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i-SALMAN APPLICATION: ENHANCING KNOWLEDGE AND CLINICAL EXPERIENCE IN HEALTH STUDENTS

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ABSTRACT

The rapid advancement of technology and the growing demand for improving the quality of healthcare resources have become significant concerns. The iSalman application was developed to support students in enhancing their learning capabilities. This study aimed to examine the effect of the iSalman application on students' knowledge, clinical experience, and competency test outcomes. A quantitative study with a quasi-experimental design (one-group pre-test and post-test) was conducted from January to October 2023. A total of 257 students from the midwifery and nursing study programs were selected using purposive total sampling. The results showed a statistically significant positive correlation between the use of the iSalman mobile application and clinical experience ($r = 0.672$, $p < 0.001$). Furthermore, 99.2% of the students were found to be competent based on the competency test results. The iSalman application is effective in improving students' capabilities and has the potential to increase users' confidence during competency evaluations. Future research should involve a broader range of participants and explore additional application features.

Kata Kunci:

Aplikasi;
Pengalaman Klinis;
Kompetensi;
Pengetahuan

ABSTRAK

Tantangan kemajuan teknologi dan tuntutan peningkatan kualitas sumber daya kesehatan saat ini sangat menjadi perhatian. Aplikasi iSalman dikembangkan untuk membantu siswa mengembangkan kemampuan belajar. Penelitian ini bertujuan untuk mengetahui pengaruh aplikasi iSalman terhadap pengetahuan, pengalaman klinis dan hasil uji kompetensi mahasiswa. Penelitian ini dilaksanakan pada bulan Januari sampai dengan Oktober 2023. Jenis penelitian kuantitatif menggunakan pendekatan model quasi eksperimen pada satu kelompok intervensi (one group pre-post test only). Penelitian ini menggunakan total sampling sebanyak 257 mahasiswa program studi kebidanan dan keperawatan secara purposive sampling. Hasil penelitian menunjukkan bahwa penggunaan aplikasi mobile iSalman memiliki korelasi positif yang signifikan secara statistik ($r = 0.672$, $p < 0.001$) dengan pengalaman klinis, dan hasil siswa dinyatakan kompeten sebesar 99,2%. Aplikasi iSalman secara efektif meningkatkan kepercayaan pengguna dalam uji kompetensi. Penelitian di masa mendatang harus melibatkan pengguna dengan cakupan yang lebih luas dan mengeksplorasi fitur-fitur tambahan.

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INTRODUCTION

Global challenges, coupled with rapid technological advancements and the need to improve the quality of human resources, have become critical concerns. Healthcare professionals—particularly midwives as frontline providers—are required to continuously update their knowledge, skills, and personal competencies, all of which contribute significantly to enhancing the overall quality of healthcare services. One of the key health development targets is to ensure a healthy and prosperous life, which can be measured through the Maternal Mortality Rate (MMR). By 2030, Indonesia is targeted to reduce its MMR to fewer than 70 deaths per 100,000 live births (Hogan et al., 2018; WHO, 2019, 2020).

Globally, over 830 women die every day from pregnancy and childbirth-related complications, with 99% of these deaths occurring in low- and lower-middle-income countries. Additionally, nearly 2 million newborns die within the first week of life each year (Masaba & Mmusi-Phetoe, 2020). Inadequate services in childbirth assistance and emergency management of obstetric and neonatal cases have been widely documented as major contributors to maternal and newborn deaths in health facilities worldwide

(Bolan et al., 2018). Most of these deaths could be prevented if mothers had access to skilled care during pregnancy and childbirth (Renfrew et al., 2020).

Therefore, it is crucial for all healthcare professionals, especially midwives, to continuously improve their knowledge, skills, and personal competencies to optimize the quality of health services (Parellada et al., 2020). In response to these challenges, the Maternity Foundation, University of Copenhagen, and Laerdal Global Health, in collaboration with ICM and UNFPA, have developed a digital innovation known as the Safe Delivery App (SDA) (Nishimwe et al., 2021; Usmani, 2020). The SDA is a smartphone-based application providing direct and rapid access to information and skills for trained midwives, based on the latest evidence-based clinical guidelines for Basic Emergency Obstetric and Neonatal Care (BEmONC/EmONC). Although the SDA has become globally recognized—with many users certified as "Champions"—it is not yet available in an Indonesian version and remains largely unfamiliar among midwives in Indonesia (Sarin et al., 2022; Usmani, 2020).

To address this gap, the iSalman application was developed using the SDA as a reference. iSalman (iT-Safe Delivery) is designed as a health education tool for midwives, nurses, and doctors to strengthen their skills in managing basic obstetric and neonatal emergencies using an updated, evidence-based approach. The application contains five structured learning modules, including animated practical videos, action cards, standard operating procedures (SOPs), and case-based quizzes to assess user competence. The Indonesian adaptation of iSalman incorporates national maternal care references, and all voiceovers in the instructional videos are recorded by the research team. This study aims to examine the impact of iSalman application usage, clinical experience, and knowledge acquisition on graduate quality, while also analyzing the relationships among several controlled variables.

METHOD

Type of Research

This study employed a quantitative approach using a one-group pretest-posttest quasi-experimental design. The iSalman application consists of five learning modules that include practical videos, action cards, standard operating procedures (SOPs), and quizzes featuring clinical case scenarios to assess participants' competence in mastering the material. The development of the iSalman application was based on the Safe Delivery App (SDA), which was adapted into an Indonesian version. It includes five animated instructional videos aligned with the stages of each learning module and incorporates references from standard midwifery care books used in Indonesia. All video narration was recorded by the research team. This innovation represents a new development in IT-based health learning tools and is expected to be scalable and user-friendly for trained healthcare workers throughout Indonesia, ultimately supporting the improvement of health human resources (HR) quality.

Research Location and Time

The study was conducted at the Bengkulu Health Polytechnic (Poltekkes Kemenkes Bengkulu), located in Bengkulu Province. The intervention took place over a period of two months, from August to October 2023.

Population and Sample

The study population included all actively enrolled students at Poltekkes Kemenkes Bengkulu. A total of 257 students from the Midwifery and Nursing Study Programs were selected using purposive sampling techniques.

Data collection

Data collection began after all respondents had successfully downloaded the iSalman application. Prior to engaging in the learning modules, participants received an initial briefing and were given a knowledge pre-test consisting of 50 multiple-choice questions, accessed through a Google Form provided by the researchers. The time allocated for the pre-test was approximately 50–60 minutes, and each participant was allowed only one attempt. Upon completion, the link was deactivated, and participants proceeded to the learning phase within the iSalman app. The learning phase lasted between one and five days. Each day, participants were given 60 to 120 minutes to complete one module. Progression to the next module was permitted only after successful completion of the current module's quiz.

This study was ethically approved by the Research Ethics Commission of the Bengkulu Health Polytechnic (approval number: KEPK.BKL/109/03/2023), and informed consent was obtained from all participants.

Processing and analysis of data: Validity and Reliability

Statistical analyses were conducted using IBM SPSS version 27. This study aimed to evaluate the effects of application usage, clinical experience, and knowledge acquisition on graduate quality, and to examine the relationships among several controlled variables. Prior to the official implementation of the iSalman application, validity and reliability tests were conducted for all 50 knowledge test items. Validity testing was conducted on a sample of 20 randomly selected respondents with a minimum education level of Diploma IV in health sciences. The results showed that 99% of the questions were valid, with only one item (question no. 44) deemed invalid (r-calculated < r-table). A test item was considered valid if the r-calculated value exceeded the r-table value (r = 0.44). The results of the reliability test are presented in Table 1:

Table 1. Validity and Reliability Test

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*

Reliability Statistics	
Cronbach's Alpha	N of Items
0,985	50

**test of reliability statistics*

The reliability test using Cronbach's Alpha yielded a value of 0.985, which is greater than the r-table value of 0.44. This indicates that the multiple-choice questions embedded in the iSalman application are reliable and consistent.

RESULT

Based on the data collection process, the distribution of respondents' characteristics was obtained from registered participants in the application, as presented in Table 2.

Table 2. Respondent characteristics

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 Master's Degree 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 2 shows that the majority of participants were fresh graduate students aged between 20–25 years (91.1%) and were predominantly female (93.4%). A total of 95 participants (37%) had completed a professional degree (Bachelor or Ners level), while 162 participants (63%) held a Diploma III qualification. Most participants (97.3%) were not pursuing a master's degree, and only 7 participants (2.7%) were enrolled in a master's program. As this study was dominated by fresh graduates, 221 participants (86%) had 1–5 years of clinical experience. In comparison, 25 participants (9.7%) had 6–10 years of experience, and 11 participants (4.3%) had more than 10 years of clinical experience. These more experienced participants were typically professional-level students who had worked in healthcare settings such as community health centers, private midwifery practices, or hospitals. Regarding current weekly working hours, the majority (67.7%) were not currently employed—mostly recent Diploma III graduates intending to pursue a professional degree. Meanwhile, 48 participants (18.7%) worked 6–10 hours per week, and 35 participants (13.6%) worked more than 10 hours per week.

In terms of childbirth assistance in the past three months, 173 participants (67.3%) assisted 0–5 births, while 41 participants (16.7%) assisted 6–10 births, and another 41 participants (16%) assisted in more than 10 births. Most participants (88.7%) used only one smartphone, and the majority (82.1%) reported daily mobile phone use of more than 10 hours. Furthermore, 42 participants (16.3%) used mobile phones for 6–10 hours per day, and only 4 participants (1.6%) used their phones for 0–5 hours per day. In terms of competency test outcomes, 255 participants (99.2%) were declared competent, while only 2 participants (0.8%) were deemed not competent.

All participants who had successfully downloaded the iSalman application were required to complete all available learning modules. Prior to starting the modules, participants received a briefing and took a 50-item multiple-choice knowledge pre-test administered via Google Form. Participants had 50–60 minutes to complete the test and were allowed only one submission. Once completed, access was closed, and participants were guided to begin the learning modules through the app. Participants were given up to five days to complete all modules. The results are presented in Table 3.

Table 3. Time to complete modules on the iSalman App

Takes a long time to complete 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	

Descriptive statistics showed that 174 participants (67.7%) completed all modules in one day, 66 participants (25.7%) completed them in 2–3 days, and 17 participants (6.6%) completed the modules within five days. To assess knowledge improvement, an independent samples t-test was conducted. Prior to analysis, the Kolmogorov–Smirnov test confirmed normal distribution of the data (N = 257, p = 0.200; p > 0.05), indicating that parametric testing could be applied. The results are shown in Table 4.

Table 4. Difference in Mean Pre-post Knowledge Scores for using the iSalman app (n=257)

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

Source: independent sample t-test

Table 4 indicates that the mean difference in knowledge scores before and after using the iSalman app was statistically significant (p = 0.001 < 0.05). This suggests a meaningful improvement in participants' knowledge following the intervention, demonstrating the app's effectiveness in enhancing learning outcomes.

Once normality assumptions were confirmed, a partial correlation analysis was performed. The aim was to assess the strength of relationships among several independent variables—such as highest level of education, clinical experience, weekly working hours, number of assisted births in the past three months, daily mobile phone usage, time to complete modules, and the improvement in knowledge scores—while controlling for the graduate competency test result. The reference r-table value for N = 257 was 0.1028. The results are summarized in Table 5.

Table 5. 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 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
Competency Test graduate results	Corr.	0.492	0.672	0.969	0.209	0.053	-0.749	0.040
	Sig (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

The analysis showed strong and significant positive correlations between the dependent variable (graduate competency outcome) and independent variables including highest education level, clinical experience, weekly working hours, and number of assisted births in the last three months. Conversely, the variables of mobile phone usage duration and knowledge score improvement showed very weak relationships, while time to complete the modules exhibited a negative and non-significant correlation. The significance value (2-tailed) = 0.000 < 0.05, confirming that the relationships between educational background, clinical experience, weekly practice hours, number of births assisted, and module completion

time with the competency test outcomes were statistically significant (Parellada et al., 2020; Thomsen et al., 2019).

DISCUSSION

The findings of this study indicate that the iSalman application significantly improves individual understanding and correlates positively with the quality of graduates who obtain competency certification. The increase in knowledge scores demonstrates that the iSalman application effectively supports learning outcomes. As an innovative tool, iSalman offers a superior learning experience by facilitating the application of clinical skills in midwifery care, and it adequately prepares students for competency examinations. A study conducted in the Somali region of Ethiopia illustrates the value of integrating the Safe Delivery App (SDA) with clinical mentorship to enhance healthcare workers' knowledge and decision-making abilities in providing maternal and neonatal care (Oladeji et al., 2022). The combined use of mentorship and digital tools holds substantial potential in strengthening clinical competence.

The development of Android-based digital learning tools via smartphones is currently highly relevant to support the quality of healthcare services, especially for frontline providers. The iSalman application is accessible via the Play Store or App Store and is specifically designed for students with the goal of improving knowledge and graduate competency. Graduation is determined nationally through exit examinations known as competency tests, which assess the extent to which a graduate meets the established competency standards (Fitria et al., 2019; Werni et al., 2020). In Indonesia, the implementation of these competency tests aligns with Law No. 12 of 2012 concerning higher education in the health sector, aiming to minimize disparities in graduate quality and strengthen the national health education system. The national competency examination is also part of the government's broader strategy for licensing and standardizing healthcare practitioners (Fitria et al., 2019).

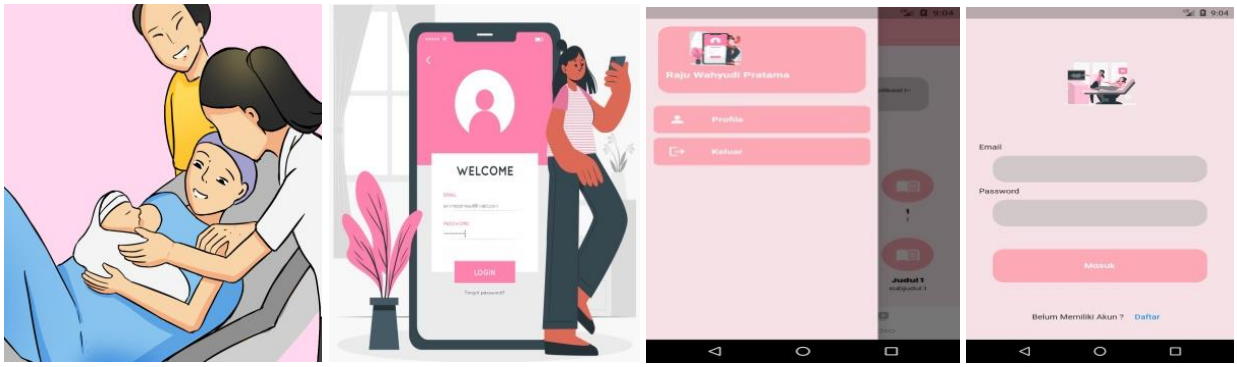

Figure 1. iSalman Application Icon and Initial stage of downloading the application

The iSalman app is designed to train midwives, nurses, and other maternal health providers in managing normal and complicated births using animated visual guides and narration in Bahasa Indonesia. The primary users in this study were 257 students (midwifery and nursing) from the Bengkulu Ministry of Health Polytechnic, selected through total sampling. The application's main interface includes registration/login, a user dashboard, lesson modules, videos, quizzes, and logout functions. Once registered, the app can be used offline without internet access. The app includes five learning modules, each supported by animated instructional videos. At the end of each module, users must complete a 10-question quiz with a minimum passing score of 80 before unlocking the next module. In total, users are required to complete 50 questions across five modules.

The five modules are Module 1. Normal Labor and Birth, Module 2. Active Management of Third Stage Labor, Module 3. Postpartum Bleeding, Module 4. Newborn Management. Management), and Module 5. Hypertension. The partial correlation analysis showed that variables such as final education level, clinical experience, weekly practice hours, and the number of assisted births in the past three months had a strong and positive relationship with graduate competency. Individuals with longer clinical experience tend to be more responsive and skilled in handling clinical cases. More than ten years of experience was strongly associated with increased professional competence, especially when supported by a structured learning tool like iSalman. The effectiveness of the blended learning method was also apparent.

Participants received an initial briefing and then completed the learning modules over five days using a combination of animated media and interactive quizzes. This method minimized learning fatigue and maximized user engagement.

The midwife and nurse competency tests are part of a national initiative involving professional organizations such as IBI and AIPKIND. These tests are regulated by the Joint Regulation of the Minister of Education and Culture and the Minister of Health (No. 3/VII/PB/2004 and No. 52/2014), and serve as an exit examination to ensure that graduates have achieved nationally standardized competencies. The tests assess knowledge, skills, and attitudes, and function as instruments to enhance the quality of healthcare professionals (Damayanti et al., 2020).

The results of the partial correlation analysis revealed strong and positive relationships between several key variables—namely, the highest level of education, clinical experience, number of weekly working hours at the practice site, and the number of assisted births in the past three months—and the quality of graduate competency. Similar research has shown that individuals with higher educational attainment tend to demonstrate better levels of knowledge and understanding. As stated by Sudiarta et al. (2019), clinical nurses with strong knowledge, skills, and attitudes are more likely to be competent in professional practice. This is supported by Djati (Djati et al., 2022), who emphasize that one of the effective approaches to developing knowledge, skills, and professional behavior is through structured nursing training. Nursing training has been shown to positively influence professional attitudes, and individual competencies—particularly in knowledge, attitude, and skills—greatly impact nurse performance in clinical settings. Therefore, the iSalman application's contribution is highly relevant and novel in enhancing the competencies of healthcare workers.

Clinical experience, duration of weekly practice, and the number of births assisted in recent months are directly proportional to a health worker's clinical competence. In actual service settings, healthcare workers inevitably face a wide range of clinical cases and unique patient presentations. Managing emergency situations becomes a memorable and skill-building experience, varying based on diagnosis, applicable clinical guidelines, professional standards, and patient-specific needs. Experience working in teams also shapes the personal and interpersonal abilities required for optimal patient care. A community-based study in Ethiopia demonstrated the effectiveness of the Safe Delivery App (SDA), which was perceived by users as a practical tool for strengthening clinical knowledge and skills. The SDA was used both as an educational resource and as a real-time guide during emergency management of obstetric and neonatal cases. Notably, most users reported an increase in their confidence and ability to manage safe deliveries after using the SDA (Thomsen et al., 2019). Nonetheless, this study acknowledges several limitations, including the sample size, the generalizability of results, and potential response bias, which should be considered in future research.

CONCLUSION

The findings of this study indicate a strong and statistically significant positive correlation between clinical experience and competency outcomes ($r = 0.672$, $p < 0.001$). The iSalman application has demonstrated its effectiveness in enhancing the learning experience, supporting the development of clinical skills in midwifery practice, and adequately preparing students for national competency examinations. Further refinement and expansion of the module content within the application are recommended, with the expectation that it can be utilized more widely—particularly by healthcare professionals—to support continuous professional development and facilitate better clinical decision-making.

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