

CULTURALLY ADAPTIVE DIGITAL MATERNAL MONITORING IN ASEAN: A COLLABORATIVE QUALITATIVE EXPLORATION

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ABSTRACT

Maternal mortality remains a major public health challenge in ASEAN countries, particularly in developing countries where disparities in maternal healthcare quality and access still exist. Digital maternal monitoring, including the implementation of digital partographs, has emerged as an important strategy to improve maternal safety, clinical documentation, and decision-making during labor. However, the implementation of digital health systems in maternal care still faces several challenges, including low digital literacy, limited infrastructure, and lack of cultural adaptation. This study aimed to explore perceptions, readiness, acceptability, and cultural factors related to the implementation of digital partographs among healthcare students and maternal healthcare stakeholders in Indonesia and Malaysia. This study used a collaborative qualitative exploratory design involving Universitas Galuh Indonesia and MAHSA University Malaysia. Data were collected through in-depth interviews, Focus Group Discussions (FGD), and preliminary questionnaires involving Diploma in Nursing students from MAHSA University. The findings showed that most participants had positive perceptions toward digital partographs and demonstrated strong readiness for digital health implementation. Participants believed that digital partographs could improve documentation efficiency, support clinical decision-making, and enhance maternal monitoring. However, cultural factors, family involvement, communication approaches, and local values remained important determinants influencing technology acceptance. The study highlights the importance of integrating cultural adaptation into digital maternal monitoring systems. The development of a culturally adaptive enhancement model for digital partographs has the potential to improve usability, acceptability, and sustainability of maternal healthcare technology in ASEAN countries.

Keywords: Digital Maternal Monitoring, Digital Partograph, Culture, ASEAN, Maternal Health

INTRODUCTION

Maternal mortality remains a major global health issue and continues to be one of the indicators reflecting the quality of healthcare systems. Although many countries have experienced improvements in maternal healthcare services, maternal mortality rates in several ASEAN countries remain relatively high compared to developed countries. According to the World Health Organization (WHO), many maternal deaths are still associated with delayed recognition of complications, inadequate monitoring during labor, and limited access to quality maternal healthcare services.

Digital transformation in healthcare has become one of the major strategies for improving maternal and neonatal outcomes. Digital maternal monitoring systems, including digital partographs, are increasingly recognized as effective tools for improving documentation

quality, supporting early detection of complications, and assisting clinical decision-making during labor. Previous studies have shown that digital health interventions may improve efficiency, reduce documentation errors, and strengthen communication among healthcare providers.

Despite these advantages, the implementation of digital maternal monitoring systems in developing countries remains challenging. Several barriers have been identified, including limited digital literacy among healthcare workers, inadequate infrastructure, lack of training, and resistance to technology adoption. In addition, cultural values and local practices significantly influence maternal healthcare behavior and acceptance of healthcare technologies.

In ASEAN countries, cultural diversity strongly influences maternal healthcare practices. Family-centered decision-making, traditional beliefs regarding childbirth, communication patterns, and local healthcare customs may affect the implementation and acceptance of digital health systems. However, most digital health studies still focus mainly on technical effectiveness rather than integrating cultural adaptation into system design.

This study addresses this gap by exploring culturally adaptive digital maternal monitoring in the ASEAN context. The research specifically focuses on enhancement of digital partographs through integration of cultural approaches and contextual communication strategies.

This study is also strengthened through collaboration between Universitas Galuh Indonesia and MAHSA University Malaysia. Universitas Galuh contributes expertise in cultural and conservation-based approaches, while MAHSA University contributes expertise in health technology and clinical education. This collaborative approach supports the development of a contextual and sustainable digital maternal monitoring model suitable for ASEAN countries.

The objectives of this study were:

1. To identify the implementation of digital partographs in Indonesia and Malaysia.
2. To analyze cultural factors influencing technology acceptance.
3. To explore perceptions and readiness toward digital maternal monitoring.
4. To develop a conceptual culturally adaptive enhancement model for digital partographs.

METHOD

Research Design

This study used a collaborative qualitative exploratory approach involving researchers from Universitas Galuh Indonesia and MAHSA University Malaysia. A qualitative approach was selected because the study aimed to explore experiences, perceptions, cultural values, and contextual factors influencing the implementation of digital maternal monitoring systems.

Research Setting

The research was conducted in maternal healthcare facilities in Ciamis Regency, Indonesia, and partner healthcare institutions affiliated with MAHSA University Malaysia.

Participants

Participants included healthcare students, nursing students, midwives, and maternal healthcare stakeholders. Preliminary exploration involved 17 Diploma in Nursing students from MAHSA University Malaysia.

The inclusion criteria included:

1. Students or healthcare providers involved in maternal healthcare education or services.
2. Participants familiar with digital health applications.
3. Participants willing to participate voluntarily.

Data Collection

Data collection was conducted through:

1. In-depth interviews.
2. Focus Group Discussions (FGD).
3. Preliminary questionnaires.

The questionnaire explored:

1. perceptions toward digital partographs,
2. readiness to use digital technology,
3. cultural perspectives,
4. acceptability of digital maternal monitoring.

Data Analysis

Data were analyzed using thematic analysis assisted by NVivo software. The analysis process involved:

1. open coding,
2. axial coding,
3. selective coding,
4. thematic categorization.

Data validity was strengthened through triangulation, member checking, and peer discussion among researchers from both institutions.

Ethical Consideration

Participation in this study was voluntary. All participants received explanations regarding study objectives, confidentiality, and data protection before participation.

RESULTS AND DISCUSSION

Characteristics of Respondents

The preliminary study involved 17 Diploma in Nursing students from MAHSA University Malaysia. Most participants were aged between 18–19 years old and had previous experience using digital health applications. Most respondents were also familiar with partographs and maternal healthcare documentation.

Table 1.
Characteristics of Respondents

<i>Characteristics</i>	<i>Frequency</i>	<i>Percentage</i>
Age 17 years	1	5.9%
Age 18 years	11	64.7%
Age 19 years	4	23.5%
Age >20 years	1	5.9%
Diploma in Nursing Students	17	100%
Familiar with Partograph	12	70.6%
Experience using digital applications	17	100%

The findings indicate that young healthcare students demonstrate strong readiness toward digital transformation in healthcare systems.

Perceptions Toward Digital Partographs

Most participants showed positive perceptions toward digital partographs. Participants believed that digital systems could improve efficiency in documentation and maternal monitoring.

Table 2.
Perceptions Toward Digital Partographs

Statement	Agree/Strongly Agree
Digital partograph is important in maternal care	94.1%
Digital partograph simplifies labor monitoring	88.2%
Digital technology supports clinical decision-making	94.1%
Digital partograph is more effective than manual documentation	82.4%

Participants stated that digital systems may help reduce documentation errors and improve monitoring accuracy.

One participant stated: “Digital partographs are easier because data can be monitored directly and documentation becomes more organized.”

This finding is consistent with previous studies showing that digital health technologies may improve maternal healthcare quality and clinical response.

Readiness Toward Digital Health

The study found high digital readiness among participants. Most participants reported being comfortable using digital applications and healthcare technology.

Table 3.
Readiness Toward Digital Health

Statement	Yes
Familiar with digital applications	100%
Able to use health applications	88.2%
Received digital health training	52.9%

However, participants also emphasized the need for additional training and education related to digital maternal monitoring systems.

Cultural Perspectives in Digital Maternal Monitoring

One of the major findings of this study was the strong influence of cultural factors on maternal healthcare and technology acceptance.

Table 4.
Cultural Perspectives

Statement	Yes
Culture influences childbirth processes	94.1%
Family influences maternal decision-making	88.2%
Technology should adapt to local culture	94.1%

Participants emphasized that communication style, language, and family involvement are important factors influencing technology acceptance.

One participant explained: “People may accept healthcare technology more easily if communication follows their culture and language.”

This finding supports the importance of culturally responsive healthcare approaches.

Acceptability of Digital Partographs

Most respondents demonstrated high acceptability toward digital maternal monitoring systems.

Table 5.
 Acceptability of Digital Partographs

Statement	Agree/Strongly Agree
Interested in using digital partographs in the future	94.1%
Comfortable using healthcare technology	88.2%
Willing to recommend digital partographs	88.2%

Participants also highlighted the importance of:

1. user-friendly interfaces,
2. simple communication systems,
3. culturally adaptive features.

The findings indicate that culturally adaptive digital maternal monitoring systems may improve usability and sustainability.

Development of a Culturally Adaptive Enhancement Model

Based on thematic findings, this study proposes a conceptual enhancement model integrating:

1. digital clinical decision support,
2. culturally adaptive communication,
3. local language adaptation,
4. user-friendly design,
5. maternal-centered care.

This enhancement model aims to strengthen digital maternal monitoring systems in ASEAN countries.

LIMITATION OF THE STUDY

This study involved a limited number of participants in the preliminary exploration phase. The study mainly focused on healthcare students and selected maternal healthcare stakeholders. Further studies involving larger populations, midwives, and healthcare institutions are necessary to validate the proposed enhancement model.

CONCLUSIONS AND SUGGESTIONS

This study demonstrated that healthcare students and maternal healthcare stakeholders showed positive perceptions and strong readiness toward digital maternal monitoring systems. Participants believed that digital partographs may improve documentation, monitoring, and clinical decision-making in maternal healthcare services.

However, cultural adaptation remains an essential factor influencing technology acceptance and implementation. Family involvement, communication style, local beliefs, and cultural values significantly affect maternal healthcare behavior in ASEAN countries.

The study highlights the importance of developing culturally adaptive enhancement models for digital partographs. Integration of cultural approaches into digital maternal

monitoring systems has the potential to improve acceptability, usability, and sustainability of maternal healthcare technology.

Future research should involve larger populations and broader implementation settings to validate and strengthen the proposed model.

ETHICAL CONSIDERATION

Funding Statement

This study was supported by Universitas Galuh Indonesia and MAHSA University Malaysia through collaborative international research activities.

Conflict of Interest Statement

The authors declare no conflict of interest related to this study.

REFERENCES

- World Health Organization. Trends in maternal mortality 2000 to 2020. Geneva: WHO; 2023.
- World Health Organization. WHO recommendations: intrapartum care for a positive childbirth experience. Geneva: WHO; 2018.
- Kemkes RI. Profil Kesehatan Indonesia 2023. Jakarta: Ministry of Health Republic of Indonesia; 2024.
- UNICEF. Maternal and newborn health disparities in ASEAN countries. New York: UNICEF; 2022.
- Aungst TD, Patel R. Integrating digital health into maternal healthcare systems. *J Med Syst*. 2021;45(6):1-8.
- Sondaal SFV, Browne JL, Amoakoh-Coleman M, et al. Assessing the effect of mHealth interventions in maternal and neonatal care in low- and middle-income countries: a systematic review. *PLoS One*. 2016;11(5):e0154664.
- Lee SH, Nurmatov UB, Nwaru BI, et al. Effectiveness of mHealth interventions for maternal, newborn and child health in low- and middle-income countries: systematic review and meta-analysis. *J Glob Health*. 2016;6(1):010401.
- Purnamasari KD, Ningrum WM, et al. Digital health innovation in maternal services: opportunities and challenges in ASEAN countries. *Int J Nurs Health Serv*. 2023;6(5):303-308.
- Betancourt JR, Green AR, Carrillo JE. Cultural competence in healthcare: emerging frameworks and practical approaches. Commonwealth Fund. 2002;1-30.
- Creswell JW. Qualitative inquiry and research design: choosing among five approaches. 4th ed. California: Sage Publications; 2018.