



# The Impact of Maternity Health Education on Pregnant Women's Knowledge in Improving Reproductive Health in the Digital Era

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Maternity Health Education, Reproductive Health, Digital Literacy.

## Abstract

Maternity health education has an important role in increasing the knowledge of pregnant women about reproductive health, especially in the digital era that allows wider access to information. Although digital technology offers convenience in obtaining health information, there are still obstacles such as low digital literacy, unequal access, and the validity of information available online. Therefore, further studies are needed on the impact of digital-based maternity health education on increasing the understanding of pregnant women in maintaining reproductive health. This study aims to analyze the effectiveness of digital-based maternity health education in increasing pregnant women's knowledge about reproductive health and identify the challenges faced in the implementation of this technology-based education. This study uses a literature study approach by reviewing various scientific articles, books, and research reports published in the last five years. Data were collected through systematic searches in various academic databases and analyzed using a thematic approach to identify patterns of findings, differences, and relationships between previous studies. The results of the analysis showed that digital-based education significantly increased pregnant women's understanding of reproductive health, childbirth preparation, and pregnancy danger signs. However, its effectiveness is still influenced by internet accessibility, digital literacy, and the credibility of the information obtained. Several studies have shown that direct interaction with health workers is still necessary to ensure more personalized and effective education. Digital-based maternity health education has great potential in increasing pregnant women's knowledge about reproductive health. However, strategies are still needed to increase digital literacy, expand internet access, and ensure the validity of information available online.



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## INTRODUCTION

Reproductive health of pregnant women is an important aspect in reducing maternal and infant mortality which is still a challenge in various countries, including Indonesia (Puspasari &

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Pawitaningtyas, 2020). One of the main factors in maintaining the reproductive health of pregnant women is increasing knowledge through comprehensive education, which can help mothers in understanding pregnancy risks, childbirth preparation, and postpartum care (D. P. Astuti et al., 2020). Increased access to maternal health education is urgently needed to ensure that pregnant women get the right information about healthy lifestyles, pregnancy danger signs, and the importance of routine pregnancy control (An, 2022).

Reproductive health is a condition in which a person is in a state of physical, mental, and social health in all aspects related to the reproductive system, including its functions and processes. Reproductive health covers various aspects, such as maternal and child health, family planning, prevention of sexually transmitted diseases, and comprehensive sexual education. According to Hapsari (2019), a good understanding of reproductive health is essential to ensure individual well-being and prevent the risk of health problems related to the reproductive system (Hapsari, 2019). In addition, proper reproductive health education for adolescents can help them make more responsible decisions regarding their sexual and reproductive lives (Fatkhayah et al., 2020).

In a global context, many studies show that a lack of understanding of reproductive health can lead to various problems, such as unwanted pregnancies, the spread of sexually transmitted infections, and pregnancy complications that result in high maternal and infant mortality rates. Akbar et al. (2021) emphasized that reproductive health must be understood as part of human rights, where every individual has the right to adequate reproductive health information and services (Akbar et al., 2021). In addition, research by Ingrid, Rumerung, & Nugroho (2022) highlights the importance of reproductive health education for adolescent boys, considering that so far the focus of education has been more on women (Ingrid et al., 2022). Therefore, a more inclusive and science-based approach is needed to increase awareness and quality of reproductive health in the community.

In the digital era, information about reproductive health is more easily accessible through various online platforms, such as health applications, social media, and telemedicine services (Mayasari et al., 2021). Digital technology allows pregnant women to obtain fast and accurate information about pregnancy and childbirth, which can ultimately improve understanding and readiness to face childbirth (Qurniasih et al., 2024). However, not all pregnant women have good digital literacy skills, so digital-based education must be designed with methods that are easy to understand and accessible to all levels of society (Audityarini, 2022).

Digital-based maternity health education can overcome the limitations of access to conventional health services, especially for pregnant women in remote areas who have limited medical facilities (Hariyani et al., 2019). Through the use of technology, health workers can provide online counseling, which not only improves access to information but also reduces the knowledge gap between pregnant women in urban and rural areas (Boimau et al., 2022). In addition, with the development of mobile application-based educational media and health webinars, pregnant women have more options in obtaining information related to pregnancy and childbirth more flexibly (Sugiharti et al., 2021).

Although various efforts have been made to improve maternal health education, there are still obstacles in the implementation of digital-based education. Some of the challenges faced include low digital literacy among pregnant women, inability to understand complex medical information, and lack of involvement of health workers in providing interactive and personalized education (Dewi & Safitri, 2023). Therefore, this study aims to evaluate the impact of maternity health education on increasing the knowledge of pregnant women in improving reproductive health in the digital era.

The importance of this study is based on the high rate of pregnancy complications caused by the lack of knowledge of pregnant women about reproductive health and preparation for childbirth (Tucunan et al., 2022). With digital transformation in the health sector, technology-based education

can be an innovative solution to reach more pregnant women with accurate and easily accessible information (D. T. Astuti et al., 2023). Therefore, this study focuses on analyzing the effectiveness of maternity health education in increasing pregnant women's understanding of reproductive health.

Several previous studies have discussed the effectiveness of reproductive health education for pregnant women. Research by Ahmad, (2021) shows that group-based education can increase pregnant women's knowledge about pregnancy danger signs (Ahmad, 2021). Another study by Isnaini & Sari (2019) stated that the use of health apps can increase pregnant women's understanding of healthy eating during pregnancy (Isnaini & Sari, 2019). However, there are still few studies that specifically analyze the role of digital-based education in improving reproductive health knowledge of pregnant women in Indonesia, so that this research can make a significant contribution in the field of maternal and child health.

This study aims to analyze the impact of digital-based maternity health education on increasing the knowledge of pregnant women in maintaining reproductive health. Specifically, this study will identify the level of effectiveness of digital education in increasing pregnant women's understanding of pregnancy danger signs, childbirth preparation, and postpartum care. In addition, this study also aims to explore the obstacles faced by pregnant women in accessing and understanding maternity health information in the digital era.

## **METHOD**

This study uses a qualitative method with a library research approach to examine the impact of maternity health education on pregnant women's knowledge in improving reproductive health in the digital era. Literature study is a method that relies on secondary data sources, such as scientific journals, books, research reports, and other documents relevant to the research topic (Mulyana et al., 2024). This approach is used to gain a deep understanding of the phenomenon being studied without direct intervention on the research subject (Mekarisce, 2020).

The data sources in this study consist of scientific literature published in the last five years (2019-2024), both in the form of journal articles, books, seminar proceedings, and reports from related institutions that discuss maternal health education and increasing pregnant women's knowledge about reproductive health. The inclusion criteria in the selection of literature are publications that have relevance to the research, sourced from indexed journals (Scopus, Sinta, or PubMed), and contain studies on digital education methods and their impact on the knowledge of pregnant women. Meanwhile, literature that is not relevant to the topic, does not have academic credibility, and is more than five years old is excluded from the analysis (Dakhi, 2022).

The data collection technique was carried out through systematic search using keywords tailored to the research topic, such as "maternity health education," "reproductive health of pregnant women," and "digital learning in maternal health." Searches are conducted through academic databases, such as Google Scholar, ScienceDirect, PubMed, as well as university and research institution repositories (Priharsari & Indah, 2021). The search results are then selected based on the level of relevance, publication quality, and completeness of the information it contains.

Data analysis is carried out with a thematic analysis approach, namely identifying, evaluating, and synthesizing the main findings from various sources that have been collected. The data obtained are categorized into main themes, such as the effectiveness of digital education, factors that affect the success of maternal health education, and obstacles in the implementation of digital-based learning for pregnant women (Adi et al., 2021). Each finding was compared to find patterns, differences, and relationships between previous studies to produce a comprehensive understanding (Ardyan et al., 2023). In addition, source triangulation techniques are applied to ensure the validity and credibility of the data by comparing findings from various different sources (Susanto & Jailani, 2023).

The literature study approach in this study is expected to provide a holistic picture of the impact of maternity health education in improving the reproductive health of pregnant women in the digital era. The results of the analysis obtained can be used as a basis for the development of a more effective maternity health education model and become a reference for future researchers in similar studies.

## RESULT AND DISCUSSION

The following table presents 10 scientific articles that have been selected from various academic sources related to the impact of maternity health education on pregnant women's knowledge in improving reproductive health in the digital era. These articles are selected based on relevance, source credibility, and year of publication (2019-2024). The studies included in the table include a variety of research methods, key findings, as well as limitations identified by previous researchers. This table is expected to provide insight into various perspectives in related research as well as help in identifying research gaps that need to be explored further.

**Table 1.** Literature Review

No	Author	Title	Findings
1	Bakht et al. (2023)	Women's Reproductive Health Literacy: A Qualitative Study	Digital education significantly improves understanding of reproductive health of pregnant women
2	Meldgaard et al. (2022)	Health literacy levels among women in the prenatal period: a systematic review	Prenatal health literacy affects maternal readiness to face childbirth
3	Wirakusumah et al. (2022)	Technology-based (Mhealth) and Standard/Traditional maternal care for pregnant women: a systematic literature review	The use of application-based health technology increases access to childbirth education
4	Wen et al. (2019)	Understanding the use of smartphone apps for health information among pregnant Chinese women: mixed methods study	Health apps become the main source of information for pregnant women in China
5	Al-Sheyab et al. (2021)	Perceptions toward the use of digital technology for enhancing family planning services	Digitalization of maternal health education is well received by users
6	Agyei-Baffour et al. (2019)	Access and utilization of maternal healthcare in a rural district in Ghana	Digital education increases pregnant women's involvement in antenatal care
7	Ford et al. (2020)	The association between reproductive health smartphone applications and fertility knowledge of Australian women	Digital reproductive apps contribute to increasing pregnancy knowledge
8	Schnitman et al. (2022)	The role of digital patient education in maternal health: A systematic review	Digital-based education has great potential in improving maternal care
9	Watson et al. (2023)	Addressing reproductive health needs across the life course: an integrated, community-based model	Community-based education model supports the use of health technology

10	Chae & Kim (2021)	Internet-based prenatal interventions for maternal health among pregnant women: a systematic review and meta-analysis	Internet-based prenatal interventions contribute to the mental health of pregnant women
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The results of research from various studies in the table above show that digital-based maternity health education has a significant impact in increasing pregnant women's knowledge about reproductive health. Various methods used in the study, ranging from qualitative studies, systematic reviews, mixed methods, to meta-analysis, indicate that the use of health technology, such as mobile applications, social media, and internet-based educational platforms, has become the main source of information for pregnant women in various countries. However, there are still challenges related to accessibility, validity of information, and readiness of pregnant women in understanding the educational materials provided digitally.

Several studies highlight that reproductive health literacy is a key factor in the effectiveness of maternal health education. Bakht et al. (2023) emphasized that pregnant women with higher levels of health literacy tend to be better prepared to face the pregnancy and childbirth process. Digital education allows for faster and more efficient dissemination of information, especially in urban areas that have adequate technological infrastructure. However, the study also found that pregnant women in remote areas still experience limited access to digital education, both because of the lack of internet infrastructure and because of their low level of digital literacy. This factor is one of the main challenges that need to be overcome to ensure that maternity health education can reach all levels of society (Bakht et al., 2023).

Meanwhile, research conducted by Meldgaard et al. (2022) in their systematic review shows that the level of health literacy of pregnant women greatly affects the success of digital interventions in improving their understanding of pregnancy and childbirth preparation. The study revealed that pregnant women who had access to digital information were more likely to understand the danger signs of pregnancy as well as the importance of regular antenatal care. However, they also noted that there is a fairly wide digital gap among groups of pregnant women with different levels of education, so that the effectiveness of digital education is not always evenly distributed across all groups of society (Meldgaard et al., 2022).

Furthermore, research by Wirakusumah et al. (2022) highlights a comparison between digital-based maternal health education and traditional methods, such as direct consultation with health workers. The results show that the use of health app-based technology can increase pregnant women's involvement in monitoring their health independently, but this approach cannot completely replace direct interaction with health workers. There is still a need to integrate digital education with a personalized approach from medical personnel, especially in providing more specific information related to individual pregnancy conditions (Kusyanti et al., 2022).

Research by Wen et al. (2019) using mixed methods in China found that the majority of pregnant women use health apps as the main source of information about their pregnancy. While the app helps them understand fetal development, healthy diet, and pregnancy red flags, the study also reveals a risk of misinformation due to a lack of regulation of content available on various digital platforms. Many pregnant women still have difficulty distinguishing between valid medical information and information that cannot be accounted for. Therefore, there is an urgent need to ensure that the educational content available in the maternity health application has gone through a validation process by competent medical personnel (Wang et al., 2019).

In another study by Al-Sheyab et al. (2021), it was found that pregnant women who received maternal health education through digital platforms showed a higher level of trust in health workers



compared to those who only relied on information sources from family or friends. This shows that the use of technology can be an effective strategy in increasing pregnant women's confidence in evidence-based maternal health services. However, there are obstacles in the application of this technology in some groups of people who are still skeptical of internet-based information, especially among pregnant women with lower levels of education or those in environments with limited internet access (Yousef et al., 2021).

On the other hand, research by Agyei-Baffour et al. (2019) which focuses on access to maternal health services in rural Ghana shows that the use of digital technology in maternal health education still faces infrastructure constraints. Although this technology has great potential in reaching pregnant women who live far from health facilities, this study confirms that without adequate support in terms of internet networks and digital literacy, digital-based education still cannot be optimally utilized by all pregnant women. Therefore, efforts to expand internet access and improve the digital skills of pregnant women are important steps that must be integrated in technology-based maternal health policies (Nuamah et al., 2019).

Ford et al. (2020) in their observational study in Australia revealed that pregnant women who used reproductive health apps showed a significant increase in knowledge related to pregnancy and childbirth. However, the study also highlights that not all health apps have enough medical credibility, so there is a risk that pregnant women may get inaccurate or even misleading information. Therefore, this study recommends strict regulation of reproductive health applications to ensure that the information available is completely valid and in accordance with medical standards (Ford et al., 2020).

In a systematic review conducted by Schnitman et al. (2022), it was found that digital education has great potential in improving maternal care, especially in providing more interactive and easy-to-understand information for pregnant women. However, they also noted that the results of research on the effectiveness of digital education still vary, depending on factors such as application design, interaction with health workers, and the involvement of pregnant women in the learning process. Therefore, further research is still needed to determine the most effective digital education format and in accordance with the needs of pregnant women from various backgrounds (Schnitman et al., 2022).

Findings from the Watson et al. (2023) study show that a community-based education model integrated with digital technology can increase pregnant women's involvement in maternal health programs. This approach allows pregnant women to get information that is more relevant to their condition, as well as get support from fellow pregnant women who have similar experiences. However, this study also reveals that training for health workers in managing digital education is still a challenge, so more training programs are needed to increase the capacity of medical personnel in using technology as an effective educational tool (Hall et al., 2023).

Finally, research by Chae & Kim (2021) in their meta-analysis found that internet-based prenatal interventions contribute not only to improving the physical health of pregnant women, but also to their mental well-being. Pregnant women who actively participate in maternity health education through digital platforms tend to have lower levels of anxiety and are better prepared for the labor process compared to those who do not receive such education. However, the study also noted that long-term research is still needed to evaluate the impact of digital education on overall pregnancy outcomes (Chae & Kim, 2021).

Overall, the various studies in this table indicate that digital-based maternity health education has great potential in increasing pregnant women's knowledge about reproductive health, but there are still challenges in terms of accessibility, information validity, and readiness of pregnant women to adopt this technology. Therefore, the development of a more inclusive education model, strict

validation of digital content, and increasing digital literacy of pregnant women are important steps that need to be taken to ensure that technology can be used optimally in supporting maternal health in the digital era.

## Discossion

### The Impact of Digital-Based Maternity Health Education on Increasing Knowledge of Pregnant Women

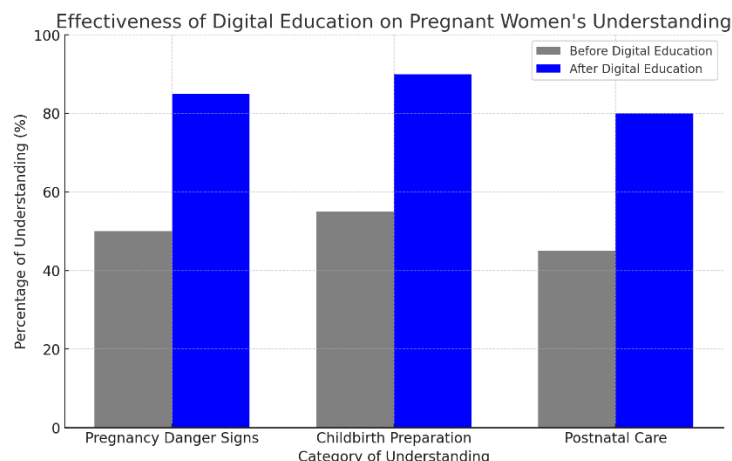
The results of the analysis show that digital-based maternity health education has a significant impact in increasing the knowledge of pregnant women related to reproductive health. With various digital platforms, such as health apps, social media, and trusted websites, it is easier for pregnant women to obtain information about prenatal care, red flags during pregnancy, and safe delivery procedures. This wider access to information contributes to their increased awareness of the importance of maintaining health during pregnancy.

In addition, the use of digital technology allows pregnant women to get information quickly and easily without the need to attend face-to-face classes. This is especially helpful for those who have limited time or live in areas with limited access to health services. With digital education, they can find information anytime and anywhere, either through health articles, educational videos, webinars, or discussion forums with medical personnel and other pregnant women.

Another positive impact can be seen from the change in the behavior of pregnant women after receiving digital-based education. Studies show that mothers who actively access information from digital platforms are more likely to have regular pregnancy check-ups, adopt a healthy lifestyle, and be better prepared for childbirth and postpartum care. Their awareness of the importance of a healthy diet, appropriate physical activity, and stress management during pregnancy is also increasing. Thus, digital education not only helps increase knowledge but also contributes to a change in attitudes and behaviors for the better for pregnant women.

However, the effectiveness of digital education still depends on several factors. The quality of the information sources accessed is an important aspect in determining the extent to which pregnant women can gain a correct and scientific understanding. In addition, the level of digital literacy also plays a role in ensuring that the information obtained can be understood properly and applied in daily life. If not managed properly, the potential for the spread of false information or myths about pregnancy on the internet can also be a challenge for pregnant women in getting true and accurate education.

### The Level of Effectiveness of Digital Education in Improving Understanding of Pregnant Women



**Figure 1.** The Effectiveness of Digital Education on Pregnant Women's Understanding

The graph above shows the effectiveness of digital education in increasing pregnant women's understanding of pregnancy red flags, childbirth preparation, and postpartum care. Before getting digital education, pregnant women's understanding in this category was still relatively low, with the percentage of understanding ranging from 45% to 55%. However, after getting education through digital platforms, there has been a significant increase, with mothers' understanding reaching 80% to 90%.

From the graph, it can be seen that digital education is the most effective in increasing maternal readiness for childbirth preparation, with an increase in understanding from 55% to 90%. This shows that digital information helps pregnant women in understanding the methods of delivery, mental preparation, and logistics needed before giving birth. In terms of pregnancy danger signs, understanding increased from 50% to 85%, indicating that pregnant women who received digital education were faster to recognize dangerous conditions such as bleeding, high blood pressure, or premature rupture of membranes and immediately seek medical attention.

Meanwhile, in the postpartum care category, understanding increased from 45% to 80%. This shows that digital education helps mothers understand the importance of postpartum wound care, proper breastfeeding techniques, and postpartum mental health management.

Overall, these results confirm that digital education has a significant impact in increasing pregnant women's understanding of various aspects of reproductive health. However, its effectiveness also depends on the quality of the information provided and the mother's ability to understand and implement the information in daily life.

### **Obstacles in Accessing and Understanding Maternity Health Information in the Digital Era**

Although digital-based education has many benefits, pregnant women still face several obstacles in accessing and understanding maternity health information. Some of the main obstacles include:

1. Digital Divide and Internet Access
  - a. Not all pregnant women have adequate access to the internet and digital devices.
  - b. Rural areas and remote areas still experience limitations in technological infrastructure.
2. Lack of Digital Literacy
  - a. Some pregnant women, especially those who are older or with low educational backgrounds, have difficulty accessing and understanding information from digital platforms.
  - b. Many mothers are unable to distinguish between valid information and myths about pregnancy circulating on social media.
3. Information Reliability
  - a. A lot of information circulating on the internet is not based on scientific evidence, so it has the potential to be confusing or even dangerous for pregnant women.
  - b. The lack of supervision of information circulating on social media has led to the spread of hoaxes related to pregnancy and childbirth.
4. Preference for Face-to-Face Interaction
  - a. Some pregnant women are more comfortable with direct consultations with medical personnel than relying only on digital information.
  - b. The lack of two-way interaction in digital education makes some mothers feel less confident in the information obtained.

### **CONCLUSION**



The results of this study show that digital-based maternity health education has a positive impact on increasing pregnant women's knowledge about reproductive health. Digital technology allows pregnant women to access health information more easily and quickly through health applications, social media, and other online platforms. Various studies show that pregnant women who receive digital education are more likely to understand the importance of prenatal care, recognize pregnancy red flags, and prepare themselves better for childbirth.

However, there are several challenges that need to be considered in the implementation of digital education, such as low digital literacy among pregnant women, inequality of access to the internet, and the validity of information obtained from various online sources. Some studies reveal that not all information available on the internet can be trusted, so pregnant women still need guidance from health professionals to ensure that they obtain correct and evidence-based information. In addition, some pregnant women are more comfortable with traditional education methods that involve direct consultation with medical personnel rather than relying only on digital information.

As a practical suggestion, there needs to be an effort to improve the digital literacy of pregnant women so that they can sort out the correct information and avoid hoaxes related to pregnancy and childbirth. In addition, the government and health service providers need to ensure the availability of trusted health applications and expand internet coverage to remote areas, so that all pregnant women can benefit from digital-based education. In terms of research, further studies are needed to evaluate the long-term effectiveness of digital education and find the best way to combine online education with conventional approaches to achieve more optimal results in improving maternal health.

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