SYSTEMATIC REVIEW

# Perceptions and Barriers to the Use of Electronic Partographs in Childbirth by Midwives

Timmy Larasati[1], Jayasree Kanathasan[2], Ratna Dewi[1], Maya Fernanda Dielsa[1], Armita Sri Azhari[1]

[1] Akademi Kebidanan Pasaman Barat, Jalan Lintas Simpang Empat – Manggopoh, Jambak Jalur 1, Pasaman Barat, 26568 Sumatera Barat, Indonesia
[2] Faculty of Health Science, Lincoln University College, Wisma Lincoln, No. 12-18, Jalan SS 6/12, 47301 Petaling Jaya, Selangor Darul Ehsan, Malaysia.

**ABSTRACT**

**Introduction:** Partograph is an important tool in labor management that monitors the progress of the labor process and the condition of the mother and fetus. This study aims to explore midwives' perceptions and barriers in using electronic partographs. **Methods:** The method used follows the PRISMA guidelines. Literature searches were conducted on the Google Scholar, Science Direct, and Pubmed databases with relevant keywords. Inclusion criteria were relevant studies published in English and Indonesian, and publications in the period 2019-2023. Exclusion criteria included studies that did not focus on midwives, articles that were not available in full text, and irrelevant studies. **Results:** A total of 14 studies were grouped in their findings in Positive perceptions, namely ease of use and reduction of errors were well highlighted. Barriers, namely lack of training and technical problems. **Conclusion:** The conclusion is that electronic partographs have great potential to improve labor management and maternal-neonatal outcomes.
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**Keywords:** Electronic partograph, Labor management, Recording accuracy, Monitoring, Outcome

**Corresponding Author:**
Timmy Larasati, M. Keb
Email: larasatitimmy@gmail.com
Tel :+6285363454363

## INTRODUCTION

The partograph is an important tool in labor monitoring and management, aiming to improve maternal and newborn outcomes by detecting early complications during labor. With the development of technology, digital partographs have been introduced as a more efficient and accurate alternative to traditional paper-based partographs.

An estimated 2.6 million stillbirths occur worldwide annually, or approximately 7,200 babies every day. 3,03,000 maternal deaths are thought to occur annually worldwide, according to estimates from the World Health Organization (WHO). According to a global burden of disease study, obstructed labor accounts for 6.4% of maternal deaths each year. Moreover, there are 904,000 neonatal hypoxic deaths and 1.3 million intrapartum stillbirths annually (1).

Early detection and treatment of intrapartum complications can stop these fatalities. A tragic result of pregnancy is fetal death, which occurs when a fetus passes away during labor or during delivery. A detailed examination of these types of cases can reveal various areas for improvement. A nation's death rate is a reflection of the care given to expectant mothers and their infants (2). Among other health professionals, midwives are crucial to health initiatives and lead community health services. Position  one of the strategic actions that can be made is to address the significant impact midwives have on service quality. Using a partograph to track the labor process is one way midwives improve the standard of care provided to patients. Partographs can assist midwives in determining whether deliveries are going according to plan or in identifying issues before they arise(3).

It is advised that partographs be routinely used to track the progression of labor and to gather data for clinical decision-making. Partographs are used in the majority of developed and developing nations to guarantee that mothers and babies receive safe, appropriate, and timely delivery care and to avoid potentially fatal complications. One of the fundamental competencies of a midwife is to monitor labor progress using the most common conventional partograph, which is also recommended by the World Health Organization (WHO) when midwives monitor labor progress. This is done in accordance with Minister of Health regulation number HK.01.07 / MENKES / 320/2020 concerning the

professional standard of midwives. Using a partograph to track the progress of labor is the fifth competency(4). Only 24% of partographs were filled incorrectly, according to research done in Kenya, where 88% of partographs were used. Aside from ignorance, a number of factors contribute to the improper use of partographs: service providers who view them solely as a reporting and administrative tool; a lack of uniform guidelines; insufficient training for service providers; and a shortage of partograph paper supplies. Every active phase delivery, regardless of location, should follow the partograph. A measure of health status can be found in the high or low rates of maternal and infant mortality. This phenomenon has a big impact on how well health development goes.(5) Therefore, Professional Standards, Standard Operating Procedures (SOP), and guidelines followed by midwives in healthcare facilities are essential elements in the execution of midwifery service tasks and in the development of performance management for midwives in midwifery care. To ensure that every action and activity is focused on a quality culture in the delivery of midwifery services, midwives can use midwifery standards as a guide and foundation when implementing high-quality health services.(6)

This study is a follow-up to one that was conducted in 2017, specifically looking at a computer-designed digital partograph(7). For regular childbirth care, the Web-Based Digital Partograph was utilized as a learning tool until 2019 when Deviant et al. developed a digital partograph with a computer system into a Web-based partograph in 2018. Furthermore, by creating SOAP and anamnestic features, the authors carried out additional research. The present investigation differs from prior research in that the former did not furnish midwives with specific features within the service. Moreover, data editing was not possible and the numbers remained flipped when monitoring the fetal heart rate and maternal vital signs. As such, he worked as a researcher and created a digital partograph application that midwives could use in health services. He also enhanced vital signs and fetal heart rate monitoring charts and added editing features The examination's output results are available in PDF format, which you can print off and use for documentation at RSKD Mother and Child Mother Earth(8).

Partograph use in labor has remained incredibly low up until this point. According to the Ministry of Health, WHO, and HOGSI's 2012 Maternal Health Quality Study and Babies, the percentage of service facilities that use a partograph for delivery assistance is still low it is 25% in hospitals, 45% in community health centers, and 54% in maternity clinics(9). The low use of partographs in labor monitoring has led to innovative product development in midwifery services, such as the creation of a digital partograph, which aims to facilitate midwives' partograph filling.(9)

Midwives continue to use traditional partographs, on average, 100%. This, naturally because many intrapartum patients require midwives to work, this presents a challenge for them as they monitor labor while still having to fill out partographs manually, which takes more time. Midwives must start from scratch because this method is not the best for monitoring labor and frequently results in filling errors. In order to determine the degree to which midwives' performance in managing labor was compared using a digital partograph and a traditional partograph, the researcher raised this title, among other reasons. Digital pantographs are expected to provide midwives with another option. Using a digital partograph is another option for labor observation. (10)

## MATERIALS AND METHODS

This study is a systematic review of the literature that uses data from Google Scholar, Science Direct, and Pubmed. The primary goal is to investigate digital Partograph information. Advanced search is used to find literature, and "AND/OR" notation is included to improve search results. Among the keywords used in the search for research articles are "conventional partograph" and "digital partograph." To find all the information, pertinent articles were also looked for and retrieved in PDF format. PICO (Population, Intervention, Comparison, Outcome) was used to determine the inclusion and exclusion criteria.

The population of focus was the digital partograph, while the intervention sought was the use of partograph in assisting childbirth by midwives, a comparison with the use of conventional partograph, and the results were barriers to implementing the use of digital partograph tools. Articles that met these criteria, viewed from the year of publication between 2019 and 2023, and using a qualitative, quantitative, or mixed method study approach, were included in this study. The initial search results produced 335 articles, then the articles were filtered according to the inclusion and exclusion criteria, and then 63 relevant articles were obtained. From the relevant articles, full-text articles were searched, and 47 articles were found. Next, the titles and abstracts were reviewed, so that 14 articles were selected for use in this study and integrated into the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) flowchart. Figure 1.

## RESULTS

Articles that look at midwives' use of electronic partographs, articles in English or Indonesian, full text articles, publications from 2019 to 2023, and research articles or original articles are among the inclusion criteria for literature sources. The research articles that the researchers have reviewed are succinctly described. (Table I)

**Table I: Characteristics of included studies**

| No | Tittle | Author/Year | Metode | The Result | doi |
|---|---|---|---|---|---|
| 1. | Willingness to Use Mobile based e-Partograph and Associated Factors among Care Providers in North Gondar Zone, Northwest Ethiopia | Yared Tadesse, Abebaw Addis Gelagay, Binyam Tilahun, Berhanu Fikadie Endehabtu, Zeleke Abebaw Mekonnen, Kassahun Dessie Gashu/2019 (16) | A cross-sectional study. | Despite the low rate of smartphone ownership, nearly all midwifery service providers have access to mobile devices. The main reason for this resistance to e-partographs is a lack of training in the field. Thus, for effective management of e-partographs, increasing digital capacity and partograph usage awareness are crucial. | DOI: 10.5210/ojphi.v11i2.9468 |
| 2. | Increasing adherence to plotting e-partograph: a quality improvement project in a rural maternity hospital in India | Shuchi Jain, Pramod Kumar, Manish Jain, Megha Bathla, Shiv Joshi, Sushil Srivastava, Mahtab Singh, Ajit Sudke, Vikram Datta, Poonam Shivkumar/2021(17) | Technique using root cause analysis. | A QI approach can help increase e-partography planning compliance in rural Indian maternity hospitals, which will improve maternal health services. | DOI: 10.1136/bmjoq-2021-001404 |
| 3. | An observational study to compare WHO modified partogram and paperless partogram | Nidhi Thakur, Bawa Ram Bhagat, V. Dadwal, R. Rachana, Preeti Preeti/2022(22) | A cross-sectional study. | Paperless partogram was found to be better than WHO partogram for monitoring labor in terms of user friendliness, teachability, and overall usefulness. | DOI : https://doi.org/10.21276/obgyn.2022.8.2.3 |
| 4. | Feasibility and effectiveness of electronic vs. paper partograph on improving birth outcomes: A prospective crossover study design | Aminur Rahman, Tahmina Begum, Fatema Ashraf , Sadika Akhter , Dewan Md Emdadul Hoque, Tarun Kanti Ghosh , Monjur Rahman, Jelle Stekelenburg, Sumon Kumar Das, Parveen Fatima, Iqbal Anwar/2019(19) | A cross-sectional study. | Prolonged labor was significantly reduced as a result of using the e-partograph. The rate of prolonged labor at Kushtia DH dropped from 42% in phase 1 with the paper version to 29% in phase 2 with the use of the e-partograph. Comparable outcomes were also seen in Jessore DH, where a 30% reported prolonged labor rate using an e-partograph was lowered to 7% using a paper partograph. | DOI: 10.1371/journal.pone.0222314 |
| 5 | Partograph versus no partograph: effect on labour progress and delivery outcome: a comparative study | Benazir Ahmed, Meena Jain, Hema Bharwani(20) | comparative study. | Partograph charting is linked to improved labor progress monitoring and better delivery outcomes, such as a healthy mother and child, when compared to not using Partograph plotting during active labor. | DOI: https://doi.org/10.18203/2320-1770.IJRCOG20175002 |
| 6 | Effectiveness of an Electronic Partogram: A Mixed-Method, Quasi-Experimental Study Among Skilled Birth Attendants in Kenya | Harshadkumar Sanghvi, Diwakar Mohan, Lindsay Litwin, Eva Bazant, Patricia Gomez, Tara MacDowell, Levis Onsase, Valentino Wabwile, Charles Waka, Zahida Qureshi, Eunice Omanga, Anthony Gichangi, Ruth Muiad(1) | A Mixed-Method, Quasi-Experimental Study | By using ePartograms, physicians reported adoptability without undue effort, and there was a decrease in unfavorable fetal outcomes and an improvement in adherence to recommendations for normal labor care. Enhancing labor monitoring and providing high-quality care at all levels of the health system will require further development of the ePartogram, which will include implementing new clinical guidelines from the 2018 WHO Guidelines on intrapartum care. | DOI: https://doi.org/10.9745/GHSP-D-19-00195 |
| 7 | Partograph use among skilled birth attendants in selected counties, Western Kenya | Kibiwott Doris, Mwangi Anne, K. Simon/2021(21) | Cross sectional | The use of the partograph, a tool for monitoring labor progress, is low among skilled birth attendants in selected counties in Western Kenya. | DOI: https://doi.org/10.5897/ijnm2021.0467 |

CONTINUE

**Table I: Characteristics of included studies. (CONT.)**

| No | Tittle | Author/Year | Metode | The Result | doi |
|---|---|---|---|---|---|
| 8 | Use of the partograph - Current thinking | Tina Lavender (Professor), Stine Bernitz (Associate professor)/2020 (18) | Cross sectional | Despite being called a "simple" labor monitoring tool occasionally, the partograph is actually a sophisticated intervention that requires careful implementation in a supportive environment. Unfortunately, due to constraints in the implementation process and the surrounding environment, the partograph has often failed to reach its full potential. Although the evidence regarding clinical outcomes is not totally clear, it is still debatable whether or not all women should use the partograph on a regular basis. | DOI: 10.1016/j.bpobgyn.2020.03.010 |
| 9 | WHO-modified Partogram versus Paperless Partogram for Effective Management of Labour: A Research Protocol | Saloni, Jyotsana Potdar/2023(23) | Cross sectional | This study will compare the efficacy of the WHO-modified partograph versus the paperless partograph for effective management of labour. | DOI: https://doi.org/10.7860/jcdr/2024/67640.18886 |
| 10 | Partograph utilization and associated factors among obstetric care givers in governmental health institutions of Jigjiga and Degehabur towns, Somali region, Ethiopia: A cross-sectional study | Liyew Mekonen Ayehubizu, Abebe Tadesse Tibebeu, Metsihet Tariku Fetene/2022(24) | Cross sectional | Especial emphasizes and interventions should be given to periodic on job training that improve knowledge and attitude of obstetric care givers to increase partograph utilization. | DOI: https://doi.org/10.1371/journal.pone.0264373 |
| 11 | Utility of paperless partogram in labor management | Nazli Tarannum, N. Akhtar/2020(25) | Cross sectional | Paperless partogram is as efficient as WHO modified partograph for labor management in resource-poor settings. | DOI: https://doi.org/10.18203/2320-1770.ijrcog20200872 |
| 12 | Advantages of "Life Curve" Mobile Application: An Easier Alternate of Paper Partograph | F. Begum, Sahariar Hossain Tanvir, Jahid Hasan/2020(26) | Cross sectional | The electronic "Life Curve" mobile app is an easier alternative to the paper partograph for monitoring labor progression | DOI: https://doi.org/10.3329/bjog.v32i2.48278 |
| 13 | Partograph adherence and its barriers in a tertiary care hospital: A mixed-method study | Nirmalya Manna, P. Bhattacharya, R. Mukherjee, Adwitiya Das/2022(27) | A mixed-method study | The study found poor adherence and completion of the partograph in a tertiary care hospital, with barriers including staff shortages, heavy workload, and lack of training and supervision. | DOI : https://doi.org/10.4103/hmj.hmj_50_22 |
| 14 | Evaluation of Digital Partograph Application Case Study On Normal Labor by Community Midwife | W. M. Ningrum, H. Wijayanegara, Suryani Soepardan/2019(12) | A mixed-method study | Digital partographs can increase the use of partographs during labor by making them easier and faster to use. | DOI: https://doi.org/10.1088/1742-6596/1179/1/012031 |

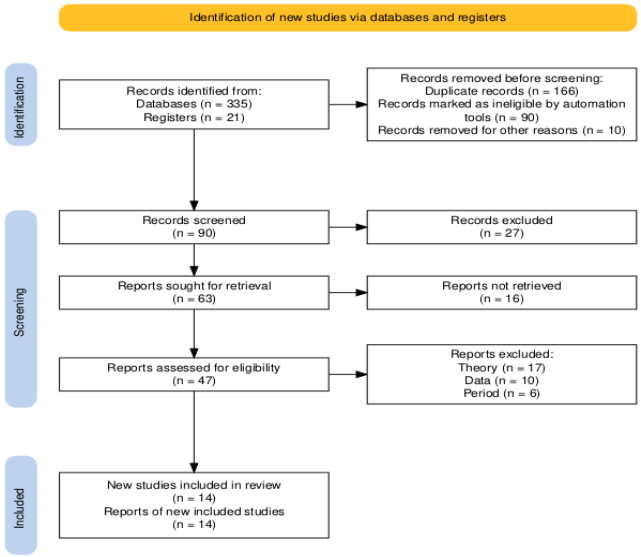


**Figure 1: Flow Diagram**

## DISCUSSION

The adoption of electronic partographs has become a major concern in recent years due to its potential to improve maternal and infant outcomes during labor. This discussion synthesizes findings from various studies of electronic partographs, focusing on their effectiveness, user acceptance, challenges in implementation, and impact on clinical practice.

Studies show that electronic partographs can improve monitoring of labor progress and early detection of complications. Research found that electronic partographs increase the accuracy of data recording compared to traditional paper-based partographs, reduce human error, and ensure real-time updates. (11) This suggests that partographs should be used routinely to track labor progress and collect data for clinical decision making when performing obstetric

care duties. Professional Standards are an important element in midwifery services. development of midwife performance management in midwifery services, and web-based digital pantographs used as educational resources for services. Standard delivery is thought to help fill the partograph(11).

Application feasibility is evaluated using the Technology Acceptance Model (TAM) methodology. In the results of the research, midwives performed better in using digital partographs to track labor. The analysis results show that the digital partograph test results have a positive impact on the performance of midwives, as evidenced by the completeness of filling between digital and conventional partographs(11). This finding is in line with research by Ningrum explains that the Man Whitney data analysis results show a p value <0.05 for the convenience, speed, and relevance of the data obtained. This indicates that there are notable differences between the manual and digital partographs in terms of convenience, which has an impact on the speed and relevance of data for clinical decision-making during the birthing process.(12)

The success of electronic partographs depends largely on user acceptance. According to this research, pantographs are widely accessible and are regularly used to monitor expectant mothers throughout labor at any time that is medically indicated. Similarly, the findings indicated that a key factor contributing to partograph non-use was a lack of staff, and that the primary method for increasing partograph use was to have enough staff. The findings of this study suggest hiring more health professionals, decreasing the workload of staff members working shifts in the midwifery sector ward, and improving staff members' knowledge and proficiency in using a partograph.(13)

The degree of training and familiarity with digital tools, however, may have an impact on user satisfaction. In order to boost user confidence and satisfaction with electronic partographs, Zaman et al.'s survey found that sufficient training and continuous support are necessary. Our results highlight the significance of providing nurses with training to acquire these particular electronic documentation systems through internships or on the job, as these systems are customized for each organization. By guaranteeing that nurses utilize the system faithfully and efficiently, doing this can enhance patient outcomes.(14)

The widespread use of electronic partographs is hampered by a number of issues, despite their obvious advantages. In remote and resource-constrained areas, technical problems like software crashes and erratic internet connectivity are frequently reported challenges. A major obstacle to a smooth transition to electronic systems is the resistance to change exhibited by healthcare providers who are used to traditional methods. This emphasizes the necessity of effective training programs and change management techniques. Using a digital partograph also has the drawback of not being automatic in filling and lacking a guide for aftercare.

The use of electronic partographs in clinical settings has improved the care given to expectant mothers and newborns in encouraging ways. For instance, Sidik et al found that in facilities that used electronic partographs, the incidence of birth asphyxia and neonatal mortality were significantly lower. This enhancement was linked to an enhanced capacity to oversee labor and take prompt action. Furthermore, electronic partographs aid in improved data analysis and management, enabling medical facilities to monitor key performance indicators and pinpoint areas in need of development.(15)

To maximize the benefits of electronic partographs, future research should focus on addressing identified challenges and exploring innovative solutions. This includes developing a more user-friendly interface, automatic partograph loading, integrated care to be provided, ensuring system reliability in resource-limited areas, and implementing a comprehensive training program. Additionally, long-term studies are needed to evaluate the ongoing impact of electronic partographs on maternal and neonatal outcomes in various health contexts.

## CONCLUSION

Conventional and electronic partographs are crucial labor management instruments. Even though electronic partographs have many benefits in terms of efficiency, accuracy, and data management, infrastructure development, sufficient training, and strong technical support are necessary to overcome implementation challenges. Therefore, in a variety of healthcare settings, electronic partographs can significantly improve the standard of care for expectant mothers and newborns.

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