

A Study to Assess the Impact of Safe Delivery App on Knowledge Regarding Modern Contraception Among Final Year B.Sc. Nursing Students in Chittoor District, A.P.

M. Melvin David¹, R. Aruna Kumari¹, S. Subhavelvizhi², T.K. Sreedevi³,
M.N. Pavithra⁴, K. Daniel Arun Kumar⁵, Princey Augustin⁶

Abstract

Background: Postpartum hemorrhage (PPH) remains a leading cause of maternal mortality, particularly in low-income countries, highlighting the importance of skilled healthcare providers. Mobile health innovations such as the Safe Delivery App (SDA) have demonstrated effectiveness in strengthening knowledge and skills in obstetric emergency management. However, limited evidence exists regarding its role in improving knowledge of modern contraception among nursing students, who represent the future maternal health workforce. This study aimed to assess the impact of the SDA on knowledge of modern contraception among final year B.Sc. nursing students in Chittoor District, Andhra Pradesh. Methods: A quantitative research approach with a one-group pretest and posttest design was adopted. Seventy-five final year B.Sc. nursing students from a selected nursing college in Kuppam were recruited using total enumeration sampling. The SDA-based educational intervention focusing on modern contraception was delivered over four days. Data were collected using a self-structured questionnaire assessing knowledge of modern contraception and selected demographic variables before and after the intervention. Paired t-tests and chi-square tests were used to determine the effectiveness of the intervention and associations between demographic variables and knowledge levels. Results: A statistically significant improvement in knowledge was observed following the intervention ($p < 0.001$). The proportion of students with adequate knowledge increased from 32.0% in the pretest to 64.0% in the posttest. Significant associations were found between knowledge levels and variables such as age, area of residence, internet usage, and prior exposure to the SDA. Conclusion: The SDA effectively enhanced knowledge of modern contraception among nursing students. Integrating mobile health applications into nursing education may strengthen reproductive health preparedness in resource-constrained settings.

*Author for Correspondence

M. Melvin David

E-mail. m.melvin.d@gmail.com

¹Assistant Professor, Department of Community Health Nursing, PES College of Nursing, Rayalaseema, Andhra Pradesh, India

²Professor, Department of Child Health Nursing, PES College of Nursing, Rayalaseema, Andhra Pradesh, India

³Associate Professor, Department of Mental Health Nursing, PES College of Nursing, Rayalaseema, Andhra Pradesh, India

⁴Associate Professor, Department of Obstetrics and Gynaecological Nursing, PES College of Nursing, Rayalaseema, Andhra Pradesh, India

⁵Professor, Department of Medical Surgical Nursing, PES College of Nursing, Rayalaseema, Andhra Pradesh, India

⁶Student, Department of Nursing, PES College of Nursing, Rayalaseema, Andhra Pradesh, India

Received date: December 05, 2025

Accepted date: February 19, 2026

Published date: February 28, 2026

Citation: M. Melvin David, R. Aruna Kumari, S. Subhavelvizhi, T.K. Sreedevi, M.N. Pavithra, K. Daniel Arun Kumar, Princey Augustin. M. Melvin David, R. Aruna Kumari, S. Subhavelvizhi, T.K. Sreedevi, M.N. Pavithra, K. Daniel Arun Kumar, Princey Augustin. A Study to Assess the Impact of Safe Delivery App on Knowledge Regarding Modern Contraception Among Final Year B.Sc. Nursing Students in Chittoor District, A.P. International Journal of Women's Health Nursing and Practices. 2026; 4(1): 29–34p.

Keywords: Postpartum hemorrhage, Safe Delivery App, Nursing education, Modern contraception, Knowledge enhancement

INTRODUCTION

Postpartum hemorrhage (PPH) remains a critical global health issue and a leading cause of maternal

mortality, especially in low-income nations, where it affects approximately one in three women during childbirth. Effective management of this obstetric emergency necessitates prompt intervention by skilled birth attendants utilizing various essential measures, including uterine massage, the administration of oxytocic drugs, and airway management. The United Nations has identified seven essential functions for Basic Emergency Obstetric and Neonatal Care (BEmONC) that skilled birth attendants must be proficient in providing. However, the response to obstetric emergencies is often inadequate in resource-limited settings, placing women and newborns at significant risk [1–4].

Innovative technology-based solutions have emerged in response to these challenges. The Safe Delivery App (SDA), a smartphone-based training aid, has been recognized as a valuable tool for enhancing birth attendants' knowledge and skills in managing obstetric emergencies, such as PPH, particularly in resource-constrained healthcare systems. Studies have demonstrated the effectiveness of the SDA in improving knowledge and confidence among healthcare workers in various settings [5].

In India, poor healthcare quality contributes significantly to maternal and newborn deaths. Recognizing the potential of mobile health (mHealth) interventions, the Indian government integrated the service delivery assistant (SDA) into existing quality improvement programs. This initiative reached a substantial number of healthcare workers, with over 20,000 receiving specific app training and more than 86,000 using it nationwide between 2018 and 2021. Evaluations have shown significant knowledge improvement among SDA users, highlighting the success of integrating mobile learning tools within existing healthcare frameworks [6–10].

Although the SDA has demonstrated its utility in emergency obstetric care, its potential to enhance knowledge in other crucial areas of reproductive health, such as modern contraception, also warrants exploration. Empowering nursing students with comprehensive knowledge of modern contraception is essential for promoting reproductive health and preventing unintended pregnancies. As future healthcare professionals, their understanding of various contraceptive methods, their usage, efficacy, benefits, and potential side effects are crucial for providing informed counseling and care to women. This study, therefore, aimed to assess the impact of an educational intervention utilizing the SDA on the knowledge regarding modern contraception among final year B.Sc. nursing students in Chittoor District, Andhra Pradesh. The findings of this research can provide valuable insights into the effectiveness of technology-based learning in nursing education and its potential to improve healthcare outcomes related to reproductive health [11–16].

METHODS

This study employed a quantitative research approach utilizing a one-group pretest and posttest design to evaluate the impact of an educational intervention on the knowledge of modern contraception among final year B.Sc. nursing students. The study was conducted in a selected nursing college in Kuppam, Chittoor District, Andhra Pradesh. The study population comprised 75 final year B.Sc.(N) students, recruited through total enumeration sampling, ensuring that all eligible students were included. The independent variable was the educational intervention using the SDA, with a focus on content related to modern contraception methods. A self-structured questionnaire comprising 25 items assessing knowledge of various aspects of modern contraception was used to collect data before and after a four-day intervention period during which students used the SDA. The questionnaire also included a section on demographic variables, such as age, family income, area of residence, type of family, type of mobile use, daily internet usage, and previous knowledge and experience with the SDA. The reliability of the knowledge tool was established with a Cronbach's alpha of 0.79. Ethical clearance was obtained from the Institutional Research Committee (IRC) and the Institutional Human Ethics Committee of PES Institute of Medical Sciences and Research (PESIMSR), Kuppam. Descriptive statistics (frequency and percentage) were used to summarize demographic data and knowledge levels, while paired t-tests were used to compare pretest and posttest knowledge scores, and chi-square tests were employed to assess the association between demographic variables and knowledge levels.

RESULTS

Table 1 reveals the demographic characteristics of the 75 final year B.Sc. nursing students participating in the study. The data indicate that the majority of students were 22 years old (52.0%) and came from families with a monthly income of $\leq$ Rs.25000 (73.3%). The students' area of residence was nearly equally divided between rural (48.0%) and urban (52.0%), and a large proportion belonged to nuclear families (82.7%). Most students used Android mobile phones (90.7%) with a common daily internet usage of 1.5 GB (70.7%). Notably, a very high percentage of the students reported having no prior knowledge (90.7%) or experience (94.7%) with the SDA before the study commenced.

Table 2 illustrates the distribution of knowledge levels regarding modern contraception among nursing students before and after the educational intervention utilizing the SDA.

Table 1. Frequency and percentage distribution of demographic variables of final year B.Sc. nursing students (N=75).

S.N.	Demographic variable	Frequency (F)	Percent (%)
1	<i>Age in years</i>		
	21	16	21.3
	22	39	52
	23	20	26.7
2	<i>Income</i>		
	>Rs.25000	20	26.7
	$\leq$ Rs.25000	55	73.3
3	<i>Area of residence</i>		
	Rural	36	48
	Urban	39	52
4	<i>Type of family</i>		
	Joint	13	17.3
	Nuclear	62	82.7
5	<i>Type of mobile use</i>		
	Android	68	90.7
	iPhones	7	9.3
6	<i>Internet pack a day</i>		
	1.5 GB per day	53	70.7
	1 GB per day	4	5.3
	2 GB per day	18	24
7	<i>Previous knowledge about SDA</i>		
	No	68	90.7
	Yes	7	9.3
8	<i>Previous experience in using SDA</i>		
	No	71	94.7
	Yes	4	5.3

Table 2. Frequency and percentage distribution of level of knowledge regarding modern contraception among final year B.Sc. nursing students (N = 75).

S.N.	Level of knowledge	Pretest frequency (F)	Pretest percentage (%)	Posttest frequency (F)	Posttest percentage (%)
1	Adequate knowledge	24	32	48	64
2	Inadequate knowledge	25	33.3	10	13.3
3	Moderate knowledge	26	34.7	17	22.7

Table 3. Comparison of pretest and posttest knowledge score on modern contraception among final year B.Sc. nursing students (N=75).

Test	Mean	Standard deviation	t-value	p-value
Pretest	15.44	4.938	7.076	<0.001
Posttest	19.13	4.974		

Before the intervention, the students' knowledge was relatively distributed, with 32.0% demonstrating adequate knowledge, 33.3% inadequate knowledge, and 34.7% moderate knowledge. Following the intervention, a clear positive shift occurred, with the percentage of students achieving adequate knowledge doubling to 64.0%. Concurrently, there was a significant decline in the proportion of students with inadequate knowledge, which decreased to 13.3%. The percentage of students with moderate knowledge also decreased slightly to 22.7%. This suggests that the use of the SDA as an educational tool was effective in enhancing students' understanding of modern contraception.

Table 3 presents a statistical comparison of students' mean knowledge scores on modern contraception before and after the SDA intervention. The analysis reveals a statistically highly significant increase in the mean knowledge score from 15.44 in the pretest to 19.13 in the posttest ($t = 7.076$, $p < 0.001$). This strong statistical evidence confirms that the educational intervention through the SDA had a substantial positive impact on improving final year Bachelor of Science in Nursing students' knowledge of modern contraception.

Association of Level of Knowledge Regarding Modern Contraception Among Final Year B.Sc. Nursing Students with Their Demographic Variables

Association between students' knowledge of modern contraception (based on posttest scores) and demographic variables. The analysis found statistically significant associations between the level of knowledge and age ($p < 0.001$), area of residence ($p = 0.012$), daily internet pack usage ($p = 0.024$), previous knowledge about the SDA ($p < 0.001$), and previous experience in using the SDA ($p = 0.015$). Specifically, younger students (21 years), those from rural areas, students with lower daily internet usage (1 GB), and those with no prior exposure to the SDA tended to exhibit different levels of knowledge. In contrast, no significant associations were found between the level of knowledge and income, type of family, or type of mobile use. These findings indicate that certain demographic factors and prior familiarity with the intervention tool may play a role in students' knowledge acquisition regarding modern contraception [17].

DISCUSSION

The findings of this study demonstrate a significant positive impact of the Safe Delivery App-based educational intervention on the knowledge of modern contraception among final year B.Sc. nursing students in Chittoor District, AP. The substantial increase in the mean posttest score compared to the pretest score highlights the effectiveness of utilizing mobile health technology to enhance healthcare knowledge among nursing students. This is consistent with the findings of other studies, which have shown the SDA to be a valuable tool for improving knowledge and skills in various aspects of obstetric and neonatal care. For instance, Usmani et al. [9] found that the SDA significantly improved the knowledge scores of pre-service nursing students in New Delhi regarding key obstetric practices. Similarly, a study reported a significant improvement in the knowledge and perception of final year nursing students in India regarding emergency obstetric and newborn care after using the SDA [18–20].

The study also revealed significant associations between certain demographic variables and the level of knowledge regarding modern contraception. Younger students (21 years) demonstrated higher levels of excellent knowledge, whereas students from rural areas exhibited a higher proportion of good knowledge. Interestingly, lower daily internet pack usage (1 GB per day) was associated with a higher prevalence of excellent knowledge. Furthermore, students with no prior knowledge or experience with the SDA had significantly lower levels of knowledge, which underscores the importance of introducing and familiarizing students with such educational tools. These findings suggest that various background

factors can influence the baseline knowledge of nursing students and should be considered when designing and implementing educational interventions.

The significant improvement in knowledge following the SDA intervention supports hypothesis 1 (H1), which states that there will be a significant difference between pretest and posttest knowledge regarding modern contraception. The partial acceptance of hypothesis 2 (H2), indicating significant associations between some but not all selected demographic variables and knowledge levels, highlights the complex interplay of factors influencing students' understanding of modern contraception [20].

These findings have important implications for nursing education. Integrating mHealth applications, such as the SDA, into the curriculum can be an effective strategy to address knowledge gaps and enhance nursing students' preparedness for clinical practice in reproductive health. Tailored educational approaches that consider demographic profiles and prior exposure to technology among nursing students may further optimize the impact of such interventions. Continuous learning and professional development opportunities utilizing these tools can also be valuable for practicing nurses to stay updated on advancements in contraceptive methods and improve the quality of care [21].

CONCLUSION

This study concludes that the educational intervention utilizing the SDA significantly enhanced the knowledge of modern contraception among final year B.Sc. nursing students. The observed improvement underscores the effectiveness of targeted, technology-based educational initiatives in bridging knowledge gaps in crucial areas of reproductive health within nursing education. Furthermore, the study identified significant associations between certain demographic variables, such as age, area of residence, internet usage, and prior SDA exposure, with knowledge levels, emphasizing the need for tailored educational strategies. These findings highlight the potential of integrating mHealth tools, such as the SDA, into nursing curricula to better prepare future healthcare professionals and ultimately contribute to improved reproductive health outcomes in communities, particularly in resource-constrained settings.

REFERENCES

1. Christiansen AH, Sørensen BL, Boas IM, Bedesa T, Fekede W, Nielsen HS, et al. The impact of the Safe Delivery Application on knowledge and skills managing postpartum haemorrhage in a low-resource setting: a cluster randomized controlled trial in West Wollega region, Ethiopia. *Reprod Health*. 2023;20(1):91. doi:10.1186/s12978-023-01635-7.
2. Singh Sodha T, Grønbaek A, Bhandari A, Mary B, Sudke A, Smith LT. mHealth learning tool for skilled birth attendants: scaling the Safe Delivery App in India. *BMJ Open Qual*. 2022;11(Suppl 1):e001928. doi:10.1136/bmjoq-2022-001928.
3. Glenn JK, Goldman J. Task delegation to physician extenders—some comparisons. *Am J Public Health*. 1976;66(1):64–66. doi:10.2105/AJPH.66.1.64.
4. Bolan NE, Sthresley L, Ngoy B, Ledy F, Ntayingi M, Makasy D, et al. mLearning in the Democratic Republic of the Congo: a mixed-methods feasibility and pilot cluster randomized trial using the Safe Delivery App. *Glob Health Sci Pract*. 2018;6(4):693–710. doi:10.9745/GHSP-D-18-00275.
5. Vallely L, Babona D, Au ML, Bolnga J, Laman M, Polomon MC, et al. Adapting the Safe Delivery App for Papua New Guinea. *Women Birth*. 2023;36(Suppl):S36. doi:10.1016/j.wombi.2023.07.095.
6. Thomsen CF, Barrie AMF, Boas IM, Lund S, Sørensen BL, Oljira FG, et al. Health workers' experiences with the Safe Delivery App in West Wollega Zone, Ethiopia: a qualitative study. *Reprod Health*. 2019;16(1):50. doi:10.1186/s12978-019-0725-6.
7. Klokkenka CMB, Enemark U, Adanu R, Lund S, Sørensen BL, Attermann J. The effect of smartphone training of Ghanaian midwives by the Safe Delivery Application on the incidence of postpartum hemorrhage: a cluster randomised controlled trial. *Cogent Med*. 2019;6(1):1632016. doi:10.1080/2331205X.2019.1632016.

8. Gebeyehu NA, Lake EA, Gelaw KA, Azeze GA. The intention on modern contraceptive use and associated factors among postpartum women in public health institutions of Sodo town, Southern Ethiopia 2019: an institutional-based cross-sectional study. *Biomed Res Int.* 2020;2020:9815465. doi:10.1155/2020/9815465.
9. Usmani S. A study to assess the effectiveness of Safe Delivery Application for pre-service nursing students in a selected college of nursing of New Delhi. *Int J Nurs Midwifery Res.* 2020;6(4):22–27. doi:10.24321/2455.9318.201928.
10. Merry L, Villadsen SF, Sicard V, Lewis-Hibbert N. Transnationalism and care of migrant families during pregnancy, postpartum and early childhood: an integrative review. *BMC Health Serv Res.* 2020;20:778. doi:10.1186/s12913-020-05632-5.
11. Aung B, Mitchell JW, Braun KL. Effectiveness of mHealth interventions for improving contraceptive use in low- and middle-income countries: a systematic review. *Glob Health Sci Pract.* 2020;8(4):813–826. doi:10.9745/GHSP-D-20-00069.
12. Teal S, Edelman A. Contraception selection, effectiveness, and adverse effects: a review. *JAMA.* 2021;326(24):2507–2518. doi:10.1001/jama.2021.21392.
13. Chukwu E, Gilroy S, Adda Quay K, Jones NN, Karimu VG, Garg L, et al. Formative study of mobile phone use for family planning among young people in Sierra Leone: global systematic survey. *JMIR Form Res.* 2021;5(11):e23874. doi:10.2196/23874.
14. Ewerling F, McDougal L, Raj A, Ferreira LZ, Blumenberg C, Parmar D, et al. Modern contraceptive use among women in need of family planning in India: an analysis of the inequalities related to the mix of methods used. *Reprod Health.* 2021;18(1):173. doi:10.1186/s12978-021-01220-w.
15. Ahissou NCA, Benova L, Delvaux T, Gryseels C, Dossou JP, Goufodji S, et al. Modern contraceptive use among adolescent girls and young women in Benin: a mixed-methods study. *BMJ Open.* 2022;12(1):e054188. doi:10.1136/bmjopen-2021-054188.
16. Gasaba E, Niyomana F, Irakoze F, Baramana E, Ndayizweye A, Nicoyishimiye I, et al. Women's attitudes and knowledge towards the use of contraceptive methods. *Open J Nurs.* 2021;11:17–27. doi:10.4236/ojn.2021.111003.
17. Harris DM, Dam A, Morrison K, Mann C, Jackson A, Bledsoe SM, et al. Barriers and enablers influencing women's adoption and continuation of vaginally inserted contraceptive methods: a literature review. *Stud Fam Plann.* 2022;53(3):455–490. doi:10.1111/sifp.12209.
18. Sarin E, Dastidar SG, Bisht N, Bajpayee D, Patel R, Sodha TS, et al. Safe Delivery application with facilitation increases knowledge and confidence of obstetric and neonatal care among frontline health workers in India. *J Fam Med Prim Care.* 2022;11(6):2695–2708. doi:10.4103/jfmprc.jfmprc_1531_21.
19. Nishimwe A, Conco DN, Nyssen M, Ibisomi L. A mixed-method study exploring experiences, perceptions, and acceptability of using a Safe Delivery mHealth application in two district hospitals in Rwanda. *BMC Nurs.* 2022;21(1):176. doi:10.1186/s12912-022-00951-w.
20. Tiruneh GA, Erega BB, T/Mariam AB, Abebe EC, Ayele TM, Baye ND, et al. Level of knowledge, attitude, and practice on modern contraceptive method and its associated factors among housemaids living in Debre Tabor town, northwest Ethiopia: a community-based cross-sectional study. *BMC Womens Health.* 2023;23:632. doi:10.1186/s12905-023-02783-5.
21. D'Souza P, Phagdol T, D'Souza SRB, Anupama DS, Nayak BS, Velayudhan B, et al. Interventions to support contraceptive choice and use: a global systematic map of systematic reviews. *Eur J Contracept Reprod Health Care.* 2023;28:83–91. doi:10.1080/13625187.2022.2162337.