

Knowledge and Application of Partograph among Midwives in Health Facilities

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Abstract: The partograph is a widely recognized tool used to monitor the progress of labor and prevent complications during childbirth. However, its utilization by health staff in low and middle-income countries (LMICs) is still suboptimal, resulting in increased maternal and neonatal morbidity and mortality. This study aimed to assess the independent influence of professional tenure on the utilization of partographs among midwives in health facilities in East Gonja. This cross-sectional study employed a random sampling technique to select 115 health staff, and data were collected on them using a structured questionnaire and facility records. The key findings revealed that almost half of the health staff had a low level of knowledge on the use of the partograph, and there was a low level of routine usage by health staff despite the high availability and presence of the partograph in facilities. The study also found a significant positive association between years of practice and utilization of partograph, and health staff aged 51 years and older had significantly higher odds of utilizing the partograph tool than those aged 21–35 years. Moreover, staff with high knowledge of Partograph were significantly more likely to utilize it than those with low knowledge. Finally, to improve the utilization of partograph, health facilities should prioritize the availability of the tool and ensure that it is accessible to all health staff.

Keywords: Partograph, midwives, labour, health facilities, Ghana

1. INTRODUCTION

Maternal Mortality is the main indicator of the growing disparity in the quality of care and reproductive health outcomes between developed and developing countries (Fawole et al., 2018). Obstructed labour is a leading cause of maternal deaths, although it is preventable. According to compelling evidence, learning how to use the partograph will significantly reduce this incidence, which accounts for 8–10% of all maternal deaths (Okokon et al., 2014). A partograph is a graphical presentation of a woman's progress in labour (Chaturvedi et al., 2015). The midwife starts using the partograph to record her observations as soon as the mother exhibits genuine labour-related symptoms. The principle of the partograph is that the rate of cervical dilation should not be slower than 1cm/hour during the active phase of labour (Yisma et al., 2013). Proper utilization of the partograph by standard

protocol, with keen attention to the alert and action lines, allows for timely identification and diagnosis of pathologic labour and thus aids in guiding timely decision-making regarding the necessary intervention (Sama et al., 2017).

According to (Wakgari et al., 2015a), the World Health Organization (WHO) approved and modified the partograph between 1990 and 2000 to monitor the health of the mother and fetus during the active stage of labour. To achieve a spontaneous vaginal delivery with a low risk of both morbidity and mortality, monitoring aids the midwives and the woman. For intrapartum monitoring, a partograph is a pictorial record of labour progress, maternal condition, and foetal condition displayed against time (Bernitz et al., 2019). Its purpose is to give obstetric care professionals a visual overview of labour and to notify them of any changes in the mother or fetus' status or labour's progression.

Globally, the maternal mortality ratio (MMR) for the year 2010 was 210 maternal deaths per 100,000 live births or an estimated 287,000 maternal deaths. Of the estimated total number of 287,000 maternal deaths worldwide, 85% (245,000) occurred in Sub-Saharan Africa and Southern Asia (WHO, 2012). The global pattern of maternal mortality shows that poor nations have annual losses of more than 515 000 maternal deaths from complications of pregnancy and childbirth (Fawole et al., 2018). Around 295,000 women perished during and after pregnancy and childbirth in the entire world in 2017. Most of these deaths (94%) happened in areas with little resources, and most of them could have been avoided. According to the 2016 Ethiopian demographic and health survey, there were 471 maternal deaths for every 100,000 live births.

Even though maternal mortality is on the decline worldwide, low-income nations still have the highest rates of its occurrence. These nations account for the great majority of maternal deaths worldwide; of these, more than one-third (or 546 per 100,000 live births) happened in sub-Saharan Africa alone (Wakgari et al., 2015). In sub-Saharan Africa, women had a greater lifetime risk of dying from preventable or treated pregnancy and delivery problems than in developed regions. Although lengthy and obstructed labours are among the leading causes of mortality in resource-poor environments, they can be avoided with the right use of a partograph (Bedada et al., 2020).

(Opoku & Nguah, 2015) concluded on the following in a study; nearly 26 years after being introduced in the nation, birth attendants still require further training on the significance and proper application of the partograph to guarantee that all labourers are tracked using it. The proper completion of the partograph is essential for identifying aberrant labour progress; hence, health personnel must be trained to record parameters per established standards. The most critical steps in preventing maternal and perinatal death and morbidity are early detection and prompt intervention of obstetric problems.

The Ghana Health Service has a system in place where obstetric care professionals (Midwives) have a policy or standard protocol for guidance on the use of partograph in their health facilities and are more likely to use partograph than their counterparts (Opoku & Nguah, 2015). This implies that it might be that a shortage of health care personnel brings workload, which means that where there was a shortage of health care personnel; appropriate actions may vary depending on the setting: augmentation of labour, operative delivery, or just timely referral to a higher level of care (Opoku & Nguah, 2015). Standard management protocols on the actions to be taken based on partograph that is available for use at first and referral system and should be used to help in decision-making. Obstetric care providers were not likely to use partograph, which leads to poor management of labouring women (Bekele et al., 2018).

Although proper use of partograph can prevent prolonged labour, which could lead to atonic postpartum haemorrhage, maternal exhaustion and dehydration, uterine rupture, and obstetric fistulas, some midwives do not have enough knowledge on the use of partograph (Opoku & Nguah, 2015). Partograph as a graphic assessment is recommended for routine monitoring of the first stage of labour to help the birth attendant identify the slow progress of labour and prevent prolonged labour and its complications. However, the situation in the East Gonja Municipality regarding knowledge and utilization of partograph among midwives' is not well known. This study will be conducted in the East Gonja Municipality to determine the knowledge and utilization of partograph among midwives on labouring women.

2. METHOD

Research design

The study was a cross-sectional mixed methods survey to determine the knowledge and utilization of partograph among midwives. This design was chosen because it can generate data quickly and therefore, economically, and

efficiently. This design was considered in the selection of the required sample of health staff (midwives) among all health facilities within the region for the study. Previous experience or exposure was not considered in selection, and neither would there be any follow-up. One flaw in this approach was that only data from sampled facilities would be analyzed, which could result skewed findings.

Study population

Midwives working in various Government, CHAG and private institutions in the East Gonja Municipality made up the research population.

Sample size

The sample was derived from midwives who were practicing in Government, CHAG and private facilities in the East Gonja Municipality of the Savannah Region. The study population stood at 115, and that represented the total number of midwives in the municipality as of October 2022. Yamane's (1967:86) formula for sample size determination was used to calculate the sample size. Therefore, at a 95% confidence level with an acceptable error level of 5% (margin of error = 0.05) and an associated Level of precision = 0.05.

Sampling technique

Over 30 days, study participants were selected from the various East Gonja Municipality Government and CHAG facilities. Throughout the selection process, there were no follow-up or consideration of prior exposure or experience.

Instruments for data collection

Data collection was done using a questionnaire. There were five sections in the questionnaire. Each facility's information was found in Section A, while respondent sociodemographic data was collected in Section B. Knowledge on the partograph among midwives in Government and CHAG facilities in Section C. Utilization and challenges with the use of the partograph in Section D. Functions of the action line in Section E.

Inclusion criteria

Midwives who are fully employed and practicing in Government, CHAG, and private facilities in the East Gonja Municipality were included in the study.

Exclusion criteria

Midwives who practice in in Government, CHAG and private facilities less than a year were not included in this study. Student midwives on clinical rotation or internship at either government, CHAG, or private facilities were also exempted from the study.

Research variables

According to the definition of cross-sectional surveys, both dependent and independent variables were investigated simultaneously in the research. The next subsections will go into detail on each of these.

Data collection procedure

The questionnaire was pretested in a purposively selected District hospital (Tamale Central hospital) in the Northern Region on 8 (approximately 7% of the total sample) eligible midwives, while the interview guide will be pre-tested on four purposively sampled eligible midwives from the same hospital. The pre-test sought to understand the appropriateness, clarity, and flow of questions of the data collection tools to be used in gathering the desired data for the study. Ambiguous questions were revised for clarity. The information gathered from the pretesting process was excluded from the result of the data management and analysis. The data from the CAPI was exported to a STaTa file format (.dta file) for further analysis. STaTa 16 MP edition was used to analyse the imported data. The summary statistics of both dependent and independent variables will be presented as tables and charts. A bivariate Chi-square test of independence was used to test the relationship between independent and dependent variables. All statistical tests were conducted at a 0.05 significance level.

3. RESULTS

Background characteristics of study respondents

This table provides information on the background characteristics of the study respondents, including their facility type, location, age, sex, religion, marital status, and professional tenure. The majority (86.09%) of the respondents worked in government facilities, followed by 7.83% in CHAG facilities and 6.09% in private facilities (Table 1). This suggests that the government employs the majority of the healthcare workers in the study, which is not surprising given that government facilities typically provide the majority of healthcare services in many countries. More than half (56.52%) of the facilities where the respondents work are located in rural areas, while the remaining 43.48% are in urban areas. This suggests that the study includes a diverse range of healthcare workers working in both urban and rural settings.

The majority (67.83%) of the respondents were aged between 21 and 35 years, with 26.96% aged between 36 and 50 years and only 5.22% aged 51 or older. The mean age of the respondents, was 33.217 years, with a standard deviation of 8.894 years, indicating that the sample includes a relatively young group of healthcare workers. The majority (99.13%) of the respondents were female, with only one male respondent (0.87%). This may be reflective of the fact that healthcare is often considered a female-dominated profession. The study includes an even split between Muslims (48.70%) and Christians (51.30%), suggesting a diverse sample of respondents.

Half (50.43%) of the respondents were married, while 35.65% were not married, and 8.70% were not married but living with a partner. The remaining 5.22% were divorced. This suggests that the study includes a mix of healthcare workers with different family statuses. The majority (47.83%) of the respondents had been in their profession for between 1 and 3 years, with 34.78% having been in the profession for between 4 and 6 years, and 17.39% having been in the profession for 7 or more years. The mean professional tenure was 5.026 years, with a standard deviation of 4.498 years, indicating a range of experience levels among the respondents. Overall, the information provided in this table suggests that the study includes a diverse group of healthcare workers in terms of their demographic and professional backgrounds. The majority of respondents work in government facilities, and more than half work in rural areas. The sample includes a predominantly female group of healthcare workers, with a relatively young age range and a mix of marital statuses and professional tenures. This information can help provide context for the study findings and aid in the interpretation and generalization of results.

Table 1: Background characteristic of study respondents

Variable / Category	Number (n)	Percentage (%)
Facility type		
Government	99	86.09
CHAG	9	7.83
Private	7	6.09
Total	115	100.00
Location of facility		
Rural	65	56.52
Urban	50	43.48
Total	115	100.00
Age (completed years)		
21 - 35	78	67.83
36 - 50	31	26.96
51+	6	5.22
Total	115	100.00
Age	$n = 115, \bar{x} = 33.217,$ $\sigma = 8.894, \text{min} = 21, \text{max} = 65$	
Sex		
Male	1	0.87
Female	114	99.13
Total	115	100.00
Religion		

Muslim	56	48.70
Christian	59	51.30
Total	115	100.00
Marital status		
Married	58	50.43
Not married	41	35.65
Not married, living with a partner	10	8.70
Divorce	6	5.22
Total	115	100.00
Professional tenure (years)		
1 - 3	55	47.83
4 - 6	40	34.78
7+	20	17.39
Total	115	100.00
Professional tenure (years)	$n = 115, \bar{x} = 5.026,$	
	$\sigma = 4.498, \min = 1, \max = 28$	

$n = \text{number}, \bar{x} = \text{mean}, \sigma = \text{standard deviation}, \min = \text{minimum}, \max = \text{maximum}$
Source: Field survey, 2023

Validity and reliability of scales on knowledge of health staff on the use of partograph

Table 2 presents the validity and reliability of knowledge scales on the partograph. The findings show that all the items on the scale have strong factor loading coefficients, ranging from 0.580 to 0.750, indicating a high level of construct validity. The Cronbach's alpha coefficients for each section of the scale range from 0.815 to 0.874, indicating high internal consistency and reliability of the items in each section.

The items on understanding the purpose of the partograph, knowing how to fill out the partograph, recognizing the action line and alert line, knowing when to act, and collaborating with other healthcare professionals have factor loading coefficients of 0.593 to 0.750 and Cronbach's alpha coefficients of 0.830 to 0.874, indicating high reliability and internal consistency (Table 2).

Table 2: Validity and reliability of knowledge scales

Scale/ Items	Factor Loading	Cronbach's Alpha
Items on Understanding the purpose of the partograph		
To what extent do you understand the purpose of the partograph?	0.652	0.830
How important do you think it is to use the partograph during labour?	0.705	
To what extent do you believe that using the partograph can improve maternal and neonatal outcomes?	0.593	
To what extent do you feel that you were adequately trained on the purpose and use of the partograph during your education or training?	0.607	
To what extent do you believe that the use of the partograph is an essential part of providing quality maternal and newborn care?	0.580	
Items on Knowing how to fill out the partograph		
How confident are you in your ability to properly fill out the partograph?	0.652	0.843
How well can you identify and document the relevant parameters on the partograph, such as cervical dilation and foetal heart rate?	0.722	
How frequently do you check and document the progress of labour using the partograph?	0.620	
To what extent do you feel that you were adequately trained on how to fill out the partograph during your education or training?	0.723	
Items on Recognizing the action line and alert line		

How familiar are you with the action line and alert line on the partograph?	0.636	
How confident are you in your ability to interpret the partograph and identify when intervention is necessary?	0.750	
How well can you differentiate between the action line and alert line on the partograph?	0.704	0.874
How well do you understand the meaning and significance of the action line and alert line on the partograph?	0.716	
To what extent do you believe that the use of the action line and alert line can help identify deviations from normal labour and facilitate timely interventions?	0.719	
Items on Knowing when to act		
To what extent do you feel confident in your ability to recognize when intervention is necessary based on the partograph?	0.690	
To what extent do you understand the criteria for intervention based on the partograph, such as when the progress of labour is not normal or the foetal heart rate is abnormal?	0.693	
How well do you follow the guidelines and protocols for intervention based on the partograph?	0.725	0.860
How often do you take appropriate action based on the partograph, such as initiating or accelerating labour or referral for a caesarean section?	0.584	
To what extent do you feel confident in your ability to make decisions and take action based on the information provided by the partograph?	0.719	
Items on Collaborating with other healthcare professionals		
How frequently do you collaborate with other healthcare professionals, such as doctors (obstetricians), colleague midwives, and nurses, when using the partograph?	0.635	
How well do you communicate with other members of the healthcare team when using the partograph?	0.607	
To what extent do you believe that collaboration with other healthcare professionals can improve the use of the partograph and outcomes for mothers and babies?	0.648	0.815
How often do you work collaboratively with other healthcare professionals, such as doctors (obstetricians), other midwives, and nurses, to use the partograph effectively?	0.657	

Source: Field survey, 2023

Knowledge of health staff on the use of partograph

The use of the partograph is an essential tool in monitoring the progress of labour and ensuring timely interventions to prevent maternal and neonatal morbidity and mortality. However, its effectiveness is largely dependent on the knowledge and skills of healthcare professionals in its proper use. This study also assessed the knowledge of healthcare staff on the use of the partograph using a 5-point Likert scale. Specifically, the study sought to determine staff knowledge of the partograph and their understanding of its purpose, knowledge of how to fill out the partograph, knowledge on recognizing the action line and alert line on the partograph, knowledge of staff on knowing when to act using the partograph, and knowledge of staff on collaborating with other healthcare professionals on the use of the partograph. The findings of this study could inform training and educational programmes to improve the knowledge and skills of healthcare staff in the use of the partograph, ultimately improving maternal and neonatal outcomes.

Health staff understanding of the purpose of the partograph

The ranking of the knowledge of health staff on the purpose of the partograph was analyzed using the relative importance index (RII). The RII was calculated by dividing the mean score of each item by the sum of all mean

scores and ranking the items according to their RII values. The findings showed that the health staff believed that the use of the partograph is an essential part of providing quality maternal and newborn care, with an RII value of 0.673, ranking first among the five items (Table 3). This indicates that the health staff considered the use of the partograph as highly important in improving maternal and neonatal outcomes. The second most important item was the importance of using the partograph during labour, with an RII value of 0.661, followed by the extent to which the health staff understood the purpose of the partograph, with an RII value of 0.643, ranking second and third, respectively. This suggests that although the health staff recognized the importance of using the partograph, they had a lower understanding of its purpose, indicating the need for further training and education.

The fourth and fifth items were the extent to which the health staff felt they were adequately trained on the purpose and use of the partograph during their education or training and the belief that using the partograph can improve maternal and neonatal outcomes, respectively. The RII values for these items were 0.638 and 0.631, respectively, indicating that the health staff considered these items to be of moderate importance. In summary, the health staff's knowledge of the purpose of the partograph was ranked using the RII, with the belief that the use of the partograph is an essential part of providing quality maternal and newborn care ranking first, followed by the importance of using the partograph during labour and the extent to which the health staff understood the purpose of the partograph. These findings suggest the need for further training and education to improve the health staff's understanding of the purpose and use of the partograph, which could ultimately improve maternal and neonatal outcomes.

Table 3: Knowledge of health staff on the purpose of the partograph

Items	Number	Sum	Mean	Std. Deviation	RII	Rank
To what extent do you understand the purpose of the partograph?	115	370	3.217	0.925	0.643	3 rd
How important do you think it is to use the partograph during labour?	115	380	3.304	0.993	0.661	2 nd
To what extent do you believe that using the partograph can improve maternal and neonatal outcomes?	115	363	3.157	0.933	0.631	5 th
To what extent do you feel that you were adequately trained on the purpose and use of the partograph during your education or training?	115	367	3.191	0.999	0.638	4 th
To what extent do you believe that the use of the partograph is an essential part of providing quality maternal and newborn care?	115	387	3.365	0.967	0.673	1 st

Source: Field survey, 2023

Health staff knowledge on how to fill out the partograph

The findings showed that the health staff had the highest level of confidence in their ability to properly fill out the partograph, with an RII value of 0.68, ranking first among the four items (Table 4). This suggests that the health staff felt competent in filling out the partograph, which is crucial in ensuring that the tool is used effectively to monitor labour progress. The second most important item was the frequency of checking and documenting the progress of labour using the partograph, with an RII value of 0.66, followed by the extent to which the health staff felt adequately trained on how to fill out the partograph during their education or training, with an RII value of 0.59, ranking second and third, respectively. This indicates that although the health staff felt confident in their ability to fill out the partograph, they still recognized the importance of being adequately trained and using the tool regularly to ensure accurate documentation and monitoring of labour progress.

The fourth and least important item was the health staff's ability to identify and document the relevant parameters on the partograph, such as cervical dilation and foetal heart rate, with an RII value of 0.57. This suggests that the health staff may need further training and education on identifying and documenting the relevant parameters to

ensure accurate monitoring of labour progress. Overall, the health staff's knowledge of how to fill the partograph correctly was ranked using the RII, with the confidence in their ability to properly fill out the partograph ranking first, followed by the frequency of checking and documenting the progress of labour and the extent to which the health staff felt adequately trained. The health staff's ability to identify and document the relevant parameters on the partograph was ranked least important. These findings suggest the need for further training and education to improve the health staff's ability to accurately monitor labour progress using the partograph.

Table 4: Knowledge of health staff on how to fill the partograph correctly

Items	Number	Sum	Mean	Std. Deviation	RII	Rank
How confident are you in your ability to properly fill out the partograph?	115	391	3.400	0.953	0.68	1 st
How well can you identify and document the relevant parameters on the partograph, such as cervical dilation and foetal heart rate?	115	328	2.852	1.053	0.57	4 th
How frequently do you check and document the progress of labour using the partograph?	115	379	3.296	0.878	0.66	2 nd
To what extent do you feel that you were adequately trained on how to fill out the partograph during your education or training?	115	342	2.974	1.030	0.59	3 rd

Source: Field survey, 2023

Health staff knowledge on recognizing the action line and alert line when using the partograph

Based on the analysis of the survey responses from 115 health staff, the relative importance index (RII) was used to rank the level of knowledge on recognizing the action lines and alert line on the partograph. The results indicate that the health staff had a good level of knowledge on recognizing the action line and alert line on the partograph. The item "How familiar are you with the action line and alert line on the partograph?" obtained the highest score with a mean of 3.34 and RII of 0.67, indicating that the respondents were highly familiar with the action line and alert line (Table 5). The item "How well can you differentiate between the action line and alert line on the partograph?" also obtained a high RII score of 0.67, ranking second. The health staff had a moderate level of knowledge on the meaning and significance of the action line and alert line on the partograph. The item "How well do you understand the meaning and significance of the action line and alert line on the partograph?" obtained a mean score of 2.97 and RII of 0.59, indicating a moderate level of understanding.

The health staff had a low level of knowledge on the belief that the use of the action line and alert line can help identify deviations from normal labour and facilitate timely interventions. The item "To what extent do you believe that the use of the action line and alert line can help identify deviations from normal labour and facilitate timely interventions?" obtained the lowest RII score of 0.56, indicating that the respondents did not believe strongly in the use of the action line and alert line for timely interventions. In conclusion, the health staff surveyed had a good level of knowledge on recognizing the action line and alert line on the partograph. However, there is room for improvement in understanding the significance of these lines in identifying deviations from normal labour and facilitating timely interventions.

Table 5: knowledge of health staff on recognizing the action lines and alert line on the partograph

Items	Number	Sum	Mean	Std. Deviation	RII	Rank
How familiar are you with the action line and alert line on the partograph?	115	384	3.34	0.815	0.67	1 st
How confident are you in your ability to interpret the partograph and identify when intervention is necessary?	115	332	2.89	0.989	0.58	4 th
How well can you differentiate between the action line and alert line on the partograph?	115	385	3.35	0.956	0.67	2 nd

How well do you understand the meaning and significance of the action line and alert line on the partograph?	115	342	2.97	1.063	0.59	3 rd
To what extent do you believe that the use of the action line and alert line can help identify deviations from normal labour and facilitate timely interventions?	115	324	2.82	1.022	0.56	5 th

Source: Field survey, 2023

Knowledge of staff on when to act when using the partograph

Based on the results of the analysis presented in Table 6, the health staff in this study had a relatively high level of confidence in their ability to follow the guidelines and protocols for intervention based on the partograph, as evidenced by the highest RII score of 0.72 and first rank. They also reported a good level of confidence in recognizing when intervention is necessary based on the partograph (RII = 0.63, 2nd rank) and in their ability to make decisions and take action based on the information provided by the partograph (RII = 0.62, 3rd rank). However, the staff had relatively lower scores in their understanding of the criteria for intervention based on the partograph (RII = 0.55, 5th rank) and in their frequency of taking appropriate action based on the partograph (RII = 0.60, 4th rank). These findings suggest a need for further training and reinforcement of the criteria for intervention and the importance of timely action based on the partograph. Overall, the results suggest a mixed level of knowledge among health staff regarding the use of the partograph as a tool for decision-making in the management of labour.

Table 6: Knowledge of health staff on when to act, when using the partograph

Items	Number	Sum	Mean	Std. Deviation	RII	Rank
To what extent do you feel confident in your ability to recognize when intervention is necessary based on the partograph?	115	363	3.16	0.854	0.63	2 nd
To what extent do you understand the criteria for intervention based on the partograph, such as when the progress of labour is not normal or the foetal heart rate is abnormal?	115	317	2.76	0.970	0.55	5 th
How well do you follow the guidelines and protocols for intervention based on the partograph?	115	412	3.58	0.888	0.72	1 st
How often do you take appropriate action based on the partograph, such as initiating or accelerating labour or referral for a caesarean section?	115	346	3.01	0.969	0.60	4 th
To what extent do you feel confident in your ability to make decisions and take action based on the information provided by the partograph?	115	355	3.09	0.790	0.62	3 rd

Source: Field survey, 2023

Knowledge of staff on collaborating with other healthcare professionals on the use of the partograph

The results showed that health staff value collaboration with other healthcare professionals when using the partograph, with a mean score ranging from 2.87 to 3.58. The item "How well do you communicate with other members of the healthcare team when using the partograph?" had the highest mean score of 3.58 and was ranked first with an RII of 0.72, indicating that health staff consider communication with other healthcare professionals as crucial to the effective use of the partograph (Table 7). The item "How often do you work collaboratively with other healthcare professionals, such as doctors (obstetricians), other midwives, and nurses, to use the partograph effectively?" had a mean score of 3.04 and was ranked second with an RII of 0.61, indicating that health staff

recognize the importance of working collaboratively with other healthcare professionals. The item "How frequently do you collaborate with other healthcare professionals, such as doctors (obstetricians), colleague midwives, and nurses, when using the partograph?" had a mean score of 2.87 and was ranked third with an RII of 0.57, indicating that health staff collaborate with other healthcare professionals to some extent. Finally, the item "To what extent do you believe that collaboration with other healthcare professionals can improve the use of the partograph and outcomes for mothers and babies?" had a mean score of 2.83 and was ranked fourth with an RII of 0.57, indicating that health staff recognize the potential benefits of collaboration with other healthcare professionals.

Table 7: Knowledge of health staff on collaborating with other healthcare professionals on the use of the partograph

	Number	Sum	Mean	Std. Deviation	RII	Rank
How frequently do you collaborate with other healthcare professionals, such as doctors (obstetricians), colleague midwives, and nurses, when using the partograph?	115	330	2.870	0.732	0.57	3 rd
How well do you communicate with other members of the healthcare team when using the partograph?	115	412	3.583	0.838	0.72	1 st
To what extent do you believe that collaboration with other healthcare professionals can improve the use of the partograph and outcomes for mothers and babies?	115	325	2.826	0.891	0.57	4 th
How often do you work collaboratively with other healthcare professionals, such as doctors (obstetricians), other midwives, and nurses, to use the partograph effectively?	115	350	3.043	0.842	0.61	2 nd

Source: Field survey, 2023

Overall level of knowledge of health staff on partograph

Out of the 115 health staff who participated in the assessment, 56 (48.70%) had a low level of knowledge on the use of the partograph, 28 (24.35%) had a fair level of knowledge, and 31 (26.96%) had a high level of knowledge (Figure 3). These findings indicate that there is a need for training and capacity building among the health staff to improve their knowledge and skills in the use of the partograph. The results also suggest that efforts should be made to identify the factors that contribute to the low level of knowledge among some of the health staff and address them appropriately.

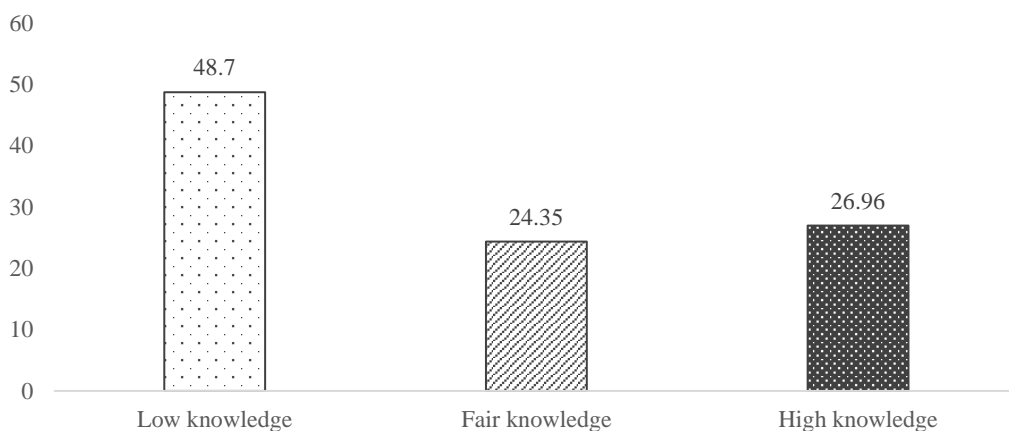


Figure 1: Knowledge level of staff on partograph use

Source: Field survey, 2023

Utilization of partograph by the health staff

Out of the 115 health staff who participated in the study, the majority (97.39%) reported that the partograph is available in their facility (Table 8). Regarding training on how to use the partograph, 71.30% reported being trained, while 28.70% reported not being trained. Additionally, 93.91% of respondents reported having the partograph in their facility.

When it comes to utilization, 44.35% of respondents reported rarely using the partograph to provide services, while 34.78% sometimes use it, and only 2.61% always use it. Furthermore, 34.78% of respondents cited little or no knowledge as the reason for non-routine usage, followed by time-consuming (33.91%), shortage of staff (21.74%), and easier to manage labour without the use of partograph (9.57%). These findings suggest that despite the high availability and presence of the partograph in facilities, there is a low level of routine usage by health staff, mainly due to knowledge gaps and operational barriers such as staff shortages and time constraints.

Table 8: Domains of utilization of partograph by the health staff

Variable	Number (n)	Percentage (%)
Availability is partograph		
Yes	112	97.39
No	3	2.61
Total	115	100.00
Are you trained on how to use pantograph		
Yes	82	71.30
No	33	28.70
Total	115	100.00
Do you have partograph in this facility		
Yes	108	93.91
No	7	6.09
Total	115	100.00
How often do you use partograph to provide services (utilization)		
Never	1	0.87
Rarely	51	44.35
Sometimes	40	34.78
Often	20	17.39
Always	3	2.61
Total	115	100.00
Reasons for non-routine usage		
Little or no knowledge	40	34.78
Shortage of staff	25	21.74
Time consuming	39	33.91
Easier to manage labour without the use of partograph	11	9.57
Total	115	100.00

Source: Field survey, 2023

Challenges / reason for not using partograph

The results showed that the majority of respondents (34.78%) cited little or no knowledge as the main reason for not using the partograph. This was followed by shortage of staff (21.74%) and time consuming (33.91%) as other significant reasons for non-routine usage. A small proportion of respondents (9.57%) felt that it was easier to manage labour without the use of partograph (Table 9).

Table 9: Challenges / reason for not using partograph

Variable /Category	Number (n)	Percentage (%)
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Reasons for non-routine usage

Little or no knowledge	40	34.78
Shortage of staff	25	21.74
Time consuming	39	33.91
Easier to manage labour without the use of partograph	11	9.57
Total	115	100.00

Source: Field survey, 2023

Association between background characteristics and utilization of partograph

The study conducted a chi-square test to determine the association between the background characteristics of the health staff and their utilization of partograph. The results show that the frequency of utilization of partograph did not significantly differ by facility type ($\chi^2=0.68$, $df=2$, $p=0.7124$), sex ($\chi^2=0.25$, $df=1$, $p=0.6155$), religion ($\chi^2=0.70$, $df=1$, $p=0.4012$), marital status ($\chi^2=1.40$, $df=3$, $p=0.7055$), or location of facility ($\chi^2=0.88$, $df=1$, $p=0.3469$).

However, the frequency of utilization of partograph was found to be significantly associated with age ($\chi^2=5.07$, $df=2$, $p=0.0479$), professional tenure ($\chi^2=7.84$, $df=2$, $p=0.0198$), whether the health staff were trained on how to use partograph ($\chi^2=11.57$, $df=1$, $p=0.0007$), and whether there was a partograph available in the facility ($\chi^2=1.86$, $df=1$, $p=0.1722$). Specifically, health staff aged 21-35 years were found to use partograph more frequently than those aged 36-50 years ($p<0.05$). Finally, the availability of partograph in the facility was found to be marginally associated with the frequency of utilization ($p=0.1722$) (Table 10). Overall, the results suggest that age, training on the use of partograph and the availability of partograph in the facility are important factors that influence the utilization of partograph by health staff.

Table 10: Chi-square test of association between background characteristics and utilization of partograph

Variable / Category	Frequency of utilization of partograph		χ^2 / F (p-value)	Sig.
	Never - Sometime	Often - Always		
Facility type				
Government	78 (78.79)	21 (21.21)	0.68 (0.7124)	
CHAG	8 (88.89)	1 (11.11)		
Private	6 (85.71)	1 (14.29)		
Total	92 (80.00)	23 (20.00)		
Sex				
Male	1 (100.00)	0 (0.00)	0.25 (0.6155)	
Female	91 (79.82)	23 (20.18)		
Total	92 (80.00)	23 (20.00)		
Religion				
Muslim	43 (76.79)	13 (23.21)	0.70 (0.4012)	
Christian	49 (83.05)	10 (16.95)		
Total	92 (80.00)	23 (20.00)		
Age				
21 - 35	66 (84.62)	12 (15.38)	5.07 (0.0479)	**
36 - 50	23 (74.19)	8 (25.81)		
51+	3 (50.00)	3 (50.00)		
Total	92 (80.00)	23 (20.00)		
Marital status				
Married	44 (75.86)	14 (24.14)	1.40 (0.7055)	
Not married	35 (85.37)	6 (14.63)		
Not married, living with a partner	8 (80.00)	2 (20.00)		
Divorce	5 (83.33)	1 (16.67)		
Total	92 (80.00)	23 (20.00)		

Location of facility

Rural	54 (83.08)	11 (16.92)	0.88 (0.3469)	
Urban	38 (76.00)	12 (24.00)		
Total	92 (80.00)	23 (20.00)		
Are you trained on how to use partograph				
Yes	59 (71.95)	23 (28.05)	11.57 (0.0007)	***
No	33 (100.00)	0 (0.00)		
Total	92 (80.00)	23 (20.00)		
Do you have partograph in this facility				
Yes	85 (78.70)	23 (21.30)	1.86 (0.1722)	
No	7 (100.00)	0 (0.00)		
Total	92 (80.00)	23 (20.00)		

*** $p < .01$, ** $p < .05$, * $p < .1$

Source: Field survey, 2023

Association between year of practice and utilization of partograph

A bivariate Chi-square test of independence was used to examine the relationship between years of practice (professional tenure) and utilization of partograph among midwives in the study. The findings indicate that midwives with professional tenure of 1-3 years had a significantly higher frequency of utilizing the partograph (90.91%) compared to those with tenure of 4-6 years (70.00%) and 7+ years (70.00%) ($\chi^2 = 7.84$, $df=2$, $p = 0.0198$). The overall utilization of partograph among the midwives was 20.00% (Table 11).

Table 11: Chi-square test of association between professional tenure and utilization of partograph

Variable / Category	Frequency of utilization of partograph		χ^2 / F (p-value)	Sig.
	Never - Sometime	Often - Always		
Professional tenure (years)				
1 - 3	50 (90.91)	5 (9.09)	7.84 (0.0198)	*
4 - 6	28 (70.00)	12 (30.00)		
7+	14 (70.00)	6 (30.00)		
Total	92 (80.00)	23 (20.00)		

*** $p < .01$, ** $p < .05$, * $p < .1$

Source: Field survey, 2023

Association between health staffs' level of knowledge on partograph and utilization of partograph.

A chi-square test of independence was conducted to examine the association between health staff's level of knowledge on partograph and their utilization of the partograph. The results showed a significant association between the two variables ($\chi^2 = 35.21$, $df = 2$, $p < 0.01$). Specifically, staff with low knowledge of partograph had a significantly higher frequency of never or sometime utilization of the partograph (98.21%) compared to those with fair knowledge (82.14%) and high knowledge (45.16%). Conversely, those with high knowledge utilized the partograph more frequently (54.84%) than those with fair knowledge (17.86%) and low knowledge (1.79%) (Table 12). These findings suggest that improving health staff's knowledge on partograph may increase its utilization and ultimately improve maternal and neonatal health outcomes.

Table 12: Chi-square test of independence between health staffs' level of knowledge on partograph and utilization of partograph

Variable / Category	Frequency of utilization of partograph	χ^2 / F (p-
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	Never - Sometime	Often - Always	value)	Sig.
Knowledge level of staff on partograph				
Low knowledge	55 (98.21)	1 (1.79)	35.21 (0.0000)	***
Fair knowledge	23 (82.14)	5 (17.86)		
High knowledge	14 (45.16)	17 (54.84)		
Total	92 (80.000)	23 (20.00)		

*** $p < .01$, ** $p < .05$, * $p < .1$
Source: Field survey, 2023

Unadjusted relationship between years of practice, age, health staffs' level of knowledge on partograph and utilization of partograph

A binary logistic regression was used to estimate the unadjusted relationship between years of practice and utilization of partograph using binary logistic regression. The results show that the odds of utilizing partograph were 4.286 times higher among health professionals with 4-6 years of practice compared to those with 1-3 years of practice (COR=4.286, 95% CI [1.369, 13.417], $p=0.012$). Similarly, health professionals with 7 or more years of practice were also 4.286 times more likely to utilize partograph compared to those with 1-3 years of practice (COR=4.286, 95% CI [1.137, 16.149], $p=0.032$) (Table 13). These results suggest a significant positive association between years of practice and utilization of partograph.

Table 13: Binary logistic regression on the raw contribution of health staffs' years of practice on utilization of partograph

Utilization of partograph	COR	St.Err.	t-value	p-value	[95% Conf Interval]	Sig
Professional tenure (years)						
1 - 3	1	.	.	.	.	.
4 - 6	4.286	2.495	2.50	0.012	1.369 13.417	**
7+	4.286	2.901	2.15	0.032	1.137 16.149	**
Constant	0.100	0.047	-4.91	0	.04 .251	***
Mean dependent var	0.200	SD dependent var			0.402	
Pseudo r-squared	0.072	Number of obs			115	
Chi-square	8.279	Prob > chi2			0.016	
Akaike crit. (AIC)	112.814	Bayesian crit. (BIC)			121.048	

*** $p < .01$, ** $p < .05$, * $p < .1$
Source: Field survey, 2023

The result further showed that the odds of utilizing the partograph were not significantly different for health staff aged 36-50 years (COR=1.913, $p=0.209$, CI=[0.695, 5.267]) compared to those aged 21-35 years. However, health staff aged 51 years and above had significantly higher odds of utilizing the partograph tool (COR=5.500, $p=0.049$, CI=[0.990, 30.545]) (Table 14). These results suggest that age may be a contributing factor to the utilization of partograph and should be considered in interventions to improve its utilization in maternal healthcare.

Table 14: Binary logistic regression on the raw contribution of health staffs' age on utilization of partograph

Utilization of partograph	COR	St.Err.	t-value	p-value	[95% Conf Interval]	Sig
Age						
21 - 35	1	.	.	.	.	.
36 - 50	1.913	0.988	1.26	0.209	0.695 5.267	
51+	5.500	4.811	1.95	0.049	0.990 30.545	**
Constant	.182	.057	-5.43	0	0.098 0.336	***
Mean dependent var	0.200	SD dependent var			0.402	
Pseudo r-squared	0.038	Number of obs			115	
Chi-square	4.397	Prob > chi2			0.111	
Akaike crit. (AIC)	116.696	Bayesian crit. (BIC)			124.930	

*** $p < .01$, ** $p < .05$, * $p < .1$

The utilization of partograph was used as the dependent variable, while the knowledge level of staff on partograph was used as the independent variable. The results of the binary logistic regression showed that staff with high knowledge on partograph were more likely to utilize it compared to those with low knowledge (COR = 66.786, $p < .001$, 95% CI = 8.175 – 545.596). Similarly, staff with fair knowledge were also more likely to utilize partograph (COR = 11.956, $p = .027$, 95% CI = 1.323 – 108.07) (Table 14).

Table 15: Binary logistic regression on the raw contribution of health staffs' level of partograph knowledge on utilization of partograph

Utilization of partograph	COR	St.Err.	t-value	p-value	[95% Conf Interval]	Sig
Knowledge level of staff on partograph						
Low knowledge	1	.	.	.	.	.
Fair knowledge	11.956	13.430	2.21	0.027	1.323 108.07	**
High knowledge	66.786	71.571	3.92	0.000	8.175 545.596	***
Constant	0.018	0.018	-3.97	0.000	.003 0.131	***
Mean dependent var	0.200	SD dependent var		0.402		
Pseudo r-squared	0.314	Number of obs		115		
Chi-square	36.099	Prob > chi2		0.000		
Akaike crit. (AIC)	84.993	Bayesian crit. (BIC)		93.228		

*** $p < .01$, ** $p < .05$, * $p < .1$

Adjusted relationship between health staffs' year of service and utilization of partograph

After controlling for variable such as knowledge of staff on partograph and age of the health staff, the results indicate that health staffs' years of professional tenure had no significant effect on the utilization of partograph. Similarly, the age of the health staff did not significantly affect the utilization of partograph. However, the knowledge level of staff on partograph significantly contributed to the utilization of partograph. Health staffs with fair knowledge of partograph were 12.059 times more likely to utilize partograph than those with low knowledge ($p = 0.033$, 95% CI: 1.229 – 118.34), while those with high knowledge were 61.251 times more likely to utilize partograph than those with low knowledge ($p < 0.001$, 95% CI: 7.072 – 530.483) (Table 16). Overall, the results suggest that improving the knowledge of health staff on partograph could enhance the utilization of partograph in clinical practice.

Table 16: Binary logistic regression on the adjusted contribution of health staffs' years of practice on utilization of partograph

Utilization of partograph	AOR	St.Err.	t-value	p-value	[95% Conf Interval]	Sig
Professional tenure (years)						
1 - 3	1	.	.	.	.	.
4 - 6	2.251	1.617	1.13	0.259	0.551 9.201	
7+	0.954	1.064	-0.04	0.966	0.107 8.497	
Age						
21 - 35	1	.	.	.	.	.
36 - 50	0.862	0.711	-0.18	0.857	0.171 4.346	
51+	3.375	4.932	0.83	0.405	0.192 59.195	
Knowledge level of staff on partograph						
Low knowledge	1	.	.	.	.	.
Fair knowledge	12.059	14.051	2.14	0.033	1.229 118.34	**
High knowledge	61.251	67.465	3.74	0.000	7.072 530.483	***
Constant	0.013	0.014	-4.02	0.000	0.002 0.108	***
Mean dependent var	0.200	SD dependent var		0.402		
Pseudo r-squared	0.338	Number of obs		115		

Chi-square	38.909	Prob > chi2	0.000
Akaike crit. (AIC)	90.184	Bayesian crit. (BIC)	109.398

*** $p < .01$, ** $p < .05$, * $p < .1$

4. DISCUSSION

Level of knowledge of midwives on partograph use in health facilities

The study results suggest that there is a need for training and capacity building among the health staff to improve their knowledge and skills in the use of the partograph. This finding is consistent with the literature review on knowledge of partograph use among midwives, which highlights the challenges and factors influencing knowledge and utilization of the partograph. The review suggests that cost-effective and affordable health interventions, such as the use of partographs, could prevent most maternal deaths and complications caused by obstructed and protracted labour (Asibong et al., 2014).

However, the review also points out that the partograph can be very challenging to use at first, with difficulties reported such as a pattern of wrong plotting, doctors being unable to plot, students being afraid to plot, and midwives not being competent in plotting which resulted in poor record keeping (Mathibe-Neke et al., 2013). This highlights the importance of ongoing training and professional education programmes to further the empowerment of healthcare providers in safe motherhood practices (Asibong et al., 2014).

The study results also suggest that efforts should be made to identify the factors that contribute to the low level of knowledge among some of the health staff and address them appropriately. The literature review highlights some of the challenges in knowledge of partograph use among midwives, such as lack of understanding of the correct role of the action line on the partograph and inadequate assessment of uterine contractions (Bazirete et al., 2017). Addressing these challenges through targeted training and education programmes could help improve knowledge and skills in the use of the partograph among health staff.

In summary, the study results indicate a need for training and capacity building among health staff to improve their knowledge and skills in the use of the partograph. The literature review supports this finding and highlights the importance of ongoing training and professional education programmes to empower healthcare providers in safe motherhood practices. Efforts should also be made to identify and address the specific challenges and factors that contribute to the low level of knowledge among some health staff, such as lack of understanding of the correct role of the action line on the partograph and inadequate assessment of uterine contractions. By addressing these challenges through targeted training and education programmes, the use of the partograph can be improved, potentially leading to a reduction in maternal mortality and morbidity.

Level of utilization of partograph in monitoring the progress of labour in health facilities

The study found that although the majority of health staff reported that the partograph was available in their facility, only a few always used it for labour monitoring, and a significant proportion rarely used it. The reasons cited for non-routine usage were mainly lack of knowledge, time constraints, and a preference for managing labour without the use of the partograph. This finding is consistent with previous studies that have identified various factors that contribute to low utilization of the partograph in low- and middle-income countries, including inadequate training, poor knowledge and understanding of the tool, and time constraints (Kigenyi et al., 2013; Opoku & Nguah, 2015).

The partograph has been shown to be an effective tool in monitoring labour progress and reducing maternal and neonatal mortality and morbidity by facilitating early detection of prolonged labour and foetal distress, leading to timely interventions such as assisted vaginal delivery or caesarean section (Kwast et al., 1994; Lavender et al., 2013). However, the benefits of the partograph can only be realized if it is used consistently and correctly. Previous studies have identified poor completion rates and inadequate monitoring of critical intrapartum information, such as foetal heart rate, maternal pulse, and uterine contractions, as some of the reasons for poor utilization of the partograph (Bedada et al., 2020; Opoku & Nguah, 2015).

The study's findings highlight the need for interventions that focus on improving the knowledge and skills of health staff regarding the correct use of the partograph, as well as addressing the perceived time constraints associated with its use. Training programmes for health staff have been shown to improve the utilization of the partograph in

some settings (Asibong et al., 2014; Wakgari et al., 2015b). Other strategies that have been suggested including simplifying the partograph and integrating it into electronic health records to enhance its ease of use and accessibility (Bedada et al., 2020; Lavender & Bernitz, 2020).

In conclusion, the study's findings suggest that although the majority of health staff reported the availability of the partograph in their facility, its utilization for labour monitoring was low. Addressing the identified barriers to utilization, such as inadequate knowledge and time constraints, is crucial to improving the uptake of the partograph and realizing its potential benefits in reducing maternal and neonatal morbidity and mortality.

The relationship between years of practice and partograph utilization

The study results suggest a positive association between years of practice and utilization of partograph. Health professionals with more years of practice were more likely to utilize partograph compared to those with fewer years of practice. The finding is consistent with the results of some previous studies, which found a significant relationship between years of practice and partograph utilization (Akadri et al., 2017; Liaqat et al., 2016). However, not all studies have found a significant relationship between years of practice and partograph utilization (Magoma et al., 2013). The study also found that age might be a contributing factor to the utilization of partograph. Health staff aged 51 years and above had significantly higher odds of utilizing the partograph tool. This result is consistent with a previous study that found older midwives were more likely to use the partograph correctly (Oladapo et al., 2013). Furthermore, the study results showed that staff with high knowledge on partograph were more likely to utilize it compared to those with low knowledge. Improving the knowledge of health staff on partograph could enhance the utilization of partograph in clinical practice. This finding is consistent with several studies that have identified knowledge and training of healthcare providers as a significant factor that influences the utilization of the partograph (Kamara et al., 2017).

Additionally, the study highlights the importance of knowledge and training in improving the utilization of the partograph. The findings suggest that healthcare providers with high or fair knowledge of the partograph were more likely to utilize it in clinical practice. This is consistent with previous studies that have identified knowledge and training as key factors influencing partograph use (Kamara et al., 2017; Muleta et al., 2018). Thus, investing in training programmes and continuous education for healthcare providers on the use of the partograph could help improve its utilization in clinical practice. The study also suggests that age may be a contributing factor to the utilization of the partograph. Healthcare providers aged 51 years and above had significantly higher odds of utilizing the partograph tool compared to those aged 21-35 years. While the study did not provide a clear explanation for this finding, it is possible that older healthcare providers will have more experience and knowledge of partograph use, which could contribute to their higher utilization. However, further studies are needed to explore this relationship.

Reason /challenges behind the non-utilization of partograph

Inadequate training has been identified as a significant factor contributing to the low utilization of the partograph. Studies in Nigeria and Tanzania have reported that midwives who had received training on the use of the partograph were more likely to use it (Onoh et al., 2014; Magoma et al., 2013). Therefore, it is crucial to ensure that healthcare providers receive adequate and appropriate training on the correct use of the partograph to promote its consistent use. The lack of awareness among health providers about the importance and effectiveness of the partograph has also been identified as a contributing factor to its low utilization. Studies in Ethiopia and Ghana have reported that a significant proportion of midwives did not know the correct use of the partograph (Gebre et al., 2014; Asibey et al., 2018). Therefore, it is essential to increase awareness among healthcare providers about the importance and benefits of the partograph to encourage its consistent use.

Inadequate staffing and supplies have also been identified as factors contributing to the low utilization of the partograph. Studies in Tanzania and Ghana have reported that midwives responsible for a larger number of patients were less likely to use the partograph and that the lack of partograph paper and pens was a significant barrier to its utilization (Magoma et al., 2013; Asibey et al., 2018). Therefore, it is important to ensure that there are adequate staffing and supplies to support the consistent use of the partograph. In conclusion, the study is consistent with the findings of the literature review, which highlight the challenges associated with the use of the partograph, including inadequate knowledge and skills, lack of awareness, and inadequate staffing and supplies.

Therefore, efforts to improve the utilization of the partograph must address these challenges, including the provision of adequate and appropriate training, increasing awareness about its importance and benefits, and ensuring that there are adequate staffing and supplies to support its consistent use.

5. CONCLUSION

The findings of this study have shed light on the current state of partograph utilization among health staff in the East Gonja Municipality. Despite the availability and presence of the partograph in most health facilities, its routine utilization in monitoring the progress of labour is low, with only a small percentage of health staff reporting regular use. This low utilization can be attributed to various operational barriers such as knowledge gaps, staff shortages, and time constraints. The study has also highlighted the importance of improving the knowledge of health staff on the use of partograph in maternal healthcare. It was found that health staff with a high level of knowledge on partograph were more likely to utilize it compared to those with low knowledge. Similarly, those with fair knowledge were also more likely to utilize it. The study did not find any significant effect of years of practice or age of health staff on the utilization of partograph after controlling for knowledge of staff on partograph and other variables.

6. RECOMMENDATIONS

In light of these findings, it is recommended that health facilities in the East Gonja Municipality provide regular training programmes on the use of partograph to bridge the knowledge gap among health staff. This training should be targeted at those with low knowledge and should be reinforced with follow-up assessments to ensure that health staff retains the knowledge. Additionally, to overcome operational barriers such as staff shortages and time constraints, health facilities could consider assigning dedicated staff responsible for monitoring the progress of labour and the use of partograph.

Finally, to improve the utilization of partograph, health facilities should prioritize the availability of the tool and ensure that it is accessible to all health staff. Health staff should also be encouraged to use partograph routinely during the management of labour to improve maternal and neonatal outcomes. These recommendations, if implemented, could lead to improved utilization of partograph and better maternal and neonatal outcomes in the East Gonja Municipality.

Conflict of Interest Disclosures

The author(s) declared no potential conflicts of interest regarding the research, authorship, and/or publication of this article.

Author Contributions

The author(s) confirms being the sole contributors of this work and approved it for publication.

Data Availability

The data can be obtained upon request from the corresponding author.

Ethical Consideration

Permission was sorted from Kintampo Health Research Centre with clearance number (**GHS-ERC 085/04/26**). Authorisation were also be sought from the health authorities in the East Gonja Municipal, and the Savannah Regional Health Directorate.

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