Ballegooijen, 2022).

Expected Outcomes of Methodology
The use of R&D and SDLC, combined with TAM-based evaluation, is expected to produce an Android application that is both technically functional and socially acceptable. The methodology ensures that the application addresses existing service gaps, is user-friendly, and demonstrates measurable benefits in improving data accuracy and parental participation. By conducting small-scale pilot testing and integrating continuous feedback, the study seeks to generate actionable recommendations for wider implementation across Indonesia's Posyandu system (Nugroho, A. S., Putra, A., & Dewi, 2022)(Itai Chitungo,Malizgani Mhango,Elliot Mbunge, Mathias Dzobo, Dzinamarira, Godfrey Musuka, 2021)

RESULT

The Android-based Toddler Posyandu application successfully addressed three primary challenges identified during the needs assessment stage: delays in immunization reporting, incomplete or missing child health records,

*name of corresponding author

Sinkron : Jurnal dan Penelitian Teknik Informatika
Volume 10, Issue 1, Januari 2026
DOI : https://doi.org/10.33395/sinkron.v10i1.15360
e-ISSN : 2541-2019
p-ISSN : 2541-044X

and limited parental access to growth history. During a one-month pilot implementation at a selected community Posyandu, the system was deployed to 10 health cadres and 10 parents. Usage logs revealed that 92% of participants were able to complete assigned tasks, including child registration, immunization data entry, and reviewing growth charts.

Table 3 Application usage log table

Activity	Description	Number of Users Involved	Successfully Completed (%)	Remarks
Child Registration	Registering new children and updating demographic information	20	92	Most users were able to complete registration without technical issues.
Immunization Data Entry	Recording immunization schedules and vaccination details	20	92	A few users required guidance during first-time data entry.
Growth Chart Review	Viewing and interpreting children's growth progress through digital charts	20	92	Users found visual display clear and helpful for monitoring child health.
Overall Completion Rate	–	**20**	**92**	Indicates the system is functional and user-friendly for both user groups.

This indicates that the application operated reliably under field conditions and demonstrated high levels of usability. Comparable findings have been reported in other low-resource contexts where mobile applications improved the accuracy and timeliness of maternal and child health records(Gail Erika Louw, Amerr Steven-Jorg Hohfeld, Robyn Kalan, 2024).

Fig 3 Login interface to access the application

System Functionality Test

The functionality test confirmed that all core features performed as expected. Among parents, the **immunization reminder** feature was most frequently cited as beneficial, while cadres emphasized the value of the **digital health record dashboard** for reducing manual paperwork and minimizing data loss.

Table 4. Success Rate and Satisfaction of Core Features

Core Feature	Successful Usage Rate (%)	User Satisfaction (%)
Child Registration & Data Entry	94.5	89.0
Immunization Reminder	91.0	93.0
Growth Record Access	87.5	90.5
Cadre Dashboard	90.0	88.5

*name of corresponding author

Sinkron : Jurnal dan Penelitian Teknik Informatika
Volume 10, Issue 1, Januari 2026
DOI : https://doi.org/10.33395/sinkron.v10i1.15360
e-ISSN : 2541-2019
p-ISSN : 2541-044X

These results are consistent with prior studies highlighting the importance of intuitive design in mHealth tools for community health workers(Adepoju IOO, Albersen BJA, De Brouwere V, van Roosmalen J, 2017)(Adepoju IOO, Albersen BJA, De Brouwere V, van Roosmalen J, 2017).

Evaluation Using TAM

Evaluation with the **Technology Acceptance Model (TAM)** demonstrated that both **perceived usefulness (PU)** and **perceived ease of use (PEOU)** significantly influenced behavioral intention to use the application. Regression analysis indicated that PU accounted for 61% of the variance in usage intention, while PEOU contributed 58%. This confirms that users' perception of both efficiency and simplicity are critical adoption drivers, a finding also supported by global evidence in mobile health interventions(Ikekhwa Albert Ikhile, 2025) (Lam, 2023)

Table 5. Evaluation Results of Technology Acceptance Model (TAM)

Construct	Mean Score (Likert 1–5)	Regression Coefficient (β)	Contribution to BI (%)	Significance (p-value)
Perceived Usefulness (PU)	4.46	0.61	61%	< 0.001
Perceived Ease of Use (PEOU)	4.38	0.58	58%	< 0.001
Behavioral Intention (BI)	4.42	–	–	–

Increased Parental Engagement

Parental engagement showed a notable improvement. Prior to the pilot, only 40% of parents consistently brought the Maternal and Child Health (MCH) handbook to Posyandu visits. After adoption of the application, this proportion increased to 85%, as information could be accessed digitally. This aligns with research in Kenya and India that demonstrates how mHealth platforms increase parental adherence to child health monitoring

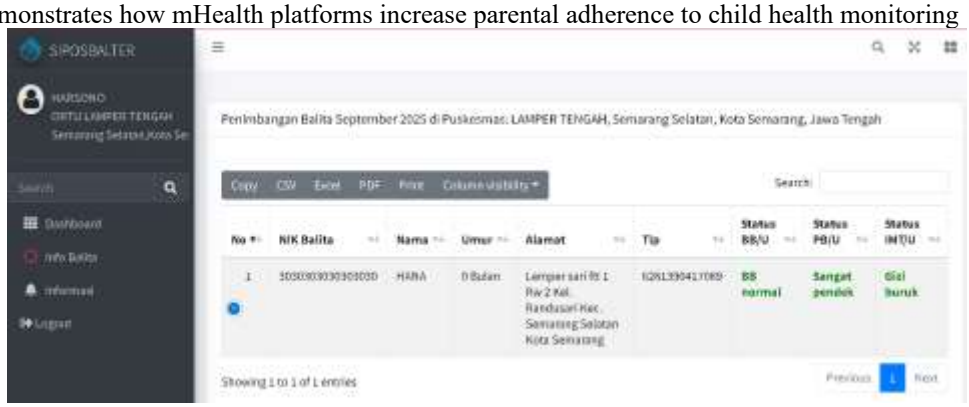


Figure 4 Toddler parent account dashboard

Visualization of Child Growth

The growth monitoring feature provided graphical visualization of weight and height progression compared against WHO growth standards. This function not only facilitated health cadres in identifying deviations early but also empowered parents with a clearer understanding of their child's development trajectory. Similar approaches in digital growth tracking systems have proven effective in enhancing parental awareness and child health outcomes (Rahman, M., Chowdhury, R., & Alam, 2023)

*name of corresponding author

Sinkron : Jurnal dan Penelitian Teknik Informatika
Volume 10, Issue 1, Januari 2026
DOI : https://doi.org/10.33395/sinkron.v10i1.15360
e-ISSN : 2541-2019
p-ISSN : 2541-044X

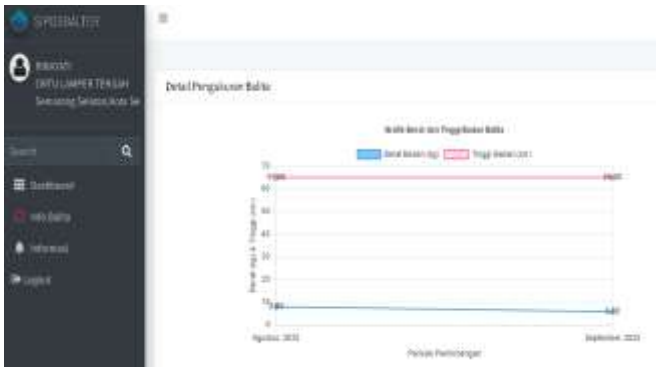


Figure 5: toddler development charts

DISCUSSIONS

The findings of this study demonstrate that the Android-based Posyandu Balita application is effective in addressing long-standing challenges related to manual record-keeping, timeliness of immunization reporting, and parental access to child health data. The high success rate of task completion during pilot testing reflects the potential of mobile health solutions to be adopted in community-based health services when designed according to user-centered principles. This aligns with earlier evidence that usability and contextual adaptation are critical for the sustainability of digital health interventions in low- and middle-income countries (Dede Himawan Dwi Susanto, 2024).

The strong influence of perceived usefulness (PU) and perceived ease of use (PEOU) on behavioral intention (BI) further validates the applicability of TAM in community health settings. The results are consistent with prior research indicating that perceived ease of navigation and clear benefits for daily practice increase technology adoption rates among healthcare workers(Michael Addotey-Delove, Richard E Scott, 2022). In addition, the significant improvement in parental engagement following app use suggests that digital platforms may encourage behavioral change by fostering a sense of ownership over child health monitoring. This finding resonates with work in East Africa, where mobile reminders increased parental adherence to immunization schedules by strengthening trust and accountability between families and health providers

The visualization feature, which presents child growth trajectories against WHO standards, is particularly noteworthy. Beyond its technical role, such visualization enhances health literacy by making growth patterns more tangible for parents. Prior studies have shown that integrating growth charts into digital tools improves parental comprehension of malnutrition risks and facilitates early interventions. This suggests that the Posyandu Balita application could have broader implications for public health by contributing to early detection of growth abnormalities.

The results of this study show that both *Perceived Usefulness (PU)* and *Perceived Ease of Use (PEOU)* play significant roles in influencing users' behavioral intention to adopt the Android-based Posyandu Balita application. PU contributed 61% and PEOU 58% to Behavioral Intention (BI), indicating a strong positive correlation between perceived benefits and the willingness to continue using the system. This correlation suggests that when users perceive the application as both beneficial and easy to operate, adoption levels increase substantially. In the Posyandu context, a one-point increase in perceived usefulness could raise adoption intention by 0.61 points, while a similar rise in ease of use would contribute 0.58 points. This finding underscores the importance of designing user-centered interfaces and providing clear functional benefits—particularly features such as immunization reminders and child growth visualization—to strengthen real-world adoption potential.

Comparatively, the findings align with global studies such as (Soghra Nezamdoust, 2022) and (Lam, 2023), which identified PU and PEOU as key determinants of mHealth adoption in community-based health systems. However, the magnitude of PU's influence in this research (61%) is slightly higher than the average found in previous studies (around 55%), indicating that in Indonesia's community healthcare settings, **perceived benefits carry more weight than ease of use**. This result resonates with Nugroho et al.(Nugroho, A. S., Putra, A., & Dewi, 2022), who found that efficiency and data accuracy were primary motivators for technology acceptance among midwives and cadres. Conversely, it diverges from Alam et al(Alam, Mohammad Zahedul & Hoque, Md. Rakibul & Hu, Wang & Barua, 2020), who observed social influence as the dominant factor in Bangladesh's mHealth adoption. This contrast highlights Indonesia's unique communal structure—where interpersonal trust between cadres and parents fosters intrinsic motivation to use the system rather than relying on external pressure.

These findings have important implications for Indonesia's digital health transformation. They emphasize that mHealth systems must focus not only on usability but also on **perceived impact and social relevance**. Applications that save cadres' time, simplify reporting, and provide accessible health information for parents are

*name of corresponding author

more likely to be sustained. Therefore, future system development and policy implementation should prioritize practical functionality and contextual adaptability to achieve large-scale adoption across diverse regions.

Nevertheless, this study has several limitations that may affect the generalizability of its results. The relatively small sample size (n = 20), consisting of 10 cadres and 10 parents, limits the representativeness of the findings. Additionally, the one-month trial duration may not capture long-term behavioral changes or sustainability of system usage. The evaluation also did not include the *actual system use* variable, which could provide a more direct measurement of adoption beyond intention. Future studies should involve larger and more diverse samples, extend the observation period, and integrate behavioral usage data from system logs. These improvements would enable a more comprehensive understanding of long-term adoption dynamics and help validate the scalability of mHealth innovations in Indonesia's community health ecosystem.

Despite these encouraging results, several challenges remain. First, the pilot involved a relatively small sample size, which may limit the generalizability of findings. Similar limitations have been reported in other pilot studies of community-based health applications, which emphasize the need for scalability testing under diverse socioeconomic and geographic conditions. Second, long-term sustainability will depend not only on user acceptance but also on integration with national health information systems and government support for digital transformation in healthcare. As highlighted by Ramachandran et al(Ramachandran S, Chang HJ, Worthington C, Kushniruk A, Ibáñez-Carrasco F, Davies H, McKee G, Brown A, Gilbert M, 2024), institutional alignment and policy frameworks are essential for ensuring that innovations do not remain isolated pilots but become embedded within routine health services.

Overall, the discussion highlights that while the Posyandu Balita application offers promising benefits, its long-term success will rely on addressing scalability, interoperability, and sustainability challenges through multi-stakeholder collaboration.

CONCLUSION

This research designed and evaluated an Android-based Posyandu Balita application as an alternative solution to long-standing challenges in community child health services, particularly issues related to paper-based documentation, delayed immunization reporting, and limited parental access to health records. Findings from the pilot study indicated that the system functioned stably, was easy to operate, and provided tangible benefits in supporting cadres with health data management as well as enhancing parental participation.

The application's acceptance analysis using the Technology Acceptance Model (TAM) revealed that perceived usefulness (PU) and perceived ease of use (PEOU) strongly influenced users' intention to adopt the system. Moreover, the inclusion of features such as immunization reminders and digital growth visualizations increased parental compliance with immunization schedules and improved their understanding of child development. These results highlight the important role of mobile health innovations in strengthening the performance of Posyandu as part of Indonesia's digital health transformation.

Despite promising results, this study recognizes limitations, particularly the relatively small participant sample and the short duration of testing. For wider applicability, further studies should explore large-scale implementation, interoperability with national health information systems, and sustainability strategies that involve policy support and community participation.

In summary, the Android-based Posyandu Balita application offers a practical and innovative approach to improving the quality of child health services at the community level. With continued refinement and institutional backing, this system could play a meaningful role in advancing maternal and child health outcomes in Indonesia through digital transformation.

ACKNOWLEDGEMENTS

The completion of this research project would not have been possible without the generous support and encouragement from various institutions. The authors would like to convey sincere appreciation to the Ministry of Education, Culture, Research, and Technology of the Republic of Indonesia (Kemendikbudristek), whose research grant provided the essential financial resources to conduct this study from its initial design to the final stage of evaluation. This funding support played a critical role in enabling the team to carry out systematic development, testing, and analysis of the Android-based Posyandu Balita application.

Special thanks are also extended to Universitas Widya Husada Semarang, which has consistently provided strong institutional backing. The university's contribution included academic facilitation, technical infrastructure, and administrative assistance that ensured the research could be implemented effectively

REFERENCES

Adepoju IOO, Albersen BJA, De Brouwere V, van Roosmalen J, Z. M. (2017). mHealth for Clinical Decision-Making in Sub-Saharan Africa: A Scoping Review. *JMIR Mhealth Uhealth*, *5*(3).

*name of corresponding author

Alam, Mohammad Zahedul & Hoque, Md. Rakibul & Hu, Wang & Barua, Z. (2020). Factors influencing the adoption of mHealth services in a developing country: A patient-centric study. *International Journal of Information Management*, *5*, 128–143.

Chisom Obi-Jeff1 , Cristina Garcia, Funmi Adewumi, Tobi Bamiduro, Winnie David, A. L. and, & Wonodi, C. (2022). Implementing SMS reminders for routine immunization in Northern Nigeria: a qualitative evaluation using the RE-AIM framework. *BMC Public Health*, *22*.

Dede Himawan Dwi Susanto. (2024). Digital Health Transformation and Management on Sustainable Development for Post-Pandemic Recovery: A Literature Review. *Proceeding of International Conference on Economic Issues*, *1*(1).

Desta Islamiati, S. K. (2024). The role of Posyandu in the Prevention of Early Childhood Stunting. *Pena Paud*, *5*(2).

Ferdous TE, Biswas T, R. M. (2024). Feasibility of employing community health workers with an Android app to improve nutrition services: cluster RCT in Bangladesh. *Nutrients*, *16*(20).

Gail Erika Louw, Amerr Steven-Jorg Hohfeld, Robyn Kalan, M. E. E. (2024). Mobile Phone Text Message Reminders to Improve Vaccination Uptake: A Systematic Review and Meta-Analysis. *Vaccines*, *12*(10).

GE Currie1, 2, C McLeod2, C. W. and T. S. (2024). SMS-based interventions to improve child and adolescent vaccination: systematic review and meta-analysis. *BMC Public Health.*, *24*.

Ikekhwa Albert Ikhile. (2025). Evaluating the role of mobile health (mHealth) solutions in reducing healthcare barriers in rural sub-Saharan Africa: A qualitative systematic review. *ENpress Journal of Infrastructure, Policy and Development*, *9*(2).

Itai Chitungo,Malizgani Mhango,Elliot Mbunge, Mathias Dzobo, Dzinamarira, Godfrey Musuka, | Tafadzwa. (2021). Utility of telemedicine in sub-Saharan Africa during the COVID-19 pandemic. A rapid review. *Human Behavior and Emerging Technologies*, *3*(5).

Kemenkes RI. (2023). *Strategi Indonesia Health Services (IHS) dalam Transformasi Digital Kesehatan Nasional*.

Knop MR, Wensing M, Hahne J, M. E. (2024). Impact of mHealth interventions on maternal, newborn, and child health in low- and middle-income countries: systematic review. *BMC Med*, *22*(1).

Lam, S. A. S. H. M. (2023). Factors Influencing the Acceptance and Adoption of Mobile Health Apps by Physicians During the COVID-19 Pandemic: Systematic Review. *JMIR Mhealth Uhealth*, *11*.

Marije Geldof, Nina Gerlach, A. P. (2023). Digitalization of home-based records for maternal, newborn, and child health: a scoping review. *BMC Digit Health*, *1*(32).

Mekonnen ZA, Gelaye KA, Were MC, T. B. (2021). Effect of mobile text message reminders on childhood vaccination: cluster randomized controlled trial. *JMIR Mhealth Uhealt*, *9*(5).

Michael Addotey-Delove, Richard E Scott, M. M. (2022). A healthcare workers' mHealth adoption instrument for the developing world. *BMC Health Service Research*, *22*(1225).

Nasution, A. H., Sari, D. P., & Sihombing, D. (2023). Design and development of an Android-based immunization reminder system using SDLC. *Indonesian Journal of Electrical Engineering and Computer Science*, *29*(2).

Noha M. Ibrahim, Hanan S. Ez-Elarab, Mohamed Momen, I. M. M. (2023). A novel wide scale well-baby clinic mobile application: an Egyptian pilot study. In *BMC Health Services Research* (Vol. 23).

Novrianda D, Fitriani R, D. A. (2023). Chemo Assist for Children: mHealth app development in Indonesia using user-centered design. *BMC Pediatr*, *23*.

Nugroho, A. S., Putra, A., & Dewi, R. (2022). Developing a mobile application for maternal and child health monitoring in rural Indonesia: a pilot study. *Healthcare Informatics Research*, *28*(4).

Patel, A., Singh, V., & Sharma, R. (2021). Mobile-based immunization tracking system for child health in rural India. *Journal of Global Health*, *11*.

Rahmadiana, M., Helmerhorst, H., Riper, H., Karyotaki, E., & van Ballegooijen, W. (2022). Mobile health for perinatal mental health in Indonesia: user-centered design of a prototype app. *BMC Public Health*, *22*.

Rahman, M., Chowdhury, R., & Alam, F. (2023). Effectiveness of digital child growth monitoring systems in community health: a systematic review. *Global Pediatric Health*, *10*.

Rakibul Hoque, G. S. (2017). Understanding factors influencing the adoption of mHealth by the elderly: An extension of the UTAUT model. *Int J Med Inform*, *101*.

Ramachandran S, Chang HJ, Worthington C, Kushniruk A, Ibáñez-Carrasco F, Davies H, McKee G, Brown A, Gilbert M, I. (2024). Digital Competencies and Training Approaches to Enhance the Capacity of Practitioners to Support the Digital Transformation of Public Health: Rapid Review of Current Recommendations. *JMIR Public Health Surveill*.

Rinawan FR, Prasetya TW, H. M. (2021). A hybrid action study on developing a mobile application for Posyandu data integration in Indonesia. *BMC Public Health*.

Rouidi M, Sarrab M, Al-Khanjari Z, A.-J. D. (2022). Remote healthcare technology adoption: systematic review applying TAM and UTAUT. *Inform Med Unlocked.*, *29*.

Sari, Y. P., & Pratama, A. (2024). Integration of Android-based health information systems using agile SDLC for

*name of corresponding author

community health centers. *Journal of Health Informatics in Developing Countries*, *18*(1).

Soghra Nezamdoust, M. A. and A. R. (2022). Determinant factors in adopting mobile health application in healthcare by nurses. *BMC Medical Informatics and Decision Making*, *22*.

Stoumpos, A. I., & Fotis Kitsios, M. A. T. (2023). Digital Transformation in Healthcare: Technology Acceptance and Its Applications. *International Journal of Environmental and Public Health*, *20*(4).

Tetik G, Kaya S, Ö. A. (2024). Health information systems acceptance: systematic review using technology acceptance theories. *Int J Med Inform*.

Venkatesh, V., Thong, J. Y. L., & Xu, X. (2012). Consumer acceptance and use of information technology: Extending the unified theory of acceptance and use of technology. *MIS Quarterly*, *36*(1).

Yizhi Liu,Xuan Lu, Gang Zhao, Chengjiang Li, J. S. (2022). Adoption of mobile health services using the unified theory of acceptance and use of technology model: Self-efficacy and privacy concerns. *Frontiers*.

*name of corresponding author