The i-Salman app for clinical experience and increased knowledge on the quality of competent graduates

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Abstract

Graduate quality standards require health workers to demonstrate competence before graduation through a formal competency test. The iSalman mobile application was developed as a digital learning tool to enhance students' knowledge, clinical experience, and readiness for such assessments. This study examined its impact on student performance using a quasi-experimental design with a one-group pre-test and post-test approach. A total of 257 students from midwifery and nursing programs participated. Findings indicate that the iSalman application substantially improved knowledge scores and was strongly correlated with enhanced clinical experience. The majority of participants achieved competency upon assessment, suggesting that the application effectively supports the acquisition of professional skills. The study highlights the potential of mobile learning platforms in health education, particularly for strengthening practical competence, increasing student confidence, and supporting success in high-stakes examinations. Broader implementation could further enhance workforce readiness and quality standards in health professions education.

Keywords: Clinical experience; competency test; health education; mobile learning; student performance.

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1. INTRODUCTION

The 2030 Agenda for Sustainable Development or The Sustainable Development Goals (SDGs) is a new development agreement that encourages changes that shift towards sustainable development based on human rights and equality in the four pillars of development (Social, Economic, Environmental, Legal and Governance), with the universal, integrated and inclusive principles of "*No-one Left Behind*" (Schutte, 2017; Brolan & Smith, 2020). The target of ensuring a healthy and prosperous life point 3.1.1, is by looking at the Maternal Mortality Rate (MMR) indicator. By 2030, Indonesia is targeted to be able to reduce the maternal mortality ratio to less than 70 per 100,000 live births (KH). However, Global Data and Estimated World Maternal Mortality Ratio (MMR) from 2000-2017 state that the highest MMR is occupied by Nigeria (67,000), second place is India (35,000), Democratic Republic of Congo (16,000), Ethiopia (14,000), the Republic of Tanzania (11,000), and Indonesia (8,600) in sixth place out of all 185 countries per 100,000 KH (World Health Organization, 2020; Hogan et al., 2018).

Throughout the world, there are more than 830 women who have lost their lives during pregnancy and childbirth, 99% of which are experienced by low or lower-middle-income countries, and almost 2 million newborn babies (BBL) die in the first week of life every year (Masaba & Mmusi-Phetoe, 2020). Substandard services in assisting childbirth and emergency management of obstetric and BBL cases have been widely documented as the main causes of maternal and BBL deaths in health facilities globally (Bolan et al., 2018). Most of these deaths could be prevented if mothers had access to services from skilled health personnel during pregnancy and childbirth (Renfrew et al., 2020; Taye et al., 2025).

Substandard services in assisting childbirth and emergency management of obstetric and BBL cases have been widely documented as the main causes of maternal and BBL deaths in health facilities globally (Thomsen et al., 2019; Groos et al., 2024). Therefore, it is very important for every health worker, especially midwives, to improve their knowledge, skills, and personal quality so that they can optimize the quality of health services (Parellada et al., 2020; Musie et al., 2025). Digital technology has been introduced to assist in delivering situations in childbirth stages (Saing et al., 2023; Mohamed et al., 2025; Amiri et al., 2025; Moghbeli et al., 2024). Maternity Foundation, University of Copenhagen, Laerdal Global Health in ICM, and UNFPA are collaborating in developing Android-based digital technology innovation, namely The Safe Delivery App (SDA) (Lassen, n.d.; Nishimwe et al., 2021; Usmani, 2019). SDA is a smartphone application that contains information and skills for trained midwives, can be accessed directly and quickly, and is based on up-to-date evidence-based clinical guidelines regarding Basic Emergency Obstetrics and Neonatal Care or Emergency Obstetric and Newborn Care (EmONC). Currently, SDA is an IT (information technology) based innovation that is known throughout the world, and many members have become Champions and are certified, but it is not yet available in the Indonesian version and is not widely known by midwives in Indonesia (Sarin et al., 2022; Usmani, 2019).

The app was created using natural resource information. This health application development model, called iSalman (iT-Safe Childbirth), can be used by all professional health workers, including midwives, nurses, and doctors, to increase their ability to improve skills in handling basic obstetric and neonatal emergencies using an evidence-based approach. -based) is up to date. The iSalman application contains 5 learning modules, which contain practice videos, action cards, action procedures (SOP), and questions or quizzes containing case questions to evaluate how far the participants' abilities are in completing the learning. The development of the iSalman health application model uses SDA App sources and is modified into an Indonesian version, displays five types of practical animation videos that correspond to the stages of the learning modules presented, and is added with several standard reference books for midwifery services in Indonesia. The voiceover for the video display is provided by the research team itself. This is something new in the development of IT-based innovation in the health sector, which is expected to continue to develop and be easy to use by all trained health workers in the territory of the unitary state of the Republic of Indonesia in order to improve the quality of Health Human Resources (HR).

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1.1. Purpose of study

This study aims to evaluate the effectiveness of the iSalman mobile application, an Indonesian-adapted digital learning tool based on the Safe Delivery App (SDA), in improving midwifery and nursing students' knowledge, clinical skills, and competency in managing basic obstetric and neonatal emergencies. The study investigates whether using the iSalman app enhances student performance and readiness for formal competency assessments, ultimately contributing to improved quality of healthcare services and maternal-newborn outcomes in Indonesia.

2. METHODS AND MATERIALS

2.1. Research design

This research was research by a midwifery lecturer in collaboration with the IT (information technology) team at the engineering faculty of Bengkulu University, which lasted for a full year, with effective intervention time from August to October 2023. This type of quantitative research uses a quasi-experimental model approach in one group intervention (one group pre-post-test only).

2.2. Participants

The research population was all students with active status at the Bengkulu Ministry of Health Polytechnic, with a total sample of 257 midwifery and nursing study program students.

2.3. Procedure

The data collection stage began after all respondents had finished downloading the iSalman app, with participants expected to complete all the modules contained in the application. Before starting the learning modules, all participants were briefed and given a knowledge pre-test consisting of 50 multiple-choice questions, accessed via a Google Form link provided by the researcher. They were given approximately 50–60 minutes to complete the pre-test, which could only be taken once. After all participants completed the pre-test, the access link was immediately closed, and they were invited to begin the learning modules on the iSalman app. Participants were allowed up to 5 days to complete the learning modules.

2.4. Ethical consideration

This research has been declared ethically appropriate by the Bengkulu Ministry of Health Polytechnic Research Ethics Commission with No. KEPK.BKL/109/03/2023, and has received research recommendations from the National and Political Unity Agency, Number: 070/1465/B.Kesbangpol/2023.

2.5. Data analysis technique

Statistical analyses were performed using IBM SPSS Statistics version 27.

2.5.1. Validity and reliability

This research aimed to determine the effect of application use, clinical experience, and knowledge improvement on the quality of student graduates, as well as to examine the relationships among several controlled variables. Before the application was launched, validity and reliability tests were conducted on each of the 50 question items. The validity test involved 20 randomly selected respondents with a minimum education level of Diploma IV in Health. The results showed that nearly all question items (99%) were valid, except for one item (question no. 44), which was invalid (calculated r value was less than the r table). A question item was considered valid if the calculated r value exceeded the table r value (r = 0.44). The reliability test results were presented in Table 1.

Table 1

Item-total statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Q1	34.80	295.221	,692	,985
Q2	34.70	295,274	,762	,985
Q3	34.75	297.145	,601	,985
Q4	34.65	294,766	,864	,984
Q5	34.65	294,766	,864	,984
Q6	34.70	295,695	,734	,985
Q7	34.75	292,829	,873	,984
Q8	34.75	293,882	,806	,984
Q9	34.65	294,766	,864	,984
Q10	34.70	295,695	,734	,985
Q11	34.75	292,829	,873	,984
Q12	34.75	293,882	,806	,984
Q13	34.75	293,882	,806	,984
Q14	34.70	294.011	,846	,984
Q15	34.70	295,274	,762	,985
Q16	34.75	297.145	,601	,985
Q17	34.65	294,766	,864	,984
Q18	34.70	294,747	,797	,985
Q19	34.75	295,671	,693	,985
Q20	34.80	292,800	,840	,984
Q21	34.80	293,853	,775	,985
Q22	34.85	294,345	,725	,985
Q23	34.85	294,345	,725	,985
Q24	34.75	293,987	,800	,984
Q25	34.70	298,642	,538	,985
Q26	34.80	295.221	,692	,985
Q27	34.70	295,274	,762	,985
Q28	34.75	297.145	,601	,985
Q29	34.65	294,766	,864	,984
Q30	34.65	294,766	,864	,984
Q31	34.70	295,695	,734	,985
Q32	34.75	292,829	,873	,984
Q33	34.75	293,882	,806	,984
Q34	34.65	294,766	,864	,984
Q35	34.70	295,695	,734	,985
Q36	34.75	292,829	,873	,984
Q37	34.75	293,882	,806	,984
Q38	34.75	293,882	,806	,984
Q39	34.75	295,671	,693	,985
Q40	34.80	292,800	,840	,984
Q41	34.80	293,853	,775	,985
Q42	34.85	294,345	,725	,985
Q43	34.85	294,345	,725	,985
Q44	34.70	310,853	-.252	,986
Q45	34.75	293,882	,806	,984
Q46	34.75	293,882	,806	,984
Q47	34.75	293,882	,806	,984
Q48	34.70	297,274	,629	,985
Q49	34.80	294,379	,743	,985
Q50	34.85	295,608	,650	,985

*test of validity statistics

Table 2

Reliability statistics

Cronbach's Alpha	N of Items
0,985	50

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test of reliability statistics

The Cronbach's Alpha value of 0.985 exceeds the critical r table value of 0.44, indicating that the reliability test results for the multiple choice questions included in the iSalman application are considered reliable and consistent (Table 2).

3. RESULTS

The data collection results yielded the distribution of respondents' characteristics, assessed based on information from participants registered on the application, as presented in Table 3 below.

Table 3

Respondent characteristics based on survey when completing data in the i-Salman app

Characteristics	Frequency (n = 257)	Percentage (%)
Gender		
Man	17	6.6
Woman	240	93.4
Age		
20 – 25 Years	234	91.1
26 – 30 Years	8	3.1
31 – 35 Years	7	2.7
36 – 40 Years	2	0.8
> 40 years	6	2,3
Last Education Level		
Diploma III	162	63.0
Midwife/Nursing Profession	95	37.0
Pursuing a Master's Degree in Further Education		
Yes	7	2.7
No	250	97.3
Clinical experience		
1-5 years	221	86.0
6-10 years	25	9.7
≥10 years	11	4.3
Number of births assisted in the last 3 months		
0-5 people	173	67.3
6-10 people	43	16.7
≥10 people	41	16.0
Length of working hours at the practice site/week		
Not yet working	174	67.7
6-10 hours	48	18.7
>10 hours	35	13.6
Using a Smartphone		
1 cellphone	228	88.7
2 cellphones or more	29	11.3
Length of time using the cellphone in hours/day		
>10 hours	211	82.1
6-10 hours	42	16.3
0-5 hours	4	1.6
Results of Competency		
Competent	255	99.2
Incompetent	2	0.8

Table 3 indicates that the majority of participants in this study were fresh graduate students aged 20 - 25 years (91.1%), dominated by women (93.4%), 95 participants who had completed professional level (Bd) or Ners. (37%) and diploma III level, as many as 162 people (63%), generally 250 people (97.3%) are not currently pursuing a master's or master's level, and only a small number of 7 people (2.7%) are currently pursuing a

master's degree (Master of Health). The condition is dominated by fresh graduate participants, so 221 people (86%) still have clinical experience of 1-5 years, 25 people (9.7%) have 6-10 years of clinical experience, and the remaining 11 people (4.3%) who have clinical experience of more than 10 years, generally these participants are students at the professional level who have worked for a long time in health service agencies, including Community Health Centers, Independent Practicing Midwives, and Hospitals and have the status of civil servants. In terms of experience of working hours in practice (per week), it is dominated by participants who have not worked as many as 174 people (67.7%) usually students who have graduated from Diploma III and will continue their professional level, 48 people (18.7%) with a long time working hours 6-10 hours, and 35 people (13.6%) worked > 10 hours/week.

In terms of frequency of helping with childbirth in the last three months, 173 people (67.3%) helped 0-5 mothers, 41 people (16.7%) helped 6-10 mothers give birth, and 41 participants (16%) helped > 10 mothers give birth. Most of the participants (228 people) only used one smartphone (88.7%), and the duration of using a cellphone in a day was predominantly more than 10 hours per day (211 people/82.1%), with 42 people (42%) using mobile phones 6-10 hours per day, and only 4 people (1.6%) use 0-5 hours per day. As a result of competent graduates, 255 participants were declared competent (99.2%), and only 2 people were incompetent (0.8%).

Furthermore, all participants who have finished downloading the iSalman app are expected to complete all the modules contained in the application. Before starting the learning module, all participants were briefed first and given a knowledge pre-test of 50 multiple-choice questions, which were accessed on the Google Form link (provided by the researcher), and given around 50-60 minutes to complete the pre-test. Participants can only answer once. After completing all the pre-test questions, the access link is immediately closed, and participants are invited to start the learning modules on the iSalman app. Participants are allowed to complete the learning module within a maximum of 5 days. The results obtained are as shown in Table 4 below.

Table 4
Time to complete modules on the iSalman App

	Takes a long time to complete the modules on the iSalman App			
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1 day	174	67.7	67.7	67.7
	2-3 days	66	25.7	25.7	93.4
	5 days	17	6.6	6.6	100.0
	Total	257	100.0	100.0	

The results of descriptive statistical tests showed that the majority of 174 participants (67.7%) were able to complete the module on the iSalman App in 1 day, 66 participants (25.7%) completed the module in 2-3 days, and the remaining 17 participants (6 .6%) completed the module in 5 days. Furthermore, to obtain results of increasing participants' knowledge, an independent sample t-test was carried out to determine the difference in the average treatment given to participants and the conditions for parametric statistical tests using the Kolmogorov – Smirnov test, informed that the data was normally distributed (N (257) Sig .2-tailed > 0.05 ; p = 0.200) then the residual value is normally distributed.

Table 5
Difference in Mean Pre-post Knowledge Scores for using the iSalman app (n=257)

Knowledge Score	Mean, SD	95%CI (Lower ± Upper)	Pvalue
Pre-test	51.54 (4,718)		
Post Test	90.69 (5.505)	(-39.973 ± -38.331)	0.001
Correlation (N = 257)	0.152		

It is known that the mean difference value tested has a significant value (p value of 0.001 < 0.05), so it can be concluded that there is a real difference between student learning outcomes in completing each module and answering the questions/quizzes listed on the iSalman app before and after using the application.

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Furthermore, once it is known that the data fulfills the classical assumption, namely normal distribution, the researcher will carry out a partial correlation test on several independent variables such as final education level, clinical experience, number of hours worked at the practice site per week, number of assisted births in the last 3 months, length of time using a cellphone in hours per day, the length of time to complete modules on the iSalman App, and the difference in increasing knowledge scores, with the quality of graduate results as a control variable. This test aims to determine the level of closeness of the relationship between variables, which is expressed by the correlation coefficient (r), which is expressed as an r value (table) = 0.1028 (obtained r value table N-2 = 255). Attached to the results in Table 6 below.

Table 6

Variable partial correlation test results

Control variables (N = 257)		last level of education	clinical experience	number of hours worked at the practice site per week	number of assisted births in the last 3 months	How long do you use your cellphone in hours per day	It takes a long time to complete the modules on the iSalman App	The difference in increasing knowledge scores
Compete ncy Test graduate results	Corr.	0.492	0.672	0.969	0.209	0.053	-0.749	0.040
	Sig (2. 2-tailed)	0,000	0,000	0,000	0.001	0.398	0,000	0.521
	Mean	1.37	1.18	1.46	1.49	1.19	1.39	39.1
	Std.D	0.484	0.486	0.723	0.756	0.434	0.609	6.65
R value (table) =		0.1028	0.1028	0.1028	0.1028	0.1028	0.1028	0.1028

According to Janna and Herianto (2021), the strength of the relationship or correlation coefficient between variables is classified based on values ranging from 0.00 to 1.00. These are categorized as follows: very weak relationship (0.00 to 0.20), weak relationship (0.21 to 0.40), strong relationship (0.41 to 0.70), very strong relationship (0.71 to 0.90), extremely strong relationship (0.91 to 0.99), and perfect relationship (greater than 1.00) (Janna & Herianto, 2021). The data analysis revealed perfect positive correlations for variables including the highest education level, clinical experience, weekly hours worked at the practice site, and the number of assisted births in the preceding three months. Conversely, the variable representing cellphone usage measured in hours or days exhibited a very weak relationship with knowledge score improvements, while no correlation, in fact a negative one, was observed for the variable related to the duration required to complete the iSalman application module. The significance level (two-tailed) was 0.000, which is less than 0.05, indicating that the associations between highest education level, clinical experience, weekly work hours, number of assisted births over the past three months, and time spent completing the iSalman app module with graduates' exit exam results (competency) as a control variable are statistically significant (Parellada et al., 2020; Thomsen et al., 2019).

Based on the statistical results presented in Table 4, it is evident that the use of the mobile iSalman application has a significant impact. Most users completed the module within one day, and this rapid completion correlates with higher knowledge scores, indicating that the app positively influences learning outcomes. The development of Android-based online application media accessible via mobile devices is highly relevant today and effectively supports the quality of services provided by health workers serving the community. The iSalman app, available for download on both the Play Store and App Store, is designed to focus on student targets with the primary goal of enhancing knowledge acquisition and improving graduate quality.

Currently, student graduation is determined by the results of an exit examination, also known as the competency test (BPPSDMK, 2020). This competency test is a national assessment aimed at evaluating competency achievements based on established Competency Standards, thereby granting a competency certificate upon successful completion (Fitria et al., 2019; Werni et al., 2019). For midwives and nurses, the competency test is mandated by Law No. 12 of 2012, which governs higher education in the health sector,

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aiming to reduce disparities in graduate quality and ensure the integrity of the health education system. To guarantee quality assurance in higher education within the health sector, the government has implemented national competency tests as part of its quality assurance framework (UUD, n.d.). These tests are intended to minimize quality gaps among graduates and serve as a mechanism for standardizing the registration and licensing processes for health professionals delivering healthcare services in Indonesia (Fitria et al., 2019). Figure 1 shows the iSalman Application Icon and the Initial stage of downloading the application.

Figure 1

iSalman Application Icon and Initial stage of downloading the application
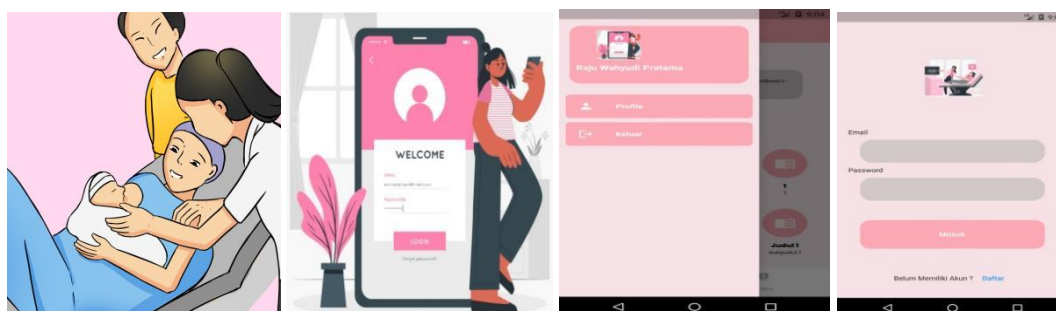
4. DISCUSSION

The iSalman Android-based application is designed to train midwives, nurses, and other birth attendants in Indonesia to manage normal births and deliveries with complications through visual guides in the form of animated videos and audio narration in Indonesian. The primary users of this application are students from the Bengkulu Ministry of Health Polytechnic academic community. In this study, the sample consisted of 257 students, combining midwifery and nursing students, selected through total sampling from the 2023 graduating cohort.

The application features a main front page requiring users to register or log in via email. Upon successful registration, users access a dashboard displaying their name, profile, home, lesson modules, videos, quizzes, and a logout option. Notably, once registered, the application can be used offline, without the need for cellular data or internet connection.

The iSalman mobile learning app includes five core learning modules, each accessible through animated video explanations. At the end of each module, participants must complete a quiz containing 10 questions, requiring a minimum passing score of 80 to unlock the subsequent module. Failure to meet this threshold results in the next module remaining locked. In total, participants must complete 50 quiz questions across the five modules, which cover normal labor and birth, active management of third stage labor, postpartum bleeding, newborn management, and hypertension management.

Partial correlation test results revealed a strong relationship between several variables and the quality of graduates. Clinical experience notably enhances a practitioner's alertness and responsiveness to common cases encountered in practice. Furthermore, having more than 10 years of work experience correlates strongly with one's ability to become a competent professional health worker. The findings demonstrate that the iSalman application significantly improves knowledge scores and bolsters practical experience in preparation for competency examinations.

The implementation of this application employs a blended learning approach, which combines multiple interactive media to ensure engagement and reduce monotony. This approach includes an initial briefing session followed by intensive monitoring over five days, supporting participants effectively in completing modules and quiz questions. Such a method is deemed highly effective in facilitating participant learning and module completion through the iSalman platform.

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The midwife competency test is a government initiative supported by relevant organizations such as the Indonesian Midwives Association (IBI) and the Indonesian Association of Midwifery Professional Education Institutions (AIPKIND). This initiative is governed by the Joint Regulation of the Minister of Education and Culture and the Minister of Health No. 3/VII/PB/2004 and 52/2014, which regulates competency testing for Diploma III Midwifery, Diploma III Nursing, Nursing Profession, and Midwife Professional Education programs. The competency test serves as an exit exam designed to guarantee that health education graduates are competent and nationally standardized by assessing knowledge and skills, thereby providing a foundation for professional healthcare service (Damayanti et al., 2020).

The partial correlation data analysis also showed perfect positive correlations with several key variables: the highest level of education, clinical experience, the number of hours worked per week at the practice site, and the number of assisted births in the past three months. Supporting literature emphasizes that higher education levels are associated with better understanding and knowledge, and clinical nurses with adequate knowledge, skills, and attitudes demonstrate greater competence (Djati et al., 2022). Professional development activities, such as nursing training, positively influence nurses' attitudes, skills, and overall performance in hospital settings. Thus, the iSalman application emerges as a valuable tool in enhancing the competencies of health workers by effectively improving their knowledge, skills, and attitudes.

Clinical experience, the number of hours the midwife/nurse has worked at the practice site, and the number of births assisted in the last three months are directly proportional to the quality of a health worker's clinical competence. When working to provide services in a practice setting, a health worker will, of course, encounter a variety of cases and unique clinical findings. Handling emergencies that may be encountered in the field will be a challenging, unique, and memorable experience. The handling of each case encountered will of course vary according to the clinical diagnosis faced, applicable standard operating procedures, professional ethical authority, and based on the patient's needs. Experience working in a team (teamwork) will certainly further train the personal qualities and abilities of a health worker in providing the best service for their patients. One of the Ethiopian community studies investigated the effectiveness of using one of the Safe Delivery App applications perceived by users as a useful tool, strengthening skills and knowledge. They use it both to improve education and maintain knowledge and skills, as well as to provide immediate emergency guidance needed to manage obstetric and neonatal complications. Most health workers who use the SDA application can increase their self-confidence and ability to manage safe birth situations. (Thomsen et al., 2019) The following study limitations have been considered that this iSalman app needs to be improved through the addition of several features and modules that will further improve participants' abilities, thereby enabling more users to use it.

5. CONCLUSION

The results of this study indicate that the use of the iSalman Android-based mobile application, designed to train midwives, nurses, and other birth attendants in Indonesia, has a significant positive effect. The difference in average knowledge scores before and after the intervention was statistically significant ($p = 0.001 < 0.05$). Additionally, the application showed a strong positive correlation with clinical experience (significance = 0.000, correlation coefficient = 0.672).

Student outcomes were highly successful, with 99.2% of participants achieving competency. Based on these findings, it is recommended to develop additional learning modules aligned with the competency requirements of midwives and nurses, expand user access to a broader audience, and ensure the application remains easily accessible and effective in enhancing competence and self-confidence for the competency test.

Conflict of interest: No potential conflict of interest was reported by the authors.

Ethical Approval: The study adheres to the ethical guidelines for conducting research.

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REFERENCES

Amiri, M., Al-Soukhni, M., Tahtamouni, M., & Al Nsour, M. (2025). Evaluation of a piloted digital reproductive health registry in Jordan to improve mother and child health. *Reproductive Health*, *22*(Suppl 1), 77. https://link.springer.com/article/10.1186/s12978-025-01995-2

Bolan, N. E., Newman, S. D., & Nemeth, L. S. (2018). Technology-Based Newborn Health Learning Initiatives for Facility-Based Nurses and Midwives in Low-and Middle-Income Countries: A Scoping Review. *International Journal of Childbirth*, *8*(4). http://dx.doi.org/10.1891/2156-5287.8.4.252

BPPSDMK, T. (2020). *Badan Pengembangan dan Pemberdayan Sumber Daya Manusia Kesehatan (BPPSDMK)*.

Brolan, C. E., & Smith, L. (2020). *No one left behind: Implementing the sustainable development goals in Australia*. Whitlam Institute within Western Sydney University. https://researchers.westernsydney.edu.au/en/publications/no-one-left-behind-implementing-the-sustainable-development-goals

Damayanti, F. N., Wardiono, K., & Rejeki, S. (2020). NEW PERLINDUNGAN HUKUM PROFESI BIDAN. http://repository.unimus.ac.id/3597/1/NEW%20PERLINDUNGAN%20HUKUM%20PROFESI%20BIDAN.pdf

Djati, S. P., Sudjana, I. M., Darsana, I. M., Sudiarta, I. N., & Mahendra, I. W. E. (2022). The Impact Of Certified Competency Tourism Human Resources In Facing The AEC Era: Case Study In Bali. *TRJ Tourism Research Journal*, *6*(2), 207-217. https://trj.iptrisakti.ac.id/index.php/trj/article/view/152

Fitria, R., Serudji, J., & Evareny, L. (2019). Persiapan uji kompetensi bidan sebagai exit exam. *Jurnal Ilmiah Universitas Batanghari Jambi*, *19*(1), 195-203. http://ji.unbari.ac.id/index.php/ilmiah/article/view/590

Groos, J., Walter, A., Wittek, A., Strizek, B., Gembruch, U., & Recker, F. (2024). Shaping ultrasound in midwifery: towards an evidence-based training framework for enhanced prenatal care. *Archives of gynecology and obstetrics*, *310*(1), 23-43. https://link.springer.com/article/10.1007/s00404-024-07558-3

Hogan, D. R., Stevens, G. A., Hosseinpoor, A. R., & Boerma, T. (2018). Monitoring universal health coverage within the Sustainable Development Goals: development and baseline data for an index of essential health services. *The Lancet Global Health*, *6*(2), e152-e168. https://www.thelancet.com/journals/langlo/article/PIIS2214-109X1730472-2/fulltext

Janna, N. M., & Herianto, H. (2021). Konsep uji validitas dan reliabilitas dengan menggunakan SPSS. https://osf.io/preprints/v9j52/

Lassen, H. (n.d.). *The Safe Delivery App*.

Masaba, B. B., & Mmusi-Phetoe, R. M. (2020). Neonatal survival in Sub-Sahara: a review of Kenya and South Africa. *Journal of multidisciplinary healthcare*, 709-716. https://www.tandfonline.com/doi/abs/10.2147/JMDH.S260058

Moghbeli, F., Setoodefar, M., Mazaheri Habibi, M. R., Abbaszadeh, Z., Keikhay Moghadam, H., Salari, S., ... & Fatemi Aghda, S. A. (2024). Using mobile health in primiparous women: effect on awareness, attitude, and choice of delivery type, semi-experimental. *Reproductive Health*, *21*(1), 49. https://link.springer.com/article/10.1186/s12978-024-01785-2

Mohamed, H., Ismail, A., Sutan, R., Rahman, R. A., & Juval, K. (2025). A scoping review of digital technologies in antenatal care: recent progress and applications of digital technologies. *BMC pregnancy and childbirth*, *25*(1), 153. https://link.springer.com/article/10.1186/s12884-025-07209-8

Musie, M. R., Tagutanazvo, O. B., Sepeng, N. V., Mulaudzi, F. M., & Hlongwane, T. (2025). A scoping review on continuing professional development programs for midwives: optimising management of obstetric emergencies and complications. *BMC Medical Education*, *25*(1), 296. https://link.springer.com/article/10.1186/s12909-025-06830-7

Nishimwe, A., Ibisomi, L., Nyssen, M., & Conco, D. N. (2021). The effect of an mLearning application on nurses' and midwives' knowledge and skills for the management of postpartum hemorrhage and neonatal resuscitation: pre–post intervention study. *Human Resources for Health*, *19*(1), 14. https://link.springer.com/article/10.1186/s12960-021-00559-2

Baska, D. Y., Esmianti, F., Savitri, W., Nugraheni, D. E., & Detriani, S. N. (2025). The i-Salman app for clinical experience and increased knowledge on the quality of competent graduates. *International Journal of Emerging Trends in Health Sciences, 9*(2), 47-57. https://doi.org/10.18844/ijeths.v9i2.9823

Parellada, C. B., Boas, I. M., Nielsen, H. S., Sørensen, B. L., & Lund, S. (2020). *Journal of Health Informatics in Developing Countries Submitted : February 13th, 2020 Accepted : March 21st, 2020 User patterns of the Safe Delivery App ; explorations from a cluster randomized controlled trial in Ethiopia*. *14*(1), 1–13.

Renfrew, M. J., Cheyne, H., Craig, J., Duff, E., Dykes, F., Hunter, B., ... & Downe, S. (2020). Sustaining quality midwifery care in a pandemic and beyond. *Midwifery*, *88*, 102759. https://www.sciencedirect.com/science/article/pii/S0266613820301315

Saing, C. H., Ung, M., Suy, S., Oy, S., Dary, C., Yam, E. L. Y., ... & Yi, S. (2023). i-MoMCARE: Innovative Mobile Technology for Maternal and Child Health Care in Cambodia—study protocol of a cluster randomized controlled trial. *Trials*, *24*(1), 692. https://link.springer.com/article/10.1186/s13063-023-07724-z

Sarin, E., Dastidar, S. G., Bisht, N., Bajpayee, D., Patel, R., Sodha, T. S., ... & Kumar, H. (2022). Safe delivery application with facilitation increases knowledge and confidence of obstetric and neonatal care among frontline health workers in India. *Journal of family medicine and primary care*, *11*(6), 2695-2708. https://journals.lww.com/jfmpc/fulltext/2022/06000/safe_delivery_application_with_facilitation.71.aspx

Schutte, A. E. (2017). Measuring progress and projecting attainment on the basis of past trends of the health-related Sustainable Development Goals in 188 countries: an analysis from the Global Burden of Disease Study 2016.

Taye, E. A., Woubet, E. Y., Hailie, G. Y., Arage, F. G., Zerihun, T. E., Zegeye, A. T., ... & Kassaw, A. T. (2025). Application of the random forest algorithm to predict skilled birth attendance and identify determinants among reproductive-age women in 27 Sub-Saharan African countries; machine learning analysis. *BMC Public Health*, *25*(1), 901. https://link.springer.com/article/10.1186/s12889-025-22007-9

Thomsen, C. F., Barrie, A. M. F., Boas, I. M., Lund, S., Sørensen, B. L., Oljira, F. G., & Tersbøl, B. P. (2019). Health workers' experiences with the Safe Delivery App in West Wollega Zone, Ethiopia: a qualitative study. *Reproductive health*, *16*(1), 50. https://link.springer.com/article/10.1186/s12978-019-0725-6

Usmani, S., Chhugani, M., & Khan, M. (2019). A study to assess the effectiveness of safe delivery application for pre-service nursing students in a selected College of nursing of new Delhi. *International Journal of Nursing & Midwifery Research*, *6*(4), 22-27. https://www.academia.edu/download/89781631/204.pdf

UUD. (n.d.). *Undang-Undang Republik Indonesia Nomor 12 TAHUN 2012 tentang Pendidikan Tinggi*.

Werni, S., Rosita, R., Prihartini, N., & Despitasari, M. (2019). Identifikasi Kompetensi Bidan: Data Riset Pendidikan Tenaga Kesehatan Tahun 2017. *Jurnal Penelitian Dan Pengembangan Pelayanan Kesehatan*, 142-151. https://www.academia.edu/download/107953084/1747.pdf

World Health Organization. (2020). Regional Strategic Framework for accelerating universal access to sexual and reproductive health in the WHO South-East Asia Region 2020–2024. In *Regional Strategic Framework for accelerating universal access to sexual and reproductive health in the WHO South-East Asia Region 2020–2024*. https://pesquisa.bvsalud.org/portal/resource/pt/who-334229