

# The Extent of Partograph Use and Associated Factors among Obstetric Care Providers in Government Hospitals in Southern Ethiopia: A Cross-Sectional Study

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## Abstract

**Background:** Prolonged labor is a significant contributor to maternal morbidity and mortality. The World Health Organization encourages using the partograph to keep track and solve this issue. The extent of partograph use in Ethiopia, however, is hardly understood. This study aimed to ascertain the level of partograph use and related variables among obstetric care providers in government hospitals in southern Ethiopia. **Methods:** A cross-sectional institutional study was conducted among obstetric care providers in government hospitals in southern Ethiopia, from March to December 2015. The data were collected using a pre-tested questionnaire and format. To establish a statistical relationship, an odds ratio with a 95% confidence interval was utilized. **Results:** A total of 212 (55.1%) obstetric providers reported routine use of partograph to monitor labor. Midwives [AOR: 3.4, 95% CI: (1.2, 9.4)], clinical nurses [AOR: 3.0, 95% CI: (1.1, 7.6)], knowledge of partographs [AOR: 2.0, 95% CI: (1.2, 3.5)], positive attitudes toward partograph use [AOR: 3.7, 95% CI: (1.7, 7.7)], service of 2 - 5 years [AOR: 3.4, 95% CI: (2.8, 4.4)] and service of more than five years [AOR: 2.3, 95% CI: (2.0, 3.3)] were associated with partograph use. **Conclusion:** This study has shown that the use of partographs to monitor labor among obstetricians is consistent with other studies from developing countries. However, this does not mean that obstetric care does not need to be strengthened, as a significant proportion of obstetricians still do not use the partograph for labor monitoring. Therefore, it is recommended that midwives and nurses be given preference in the delivery of obstetric services, the knowledge and attitudes of providers be improved, and mechanisms be developed that can help keep senior care provid-

ers.

## Keywords

Midwives, Nurses, Obstetric Care Providers, Partograph Utilization, Service Duration

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## 1. Background

A significant issue with reproductive health is maternal mortality. In 2020, there were projected to be 287,000 maternal fatalities worldwide, and every day, about 800 women died from conditions that could have been avoided during pregnancy and childbirth. Seventy percent of them originated in Sub-Saharan Africa [1]. In developing nations, prolonged labor is one of the leading causes of maternal and neonatal fatalities. Obstructed labor, dehydration, tiredness, uterine rupture, bleeding, and infections in the mother and the newborn can result from abnormally progressing labor [2]. In response, in order to improve health outcomes and lower maternal and fetal morbidity and mortality, the World Health Organization advises using a partograph to track labor and delivery. However, the partograph is rarely used as a tool for making decisions during delivery in many developing nations. Instead, it is used as a labor record to be completed after the baby is born. Furthermore, filling out the partograph is frequently seen by those who offer obstetric care as an additional time-consuming duty, and they hardly ever realize how life-saving it can be [3] [4].

Although the Ethiopian government has committed to reducing maternal mortality, the rate is still 401 per 100,000 live births in 2020 [5]. Numerous interventions have been devised to lower this unacceptable maternal death rate. The most crucial tactic for a short-term reduction in maternal mortality and morbidity in the nation has been recognized as skilled attendance during pregnancy, labor, and delivery. One element of competent care that prevents maternal mortality and problems due to obstructed or protracted labor is the use of partographs. The extent of partograph use in Ethiopia, however, is little understood [6] [7]. The purpose of this study was to ascertain the level of partograph use and related variables among obstetric care providers in government hospitals in Ethiopia's Southern Nations, Nationalities, and Peoples' Region. The findings could help improve obstetric care and reduce preventable maternal deaths.

## 2. Materials and Methods

### 2.1. Study Design and Area

From March to December 2015, a cross-sectional institutional survey of obstetric care providers was conducted in the Southern Nations, Nationalities, and Peoples' Region of Ethiopia. Currently, the region is administratively divided into the Sidama, Southern Nations, Nationalities, and Peoples', and South West Ethiopia

Peoples' regions.

## 2.2. Participants and Sample Size

All obstetric care providers working in the maternity wards of 15 randomly selected government hospitals in southern Ethiopia (out of 21) participated in the study. Staff who were unavailable during data collection were excluded from the study. Epi Info version 7 was used to determine the minimum sample size of 410 participants, based on an expected proportion of 40.2% of partograph use [7], a margin of error of 5%, a confidence level of 95%, and a non-response rate of 10%.

## 2.3. Data Collection Tools and Procedures

A pretested interview questionnaire was used for data collection. The questionnaire included detailed information on sociodemographic characteristics, use of the partograph and reasons for not using it, and providers' knowledge and attitudes toward the use of the partograph. In addition, 13 randomly selected charts were reviewed at each hospital using a pretested data collection format. Ten certified nurses and two certified midwives participated in the data collection.

## 2.4. Data Quality Control

Training of data collectors and supervisors included the data collection instrument, field methods, inclusion/exclusion criteria, and record keeping. The investigators coordinated the interview process, spot-checked, and reviewed the completed questionnaire daily to ensure the completeness and consistency of the data collected. The interview questionnaire and data collection format were pretested on obstetric care providers at a hospital not selected for this study to identify potential problem areas and unexpected interpretations. We changed the questionnaire based on the results of the pretest.

## 2.5. Data Management and Statistical Analyses

Data were entered and cleaned using Epi Info version 7 and analyzed using SPSS version 20. Frequency distributions and percentages were used for descriptive analyses. All independent variables were separately fitted to a bivariate logistic regression model to assess the association with partograph use, and a multivariable logistic regression model was also used to control for confounding factors. An odds ratio (OR) with a 95% confidence interval (CI) was used to explain the statistical significance of the variables.

## 2.6. Operational Definitions

**Partograph use:** Obstetric care providers are reportedly using the partograph to routinely monitor labor.

**Knowledgeable:** Obstetric care providers who scored mean or higher on knowledge questions (see [Table A1](#)).

**Favorable attitude:** Obstetric care providers who scored mean or higher on attitude questions (see [Table A2](#)).

**Obstetric care provider:** A certified health care professional who cares for the woman during labor and delivery.

### 3. Results

#### 3.1. Sociodemographic Characteristics

A total of 385 participants completed the questionnaire, representing a response rate of 93.9%. Of these, 65.7% were female. The majority, 72.5%, of participants belonged to the 20 - 29 age group. By profession, 44.7% were nurses, followed by 36.9% midwives ([Table 1](#)).

#### 3.2. Participants' Years of Service and Their History of Training

Three-quarters, or 75.6%, of obstetric care providers, had served for over two years. More than half, 51.2%, received training in obstetrics and neonatal care ([Table 2](#)).

#### 3.3. Use of the Partograph

A total of 55.1% of obstetric providers reported routinely using the partograph to monitor labor. Use was also assessed by reviewing 195 charts at the hospitals studied. Partograph paperwork was included in 75% of the charts. Of these, 55% were completed to assess the progress of labor, and the remainder still needed to be completed. Nearly three-quarters of the completed papers were not properly filled out ([Table 3](#)).

**Table 1.** Sociodemographic characteristics of obstetric care providers at governmental hospitals in southern Ethiopia, from March to December 2015.

| Variables                 | Number | Percent |
|---------------------------|--------|---------|
| <b>Sex</b>                |        |         |
| Male                      | 132    | 34.3    |
| Female                    | 253    | 65.7    |
| <b>Age (in years)</b>     |        |         |
| 20 - 29                   | 279    | 72.5    |
| 30 - 39                   | 75     | 19.5    |
| ≥40                       | 31     | 8.0     |
| <b>Profession</b>         |        |         |
| Medical doctor            | 27     | 7.0     |
| Health officer            | 20     | 5.2     |
| Clinical nurse            | 172    | 44.7    |
| Midwives                  | 142    | 36.9    |
| Emergency surgery officer | 24     | 6.2     |

**Table 2.** Service duration and history of training on skilled delivery by obstetric care providers at governmental hospitals in southern Ethiopia, from March to December 2015.

| Variables   | Number | Percent |
|---|--------|---------|
| <b>Service duration (in years)</b>                        |        |         |
| <2  | 94     | 24.4    |
| 2 - 5   | 137    | 35.6    |
| >5  | 154    | 40.0    |
| <b>Have you ever received training in obstetric care?</b> |        |         |
| Yes   | 197    | 51.2    |
| No  | 188    | 48.8    |

**Table 3.** Patterns of plotting on partograph papers at governmental hospitals in southern Ethiopia, from March to December 2015.

| Components of partograph plotted                     | Number | Percent |
|--|--------|---------|
| <b>Fetal heartbeat plotted correctly</b>             |        |         |
| Yes  | 22     | 27.5    |
| No   | 58     | 72.5    |
| <b>The membrane, intact or ruptured, is recorded</b> |        |         |
| Yes  | 23     | 28.8    |
| No   | 57     | 71.2    |
| <b>Cervix initial dilation plotted correctly</b>     |        |         |
| Yes  | 24     | 30.0    |
| No   | 56     | 70.0    |
| <b>Cervical dilation plotted four hourly</b>         |        |         |
| Yes  | 19     | 23.8    |
| No   | 61     | 76.2    |
| <b>The color of the liquor recorded</b>              |        |         |
| Yes  | 21     | 26.2    |
| No   | 59     | 73.8    |
| <b>Descent plotted correctly</b>                     |        |         |
| Yes  | 18     | 22.5    |
| No   | 62     | 77.5    |
| <b>Uterine contraction plotted correctly</b>         |        |         |
| Yes  | 25     | 31.2    |
| No   | 55     | 68.8    |
| <b>Correctly plotted across the alert line</b>       |        |         |
| Yes  | 19     | 23.8    |
| No   | 61     | 76.2    |

### 3.4. Reasons for Not Using the Partograph

Forty-five percent of obstetric care providers reported not routinely using the partograph to monitor labor. The most common reason for not using the parto-

graph was the use of other tools, such as clinical notes, monitoring charts, and a piece of paper other than the partograph, for 28.1%; time constraints, for 27.1%; lack of staff, for 24.8%; and unavailability of the partograph, for 19.4% (Figure 1).

### 3.5. Level of Knowledge and Attitude

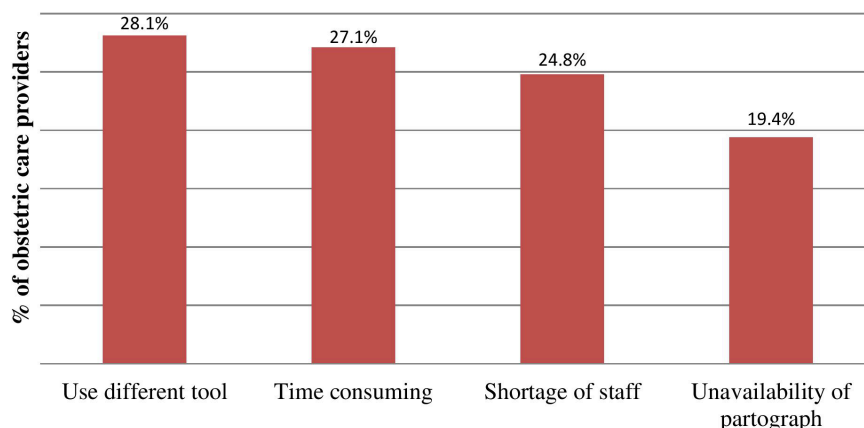
In terms of knowledge about the partograph, 61.0% of care providers were knowledgeable. Almost all of them, namely 99.2%, learned about the partograph during their studies. More than half, 51.2%, received training on the partograph at work. The majority, 70.4%, had a positive attitude toward the use of the partograph.

### 3.6. Factors Associated with the Use of Partographs

In this study, the independent predictors of partograph use in the multivariable analysis are: midwife [AOR: 3.4, 95% CI: (1.2, 9.4)], clinical nurse [AOR: 3, 95% CI: (1.1, 7.6)], knowledge of partographs [AOR: 2, 95% CI: (1.2, 3.5)], a positive attitude toward partograph use [AOR: 3.7, 95% CI: (1.7, 7.7)], a service of 2 - 5 years [AOR: 3.4, 95% CI: (2.8, 4.4)], and a service of over 5 years [AOR: 2.3, 95% CI: (2, 3.3)] (Table 4).

**Table 4.** Bivariate and multivariable analyses of factors associated with partograph utilization at governmental hospitals in southern Ethiopia, from March to December 2015.

| Variables                          | Crude OR (95% CI) | Adjusted OR (95% CI) |
|------------------------------------|-------------------|----------------------|
| <b>Profession</b>                  |                   |                      |
| General practitioner               | 1                 | 1                    |
| Health officer                     | 1.7 (0.6, 6.7)    | 2.2 (0.6, 7.9)       |
| Midwife                            | 6.6 (2.1, 20.9)   | 3.4 (1.2, 9.4)       |
| Clinical nurse                     | 4.9 (2.0, 5.3)    | 3.0 (1.1, 7.6)       |
| Emergency surgery officer          | 2.0 (0.8, 3.8)    | 9.2 (0.4, 34.9)      |
| <b>On-job training</b>             |                   |                      |
| No                                 | 1                 | 1                    |
| Yes                                | 2.5 (1.6, 3.8)    | 1.0 (0.4, 2.4)       |
| <b>Knowledgeable</b>               |                   |                      |
| No                                 | 1                 | 1                    |
| Yes                                | 1.2 (1.1, 2.2)    | 2.0 (1.2, 3.5)       |
| <b>Attitude</b>                    |                   |                      |
| Unfavorable                        | 1                 | 1                    |
| Favorable                          | 1.3 (1.2, 2.1)    | 3.7 (1.7, 7.7)       |
| <b>Service duration (in years)</b> |                   |                      |
| <2                                 | 1                 | 1                    |
| 2 - 5                              | 2.3 (1.4, 4.0)    | 3.4 (2.8, 4.4)       |
| >5                                 | 1.2 (0.7, 1.9)    | 2.3 (2.0, 3.3)       |



**Figure 1.** Reasons for not using partograph.

#### 4. Discussion

Skilled labor management using a partograph, a simple instrument that provides a continuous pictorial overview of labor and alerts midwives and obstetricians to abnormalities in maternal or fetal well-being, is an important approach to preventing prolonged labor and its complications [1] [8] [9]. The aim of this study was to assess the extent of partograph use and associated factors among obstetric care providers in government hospitals in southern Ethiopia. The study found that partograph use was 55.1%. In addition, midwifery, clinical nursing, knowledge of partographs, a positive attitude towards partograph use, a service of 2 - 5 years, and a service of more than 5 years were significantly associated with partograph use.

Reportedly, 55.1% of obstetric care providers in government hospitals in southern Ethiopia use partographs. This is within the range of studies from Ethiopia (13% - 57%) [6] [7] [10] and Africa (30% - 98.8%) [1] [11]. However, this does not mean that obstetric care does not need to be improved, as a significant proportion of staff still do not use the partograph to monitor labor. To encourage staff to use the partograph, interventions should include regular supportive supervision, partograph paper distribution, and training on obstetric care and partograph use [1] [6]. The significance of prompt interventions during labor and delivery, as well as accurate documentation of these interventions, should also be emphasized. The use of the partograph may be hampered by underlying systemic problems, such as insufficient staffing or a shortage of necessary supplies, which must be addressed as well. In the end, better partograph use can result in better outcomes for mothers and babies, making it an essential part of high-quality obstetric care.

This study identified important predictors influencing partograph use. Midwives and nurses were about three times more likely to use the partograph than general practitioners. This is consistent with studies conducted in Ethiopia [7] [12]. This could be because midwives and clinical nurses had a greater chance of being trained in partograph use and were assigned to maternity wards because obstetric care is their primary role. However, it is important to note that parto-

graph use should not be limited to just midwives and clinical nurses. All healthcare providers who are involved in the care of pregnant women should be trained in partograph use to ensure the best possible outcomes for both the mother and baby. In addition, it is crucial that healthcare facilities have adequate resources and support systems in place to enable the effective use of the partograph. This includes having enough staff available to monitor labor progress and respond to any complications that may arise, as well as having access to necessary medical equipment and supplies. By ensuring that all healthcare providers are trained in partograph use and that facilities have adequate resources, we can improve maternal and neonatal outcomes and reduce the risk of complications during childbirth.

In this study, good knowledge and a positive attitude were associated with the use of partographs among obstetric providers. Previous studies have confirmed this [1] [7] [10]. The reason could be that good knowledge and a positive attitude toward partograph use could increase staff motivation, enhance job satisfaction, and encourage them to use partographs. Therefore, intervention programs to promote high-quality obstetric care should aim to regularly assess knowledge, attitude, and practice of standard obstetric care, including partograph use, and provide on-the-job training [10] [13] [14].

Partographs were about three times more likely to be used by obstetric care providers with longer work experience than by those with less than one year of service. A possible explanation for this could be that those who had been in service longer had good knowledge and skills in obstetrics and were familiar with the partograph [10]. In addition, they may have participated in various safe deliveries that could help them understand the importance of using the partograph to monitor labor. It can be concluded that there is a need to retain senior professionals in government health facilities to provide quality obstetric care and reduce maternal and infant mortality associated with prolonged and obstructed labor. In addition, providing quality pre-service training with appropriate exposure and a conducive clinical practice environment should also be considered to equip young professionals with the necessary skills and knowledge to handle obstetric emergencies.

The implications of this study's findings for clinical practice and public health decision-making are significant. The use of partographs can lead to earlier detection of labor complications, allowing for timely interventions and potentially reducing the need for emergency obstetric care. This can ultimately improve maternal and neonatal health outcomes, especially in low-resource settings where access to emergency care may be limited. Additionally, incorporating partograph use into standard labor monitoring protocols can help ensure consistent and high-quality care across healthcare providers. However, it is important to recognize that simply providing education and training on partograph use may not be enough to ensure its widespread adoption. Addressing systemic barriers such as inadequate staffing or a lack of necessary equipment must also be prioritized in



order to fully realize the potential benefits of this tool. Overall, this study underscores the importance of evidence-based approaches to improving maternal and neonatal health outcomes and highlights the need for continued investment in healthcare worker education and training programs.

However, it is important to keep in mind the limitations of the study when interpreting the findings. In self-report studies like this one, social desirability might pose a problem since participants might provide more socially desirable answers than they actually do. Furthermore, no cause-and-effect link between the independent factors and the usage of partographs was found due to the study's cross-sectional design. The use of partographs in labor monitoring may be impacted by other factors, such as cultural beliefs and attitudes about birthing, which require further study. A further limitation on the generalizability of the results to other contexts may be that the study only included healthcare professionals from government hospitals in southern Ethiopia. Future studies should aim to include a more diverse sample of healthcare workers from multiple hospitals and regions to better understand the factors that influence partograph use.

## **5. Conclusion**

This study has shown that the use of partographs to monitor labor among obstetric care providers is consistent with other studies from developing countries. However, this does not mean that obstetric care does not need to be improved, as a significant proportion of care providers still do not use the partograph for labor monitoring. Therefore, it is recommended that preference be given to midwives and nurses in the delivery of obstetric services, the knowledge and attitudes of providers be improved, and mechanisms be developed to help retain experienced providers.

## **Authors' Contribution**

T.A., S.T., and D.H. are involved in conceptualization, data analysis, and interpretation. S.T. and D.H. supervised and provided mentorship. S.T. wrote the manuscript. All authors have approved the final version of the manuscript.

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## **Ethical Approval**

Ethical approval was obtained from the Institutional Ethical Review Board of the University of Gondar via the Institute of Public Health. Informed verbal consent was obtained from the study participants.

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## Data Availability Statement

All relevant data are within the manuscript.

## Conflicts of Interest

The authors declare that they have no competing interests.

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## Appendix

**Table A1.** Knowledge-related questions.

| No. | Questions   | Response  |
|-----|---|---|
| 301 | Do you think that, monitoring labor by partograph is important to prevent obstructed labor and its sequelae?    | 1. Yes<br>2. No   |
|     | For you, the partograph may be defined as:  |   |
| 302 | 302.1 A chart for monitoring of labor by doctors.   | 1. Yes<br>2. No   |
|     | 302.2 A complex tool with pictorial overview of labor for the use by midwives.                                  | 1. Yes<br>2. No   |
|     | 302.3 A simple graphic recording of progress of labor and conditions of mother and fetus against time in hours. | 1. Yes<br>2. No   |
| 303 | The following diagnosis/assessment can be made with the partograph.   | 1. Fetal well-being<br>2. Maternal well-being<br>3. Progression of the labor<br>4. Medication used during labor |
| 304 | Do you think the partograph will reduce maternal and newborn death?   | 1. Yes<br>2. No   |
| 305 | Do you think that, cervical dilation should be plotted on partograph every 1 hour?                              | 1. Yes<br>2. No   |
| 306 | Do you think that, maternal blood pressure should be plotted on partograph at least every 4 hrs?                | 1. Yes<br>2. No   |
| 307 | Do you think that partograph should be used for all laboring mother?  | 1. Yes<br>2. No   |
| 308 | In a normal progress of labor, the graph/plot on the partograph should fall on the alert line.                  | 1. Yes<br>2. No   |
| 309 | In a normal progress of labor, the graph/plot on Partograph should fall on the left of alert line.              | 1. Yes<br>2. No   |
| 310 | In your practice, you usually enter information onto the partograph?  | 1. Upon diagnosis of labor<br>2. While the woman is still in labor<br>3. After delivery of the baby             |

**Table A2.** Attitude-related questions.

| No. | Questions  | Response   |
|-----|--|--|
| 401 | Partograph usage can reduce maternal and newborn deaths. | 1. Strongly disagree<br>2. Disagree<br>3. Undecided<br>4. Agree<br>5. Strongly agree |

## Continued

|     |  |  |
|-----|--|--|
| 402 | Partograph can be used to diagnosis prolonged labor.                                 | <ol style="list-style-type: none"> <li>1. Strongly disagree</li> <li>2. Disagree</li> <li>3. Undecided</li> <li>4. Agree</li> <li>5. Strongly agree</li> </ol> |
| 403 | Partograph is necessary to improve quality of care.                                  | <ol style="list-style-type: none"> <li>1. Strongly disagree</li> <li>2. Disagree</li> <li>3. Undecided</li> <li>4. Agree</li> <li>5. Strongly agree</li> </ol> |
| 404 | Partograph is a simple graphic recording of progress of labor.                       | <ol style="list-style-type: none"> <li>1. Strongly disagree</li> <li>2. Disagree</li> <li>3. Undecided</li> <li>4. Agree</li> <li>5. Strongly agree</li> </ol> |
| 405 | Partograph is relevant to prevent obstructed labor.                                  | <ol style="list-style-type: none"> <li>1. Strongly disagree</li> <li>2. Disagree</li> <li>3. Undecided</li> <li>4. Agree</li> <li>5. Strongly agree</li> </ol> |
| 406 | Partograph is a chart for monitoring labor by doctors.                               | <ol style="list-style-type: none"> <li>1. Strongly disagree</li> <li>2. Disagree</li> <li>3. Undecided</li> <li>4. Agree</li> <li>5. Strongly agree</li> </ol> |
| 407 | Partograph is a complex tool with pictorial overview of labor.                       | <ol style="list-style-type: none"> <li>1. Strongly disagree</li> <li>2. Disagree</li> <li>3. Undecided</li> <li>4. Agree</li> <li>5. Strongly agree</li> </ol> |
| 408 | Partograph is developed for midwives to monitor labor.                               | <ol style="list-style-type: none"> <li>1. Strongly disagree</li> <li>2. Disagree</li> <li>3. Undecided</li> <li>4. Agree</li> <li>5. Strongly agree</li> </ol> |
| 409 | Action line of partograph plot falls on the left of alert line.                      | <ol style="list-style-type: none"> <li>1. Strongly disagree</li> <li>2. Disagree</li> <li>3. Undecided</li> <li>4. Agree</li> <li>5. Strongly agree</li> </ol> |
| 410 | In normal progress of labor, plot on the partograph falls on the left of alert line. | <ol style="list-style-type: none"> <li>1. Strongly disagree</li> <li>2. Disagree</li> <li>3. Undecided</li> <li>4. Agree</li> <li>5. Strongly agree</li> </ol> |