Jurnal Keluarga Berencana
P-ISSN: 2527-3132 E-ISSN: 2503-3379
Vol. 11 No. 1, 2026
https://ejurnal.kemendukbangga.go.id/
Kementerian Kependudukan dan Pembangunan Keluarga/BKKBN

THE ROLE OF MOBILE HEALTH IN IMPROVING CONTRACEPTIVE UPTAKE AMONG WOMEN OF REPRODUCTIVE AGE: A CROSS-SECTIONAL COMMUNITY-BASED STUDY

[1]Santy Irene Putri, [2]Dian Jayantari Putri K. Hedo
[1]Wira Husada Nusantara Health of Polytechnic, Malang, Indonesia, [2]Ministry of Population and Family Development, Jakarta, Indonesia
Corresponding Email: santyireneacc@gmail.com

ABSTRACT
The use of mobile health (mHealth) technology is increasingly recognized as a strategy to improve access and quality of family planning services. Therefore, this study aimed to examine the relationship between mHealth utilization and contraceptive uptake among women of reproductive age. A community-based cross-sectional study was conducted involving 160 women selected through purposive sampling. The independent variable was mobile health utilization, while the dependent variables included contraceptive uptake status, type of contraception, duration of contraceptive use, satisfaction with family planning services, and utilization of family planning services. Data was analyzed using multiple linear regression. The results showed that mobile health utilization was significantly associated with contraceptive uptake status, type of contraception, duration of contraceptive use, satisfaction with family planning services, and utilization of family planning services ($p<0.05$). These findings indicate that mHealth utilization is closely related to contraceptive behavior and service engagement. Strengthening mobile health interventions may enhance the effectiveness of family planning programs and support increased contraceptive uptake among women of reproductive age.

Keywords: contraception; family planning; mobile health; women of reproductive age.

INTRODUCTION
Family Planning is an integral part of the national health development strategy that aims to improve the community's quality of life through birth control and family planning programs (Hellwig et al., 2024). These programs help reduce maternal and child mortality rates and improve family well-being. Although it has been running for decades, the challenge of increasing the coverage of modern contraception uptake remains a crucial issue, especially in communities with limited access to health services (Hedo & Simarmata, 2022; Memon et al., 2024). The contraception uptake by women of childbearing age is influenced by various factors, from education level, access to information, social support, to trust of the health service system (D'Souza et al., 2022; Maia et al., 2024). One of the main barriers in increasing contraceptive participation is the limited availability of accurate, accessible, and individualized information (National Population and Family Planning Board, 2018). In many cases, women of childbearing age from remote communities do not have enough information to make informed decisions about the contraceptive options (Asif et al., 2024; Mazza et al., 2024).

In line with information technology development, digitally based approaches have begun to be utilized in conducting various public health interventions, including family planning services; for instance, mobile health (mHealth) uses smartphone devices to provide health services and information. MHealth delivers educational information in a personal, interactive, and real-time manner, so that it can reach populations that are difficult to reach by conventional systems (Aung et al., 2020; Javaid et al., 2024). In the context of family planning services,

Corresponding Email:
santyireneacc@gmail.com
Article History
Received: 19-06-2025 Accepted: 30-07-2026
© 2024 The Author(s). This is an open-access article under Attribution-NonCommercial-ShareAlike 4.0 International License (https://creativecommons.org/licenses/by-nc-sa/4.0/)

mHealth has been used for various functions, such as the sender of educational messages, reminders for visit schedules, online consultations, and self-reporting of contraception uptake (Permatasari et al., 2021). The use of digital applications to educate the public about contraceptive methods has been shown to increase awareness, reduce misunderstandings, and strengthen decisions in using family planning services (Kus et al., 2024; Mills et al., 2024). However, the implementation of mHealth at the community level still faces obstacles such as limited digital literacy, limited infrastructure, and less integration with existing health service systems. Although a number of international studies have shown the effectiveness of mHealth in improving reproductive health (Alhassan et al., 2025; Meherali et al., 2024)Local contextual factors are also important in determining the success of digital interventions in community-based health systems in Indonesia. Local health workers, such as local midwives and health cadres, have an important role in reproductive health, including family planning services. Therefore, the use of mHealth needs to be adjusted to the socio-cultural characteristics and community dynamics (Jacob et al., 2022; Siregar & Rahman, 2020).

Despite the growing evidence on technological feasibility, the effectiveness of mHealth in family planning cannot be separated from behavioral determinants of contraceptive decision-making (Chandrasekar et al., 2024; Daranova et al., 2025). In addition to structural and technological factors, behavioral and psychosocial dimensions also play a critical role in shaping contraceptive uptake in the digital era. The decision to initiate, continue, or discontinue a contraceptive method is not merely a clinical choice but a complex behavioral outcome influenced by perceived susceptibility to pregnancy, perceived benefits and risks of contraception, cultural norms, spousal communication, and previous experiences with health services (Carbone et al., 2020). Digital platforms, particularly mHealth applications, have the potential to address these multidimensional determinants by providing tailored information, interactive counseling modules, and peer-support forums that foster self-efficacy and informed decision-making (Löchner et al., 2025). For women of reproductive age, especially those living in semi-urban and rural communities, mobile phones often represent the most accessible source of information and communication. The penetration of smartphones in many developing countries has grown rapidly over the last decade, creating an unprecedented opportunity to bridge gaps in reproductive health literacy (Wang et al., 2022). Through features such as push notifications, chatbots, and teleconsultation, mHealth interventions can deliver continuous support beyond the limited time available during face-to-face consultations at health facilities. This continuity of care is particularly important in family planning, where consistent follow-up is required to manage side effects, ensure method adherence, and prevent unintended discontinuation. Furthermore, digital health tools can empower women by increasing privacy and confidentiality in seeking information about contraception, which is often considered a sensitive topic influenced by sociocultural stigma (Grace et al., 2025).

By allowing women to explore contraceptive options discreetly, mHealth may reduce embarrassment, fear of judgment, and misinformation that commonly hinder participation in family planning programs (Simmons et al., 2024). At the same time, the effectiveness of such digital interventions depends on user engagement, perceived usefulness, and trust in the credibility of information sources. If mHealth platforms are perceived as dependable and endorsed by health professionals, women are more likely to integrate digital advice into their reproductive health decisions. Conversely, low digital literacy or exposure to inaccurate online information may limit the positive impact of mHealth. Therefore, understanding how women interact with mobile health technologies and how these interactions relate to their contraceptive behaviors becomes essential for designing contextually appropriate interventions (Adnani et al., 2025). Integrating behavioral change theories, such as the Health Belief Model and the Theory of Planned Behavior, into mHealth program design may enhance its effectiveness by systematically addressing attitudes, subjective norms, and perceived behavioral control related to contraception (Fang et al., 2025). Moreover, collaboration between policymakers, technology developers, and frontline health workers is crucial to ensure that digital solutions complement rather than replace interpersonal counseling services. In community-based settings, the synergy between digital platforms and local health cadres can strengthen outreach efforts, improve monitoring of

contraceptive continuation, and facilitate timely referrals when complications arise (Khan et al., 2025). Thus, exploring the role of mHealth in influencing contraceptive uptake requires not only an assessment of technological availability but also a comprehensive evaluation of behavioral, social, and service-related factors that shape women's reproductive health choices (Onukwugha et al., 2022).

Currently, there are not enough studies that specifically examine the use of mHealth related to contraceptive participation in women of childbearing age in the context of local communities. In fact, empirical data from field studies are needed to formulate evidence-based policies that support the development of mHealth interventions broadly. Understanding the extent to which mHealth has a role in influencing contraceptive behavior can also provide insight into planning family planning programs that are more adaptive to technological advances. This study was conducted to evaluate the relationship between the use of mobile health and contraception uptake in women of childbearing age, using a community-based cross-sectional study approach. This study was expected to fill the information gap regarding the effectiveness of mHealth in family planning programs and provide strategic recommendations for strengthening digital technology-based reproductive health services, especially in areas with limited access to conventional services. By exploring evidence from the community level, the results of this study will not only provide a picture of the actual situation regarding the use of mHealth in family planning services, but also contribute to the development of a more inclusive health information system that is responsive to the needs of women of childbearing age in local communities. An approach that integrates technology, education, and community empowerment is also believed to be the key to success in achieving sustainable health development goals.

METHOD

This study employed a community-based cross-sectional design. The study was conducted in Gunungsari Batu Village, an area with active community-based health service coverage and access to mobile health technology. Data collection was conducted between October and December 2024. The study population consisted of women of reproductive age between 15 and 49 years who were potentially using contraception as part of family planning efforts. A purposive sampling technique was applied to recruit respondents who met the inclusion criteria. The inclusion criteria included women of reproductive age who had resided in the study area for at least six months, had used or were currently using family planning services, and were willing to participate in the study. Exclusion criteria included women with cognitive impairments that prevented them from completing the questionnaire, pregnant women, and individuals who refused to provide informed consent.

The independent variable in this study was mobile health utilization, which was assessed based on the frequency of mobile-based health application use and the level of interaction with mobile health features related to family planning services. The dependent variables consisted of several contraceptive uptake-related indicators among women of reproductive age. The first dependent variable was contraceptive uptake status, defined as whether respondents were currently using contraception at the time of data collection. This variable was measured categorically using yes/no responses. The second variable was the type of contraception, which included contraceptive methods such as pills, injections, intrauterine devices, condoms, implants, and natural methods. This variable was categorized as describing the distribution of contraceptive method preferences among respondents. The duration of contraceptive use was also assessed to determine the length of time respondents had consistently used contraception, measured in months or years since initiation of contraceptive use. In addition, satisfaction with family planning services was evaluated using a Likert scale covering aspects such as accessibility, quality of services, and interactions with healthcare providers. The final dependent variable was utilization of family planning services, which reflected the frequency and ease of accessing family planning services through both conventional healthcare facilities and mobile health technology.

Data were collected using structured questionnaires that had undergone validity and reliability testing to ensure measurement accuracy and consistency. The questionnaire consisted

of respondent demographic characteristics, mobile health utilization, and contraceptive uptake-related variables, including contraceptive uptake status, type of contraception, duration of contraceptive use, satisfaction with family planning services, and utilization of family planning services. Prior to data collection, respondents received explanations regarding the study objectives, procedures, confidentiality, and their rights as participants, including the right to withdraw at any stage without consequences. Written informed consent was obtained before respondents completed the questionnaires independently.

Data was processed and analyzed using SPSS version 26. Descriptive statistics were used to describe respondent characteristics and the distribution of study variables. Pearson correlation analysis was conducted to assess the strength and direction of associations between mobile health utilization and contraceptive uptake-related variables. Multiple linear regression analysis was further performed to examine the associations between mobile health utilization and contraceptive uptake-related variables with a significance level of 5% ($p<0.05$). Due to the cross-sectional design, the regression analysis was interpreted as an assessment of statistical associations rather than causal relationships.

RESULTS AND DISCUSSION

Table 1 presents the descriptive statistics of mobile health utilization and contraceptive uptake-related variables among respondents. The descriptive analysis provides an overview of score distributions, value ranges, and central tendencies for each variable. These findings are important for understanding the characteristics of women of reproductive age, patterns of mobile health utilization in the context of family planning services, and variables related to contraceptive uptake, including contraceptive uptake status, type of contraception, duration of contraceptive use, satisfaction with family planning services, and utilization of family planning services.

Table 1: Descriptive statistics of mobile health utilization and contraception uptake.

Variables	N	Min	Max	Mean	SE	SD
Utilization of mobile health	160	6	9	7.68	0.07	0.84
Contraception uptake status	160	0	1	.84	0.03	0.37
Type of contraception	160	1	6	3.42	0.14	1.81
Duration of contraception uptake	160	4	28	7.47	0.30	3.79
Satisfaction level of family planning services	160	19	25	20.14	0.11	1.38
Utilization of family planning services	160	3	9	6.42	0.16	2.00

Source: Research Data, 2024.

Based on the results of descriptive analysis, it was known that the level of mobile health utilization among women of childbearing age had an average value of 7.68 with a standard deviation (SD) of 0.84, in a score range of 6 to 9. This showed that most of the respondents had utilized mobile health services in high categories. For the contraception uptake status, the average value was recorded at 0.84 with a standard deviation of 0.37. The minimum value was 0, and the maximum was 1, indicating that most respondents were currently using contraception. The type of contraception uptake has an average score of 3.42 with a standard deviation of 1.81, in the range of 1 to 6, indicating that there was a variation in the choice of contraceptive methods among respondents. The variable duration of contraception uptake showed an average value of 7.47 months with a standard deviation of 3.79, in a range of 4 to 28 months. These results indicated that most respondents had used contraception for varied periods, although it tended to be less than two years. The level of satisfaction with family planning services showed an average of 20.14 with a standard deviation of 1.38, in a score range of 19 to 25. A high average score indicated that most respondents felt quite satisfied with the family planning services. Meanwhile, the variable of utilization of family planning services showed an average value of 6.42 with a

standard deviation of 2.00, in the range of 3 to 9. These results reflected the varying levels of utilization of family planning services by respondents, both delivered through health facilities and mobile-based technology.

Table 2: Correlation between mobile health utilization and contraception uptake.

Variables		Utilization of mobile health	Contraception uptake status	Type of contraception	Duration of contraception uptake	Satisfaction level of family planning services	Utilization of family planning services
Utilization of mobile health	Pearson Correlation	1	0.218**	0.193*	0.288**	0.204**	0.291**
	P		0.006	0.014	0.000	0.010	0.000
Contraception uptake status	Pearson Correlation	0.218**	1	-0.095	0.113	0.107	0.160*
	P	0.006		0.232	0.155	0.176	0.043
Type of contraception	Pearson Correlation	0.193*	-0.095	1	0.143	0.091	0.083
	P	0.014	0.232		0.072	0.250	0.295
Duration of contraception uptake	Pearson Correlation	0.288**	0.113	0.143	1	0.076	0.243**
	P	0.000	0.155	0.072		0.340	0.002
Satisfactions level of family planning services	Pearson Correlation	0.204**	0.107	0.091	0.076	1	0.087
	P	0.010	0.176	0.250	0.340		0.273
Utilization of family planning services	Pearson Correlation	0.291**	0.160*	0.083	0.243**	0.087	1
	P	0.000	0.043	0.295	0.002	0.273	
**. Correlation is significant at the 0.01 level (2-tailed).							
*. Correlation is significant at the 0.05 level (2-tailed).							

Source: Research Data, 2024.

The results of the Pearson correlation analysis showed significant associations between mobile health utilization and contraceptive uptake-related variables among women of reproductive age. Mobile health utilization demonstrated significant positive correlations with contraceptive uptake status ($r=0.218$; $p=0.006$), type of contraception ($r=0.193$; $p=0.014$), duration of contraceptive use ($r=0.288$; $p<0.001$), satisfaction with family planning services ($r=0.204$; $p=0.010$), and utilization of family planning services ($r=0.291$; $p<0.001$). These findings indicate that higher levels of mobile health utilization were associated with greater engagement in contraceptive use, wider variation in contraceptive methods, longer duration of contraceptive use, higher satisfaction with family planning services, and greater utilization of family planning

services. Contraceptive uptake status also showed a significant positive correlation with utilization of family planning services (r=0.160; p=0.043), whereas its correlations with type of contraception, duration of contraceptive use, and satisfaction with family planning services were not statistically significant. In addition, duration of contraceptive use demonstrated a significant positive correlation with utilization of family planning services (r=0.243; p=0.002), indicating a positive association between longer contraceptive use and greater utilization of family planning services.

Table 3: Multiple linear regression analysis of mobile health utilization and contraception uptake.

Variables	Unstandardized Coefficients		Standardized Coefficients	t	P	95% CI
	B	SE	Beta			
Contraception uptake status	0.37	0.18	0.17	2.23	0.027	0.02-0.72
Type of contraception	0.07	0.03	0.15	2.08	0.040	0.01-0.13
Duration of contraception uptake	0.04	0.02	0.19	2.54	0.012	0.00-0.08
Satisfaction level of family planning services	0.09	0.04	0.14	1.93	0.052	0.01-0.17
Utilization of family planning services	0.08	0.03	0.19	2.59	0.011	0.02-0.14

Source: Research Data, 2024.

Multiple linear regression analysis demonstrated significant associations between mobile health utilization and contraceptive uptake-related variables among women of reproductive age. Contraceptive uptake status was significantly associated with mobile health utilization (β=0.17; p=0.027). In addition, the type of contraception (β=0.15; p=0.040), duration of contraceptive use (β=0.19; p=0.012), and utilization of family planning services (β=0.19; p=0.011) also showed significant positive associations with mobile health utilization. Satisfaction with family planning services demonstrated a positive but marginally significant association (β=0.14; p=0.052). Overall, these findings suggest that women with higher mobile health utilization tended to demonstrate greater engagement in contraceptive use and family planning services.

DISCUSSION

The results of correlation analysis and multiple linear regression showed a significant relationship between mobile health utilization and factors of contraception uptake in women of childbearing age. This relationship suggested that mobile health utilization may be associated with contraceptive behavior and decision-making among women of reproductive age. Contraception uptake status was positively and significantly related to mobile health utilization. This meant that women who actively used contraception tended to utilize mobile-based health services more. This finding was in line with previous research, which stated that access and ease of information through mobile health applications could increase women's motivation and willingness to begin or maintain using contraception (Goueth et al., 2022). Mobile health may provide effective educational support and reminder features that can assist contraceptive users in maintaining adherence (Perinpanathan et al., 2023).

Beyond the statistical association observed in this study, the significant relationship between contraception uptake status and mobile health utilization may also reflect a pattern of initiative-taking health-seeking behavior among women of childbearing age. Women who actively use contraception are likely to possess higher awareness regarding reproductive health risks and benefits, which may predispose them to seek additional sources of information and support, including digital platforms (Salem et al., 2024). In this context, mobile health can function as both an enabler and a reinforcing mechanism. From a behavioral science perspective, this relationship can be interpreted through constructs such as perceived benefits, perceived barriers, and self-efficacy (André et al., 2024). Women who recognize the benefits of contraception may also perceive mobile health as a useful tool to enhance effectiveness and reduce uncertainties related to side effects or method management (Yousef et al., 2021). Moreover, digital platforms offer immediacy and convenience that traditional services may not always provide, especially in resource-limited settings (Ezeamii et al., 2024). This immediacy may strengthen the perception of control over reproductive choices, thereby increasing continued engagement with both contraception and digital health services. The private and confidential nature of mobile health access is also particularly important in sociocultural environments where open discussions about reproductive health can be constrained by stigma or gender norms (Jonayed & Rumi, 2024). By providing discreet channels for consultation and information-seeking, mobile health reduces psychological barriers and supports autonomous decision-making. Therefore, the relationship between contraception uptake status and mobile health utilization should not be interpreted solely as a technological phenomenon, but rather as part of a broader empowerment process in which digital literacy, autonomy, and reproductive agency intersect to shape health behaviors (Harzif et al., 2023).

There was a positive relationship between the type of contraception uptake and mobile health utilization. The results of this study were in accordance with previous studies, which stated that women who used modern contraception, such as pills, IUDs, or implants, tended to use digital-based applications more (Dehlendorf et al., 2020). This happened because the use of modern contraception required more intensive care and monitoring, thus it needed to be supported by technology that facilitated access to information and consultations (Leight et al., 2022). Mobile health utilization could help contraception users get specific information and education according to their contraception (Fanny et al., 2018; Tebb et al., 2019). It could increase the effectiveness and contraceptive safety for the users. Duration of contraception uptake was also positively associated with mobile health utilization. Users who had been using contraception for a longer period showed higher levels of mobile health utilization. This finding suggests that mobile health utilization may support continuity of contraceptive use among women of reproductive age. Thus, mobile health utilization contributed to improving consistent uptake patterns among contraception users (Cartwright et al., 2022; Zulu & Sukwa, 2020).

The association between the type of contraception and mobile health utilization also highlights the heterogeneity of informational and monitoring needs across contraceptive methods. Modern contraceptive methods differ substantially in terms of user responsibility, follow-up requirements, potential side effects, and perceived risks (Takyi et al., 2023). Short-acting methods such as oral contraceptive pills require strict daily adherence, making reminder systems and adherence-tracking features particularly valuable. Meanwhile, long-acting reversible contraceptives, such as intrauterine devices and implants, may generate concerns regarding side effects, insertion procedures, or long-term health implications, which can prompt users to seek reassurance through digital consultations or educational resources (Kabeto et al., 2025). Consequently, women using modern methods may demonstrate greater reliance on mobile health due to these complex informational demands. This finding underscores the importance of designing mobile health applications that are method-specific rather than generic. Digital interventions should incorporate tailored content, interactive frequently asked questions, side-effect management guidance, and personalized follow-up schedules according to the contraceptive method selected (Gebresillassie et al., 2026). Furthermore, adaptive technologies such as algorithm-based recommendations or chatbot-assisted counseling could enhance user engagement by providing customized responses. In this way, mobile health platforms move

beyond passive information dissemination toward dynamic, responsive systems that mirror individualized clinical counseling. The integration of such personalized digital support may increase method satisfaction, reduce premature discontinuation, and ultimately strengthen contraceptive continuation rates (Espinosa et al., 2024). Therefore, policymakers and program developers should consider differentiation strategies in digital family planning tools to address the unique needs associated with various contraceptive types (Meekers et al., 2024).

The positive relationship between the satisfaction level of family planning services and mobile health utilization showed that positive perceptions of family planning service quality encouraged women to become more active in using mobile technology as a tool to optimize the services. High satisfaction with family planning services could increase user comfort and trust in using mobile health for consultation, education, and monitoring related to reproductive health (Phianphitthayakul et al., 2023; Pires et al., 2022). This finding supports the notion that service quality and user-friendly technology may contribute to the success of digital-based family planning programs (Brittingham et al., 2024). The utilization of family planning health services was also related to the utilization of mobile health services. Women of childbearing age who accessed family planning health services more frequently, either directly or through technology, showed higher levels of mobile health utilization (Chukwu et al., 2021; Yousef et al., 2021). This result suggests that mobile health utilization has become increasingly integrated into modern family planning service systems. Ease of access to services through digital technology allowed the expansion of service coverage, increased interaction between users and health workers, and more effective supervision of contraception uptake (Toffolutti et al., 2020).

The positive association between duration of contraception uptake and mobile health utilization suggests that digital engagement may play a sustaining role rather than merely initiating contraceptive behavior. Long-term contraceptive users often encounter evolving informational needs, including managing side effects, scheduling routine check-ups, or transitioning between methods (Alspaugh et al., 2021). Continuous access to mobile health platforms may provide reassurance and ongoing education that prevents discontinuation driven by fear, misconceptions, or lack of follow-up. From a continuity-of-care perspective, mobile health can bridge temporal gaps between clinical visits by maintaining communication channels and delivering periodic reinforcement messages (Cohen & Lindman, 2024). This sustained interaction may cultivate habitual engagement with health information, thereby normalizing preventive health behavior as part of daily routines. In addition, women who have used contraception for extended periods may develop stronger trust in healthcare systems, making them more receptive to digital extensions of these services (Brander et al., 2025). However, it is also important to consider the possibility of reverse influence, whereby women who are digitally engaged from the beginning of their contraceptive journey are more likely to continue use due to consistent support mechanisms. Although the cross-sectional design of this study limits causal interpretation, the observed pattern indicates a synergistic relationship between behavioral persistence and digital facilitation. Future longitudinal research is needed to examine whether early exposure to mobile health interventions predict long-term contraceptive continuation and whether sustained digital interaction reduces discontinuation rates associated with side effects or service barriers. Strengthening digital follow-up mechanisms may therefore represent a strategic approach to enhancing long-term family planning outcomes in community-based settings (Baynes et al., 2022).

The findings of this study suggest that mobile health has the potential to support contraceptive uptake among women of reproductive age through the provision of accessible information, education, and integrated health service support. The utilization of technology was expected to be an innovative solution in increasing the coverage and quality of family planning programs, especially in areas with limited access to conventional health services. Therefore, the development and implementation of mobile health need to be encouraged by paying attention to aspects of user experience, relevant educational content, and the involvement of health workers in providing digital assistance to the women of childbearing age as its users.

CONCLUSION

This study demonstrated that mobile health utilization was significantly associated with contraceptive uptake-related outcomes among women of reproductive age. Women with higher levels of mobile health utilization tended to show greater engagement in contraceptive use, including current contraceptive uptake, variation in contraceptive methods, longer duration of contraceptive use, higher satisfaction with family planning services, and greater utilization of family planning services. These findings suggest that mobile-based health technology may support access to contraceptive information, informed decision-making, and continuity of contraceptive use among women of reproductive age.

From a practical perspective, the findings indicate that mobile health should be systematically integrated into family planning programs as a complementary strategy to strengthen education, follow-up, and service coordination. Policymakers and program managers are encouraged to develop structured and method-specific digital interventions, ensure integration with primary healthcare systems, and improve digital literacy among both healthcare providers and users. Expanding digital infrastructure, particularly in underserved areas, and strengthening data privacy protections are also important to ensure equitable access and maintain user trust. However, the cross-sectional design of this study limits causal interpretation, and the findings may not be fully generalizable to populations with limited digital access. Future studies using longitudinal or experimental approaches are recommended to further examine the long-term role of mobile health in supporting contraceptive continuation and reproductive health outcomes. Research involving more diverse populations and exploring mediating factors such as digital literacy, women's autonomy, and access to healthcare services would further strengthen the evidence base.

In conclusion, mobile health has strategic potential to support contraceptive uptake and strengthen sustainable family planning programs among women of reproductive age. Effective implementation requires supportive policies, multisectoral collaboration, continuous evaluation, and equitable digital access to ensure meaningful public health impact.

Artificial Intelligence (AI) Use Disclosure

The authors declare that no artificial intelligence (AI) tools were used in the writing, data analysis, interpretation, or preparation of this manuscript.

REFERENCES

Adnani, Q. E. S., Ersianti, Y. L., Khuzaiyah, S., Ramadhan, K., Susanti, A. I., Maimburg, R. D., & Chia, K. R. (2025). Determinant factors in the use of modern contraception in urban and rural areas in Western Indonesia. *BMC Public Health*, *25*(1), 2044. https://doi.org/10.1186/s12889-025-23299-7

Alhassan, R. H. A. H., Haggerty, C. L., Fapohunda, A., Affan, N. J., & Anto-Ocrah, M. (2025). Exploring the use of digital educational tools for sexual and reproductive health in Sub-Saharan Africa: Systematic review. *JMIR Public Health and Surveillance*, *11*, 1–11. https://doi.org/https://doi.org/10.2196/63309

Alspaugh, A., Reibel, M. D., Im, E.-O., & Barroso, J. (2021). "Since I'm a little bit more mature": Contraception and the arc of time for women in midlife. *Women's Midlife Health*, *7*(1), 3. https://doi.org/10.1186/s40695-021-00062-7

André, N., Grousset, M., & Audiffren, M. (2024). A behavioral perspective for improving exercise adherence. *Sports Medicine - Open*, *10*(1), 56. https://doi.org/10.1186/s40798-024-00714-8

Asif, M. F., Ali, M., Abbas, H. G., Ishfaq, T., Ali, S., Abid, G., & Lassi, Z. S. (2024). Access and knowledge of contraceptives and unmet need for family planning in Pakistan. *BMC Women's Health*, *24*(1), 1–8. https://doi.org/10.1186/s12905-024-03495-0

Aung, B., Mitchell, J. W., & Braun, K. L. (2020). Effectiveness of m-health interventions for improving contraceptive use in low- and middle-income countries: A systematic review. *Global Health Science and Practice*, *8*(4), 813–826. https://doi.org/10.9745/GHSP-D-20-00069

Baynes, C., Steyn, P., Soi, C., Dinis, A., Tembe, S., Mehrtash, H., Narasimhan, M., Kiarie, J., & Sherr, K. (2022). Use of implementation science to advance family planning programs in low- and middle-income countries: A systematic review. *Frontiers in Global Women's Health*, *3*(1), 1038297. https://doi.org/10.3389/fgwh.2022.1038297

Brander, C., Grindlay, K., Grossman, D., & Zuniga, C. (2025). An exploratory study of patients' experiences with and reasons for using one virtual-only telecontraceptive platform in the United States in 2020-2021. *Reproductive Health*, *22*(1), 245. https://doi.org/10.1186/s12978-025-02181-0

Brittingham, S., Mitchell, L., & Zan, T. (2024). What's inside matters: an assessment of the family planning content of digital self-care platforms. *Reprod Health*, *21*(July), 112–117. https://doi.org/doi: 10.1186/s12978-024-01848-4

Carbone, S. L., Guillen, M., Ramirez, J. J., Vargas, S. E., Lu, C. F., Getz, M. L., Frimpong, Y., Smith, K. A., Stout, C., Tong, I., Hill, M., Berry, R. E., Harrison, A., & Guthrie, K. M. (2020). "I feel like a person has a right to use a product to protect themselves…": A qualitative study of the risk-benefit calculus on women's contraceptive use and choice. *Sexual Health*, *17*(3), 262–269. https://doi.org/10.1071/SH19197

Cartwright, A. F., Alspaugh, A., Britton, L. E., & Noar, S. M. (2022). M-health interventions for contraceptive behavior change in the United States: A systematic review. *Journal of Health Communication*, *27*(2), 69–83. https://doi.org/10.1080/10810730.2022.2044413

Chandrasekar, A., Warren, E., Free, C., Mbogua, J., Curtin, E., Gazeley, U., Wong, G., Church, K., & McCarthy, O. (2024). M-health interventions for postpartum family planning in LMICs: A realist review. *PLOS Global Public Health*, *4*(7), e0003432. https://doi.org/10.1371/journal.pgph.0003432

Chukwu, E., Gilroy, S., Addaquay, K., Jones, N. N., Karimu, V. G., Garg, L., & Dickson, K. E. (2021). Formative study of mobile phone use for family planning among young people in Sierra Leone: Global systematic survey. *JMIR Formative Research*, *5*(11), 1–15. https://doi.org/10.2196/23874

Cohen, E., & Lindman, I. (2024). Importance of continuity of care from a patient perspective - a cross-sectional study in Swedish health care. *Scandinavian Journal of Primary Health Care*, *42*(1), 195–200. https://doi.org/10.1080/02813432.2023.2299119

D'Souza, P., Bailey, J. V., Stephenson, J., & Oliver, S. (2022). Factors influencing contraception choice and use globally: A synthesis of systematic reviews. *European Journal of Contraception and Reproductive Health Care*, *27*(5), 364–372. https://doi.org/10.1080/13625187.2022.2096215

Daranova, F. A., Suprapti, S., & Ardhiani, I. T. (2025). The effect of health education on decision-making for long-term contraceptive use among women of fertile age. *Jurnal Keluarga Berencana*, *10*(2), 128–137. https://doi.org/10.37306/1gfn6140

Dehlendorf, C., Fox, E., Sharma, A. E., D, J. Z., Yang, S., & Centola, D. (2020). Birth control connect: A randomized trial of an online group to disseminate contraceptive information. *Contraception*, *101*(6), 376–383. https://doi.org/https://doi.org/10.1016/j.contraception.2020.01.014

Espinosa, M., Butler, S. A., Mengelkoch, S., Prieto, L. J., Russell, E., Ramshaw, C., Rose-Reneau, Z.,

Remondino, M., Nahavandi, S., & Hill, S. E. (2024). The impact of a digital contraceptive decision aid on user outcomes: Results of an experimental, clinical trial. *Annals of Behavioral Medicine : A Publication of the Society of Behavioral Medicine*, *58*(7), 463–473. https://doi.org/10.1093/abm/kaae024

Ezeamii, V. C., Okobi, O. E., Wambai-Sani, H., Perera, G. S., Zaynieva, S., Okonkwo, C. C., Ohaiba, M. M., William-Enemali, P. C., Obodo, O. R., & Obiefuna, N. G. (2024). Revolutionizing healthcare: How telemedicine is improving patient outcomes and expanding access to care. *Cureus*, *16*(7), 1–9. https://doi.org/10.7759/cureus.63881

Fang, L., Zhang, Q., Zhou, N., Chen, J., & Lou, H. (2025). Influencing factors and mechanisms promoting proactive health behavior intention: An integration of the health belief model and the theory of planned behavior. *Frontiers in Public Health*, *13*(2), 1629046. https://doi.org/10.3389/fpubh.2025.1629046

Fanny, R., Godineau, S., Casabianca, C., Begue, C., Tessier-Cazeneuve, C., & Legendre, G. (2018). State of knowledge on smartphone applications concerning contraception: A systematic review. *Journal of Gynecology Obstetrics and Human Reproduction*, *48*(2), 1–15. https://doi.org/10.1016/j.jogoh.2018.11.001

Gebresillassie, B. M., Doley, N., & Harris, M. L. (2026). Online decision aids for contraceptive choices in women with chronic conditions: A systematic review. *International Journal of Gynaecology and Obstetrics: The Official Organ of the International Federation of Gynaecology and Obstetrics*, *172*(3), 1367–1380. https://doi.org/10.1002/ijgo.70555

Goueth, R. C., Maki, K. G., Babatunde, A., Eden, K. B., & Darney, B. G. (2022). Effects of technology-based contraceptive decision aids: A systematic review and meta-analysis. *American Journal of Obstetrics and Gynecology*, *227*(5), 705–713. https://doi.org/https://doi.org/10.1016/j.ajog.2022.06.050

Grace, B., Wise, L. A., Nieroda, M., Egbunike, J., & Usman, N. O. (2025). Digital health technologies to transform women's health innovation and inclusive research. *BMJ (Clinical Research Ed.)*, *391*(3), e085682. https://doi.org/10.1136/bmj-2025-085682

Harzif, A. K., Shadrina, A., Yo, E. C., Reviani, N., & Hestiantoro, A. (2023). Influence of internet, mobile phone use, and sociodemographic factors on women's knowledge and attitude towards contraception in Indonesia. *Obstetrics & Gynecology Science*, *66*(1), 42–48. https://doi.org/10.5468/ogs.22277

Hedo, D. J. P. K., & Simarmata, N. (2022). What predicts modern contraception use? A study of reproductive age married couples in Indonesia. *Jurnal Promosi Kesehatan Indonesia*, *18*(1), 1–7. https://doi.org/10.14710/jpki.18.1.1-7

Hellwig, F., Moreira, L. R., Silveira, M. F., Vieira, C. S., Rios-Quituizaca, P. B., Masabanda, M., Serucaca, J., Rudasingwa, S., Nyandwi, A., Mulu, S., Rashad, H., & Barros, A. J. D. (2024). Policies for expanding family planning coverage: Lessons from five successful countries. *Frontiers in Public Health*, *12*(May), 1–26. https://doi.org/10.3389/fpubh.2024.1339725

Jacob, C., Sezgin, E., Sanchez-Vazquez, A., & Ivory, C. (2022). Sociotechnical factors affecting patients' adoption of mobile health tools: Systematic literature review and narrative synthesis. *JMIR MHealth and UHealth*, *10*(5), 1–27. https://doi.org/10.2196/36284

Javaid, M., Haleem, A., & Singh, R. P. (2024). Health informatics to enhance the healthcare industry's culture: An extensive analysis of its features, contributions, applications and limitations. *Informatics and Health*, *1*(2), 123–148. https://doi.org/10.1016/j.infoh.2024.05.001

Jonayed, M., & Rumi, M. H. (2024). Towards women's digital health equity: A qualitative inquiry

into attitude and adoption of reproductive mHealth services in Bangladesh. *PLOS Digital Health*, *3*(10), e0000637. https://doi.org/10.1371/journal.pdig.0000637

Kabeto, B. S., Sendo, E. G., & Abebe, W. S. (2025). Intentions and barriers to using long-acting reversible contraceptives among young women seeking safe abortion care in Addis Ababa, Ethiopia: a qualitative study. *BMC Public Health*, *25*(1), 1868. https://doi.org/10.1186/s12889-025-23069-5

Khan, Z., Scott-Fiddler, P., & Munro, S. (2025). How can community-based organizations be involved in the contraception care pathway for newcomer youth? Results of knowledge translation workshops. *PEC Innovation*, *7*(2), 100422. https://doi.org/10.1016/j.pecinn.2025.100422

Kus, L. H., Paul, R., Rivera, A. N., Zeal, C., & Madden, T. (2024). Improvement in contraceptive knowledge after using an online educational resource. *Contraception*, *2*(1), 1–14. https://doi.org/10.1016/j.contraception.2023.110095.Improvement

Leight, J., Hensly, C., Chissano, M., Safran, E., Ali, L., Dustan, D., & Jamison, J. (2022). The effects of text reminders on the use of family planning services: Evidence from a randomised controlled trial in urban Mozambique. *BMJ Global Health*, *7*(4), 1–12. https://doi.org/10.1136/bmjgh-2021-007862

Löchner, J., Carlbring, P., Schuller, B., Torous, J., & Sander, L. B. (2025). Digital interventions in mental health: An overview and future perspectives. *Internet Interventions*, *40*(2), 100824. https://doi.org/10.1016/j.invent.2025.100824

Maia, E. M. C., Peixoto, R. A. C., & Guazzelli, C. A. F. (2024). Choice and factors associated to the use of contraceptive methods among postpartum women: A prospective cohort study. *European Journal of Obstetrics & Gynecology and Reproductive Biology*, *298*(July), 1–5. https://doi.org/https://doi.org/10.1016/j.ejogrb.2024.04.038

Mazza, D., Botfield, J. R., Zeng, J., Morando-Stokoe, C., & Arefadib, N. (2024). Examining the impact of an online educational video on the contraceptive knowledge, awareness and choices of young women living in rural and remote Australia. *Sexual & Reproductive Healthcare*, *December*(101034), 1–6. https://doi.org/https://doi.org/10.1016/j.srhc.2024.101034

Meekers, D., Elkins, A., & Obozekhai, V. (2024). Tools for patient-centred family planning counselling: A scoping review. *Journal of Global Health*, *14*(1), 1–17. https://doi.org/10.7189/JOGH.14.04038

Meherali, S., Bhaumik, S., Idrees, S., Kennedy, M., & Lassi, Z. S. (2024). Digital knowledge translation tools for disseminating sexual and reproductive health information to adolescents: protocol for an evidence gap map review. *JMIR Research Protocols*, *13*, 1–9. https://doi.org/https://doi.org/10.2196/55081

Memon, Z. A., Tahmeena, Fazal, S. A., Reale, S., Spencer, R., Bhutta, Z., & Soltani, H. (2024). Effective strategies for increasing the uptake of modern methods of family planning in South Asia: A systematic review and meta-analysis. *BMC Women's Health*, *24*(1), 1–15. https://doi.org/10.1186/s12905-023-02859-2

Mills, R., Mangone, E. R., Lesh, N., Jayal, G., Mohan, D., & Baraitser, P. (2024). Chatbots that deliver contraceptive support: Systematic review. *Journal of Medical Internet Research*, *26*, 1–8. https://doi.org/https://doi.org/10.2196/46758

National Population and Family Planning Board. (2018). *Contraceptive Method Choices for the General Public*. Jakarta: Skata BKKBN. https://pustaka.kbjatim.id/index.php?p=fstream&fid=49&bid=44

Onukwugha, F. I., Smith, L., Kaseje, D., Wafula, C., Kaseje, M., Orton, B., Hayter, M., & Magadi, M.

(2022). The effectiveness and characteristics of m-health interventions to increase adolescent's use of sexual and reproductive health services in Sub-Saharan Africa: A systematic review. *PloS One*, *17*(1), e0261973. https://doi.org/10.1371/journal.pone.0261973

Perinpanathan, T., Maiya, S., van Velthoven, M. H. H., Nguyen, A. T., Free, C., & Smith, C. (2023). Mobile phone-based interventions for improving contraception use. *Cochrane Database of Systematic Reviews*, *2023*(7), 1–15. https://doi.org/10.1002/14651858.CD011159.pub3

Permatasari, A. D., Trihandini, I., Baharuddin Nur, R., & Kurniawan, R. (2021). Benefits of using mobile health (m-health) in maternal health recording and reportin. *Jurnal Biostatistik, Kependudukan, Dan Informatika Kesehatan*, *1*(2), 100. https://doi.org/10.51181/bikfokes.v1i2.4810

Phianphitthayakul, O. A., Li, J., Rongkapich, R., Karroon, P., Vatrasresth, J., Jaisamrarn, U., & Santibenchakul, S. (2023). Client experiences with telehealth using LINE for consultation and assessment of adverse effects of contraceptive implants during the COVID-19 pandemic in Thailand. *Digital Health*, *9*(1), 1–14. https://doi.org/10.1177/20552076231203877

Pires, P., Mupueleque, M., Macaringue, C., Zakus, D., Siemens, R., & Belo, C. (2022). Users' perspectives on the quality of family planning services in Mozambique: A case study. *Pan African Medical Journal*, *42*(2), 1–10. https://doi.org/10.11604/pamj.2022.42.174.26049

Salem, A., Shafi, N., Alsaadi, S. S., Klantan, F., Alhajjaji, D. S., Allihyani, R., & Daghestani, M. (2024). Knowledge of the benefits and risks of oral contraceptive use among women of reproductive age in western Saudi Arabia: A descriptive cross-sectional study. *Cureus*, *16*(12), e76400. https://doi.org/10.7759/cureus.76400

Simmons, K., Llewellyn, C., Bremner, S., Gilleece, Y., Norcross, C., & Iwuji, C. (2024). The barriers and enablers to accessing sexual health and sexual well-being services for midlife women (aged 40-65 years) in high-income countries: A mixed-methods systematic review. *Women's Health (London, England)*, *20*(2), 17455057241277724. https://doi.org/10.1177/17455057241277723

Siregar, I. A., & Rahman, L. O. A. (2020). The role of m-health applications in promoting physical activity health. *Jurnal Kesehatan*, *9*(1), 1. https://doi.org/10.46815/jkanwvol8.v9i1.86

Takyi, A., Sato, M., Adjabeng, M., & Smith, C. (2023). Factors that influence modern contraceptive use among women aged 35 to 49 years and their male partners in Gomoa West District, Ghana: A qualitative study. *Tropical Medicine and Health*, *51*(1), 40. https://doi.org/10.1186/s41182-023-00531-x

Tebb, K. P., Trieu, S. L., Rico, R., Renteria, R., Rodriguez, F., & Puffer, M. (2019). A mobile health contraception decision support intervention for latina adolescents: Implementation evaluation for use in school-based health centers. *JMIR MHealth and UHealth*, *7*(3), 1–10. https://doi.org/10.2196/11163

Toffolutti, V., Ma, H., Menichelli, G., Berlot, E., Mencarini, L., & Aassve, A. (2020). How the internet increases modern contraception uptake: Evidence from eight sub-Saharan African countries. *BMJ Global Health*, *5*(11), 1–10. https://doi.org/10.1136/bmjgh-2020-002616

Wang, X., Shi, J., & Lee, K. M. (2022). The digital divide and seeking health information on smartphones in asia: Survey study of ten countries. *Journal of Medical Internet Research*, *24*(1), e24086. https://doi.org/10.2196/24086

Yousef, H., Al-Sheyab, N., Al Nsour, M., Khader, Y., Al Kattan, M., Bardus, M., Alyahya, M., Taha, H., & Amiri, M. (2021). Perceptions toward the use of digital technology for enhancing family planning services: Focus group discussion with beneficiaries and key informative interview

with midwives. *Journal of Medical Internet Research*, *23*(7), 1–15. https://doi.org/10.2196/25947

Zulu, E. M., & Sukwa, T. (2020). Impact of m-health on contraceptive use among women and men of reproductive age in low- and middle-income countries: A systematic review and meta-analysis. *Tropical Medicine and International Health*, *25*(10), 1182–1197. https://doi.org/10.1111/tmi.13464