Indonesian Journal of Global Health Research
Volume 9 Number 1, Februari 2027
e-ISSN 2715-1972; p-ISSN 2714-9749
https://jurnal2.globalhealthsciencegroup.com/index.php/IJGHR

DEVELOPMENT OF AN ANDROID-BASED APPLICATION FOR PEDIATRIC NURSING CARE

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ABSTRACT
Manual documentation of nursing care requires considerable time, increases administrative workload, and may lead to recording errors, potentially reducing nursing students' focus on clinical learning and patient interaction. This study aims to develop a Mobile Pediatric Nursing Care application to support nursing care documentation during clinical practice. This study used a Research and Development (R&D) design consisting of user needs analysis, application design, development, and testing. The participants were 36 nursing students undergoing clinical practice in a hospital, the study used purposive sampling to select nursing students as application users. The data analysis plan included descriptive analysis and a paired-samples t-test to evaluate the mobile application, data processing involved editing, coding, scoring, and tabulation. Descriptive statistical analysis using frequencies and percentages was conducted to summarize user acceptance across the TAM dimensions. Application evaluation used the Technology Acceptance Model (TAM), including Perceived Usefulness, Attitude Toward Using, Behavioral Intention to Use, and Actual System Use. Inclusion criteria were nursing students undergoing clinical practice who used the application. The Mobile Pediatric Nursing Care application was developed according to user needs and provided features for systematic pediatric nursing care documentation. The application facilitated documentation, patient data management, and clinical learning. The application was considered feasible as a digital learning and documentation tool for nursing students. The Mobile Pediatric Nursing Care application was successfully developed as a technology-based innovation to support efficient and systematic pediatric nursing care documentation and clinical learning among nursing students.

Keywords: nursing documentation; nursing student; pediatric nursing; pediatric nursing care; technology acceptance model

First Received	Revised	Accepted
22 October 2026	25 October 2026	26 October 2026
Final Proof Received		**Published**
07 November 2026		01 February 2027

How to cite (in APA style)
Ardianti, I., Julianto, E. K., Kurniawati, F. R., & Nurfitriani, Y. (2026). Development of An Android-Based Application for Pediatric Nursing Care. *Indonesian Journal of Global Health Research*, *9*(1), 161–168. https://doi.org/10.37287/ijghr.v9i1.2891.

INTRODUCTION

The rapid development of information technology in recent decades has influenced various sectors, including healthcare. One form of technological innovation that is increasingly being applied is mobile-based applications, which can facilitate various aspects of healthcare services, including medical documentation and nursing care (Wang, X. et al., 2021). Mobile applications can support more efficient and accurate data management and have the potential to improve the quality of healthcare services (Liu et al., 2021). In nursing, particularly pediatric nursing care, documentation is an essential component of the nursing process. Nursing documentation includes patient assessment, nursing diagnoses, intervention planning, implementation, and evaluation of patient conditions. Accurate, timely, systematic, and accessible documentation is important to support appropriate decision-making and continuity of care (Enterprise, 2017). However, nursing students commonly still use manual documentation methods, such as handwritten notes and forms, which may require considerable time and increase the administrative burden during clinical practice (Hoffman et al., n.d.).

Manual documentation can also create various problems, including delayed recording, writing errors, unclear handwriting, incomplete information, and difficulties in storing and retrieving patient data. For nursing students, particularly those undertaking pediatric clinical practice in hospitals, these conditions may reduce the time available for learning, interacting with patients, and applying the knowledge and skills acquired during their education. In addition, lecturers may experience difficulties in reviewing documentation because of unclear or poorly organized handwriting (Davis et al., 2020). Based on these problems, an Android-based mobile application for pediatric nursing care can be developed as an alternative solution to support students during clinical practice. The application can provide structured features for collecting patient data, planning nursing care, documenting interventions, and evaluating outcomes. Digital documentation can also facilitate data storage and retrieval while reducing the risk of loss or damage associated with handwritten records (Kurniawati, 2019).

Mobile applications have also been used in nursing education to facilitate access to clinical information and support students in developing their clinical competencies. Previous studies reported that mobile technology can support learning, provide quick access to relevant information, and assist nursing students in planning and evaluating nursing care (Purnamasari, 2021). However, existing applications are often limited to certain aspects of the nursing process and have not specifically focused on pediatric nursing care, which requires more specific and structured assessment and management (Fadillah et al., 2020). The development of Mobile Pediatric Nursing Care is therefore important to integrate documentation and clinical learning into a single digital platform. The application is designed to provide systematic features for patient assessment, nursing diagnosis, intervention planning, implementation, evaluation, and access to relevant references. These features are expected to help students organize nursing care more effectively, improve documentation efficiency, and support the application of theoretical knowledge during clinical practice (Lai et al., 2022).

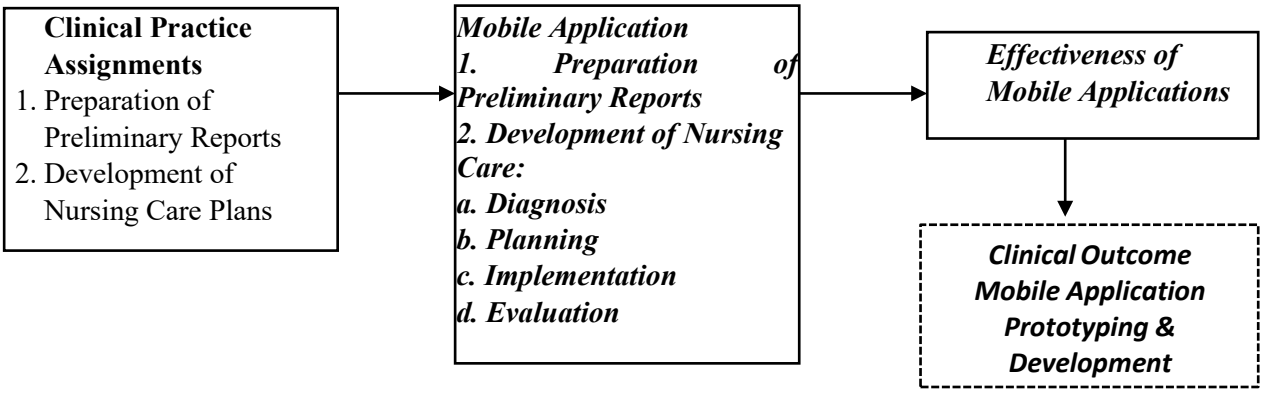
In addition to supporting documentation, the acceptance of technology by users is an important factor in the implementation of mobile applications in nursing education. The Technology Acceptance Model (TAM) explains technology acceptance through users' perceptions of usefulness, attitudes toward use, behavioral intention, and actual system use. In this study, TAM is used to evaluate nursing students' acceptance of the Mobile Pediatric Nursing Care application during clinical practice (F.D, 1989). Therefore, this study aims to develop and evaluate a Mobile Pediatric Nursing Care application based on Android technology to support nursing students in documenting pediatric nursing care during clinical practice. The application is expected to reduce the administrative burden associated with manual documentation, facilitate systematic nursing care documentation, and support more effective clinical learning.

METHOD

This research employed a Research and Development (R&D) approach to develop a mobile application for pediatric nursing care based on Android. The development process focused on designing, developing, validating, and testing a prototype application that could assist nursing students in documenting and preparing pediatric nursing care during clinical practice. The research and development process consisted of several stages, including needs analysis, application design, prototype development, expert validation, and user testing. The needs analysis was conducted to identify problems experienced by nursing students during pediatric clinical practice, particularly problems related to manual documentation, limited time, difficulties in organizing nursing care documentation, and the risk of errors in recording patient data.

The application was developed based on the needs identified from nursing students. The development approach included the preparation of application features, system design, development of the prototype, and implementation of the application for users. The application was designed to

support several stages of the nursing process, including data collection, nursing diagnosis, intervention planning, implementation, and evaluation. This conceptual framework is illustrated in the following diagram.



The population in this study consisted of nursing students who were undertaking or had undertaken pediatric nursing clinical practice. The respondents consisted of 36 nursing students from two clinical practice locations, namely RSUD Padangan, Bojonegoro, East Java, and RSUD Dr. Soeprapto Cepu, Blora, Central Java. Respondents were selected based on their suitability as the primary users of the Mobile Pediatric Nursing Care Application. Data collection was conducted using a questionnaire based on the Technology Acceptance Model (TAM), consisting of Perceived Usefulness (PU), Attitude Toward Using (ATU), Behavioral Intention (BI), and Actual System Use (AU). The data were analyzed descriptively to determine the level of acceptance of the application among nursing students.

RESULT

The research resulted in an Android-based Mobile Pediatric Nursing Care Application designed to support nursing students in documenting and preparing pediatric nursing care during clinical practice. The application integrates several stages of the nursing process into one mobile platform, allowing students to collect patient data, determine nursing diagnoses, plan interventions, document implementation, and conduct evaluations. The application was developed based on the needs of nursing students during clinical practice. The needs analysis identified several problems associated with manual documentation, including the length of time required for documentation, difficulty organizing nursing care systematically, the possibility of recording errors, and limited time available for direct learning and interaction with patients. The application provides features that support nursing students in organizing pediatric nursing care more systematically. The main features include patient data collection, nursing assessment, nursing diagnosis, intervention planning, implementation documentation, and evaluation.

Characteristics of Respondents

Table 1.
Characteristics of Respondents

Characteristics of Respondents	f	%
Gender		
Male	2	5,6
Female	34	94,4
Practice Location		
RSUD Padangan Kab.Bojonegoro Jawa Timur	17	47,2
RSUD Dr.Soeprapto Cepu Kab.Blora Jawa Tengah	19	52,8

A total of 36 nursing students participated in the study. The majority of respondents were female, with 34 respondents (94.4%), while 2 respondents (5.6%) were male. Based on the clinical practice

location, 19 respondents (52.8%) undertook clinical practice at RSUD Dr. Soeprapto Cepu, Blora, Central Java, while 17 respondents (47.2%) undertook clinical practice at RSUD Padangan, Bojonegoro, East Java.

Acceptance of the Mobile Pediatric Nursing Care Application

Table 2.
Acceptance of the Mobile Pediatric Nursing Care Application

Acceptance Category	f	%
Very Low	0	0,00
Low	0	0,00
Moderate	3	8,33
High	17	47,22
Very High	16	44,44

The results showed that the majority of respondents accepted the Mobile Pediatric Nursing Care Application positively. A total of 17 respondents (47.22%) assessed the application as having a high level of acceptance, while 16 respondents (44.44%) assessed it as having a very high level of acceptance. Only 3 respondents (8.33%) assessed the application as having a moderate level of acceptance, and no respondents assessed it as low or very low.

The results based on the Technology Acceptance Model were as follows.

Perceived Usefulness

Table 3.
Perceived Usefulness

Perceived Usefulness (PU)	f	%
Very Low	0	0
Low	0	0
Moderate	3	8.333333333
High	14	38.88888889
Very High	19	52.77777778

The results showed that 19 respondents (52.78%) assessed Perceived Usefulness as very high, 14 respondents (38.89%) as high, and 3 respondents (8.33%) as moderate. No respondents assessed the usefulness of the application as low or very low.

These findings indicate that most nursing students perceived the application as useful in supporting documentation and learning during pediatric clinical practice.

Attitude Toward Using

Table 4.
Attitude Toward Using

Attitude Toward Using (ATU)	**f**	%
Very Low	0	0
Low	0	0
Moderate	9	25
High	13	36.11111111
Very High	14	38.88888889

The results showed that 14 respondents (38.89%) had a very high attitude toward using the application, 13 respondents (36.11%) had a high attitude, and 9 respondents (25%) had a moderate attitude. No respondents were categorized as having a low or very low attitude toward using the application.

Behavioral Intention

The results showed that 15 respondents (41.67%) had a very high behavioral intention to use the application, 16 respondents (44.44%) had a high behavioral intention, and 5 respondents (13.89%)

had a moderate behavioral intention. These results indicate that most respondents showed an intention to continue using the application in nursing education and clinical practice.

Table 5.
Behavioral Intention

Behavioral Intention (BI)	f	%
Very Low	0	0
Low	0	0
Moderate	5	13.8888888
High	16	44.4444444
Very High	15	41.6666666

Actual System Use

Table 6.
Actual System Use

Actual System Use (AU)	Total	%
Very Low	0	0
Low	0	0
Moderate	4	11.11111111
High	12	33.3333333
Very High	20	55.55555556

The results showed that 20 respondents (55.56%) were categorized as having very high actual system use, 12 respondents (33.33%) were categorized as high, and 4 respondents (11.11%) were categorized as moderate. No respondents were categorized as having low or very low actual system use. Overall, the results demonstrated that the Mobile Pediatric Nursing Care Application received a high level of acceptance among nursing students. The application was considered useful and could be used to support the documentation and learning process during pediatric clinical practice.

DISCUSSION

The development of the Mobile Pediatric Nursing Care Application was conducted in response to challenges experienced by nursing students during pediatric clinical practice. Manual documentation may require considerable time and effort, particularly when students need to organize assessment findings, nursing diagnoses, interventions, implementation, and evaluation systematically. Electronic nursing documentation has been shown to improve the comprehensiveness and standardization of nursing documentation, as well as students' satisfaction with the documentation process (Using Electronic Software for Nursing Documentation in Nursing Students, 2021). Furthermore, mobile applications have demonstrated potential as supplementary learning resources that support nursing students in applying the nursing process during clinical education (Kim, 2024). Therefore, the development of an Android-based application represents a relevant approach to supporting digital documentation and learning in pediatric nursing practice.

The results showed that the Mobile Pediatric Nursing Care Application was well accepted by nursing students, with most respondents rating it in the high and very high categories. This finding suggests that the application was perceived as relevant to students' needs during clinical practice. Similar findings have been reported in studies evaluating mobile applications for nursing education, in which students demonstrated positive experiences, satisfaction, and perceived benefits from using mobile-based learning tools (Suh et al., 2022). However, user acceptance should be interpreted within the context of the present evaluation and does not, by itself, establish the application's effectiveness in improving clinical performance or patient outcomes. The high level of acceptance can be interpreted through the Technology Acceptance Model (TAM). This model emphasizes the importance of perceived usefulness and perceived ease of use in explaining users' acceptance of technology and their intention to use it. A systematic review and meta-analysis by Binyamin and Zafar (Binyamin, 2021) identified perceived usefulness, perceived ease of use, and

attitude toward use among the important factors associated with behavioral intention to use mobile health applications. In the present study, students' positive evaluations may indicate that the application was perceived as a useful technological resource for supporting pediatric nursing documentation and clinical learning.

Perceived usefulness is particularly relevant because the application integrates several stages of the pediatric nursing process into a single digital platform. Students can use the available features to collect patient data, formulate nursing diagnoses, plan interventions, document implementation, and evaluate nursing care. These functions may help students organize clinical information and access the relevant documentation components more conveniently. Research on mobile clinical decision-support applications has similarly demonstrated the potential of mobile technology to support nursing students' clinical reasoning and decision-making (Miles & Lee, 2024). Nevertheless, whether the application improves the accuracy and completeness of students' documentation requires further evaluation using objective measures. The Perceived Usefulness assessment showed that most respondents were classified in the high and very high categories. This result suggests that usefulness was an important perceived benefit of the application. Beyond its documentation function, the application may also serve as a learning resource by helping students connect patient assessment findings with nursing diagnoses, interventions, and evaluations. Previous research has demonstrated that mobile applications can support nursing students' learning and clinical preparation, including improvements in knowledge and confidence when using a structured mobile learning application (Kim, 2024). Thus, the present findings support the potential educational value of integrating the nursing process into a mobile application.

The positive Attitude Toward Using results indicate that students generally had a favorable perception of using the application during pediatric clinical practice. The availability of nursing care features on an Android device may offer a practical alternative to preparing separate manual documentation. This interpretation is consistent with research showing that mobile applications can provide convenient supplementary learning experiences and encourage students to engage with nursing education content (Suh et al., 2022). However, students' positive attitudes may also be influenced by factors such as familiarity with smartphones, previous experience with digital applications, and the quality of the application's interface. These factors should be considered when interpreting acceptance results.

The Behavioral Intention results showed that most respondents reported high or very high intentions to continue using the application. This finding suggests that students may be willing to incorporate the application into subsequent clinical learning activities. According to the evidence synthesized by Binyamin and Zafar (2021), behavioral intention to use mobile health applications is associated with perceived usefulness, perceived ease of use, and attitudes toward use, although the strength of these relationships may vary across contexts. Therefore, the intention observed in this study may reflect students' positive evaluation of the application's potential benefits. However, intention to use should not be interpreted as a guarantee of sustained use in routine clinical practice. The Actual System Use results also showed that most respondents were classified in the high and very high categories. This suggests that the application was used during the evaluation process rather than being assessed solely through hypothetical judgments. Students accessed features related to assessment, nursing diagnosis, intervention planning, implementation, and evaluation. Actual use is an important dimension of technology acceptance because the benefits of digital health applications depend partly on whether intended users adopt and use them in practice (Binyamin & Zafar, 2021). Nevertheless, the interpretation of actual use should reflect the measurement method employed in this study. If actual use was measured through self-reported questionnaires, the findings indicate reported use rather than independently verified usage frequency or duration.

The relationships among the findings can be discussed within the framework of TAM. Perceived usefulness and perceived ease of use help explain how users evaluate a technological system, while attitude and behavioral intention provide additional insight into their willingness to adopt it. Binyamin and Zafar (2021) found that these constructs are relevant to explaining the acceptance of mobile health applications. In the present study, the high ratings across perceived usefulness, attitude toward using, behavioral intention, and actual system use are broadly consistent with this framework. However, unless the relationships among these constructs were statistically tested, the results should be described as conceptually consistent with TAM rather than as evidence that one construct directly caused another.

Overall, the Mobile Pediatric Nursing Care Application provides an Android-based platform that integrates the pediatric nursing process into a single application. The high acceptance ratings suggest that the application may be a relevant resource for nursing students during clinical practice. Its potential benefits include supporting more structured documentation, facilitating access to nursing care information, and complementing clinical learning activities. These findings are consistent with previous research demonstrating the potential value of electronic nursing documentation and mobile learning applications in nursing education (Ranjbar et al., 2021). Further studies should evaluate usability, documentation accuracy and completeness, time efficiency, clinical reasoning, and sustained use in actual clinical settings to establish the application's broader educational and practical value.

CONCLUSION

The Mobile Pediatric Nursing Care application developed in this study was successfully designed to support nursing students in carrying out pediatric nursing care documentation systematically and according to standardized nursing processes. With its simple and user-friendly interface, the application provides features that facilitate patient data management, nursing care documentation, and clinical learning activities. The trial results showed that the application had good usability and user acceptance, as students reported that it helped accelerate the documentation process, improve the organization of nursing records, simplify patient data management, and support clinical learning more effectively. Furthermore, based on the aspects of Perceived Usefulness, Attitude Toward Using, Behavioral Intention to Use, and Actual System Use, the application received positive responses from users. Therefore, the Mobile Pediatric Nursing Care application has considerable potential as an effective digital learning and documentation tool to assist nursing students in conducting pediatric clinical practice more efficiently, systematically, and in accordance with the standards of the nursing process.

DECLARATIONS

Acknowledgment: The authors thank the Director of RSUD dr. R. Koesma Tuban for permission to conduct the study, all staff nurses in the inpatient wards who participated as respondents, and the Faculty of Health, Institut Sains Teknlogi dan kesehatan Icasada Bojonegoro, for its support.

Conflicts of interest: The authors declare no conflicts of interest.

Ethical approval: This study was approved by the Health Research Ethics Committee of Institut Ilmu Kesehatan Nahdlatul Ulama Tuban (No. No. 492/0084223523/LEPK.IIKNU/X/2025, dated October 5, 2025) through expedited review. All respondents received an explanation of the study and gave informed consent before participating.

Financial support and sponsorship: This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

Data Availability Statement: The data supporting the findings of this study are available from the corresponding author upon reasonable request.

Author Contributions: All authors contributed to the conception and design of the study, data analysis and interpretation, and drafting and critical revision of the manuscript. All authors read and approved the final manuscript.

Declaration of the Use of Artificial Intelligencein Scientific Writing: The authors used an AI-assisted tool (Claude, Anthropic) for language editing and manuscript revision. The authors reviewed and verified all content and take full responsibility for the final manuscript.

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