

ARTICLE INFORMATION

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Association between digital health literacy and antenatal care adherence among pregnant women

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Abstract

Background: Pregnancy is a critical period that affects the health of both the mother and the fetus. Antenatal Care (ANC) plays an important role in the early detection of pregnancy complications, however, adherence to the recommended ANC visit schedule remains a challenge. Digital health literacy is increasingly important in supporting health-related decision-making among pregnant women.

Purpose: To examine the association between digital health literacy and adherence to Antenatal Care (ANC) visits among pregnant women.

Method: This study employed an analytic observational design with a cross-sectional approach. The study was conducted in three villages in Silih Nara District, Aceh Tengah Regency, from May to June 2026. The population comprised all pregnant women who underwent examinations at Posyandu during the study period. A total sampling technique was used, resulting in a sample of 38 pregnant women. Digital health literacy was measured using the eHealth Literacy Scale (eHEALS), and adherence to ANC visits was assessed through verification of the Maternal and Child Health Book and ANC visit records at the Community Health Center. Data were analyzed using the Chi-square test to determine the association between digital health literacy and adherence to ANC visits.

Results: The average age of respondents was 29.52 years ($SD \pm 6.49$), with the majority having completed secondary education (52.63%). Most respondents' mothers were working (78.95%). The mean distance from respondents' homes to the nearest health facility was 5.78 km ($SD \pm 3.05$). Based on the Chi-square test, a p-value of 0.002 was obtained, indicating a statistically significant association between digital health literacy and adherence to ANC visits. In the non-adherent group, 10.00% had low digital health literacy, 16.67% had moderate literacy, and 36.84% had high literacy. In contrast, in the adherent group, 90.00% were classified in the low literacy category, 83.33% in the moderate category, and 31.25% in the high category.

Conclusion: Digital health literacy was significantly associated with adherence to Antenatal Care (ANC) visits among pregnant women. Pregnant women with better digital health literacy tended to demonstrate higher adherence to recommended ANC schedules.

Suggestion: It is recommended that health facilities and community health workers provide education to the public regarding the understanding and benefits of digital health literacy in supporting Antenatal Care (ANC) adherence. Enhancing community knowledge in this area will contribute to the implementation of maternal and child health programs as a preventive effort against pregnancy complications and poor birth outcomes.

Keywords: Antenatal Care; ANC Adherence; Digital Health Literacy; Pregnant Women; Maternal Health.

INTRODUCTION

Pregnancy is a critical period in a woman's life cycle because the mother's health during pregnancy significantly influences the health outcomes of both

the mother and the fetus (Mutianingsih, Muliani, Supiana, Safinatunnaja, Munawarah, & Mawaddah, 2022). One of the primary strategies for maintaining

maternal and fetal health is through Antenatal Care (ANC) services, which aim to facilitate the early detection of pregnancy-related risk factors, prevent complications, and provide education on pregnancy, childbirth, the postpartum period, and newborn care. Regular attendance at ANC services has been proven to reduce maternal and neonatal morbidity and mortality by enabling the early identification of complications and ensuring appropriate management (Tahir & Anjarwati, 2025).

Although the coverage of Antenatal Care (ANC) services has continued to improve across many countries, adherence to the recommended schedule of ANC visits among pregnant women remains a significant challenge. The World Health Organization (WHO) recommends a minimum of eight ANC contacts throughout pregnancy to improve the quality of maternal healthcare and reduce the risk of pregnancy-related complications (Sari, 2026). Nevertheless, another studies report indicate that many pregnant women still do not utilize ANC services optimally. This suboptimal utilization is influenced by various factors, including social, economic, and cultural conditions, access to healthcare services, as well as individual factors such as health knowledge and the ability to obtain health-related information (Shalma & Agustia, 2026; Zainuddin, A., & Salma, 2025; Lestari, Syakurah, & Idris, 2025). In Indonesia, improving maternal healthcare services has become one of the national health development priorities. The Ministry of Health continues to promote the expansion of standard ANC coverage through the strengthening of primary healthcare services, the utilization of the Maternal and Child Health (MCH) Handbook, and the implementation of digital health transformation initiatives (Widjaja, 2025). Nevertheless, a gap remains between the coverage of ANC services and pregnant women's adherence to the recommended ANC visit schedule. This situation suggests that, beyond the availability of healthcare services, other factors also influence pregnant women's behavior in utilizing antenatal care services.

The rapid advancement of information technology has transformed the way people access health information (Diyan, Nurdin, Fitria, & Kurnia, 2024). Today, many pregnant women use the internet, social media, search engines such as Google, mobile health applications, and online consultation platforms as

primary sources of pregnancy-related information. While the use of digital media facilitates timely and convenient access to health information, it also increases the risk of exposure to inaccurate information (misinformation) and content that is not based on scientific evidence (Sa'diyyah, Pratama, & Ariani, 2023). Therefore, the ability to search for, understand, evaluate, and apply health information obtained from digital media has become increasingly important in supporting informed health-related decision-making.

Digital health literacy refers to an individual's ability to access, understand, evaluate, and use health information obtained through digital media to support health-related decision-making (Oktaviana & Solihin, 2025). Individuals with high levels of digital health literacy are more likely to identify credible sources of health information, understand recommendations provided by healthcare professionals, and make informed health decisions. Conversely, inadequate digital health literacy may lead to the misinterpretation of health information, increased reliance on unreliable or invalid sources, and potentially influence health-seeking behaviors, including adherence to recommended ANC visits.

Previous studies on the factors influencing adherence to ANC visits in Indonesia have primarily focused on conventional determinants, such as maternal age, education, employment status, parity, income, health knowledge, family support, and access to healthcare services. In contrast, research examining the influence of digital health literacy on ANC visit adherence remains limited, particularly within primary healthcare settings. This gap is noteworthy given that the government's ongoing digital health transformation provides substantial opportunities to utilize digital media as a platform for maternal health education and health promotion. Therefore, further research is needed to examine the relationship between digital health literacy and adherence to ANC visits, thereby providing evidence to support the development of effective digital-based maternal health promotion interventions.

Despite the increasing use of digital technologies in maternal healthcare, evidence regarding the role of digital health literacy in influencing ANC adherence among pregnant women in rural primary healthcare settings remains limited in Indonesia. Understanding this relationship is important to support digital health

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transformation initiatives and improve maternal healthcare utilization. Therefore, this study aimed to examine the association between digital health literacy and adherence to ANC visits among pregnant women.

RESEARCH METHOD

This study employed an analytic observational design with a cross-sectional approach to examine the association between digital health literacy and adherence to Antenatal Care (ANC) visits among pregnant women. The study was conducted in three villages in Silih Nara District, Aceh Tengah Regency, from May to June 2026.

The study population comprised all pregnant women who attended pregnancy examinations at Posyandu during the study period. A total sampling technique was employed, resulting in a sample of 38 pregnant women. Inclusion criteria were pregnant women in the second and third trimesters, aged 18 years or older, able to read and communicate effectively, owning or using a smartphone connected to the internet, and willing to participate by signing an informed consent form. Exclusion criteria included pregnant women with severe obstetric complications that precluded participation, those with cognitive or communication impairments, and respondents who did not complete the questionnaire.

The independent variable in this study was digital health literacy, defined as the ability of pregnant women to access, understand, evaluate, and utilize health information obtained through digital media to

support health-related decision-making. Digital health literacy was measured using the eHealth Literacy Scale (eHEALS) developed by Norman and Skinner, which consists of eight items rated on a five-point Likert scale ranging from strongly disagree (score 1) to strongly agree (score 5). Total scores ranged from 8 to 40, with higher scores indicating better digital health literacy. Based on the total score, respondents were categorized into low, moderate, and high levels of digital health literacy according to the predetermined cut-off points used in this study.

The dependent variable was adherence to Antenatal Care (ANC) visits, defined as pregnant women's compliance with the recommended ANC visit schedule according to the guidelines of the Ministry of Health of the Republic of Indonesia. Adherence was assessed through verification of the Maternal and Child Health (MCH) Handbook and ANC visit records obtained from the Community Health Center. Respondents were categorized as adherent if they attended ANC visits according to the recommended schedule based on their gestational age and as non-adherent if the number or timing of visits did not meet the established standards.

Data were analyzed using StataMP17 software. Univariate analysis was performed to describe respondents' characteristics and the distribution of study variables. The association between digital health literacy and adherence to ANC visits was analyzed using the Chi-square test. Statistical significance was determined at $p < 0.05$ with a 95% confidence level.

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RESEARCH RESULTS

Table 1. Characteristics of the Respondents (N=38)

Variable	Results
Age (Mean±SD) (Years) (Range)	(29.52±6.49) (19-38)
Education (n/%)	
Primary Education	10/26.32
Secondary Education	20/52.63
Higher Education	8/21.05
Mother's Occupation (n/%)	
No	8/21.05
Yes	30/78.95
Distance to health facility (Mean±SD) (Km)	(5.78±3.05)(1-10)

Table 1 shows that the respondents had a mean age of 29.52 years (SD ± 6.49), with the largest proportion (52.63%) in the secondary education group. In terms of educational attainment, most respondents had completed secondary education (52.63%). Furthermore, the majority of respondents' mothers were working (78.95%). The mean distance from respondents' homes to the nearest health facility was 5.78 km (SD ± 3.05), with a range of 1-10 km.

Table 2. Digital Health Literacy and Adherence to Antenatal Care Visits Among Pregnant Women (N=38)

Variable	Results		
	Non-Adherent (n=12)	Adherent (n= 24)	p-Value
Digital Health Literacy (n/%)			
Low	1/10.00	9/90.00	0.002
Moderate	2/16.67	10/83.33	
High	11/36.84	5/31.25	

Table 2 presents the analysis of digital health literacy and adherence to antenatal care visits among pregnant women. The Chi-square test yielded a p-value of 0.002, indicating a statistically significant association between digital health literacy and adherence to antenatal care visits. In the non-adherent group, 10.00% of women had low digital health literacy, 16.67% had moderate literacy, and 36.84% had high literacy. In contrast, within the adherent group, 90.00% of women were classified in the low literacy category, 83.33% in the moderate category, and 31.25% in the high category.

DISCUSSION

Pregnancy is a critical period for women, particularly in ensuring the health of both the mother and the fetus and preparing for a safe childbirth. One of the key strategies for monitoring and supporting maternal health during pregnancy is through regular and standard-compliant Antenatal Care (ANC) visits. Adherence to the recommended ANC schedule enables the early detection of obstetric complications, continuous monitoring of fetal growth and development, and the provision of appropriate health education for pregnant women. Furthermore, optimal ANC services enhance mothers' psychological

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preparedness for childbirth and the postpartum period (Purnami, Adhistry, & Salim, 2025).

However, field observations conducted in Silih Nara District, Aceh Tengah Regency, indicate that adherence to the recommended ANC visit schedule remains a challenge. Many pregnant women have not fully understood the importance of attending ANC visits according to the recommended schedule. Several factors contribute to this issue, including the distance to healthcare facilities, educational level, employment status, and family support. In addition, limited access to reliable health information and the varying quality of health education have become barriers to improving pregnant women's adherence to ANC visits.

Digital health literacy plays an important role in adherence to Antenatal Care (ANC) visits. Pregnant women with high levels of digital health literacy are more likely to seek, understand, and utilize health information obtained from digital sources to support informed decisions regarding their pregnancy (Prihadianto, Astiah, & Romiana, 2025). This finding is consistent with the results of the present study, which demonstrated a statistically significant association between digital health literacy and adherence to ANC visits ($p = 0.002$). Pregnant women with high digital health literacy were more likely to adhere to the recommended ANC schedule than those with low or moderate levels of digital health literacy.

Educational level also contributes to adherence to Antenatal Care (ANC) visits. Pregnant women with higher levels of education are generally better able to understand health information and are more proactive in seeking quality healthcare services. In contrast, women with lower educational attainment may experience difficulties in understanding medical information, which can reduce their motivation to attend ANC visits regularly. Both formal and informal education enhance knowledge, critical thinking, and life experiences, thereby improving pregnant women's understanding of the importance of ANC throughout pregnancy (Mutia & Hadi, 2023).

Maternal employment status also influences adherence to Antenatal Care (ANC) visits. Pregnant women who are employed often face challenges such as limited time, heavy workloads, and long distances between their workplace and healthcare facilities. These factors may reduce the frequency of ANC visits

or lead to delays in attending scheduled appointments. Workplace support, including maternity leave policies, flexible working arrangements, and easy access to healthcare services, can help improve ANC adherence among employed pregnant women (Cahyani, Nuzuliana, & Puspitasari, 2026).

Distance to healthcare facilities is another important factor influencing adherence to ANC visits. Pregnant women who live far from primary healthcare centers or hospitals often face greater difficulties in accessing ANC services, particularly if they do not have access to private transportation. These barriers may lead women to seek ANC only when they experience pregnancy-related symptoms or complications, rather than attending visits according to the recommended schedule (Astari, 2024).

The findings of this study, supported by the Chi-square test results ($p = 0.002$), confirm a statistically significant association between digital health literacy and adherence to ANC visits. These findings are consistent with another study, which demonstrated that access to and the ability to effectively use digital health information contribute to improved adherence to ANC among pregnant women. Women with higher levels of digital health literacy reported feeling more confident, more reassured, and more motivated to attend ANC visits according to the recommended schedule (Mutia & Hadi, 2023).

Overall, digital health literacy has been shown to be an important factor influencing adherence to Antenatal Care (ANC) visits. This study highlights the potential of utilizing digital technologies, such as mobile health applications and online health education platforms, as effective strategies to improve pregnant women's adherence to the recommended ANC schedule. Therefore, digital-based interventions may serve as accessible, practical, and effective solutions to support maternal and fetal health throughout pregnancy.

CONCLUSION

Digital health literacy was significantly associated with adherence to Antenatal Care (ANC) visits among pregnant women. These findings indicate that digital health literacy may play an important role in supporting pregnant women's utilization of maternal healthcare services.

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SUGGESTION

Health facilities are encouraged to provide digital health education programs and improve access to reliable maternal health information through digital platforms to enhance ANC adherence among pregnant women.

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