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DIPLOMA PROGRAMMES

DETERMINANTS OF CARDIOTOCOGRAPHY USE AMONG MIDWIVES IN THE SENASE COMMUNITY, BEREKUM

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DECLARATION

We hereby declare that this submission is our own work towards the Diploma in Midwifery and that, to the best of our knowledge, it contains no material previously published by another person nor material which has been accepted for the award of diploma of the University, except where due acknowledgement has been made in the text.

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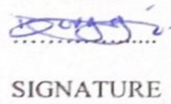
MISS DORCAS OSEI		10/10/2023
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ABSTRACT

The study focused on assessing the knowledge, perception and strategies to enhance midwifery practice regarding the utilization of cardiotocography among midwives in the Senase Community, Berekum. A descriptive study design was used to collect in-depth information for the study. The sample population was obtained using a convenience sampling technique. A

total of 15 participants were selected for the study. The data for the study was collected by administering the questionnaire to the participants.

The study found that the majority (73.3%) of the respondents rightly indicated that the primary purpose of CTG is to prevent adverse fetal reactions, most (60%) of the respondents correctly indicated that CTG is good at informing users which fetus is well, Majority (86.7%) of the respondents rightly said the baseline FHR for a normal intrapartum CTG is 110-160 bpm. The study recommended that authorities of the hospital should provide frequent in-service training to health personnel's regarding the use of CTG. Further research is required to establish how some of these perceptions might be addressed to ensure that individual women receive the CTG monitoring they need, so that optimum care is provided to women and their infants. The study concluded that respondents demonstrated good knowledge regarding utilization of CTG. Overall perception of respondents regarding the use of CTG was average. Higher percentage of the respondents indicated that proper and quick maintenance of equipment's and using computerized analysis instead of subjective analysis with the eye can enhance midwifery practice regarding the utilization of CTG.

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ABBREVIATION

CTG	Cardiotocography
EFM	Electronic Fetal Monitoring
WHO	World Health Organisation
CDC	Center for Disease Control
NICE	National Institute of Clinical Excellence

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CHAPTER ONE

INTRODUCTION

1.0 Background of the study

Cardiotocography was introduced into obstetric and midwifery clinical practice more than five decades ago on the premise that it would reduce neonatal mortality rates (Fedorka, 2020). This gave rise to the global use of CTG as a golden standard for intrapartum foetal surveillance (Sartwelle, 2019). The goal of perinatal nursing is to facilitate maximum physical and emotional well-being for the mother and her fetus. Care given during the intrapartum period is the 'cornerstone of midwifery practice' which would help women both physically and emotionally (National Institute of Clinical Excellence (NICE), 2018). Pregnancy is a wonderful, normal experience, which is a part of the cycle of every woman's life. It is a miracle that occurs by the union of two microscopic entities–an ovum and a sperm; that can produce a living being (Fedorka, 2020). The health of the fetus and the health of the mother are extensively linked with each other and thus midwife plays a major role in attaining this goal throughout pregnancy to till the time of delivery (Kirkup, 2019). Continuous fetal heart monitoring during pregnancy and labour gives an impression of the fetal well-being or fetal compromise thereby promoting the newborn's health status after birth (Carbonne & Sabri-Kaci, 2019). The past few decades have shown a notable increase in the number of techniques used to assess fetal well-being that ranges from the relatively simple maternal assessment of fetal movement to more complex diagnostic tests guided by the ultrasound. One such technology developed is cardiotocography (Owen, 2019).

Antenatal CTG is a commonly used form of fetal assessment in pregnancy and uses the fetal heart rate as an indicator of fetal well-being. It may be used in isolation, sometimes referred to as the 'non-stress test' or with the stimulation of uterine activity to see how the fetal heart

responds, sometimes known as the ‘contraction stress test’ (Owen, 2019). Antenatal CTG is most commonly performed in the third trimester of pregnancy. The gestational age at which CTG commences varies in practice, and at least in part depends on the minimum age of survival in the local neonatal unit and therefore, in some institutions may be used even before 26 weeks' gestation (Smith & Paul, 2019).

Some pregnancies can be complicated by a medical condition in the mother (e.g. diabetes or high blood pressure) or a condition that might affect the health or development of the baby. If these babies with potential difficulties could be identified, and if there were effective interventions to improve the outcomes, then an accurate test that could be used during pregnancy could be beneficial. Cardiotocography (CTG) is a continuous electronic record of the baby’s heart rate obtained via an ultrasound transducer placed on the mother’s abdomen (Grivell, et al., 2019).

The term electronic fetal monitoring (EFM) is sometimes used synonymously with CTG monitoring, but is considered to be a less precise term because CTG monitoring also includes monitoring the mother's contractions, and other forms of fetal monitoring might also be classed as 'electronic', such as fetal electrocardiograph or fetal pulse oximetry (Alfirevic, et al., 2017). Numerous studies concur that the correct use of CTG reduces the incidence of neonatal seizures as well as perinatal morbidity and mortality (Alfirevic, et al., 2017); therefore, the value of CTG in maternal and neonatal care is not to be underestimated.

Although CTG was introduced into obstetrics and midwifery clinical practice a long time ago, it has not yet fully lived up to the expectation that it would contribute towards the reduction of perinatal morbidity and mortality (Carbonne & Sabri-Kaci, 2019). Globally, research findings have shown that the efficacy of CTG has been continuously undermined by the lack of competency of midwives among other healthcare professionals who make use of this intrapartum tool (McKevitt, Gillen, & Sinclair, 2018).

CTG has some significant challenges related to its interpretation by midwives and doctors (Lutomski, et al., 2020). In addition, numerous studies frequently highlight that the level of agreement in the usage and interpretation of the CTG is poor among professionals (McKevitt, et al., 2018). Factors that influence the competency and interpretation of the cardiotocograph are various and diverse. Lutomski et al. (2020) affirm that the interpretation of cardiotocograph tracings is subject to individual interpretation and the diagnostic accuracy of midwives and clinicians. However, as Ugwumadu et al. (2016) highlight, one of the main causes for litigation in obstetrics is poor cardiotocograph interpretation, suggesting that there is a need for the training of midwives and obstetricians in the knowledge of cardiotocograph interpretation.

According to the most recent report, one of the major causes of death for babies weighing 500g-1000g remains intrapartum asphyxia from avoidable factors. For example, in public district hospitals, there were a total of 6082 deaths because of foetal hypoxia (Pattinson & Rhoda, 2014). A total of 8.4% (n = 510) fetuses died of hypoxia that had not been detected during intrapartum monitoring, while 4.6% (n = 282) had not been monitored at all. Hence, foetal asphyxia was not detected and the neonates died of foetal hypoxia (Pattinson & Rhoda 2014:26). During the period 2014–2015, 13.43% (n = 417) of neonatal deaths occurred when foetal distress went undetected in monitored labours (Rhoda, et al., 2018).

A study conducted in Limpopo Province, found a gap in the midwifery practice environments because of the shortage of human and material resources, bringing about unsafe, unattractive, and inadequate practice environments. Midwives were unable to monitor the foetal condition during intrapartum management because the CTG machines were not functional (Thopola & Lekhuleni, 2019).

According to Hindley and Thomson (2018), midwives' knowledge and experiences related to the use of CTG monitoring is based on the perception that it would provide a legal defense in the event of litigation and would help to defend their practice in the event of a legal claim.

However, some midwives stated that, despite the paper print out of the heart rate or CTG, provoking anxiety helps to proof that the foetus was not compromised whilst in their care.

There are CTG guidelines available, but these are utilised by a range of healthcare professionals with different skill sets and who may have challenges understanding concepts or in application, and with retaining knowledge over a long-term period (Santo & Ayres-de-Campos, 2019). Hence, there is a great need for health professionals, specifically midwives, to have the ability and sufficient knowledge of CTG, particularly regarding the application and interpretation of the cardiotocograph.

Against this background, it is therefore evident that there is a need for adequately skilled midwives in Ghana who are equipped to utilise the cardiotocograph machine effectively. Therefore, this study seeks to assess the knowledge, perception and strategies to enhance midwifery practice regarding the utilization of cardiotocography among midwives in the Senase Community, Berekum..

1.1 Problem statement

Preventable harm related to childbirth can be catastrophic for women, children and families, (Kirkup, 2019) as well as causing high costs for health systems (NHS Resolution, 2019). One important source of preventable harm in maternity care arises from sub-optimal fetal heart rate monitoring, particularly electronic fetal heart rate monitoring (EFM) using cardiotocography (CTG) in labour (NHS Resolution, 2019). Concerns have been raised about the efficacy and safety of routine use of continuous CTG in labour. The apparent contradiction between the widespread use of continuous CTG with claims of its effectiveness in lowering early neonatal mortality and morbidity and recommendations to limit its routine use on all women, indicates that a regular reassessment of this practice is warranted (Alfirevic, et al., 2017).

Although CTG was initially developed as a screening tool to predict fetal hypoxia, its positive predictive value for intrapartum fetal hypoxia is approximately only 30%. Even though

different international classifications have been developed with the aim of defining combinations of features that help predict intrapartum fetal hypoxia, the false-positive rate of the CTG is high (60%). Moreover, there has not been a demonstrable improvement in the rate of cerebral palsy or perinatal deaths since the introduction of CTG into clinical practice approximately 45 years ago. However, there has been a significant increase in intrapartum caesarean section and operative vaginal delivery rates (Pinas & Chandraharan, 2018).

Medical and midwifery staff are responsible for decision-making regarding identification of women and babies who require electronic fetal monitoring, for the interpretation of the CTG with regard to the total clinical picture and for the clinical management response to the CTG interpretation. This is why it has become momentous to assess the knowledge, perception and strategies to enhance midwifery practice regarding the utilization of cardiotocography among midwives in the Senase Community, Berekum

1.2 General objective of the study

To assess the knowledge, perception and strategies to enhance midwifery practice regarding the utilization of cardiotocography among midwives in the Senase Community, Berekum.

1.3 Specific Objective

1. To assess the knowledge level regarding cardiotocograph utilization.
2. To determine the perception of midwives on the use of cardiotocograph.
3. To suggest strategies to enhance midwifery practice regarding the utilization of cardiotocography.

1.4 Operational Definition

Utilization: Utilization it is the action of making practical and effective use of something. In this study, the effective use will be based on the cardiotocography monitor utilized by midwives during labour when monitoring the foetus in utero.

Knowledge: Knowledge is information and skills acquired through experience or education. In this study, the researcher seeks to gain insight into and understanding of the knowledge of midwives regarding the utilization of CTG in labour units.

Cardiotocography (CTG): Cardiotocography is a tool that is used to assess foetal well–being during labour and to identify the possibility of asphyxia.

Electronic Fetal Monitoring (EFM): refers to the use of equipment's to continuously gauge the baby's heartbeat in response to contractions.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This chapter provides an overview of the existing base of utilization of CTG in labour units. It focuses on knowledge CTG, perception on CTG utilization and strategies to enhance midwifery practice regarding the utilization of CTG. It summarizes the framework of the research study within the context of what is already known about the phenomenon. The main purpose of a literature review is to summarize old interpretations of the topic and to integrate them with new interpretations from the emerging body of knowledge.

2.1 Overview of Cardiotocography

The baby's heart rate and the mother's uterine contractions can be recorded electronically on a paper trace known as a cardiotocograph. This is done using a Doppler ultrasound transducer to monitor the baby's heart rate and a pressure transducer to monitor uterine contractions, both of which are linked to a recording device. This is known as external cardiotocography (external CTG) and is usually undertaken continuously in labour, although it is sometimes used intermittently (intermittent CTG) (Alfirevic, et al., 2017). Fetal heart activity is the prominent source of information about fetal well-being during delivery. Cardiotocography (CTG)-recording of fetal heart rate (FHR) and uterine contractions – enables obstetricians to detect fetus with deteriorating status (e.g. ongoing fetal hypoxia), which may occur even in a previously uncomplicated pregnancy (Heintz, et al., 2020).

Even though fetus has its own natural defense mechanism to tackle the oxygen insufficiency during the delivery, in some cases only timely intervention can prevent adverse consequences. Hypoxia, with prevalence lying in the region of 0.6% to 3.5% (Strachan, et al., 2019), is considered to be the third most common cause of newborn death (d'Aloja, et al., 2019).

Cardiotocography was introduced in late 1960s and is still the most prevalent method of intrapartum hypoxia detection (Melman, et al., 2019).

2.2 Knowledge level regarding CTG

Cardiotocography (CTG) or electronic fetal monitoring (EFM) is the most widely used technique for assessing fetal wellbeing in labour in the developed world. The primary purpose of fetal surveillance by CTG is to prevent adverse fetal outcomes. CTGs have a high degree of sensitivity but a low level of specificity which means that they are very good at telling us which fetuses are well but are poor at identifying which fetuses are unwell (Baker, Beaves, & Wallace, 2019). According to Baker et al. (2019) the normal antenatal CTG is associated with a low probability of fetal compromise and has the following features: baseline fetal heart rate (FHR) is between 110-160bpm, variability of FHR is between 5-25bpm, decelerations are absent or early, accelerations x2 within 20 minutes. The normal intrapartum CTG is associated with a low probability of fetal compromise and has the following features: baseline FHR is between 110-160bpm, variability of FHR is between 6-25bpm and decelerations are absent or early.

Baker et al. (2019) reported on antenatal risk factors that requires intrapartum monitoring, some of which are; abnormal antenatal CTG, antepartum haemorrhage, breech presentation, decreased fetal movements, maternal age greater than or equal to 42 weeks, multiple pregnancy, oligohydramnios or polyhydramnios. Intrapartum risk factors include; induction of labour with prostaglandin/oxytocin, abnormal auscultation or CTG, oxytocin augmentation, regional analgesia e.g. epidural or spinal, paracervical block, abnormal vaginal bleeding in labour and maternal pyrexia greater than or equal to 38°C.

A study conducted in Sweden revealed that 76% of foetal distress and 70% of brain damage or death are related to incompetence in interpreting the foetal monitor tracing. This incompetence is the result of midwives' lack of knowledge and skills in electronic foetal monitoring, using

CTG. Most midwives underwent disciplinary action as they were unable to recognize foetal distress. Injudicious use of oxytocin was found in 68.5% of the participants and was the primary reason for disciplinary action in 33% of them (Jonsson, Lindeberg, & Hanson, 2019).

A quantitative research approach was employed with a descriptive cross-sectional design to conduct a study in KwaZulu-Natal public hospitals. This study aimed to establish midwives' knowledge and interpretive skills of cardiotocography. A purposive criterion-based sampling method was used to select 226 participants for the study. Data were captured and entered into an Excel spreadsheet for the purpose of data analysis. The findings revealed that the midwives in KwaZulu-Natal public hospitals were found to be clinically lacking in knowledge of cardiotocography. The concluded that cardiotocography knowledge remains a challenge for practicing midwives in South Africa. The study findings show that midwives lack knowledge regarding CTG interpretation. The limited CTG knowledge of the midwives in KwaZulu-Natal public hospitals was possibly because of a lack of in-service training, as more than half of the participants (70%) indicated a need for in-service training (James, Maduna, & Morton, 2019).

A cross-sectional study was carried out among midwifery nurses who are working at Obstetric Wards and Labour & Delivery Units Hospital Putrajaya and Hospital Serdang in Malaysia. The purpose of current study was to determine the level of knowledge on the interpretation of Cardiotocography (CTG). Statistical analyses were performed using SPSS version 14. A total of 165 midwifery nurses from labour and delivery unit and obstetric wards in the two hospitals were selected. The study assessed the knowledge of nurses regarding interpretation of CTG graphs. Six figures of Normal CTG, Bradycardia graph, Tachycardia graph, Type 1 deceleration graph, Type II deceleration graph and lastly Prolong deceleration graph. Finding revealed inadequate knowledge of respondents regarding interpretation and diagnosis of different graph in CTG. The findings from this study indicated that midwifery nurses who

participated in this study would benefit from attending joint training on fetal heart rate monitoring and interpretation (Parhizkar, Latiff, & Aman, 2019).

Brown et al. (2017) emphasis that health professionals should be aware that machines from different manufacturers use different vertical axis scales, and this can change the perception of the foetal heart rate variability. They claimed that midwives should not undertake continuous CTG monitoring in the absence of medical supervision. In South Africa, midwives are expected to report to a medical doctor if any signs of foetal distress are present and ensure that clear and accurate records are kept (Tities, 2018).

2.3 Perception regarding CTG utilization

Midwives and obstetricians monitor the CTG combination of FHR and uterine contraction signals in delivery wards throughout the world to detect foetal hypoxia. Early detection enables them to act appropriately and to reduce the subsequent foetal and neonatal mortality (Chudáček, et al., 2020).

A qualitative descriptive methodology was used to conduct a study in four different countries: New Zealand, Australia, Denmark, and Norway. The study found that most midwives recognised that the CTG acted as a disturber of normal birth in different ways. Midwives perceived a shift in focus from woman to the machine in the birthing room. Moreover, the use of the CTG can potentially restrict freedom of movement during labour. The study concluded that the cardiotocograph is a multifaceted actant that influences practice by performing different roles (Japsen, et al., 2022).

Hindley and Thomson (2018), conducted a study in two hospitals in England, where midwives attempted to manage the psychological burden of the threat of clinical negligence by using Electronic Foetal Heart Monitoring (EFM). This meant that some midwives used electronic monitoring regardless of the clinical need. The midwives' knowledge of the evidence relating

to CTG monitoring was based on the perception that using this type of monitoring would provide a legal defense in the event of litigation. Hindley and Thomson (2018), further found that although the midwives lacked confidence in the ability of EFM to accurately detect foetal compromise they were aware that the visual monitoring record was recognized as a valuable piece of legal evidence. The midwives' perceptions of professional self-efficacy in seeking to avoid a claim in clinical negligence contributed to defensive practice.

A cross sectional study in Northern Ireland aimed to conduct a survey of midwives' views on the use of technology in assisting births. Over 400 midwives responded to a questionnaire seeking information on their experiences and perceived competence with labour ward technology, with a particular focus on the use of cardiotocograph machines (CTGs) for electronic foetal monitoring. The majority of midwives in this survey trusted the use of technology but had concerns about issues of safety in relation to potential faults, and to their perceived lack of training in technology usage. The majority also indicated that they preferred a nontechnological birth although many pointed to the benefits of technological support when difficulties are encountered. The use of technology was seen as multi-professional and there was much support among the respondents for multi-disciplinary training in the use of technologies in future curricula (Sinclair & Gardner, 2020).

An exploratory descriptive study was undertaken in the United Kingdom. The design combined qualitative and quantitative approaches and used a validated questionnaire. The sampling strategy utilised in this study was purposive sampling. The study demonstrated a favourable disposition towards the use of CTG machines with 72.5% of respondents indicating that they viewed CTG technology positively and 87.5% indicating they were confident about their skill in interpreting CTG tracings. The majority of the respondents (60.0%) felt that their training adequately prepared them for using CTGs. The illustrative accounts provided by the respondents demonstrated a predominant belief that CTG technology continues to have a role

in monitoring and detecting abnormalities in the fetal heart rate but this role is limited by how well the CTG is used and interpreted. Most (62.5%) respondents perceived that medical/midwifery colleagues rely too much on CTGs. Less than half (35%) believed that CTGs spoil the beauty of a birth. Majority (70%) felt that CTGs are often used unnecessarily. Only (5%) of respondents felt that CTGs are essential for ensuring successful deliveries (McKevitt, et al., 2018).

2.4 Strategies to enhance midwifery practice regarding the utilization of cardiotocography

A study conducted by Van der Pijl et al. (2019), validates that midwives are happy performing antenatal CTG and feel it contributes positively towards the midwife-client relationship. However, midwives experienced an increased workload, partly due to time-consuming technical difficulties.

According to Pearson et al. (2018), in a study presented at the fourth annual Confidential Enquiry into Stillbirths and Deaths in Infancy (CESDI), the CTG interpretation component of obstetric care was questioned in over 50% of perinatal deaths. Therefore, regular training programmes for all health professionals involved in intrapartum care were recommended.

Attendance of midwives at foetal monitoring education programmes increases their foetal monitoring knowledge and CTG interpretation skills. Irrespective of their years of clinical experience and exposure, midwives identified their need for CTG training (Tities, 2018). Continuous learning is an essential part of any healthcare worker’s professional life to ensure professional and personal enrichment and development. This learning can be in the form of informal or formal training (Tities, 2018).

Pathological changes recognized on CTG tracings in hindsight are responsible for a considerable volume of obstetric litigation (Pehrson, et al., 2019). The main reason for the poor

outcomes lies in the generally poor standard of CTG interpretation. Therefore, more intensive training on CTG interpretation should be offered to enable all new staff members to consolidate their CTG interpretive skills before allowing them to practice in labour units (Westerhuis, et al., 2019).

Informal and formal training should be available to assist midwives in performing and interpreting electronic FHR patterns, to ensure that appropriate actions can be implemented and that high-risk factors can be identified. They advised that 6-monthly interval CTG study days would assist in keeping midwives and doctors up to date with CTG interpretation. All new staff should undergo induction training programmes to ensure that trained staff adequately assist women in labour and assess the well-being of the foetus (Tities, 2018).

There is evidence of difficulties in the availability and maintenance of equipment, and some deficits in staff knowledge and skill. Differing orientations towards foetal monitoring were reported by midwives. These are likely to have an impact on practice (Altaf et al., 2006). Perinatal mortality is closely linked to the availability of modern obstetric care. CTG machines are commonly used in high-income countries in the management of highrisk pregnancies. However, they are often unavailable in low-income settings, where the rates of complicated pregnancy are highest (Lawrence, et al., 2016).

According to Altaf et al. (2020), availability and maintenance of equipment are viewed as a problem by all midwives observed in a study. Midwives described their frustration at not being able to easily access equipment that was in good order and could be relied on to function correctly. Identified problem equipment included abdominal belt knots, paper getting stuck, having no system for reporting repairs, dirty or damaged belts. Furthermore, considerable frustration was expressed concerning the quality, availability, and maintenance of equipment for foetal heart monitoring.

Redman and Moulden (2014), maintain that the interpretation of CTG patterns is unreliable when done, subjectively, by eye. Computerized analysis ensures consistency and relates the many patterns to the outcome in an evidence-based way. According to Chapman and Charles (2018), to be able to interpret a CTG you need a structured method of assessing its various characteristics. The most popular structure to adhere to can be remembered using the acronym, DR C BRAVADO. **DR** Define Risk, **C**- Contractions, **BRa**- Baseline Rate, **V**- Variability, **A**-Accelerations, **D**-Decelerations and **O**- Overall impression.

CHAPTER THREE

MATERIALS AND METHODS

3.0 Introduction

This chapter describes in detail the study area and study population, study design, sampling techniques, data collection method and instrument, data analysis techniques, ethical consideration, and the limitations of the study.

3.1 Study area

The study was conducted at Senase located in the Berekum Municipality. The distance from Berekum to Senase is one kilometer by road. Berekum is a town in the Bono Region of Ghana. The town is known for the Methodist Secondary Technical School which is a second cycle institution. The native language of the Berekum people is Bono Twi. The municipality comprises of Christians, Muslims and Traditionalist. The population is largely made of Akans. It is a youthful population. Farming is predominant among the people of Berekum.

3.2 The study population

The study target population were midwives living in the Senase community, Berekum. The accessible population were midwives who were present during the study period.

3.3 Study design

A research design is the arrangement of the conditions for the collection and analysis of data in a manner that aims to combine relevance to the research (Rivers & Wilson, 2020). The researcher used a descriptive quantitative research approach to assess the utilization of cardiotocography (CTG) when caring for pregnant women in the maternity unit. Descriptive research design refers to an intensive examination of the phenomenon and their deeper meanings, thus leading to thicker descriptions. A descriptive research design was used to describe in detail the knowledge and practices of midwives regarding the utilization of CTG in

labour units. The participants were given an opportunity to describe their knowledge and practices regarding the utilization of CTG in labour units.

3.4 Sampling technique and Size

Sampling is the process by which you reduce the total research population for a research project to a number which is practically feasible and theoretically acceptable (MacDonald & Headlam, 2015) A non-probability convenience sampling technique approach was used as the research team selected participants who were actively involved in maternity units and were available and willing to participate in the study. A total of 15 participants were selected for the study.

3.5 Data collection methods and instruments

Data collection was done through the use questionnaires consisting of both closed-ended and open-ended questions for easy expression of views and ideas. This was chosen as the method of data collection because it is relatively cheaper, avoided embarrassment on the part of the respondents, and the complete anonymity of respondents. The questionnaire was developed based on the reviewed literature.

3.6 Data analysis techniques

The data obtained from the study were checked for accuracy, utility, and completeness. The quantitative data from questionnaire were coded and entered using Microsoft excel and the results generated were presented in frequency tables or figures (pie charts, bar graphs and narratives).

3.7 Ethical consideration

Before conducting the survey, an introductory letter was obtained from Holy Family NMTC, Berekum. Permission letter will be obtained from the assembly to conduct the study at Senase. The main ethical issues involved in this study were the respondents' rights to self-

determination, anonymity and confidentiality. For this reason, respondents were given full information on the nature of the study. The names of the respondents were not recorded. Participants were informed about their right to withdraw or refuse to be part of the study at any point in the course of the study and were assured of confidentiality of all information that were obtained. Furthermore, the identities of the participants were not disclosed, and only aggregate data were reported. Moreover, participants were fairly selected and no form of harm or discomfort was done.

3.8 Limitation of the study

The limitations to this study were, the limited time with which we had to complete the study and the smaller sample size that was chosen for the study. Because the sample size was small, we could not generalize the study findings. There was no sponsorship for the study hence the team encountered financial constraints.

CHAPTER FOUR

DATA ANALYSIS AND RESULTS

4.0 Data Presentation & Analysis

A detailed discussion of the analysed results is presented in this chapter. The data collected was coded and analysed with the help of Microsoft excel.

4.1 Demographic Profile of Respondents

Table 4. 1: Respondents Age

Variable	Categories	Frequency (n)	Percentage (%)
Age	21-30	8	53.3
	31-40	5	33.3
	Above 40	3	20.0

Majority (53.3%) of the respondents were between the ages of 21-30 followed by 31-40 (33.3%), and above 40 (20%).

Table 4. 2: Respondents Marital Status

Variable	Categories	Frequency (n)	Percentage (%)
Marital status	Married	6	40
	Single	8	53.3
	Divorced/Separated	1	6.7
	Widowed	0	0

Over half (53.3%) of the respondents were single followed by 40% who were married and only (6.7%) was divorced/separated.

Table 4. 3: Respondents Educational level

Variable	Categories	Frequency (n)	Percentage (%)
Educational level	Certificate	3	20
	Diploma	8	53.3
	Degree	4	26.7
	Other	0	0

Most (53.3%) of the respondents were diploma holders followed by degree (26.7%) and certificate (20%).

Table 4. 4: Respondents Religion

Variable	Categories	Frequency (n)	Percentage (%)
Religion	Christian	11	73.3
	Muslim	4	26.7
	Others	0	0

Majority (73.3%) of the respondents were Christians whiles a little over twenty percent (26.7%) were Muslims.

Table 4. 5: Respondents Labour ward experience

Variable	Categories	Frequency (n)	Percentage (%)
Labour ward experience	One-Four	9	60
	Five-Ten	4	26.7
	> 10	2	13.3

Majority (60%) of the respondents had one to four years labour ward experience followed by five to ten years (26.7%) and greater than ten years (13.3%).

4.2 Knowledge on Cardiotocograph Utilization

Table 4. 6: Knowledge on Cardiotocograph Utilization

Variable	**Categories**	**Frequency (n)**	**Percentage (%)**
What is the primary purpose of CTG?	Prevent adverse maternal outcomes	1	6.7
	Prevent adverse fetal outcomes	11	73.3
	Prevent both adverse maternal and fetal outcomes	3	20
CTG is good at	Informing users which fetus is well	9	60
	Informing users which fetus is unwell	4	26.7
	Both a & b	2	13.3
What is the baseline FHR for a normal intrapartum CTG?	90-150 bpm	0	0
	110-160 bpm	13	86.7
	100-190 bpm	2	13.3
Decelerations of a normal intrapartum CTG is;	Present or late	3	20
	Absent or early	8	53.3
	Present or early	4	26.7
How many types of deceleration graphs are there on a CTG?	Two types	2	13.3
	Three types	10	66.7
	Four types	3	20

Majority (73.3%) of the respondents rightly indicated that the primary purpose of CTG is to prevent adverse fetal reactions, most (60%) of the respondents correctly indicated that CTG is good at informing users which fetus is well, Majority (86.7%) of the respondents rightly said

the baseline FHR for a normal intrapartum CTG is 110-160 bpm, over half (53.3%) correctly responded that decelerations of a normal intrapartum CTG is absent and early, most (66.7%) of the respondents knew that they are three types of deceleration graphs on a CTG.

4.3 Perception Regarding the Use of Cardiotocograph

Table 4. 7: Perception Regarding the Use of Cardiotocograph

Statement		Agree	Disagree	Undecided
CTG use restricts freedom of movement during labour	n	12	3	0
	%	80	20	0
CTG directs the attention of the midwife from the mother to the machine.	n	9	6	0
	%	60	40	0
CTG provides a legal defense in the event of a lawsuit.	n	15	0	0
	%	100	0	0
Nontechnological birth is better than the use of CTG during labour.	n	11	3	1
	%	73.3	20	6.7
Medical/midwifery colleagues rely too much on CTGs	n	10	3	2
	%	66.7	20	13.3
CTGs has ruined the beauty of a birth	n	6	9	0
	%	40	60	0
CTGs are essential for ensuring successful deliveries	n	2	11	2
	%	13.3	73.3	13.3
CTGs are often used unnecessarily	n	10	3	2
	%	66.7	20	13.3

Majority (80%) of the respondents agreed that the use of CTG restricts freedom of movement during labour. Most (60%) of the respondents agreed that CTG directs the attention of the midwife from the mother to the machine. All (100%) the respondents agreed that CTG provides a legal defense in the event of a lawsuit. Most (73.3%) of the respondents agreed that nontechnological birth is better than the use of CTG during labour. Most (60%) of the respondents agreed that medical/midwifery colleagues rely too much on CTGs. Less than half (40%) of the respondents agreed that CTGs has ruined the beauty of a birth. Most (73.3%) of

the respondents disagreed that CTGs are essential for ensuring successful deliveries. Most (66.7%) of the respondents agreed that CTGs are often used unnecessarily.

4.4 Strategies to Enhance Midwifery Practice Regarding the Utilization of CTG

Table 4. 8: Strategies to Enhance Midwifery Practice Regarding the Utilization of CTG

Statement		Agree	Disagree	Undecided
Regular training programmes for midwives	n	12	3	0
	%	80	20	0
Increasing the availability of CTG machines	n	9	6	0
	%	60	40	0
Proper and quick maintenance of equipment's	n	15	0	0
	%	100	0	0
Using computerized analysis instead of subjective	n	14	0	1
analysis with the eye.	%	93.3	0	6.7

All (100%) the respondents agreed that proper and quick maintenance of equipment's can enhance midwifery practice regarding the utilization of CTG. Majority (93.3%) of the respondents agreed using computerized analysis instead of subjective analysis with the eye can enhance the use of CTG. Majority (80%) of the respondents agreed that regular training programmes for midwives can improve the use of CTG. Most (60%) of the respondents agreed increasing the availability of CTG machines can improve the use of CTG.

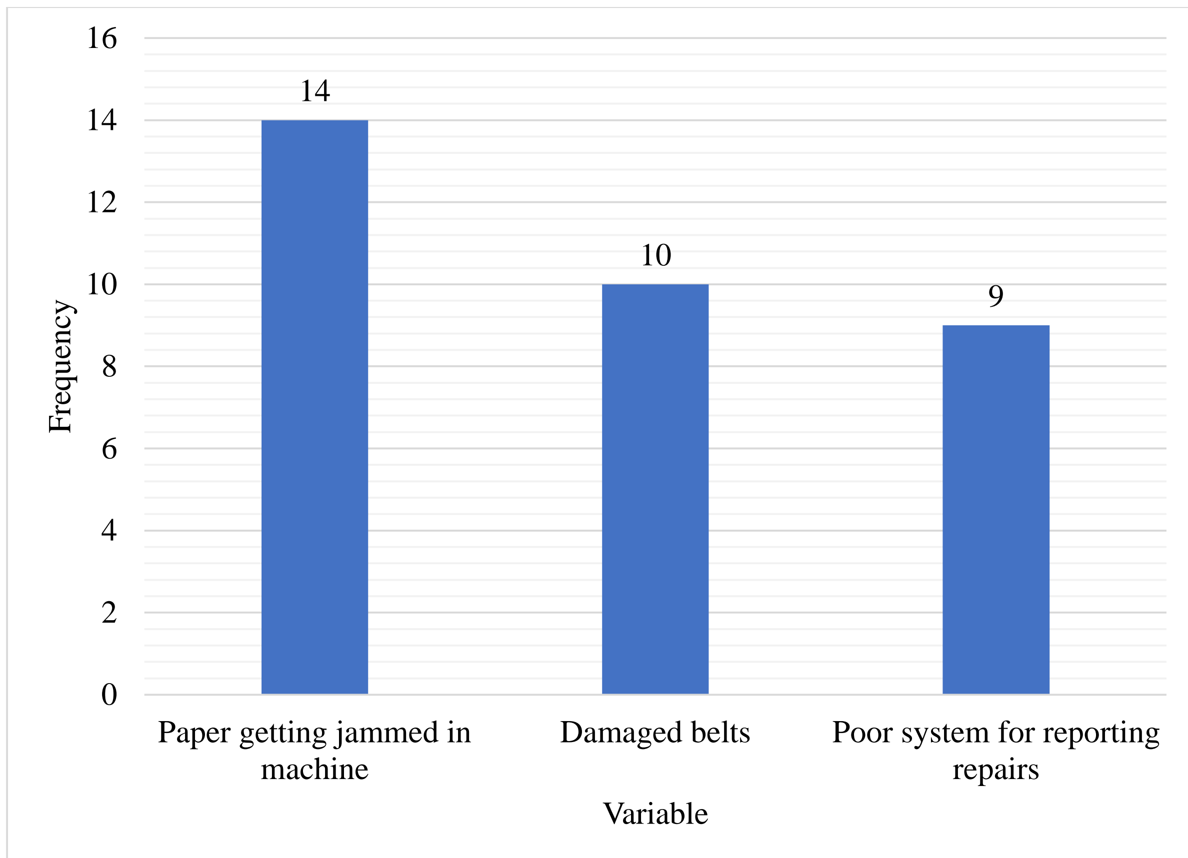

Figure 4. 1: Equipment related issues

Regarding equipment related issues, majority (93.3%) of the respondents indicated paper getting jammed in machine followed by damaged belts (66.7%) and poor system for reporting repairs (60%).

CHAPTER FIVE

DISCUSSION, CONCLUSIONS, AND RECOMMENDATIONS

5.0 Introduction

This chapter discusses pertinent results from the study with new insights and comparisons made with studies conducted in other jurisdictions. The discussion is done based on the objectives of the study.

5.1 Discussions

5.1.1 Knowledge on Cardiotocograph Utilization

In the current study, majority (73.3%) of the respondents rightly indicated that the primary purpose of CTG is to prevent adverse fetal reactions, most (60%) of the respondents correctly indicated that CTG is good at informing users which fetus is well, Majority (86.7%) of the respondents rightly said the baseline FHR for a normal intrapartum CTG is 110-160 bpm, over half (53.3%) correctly responded that decelerations of a normal intrapartum CTG is absent and early. Similarly, Baker et al. (2019) reported that the primary purpose of fetal surveillance by CTG is to prevent adverse fetal outcomes, CTGs have a high degree of sensitivity but a low level of specificity which means that they are very good at telling us which fetuses are well but are poor at identifying which fetuses are unwell, The normal intrapartum CTG is associated with a low probability of fetal compromise and has the following features: baseline FHR is between 110-160bpm, variability of FHR is between 6-25bpm and decelerations are absent or early.

In the current study, most (66.7%) of the respondents knew that they are three types of deceleration graphs on a CTG. Correspondingly, Parhizkar et al. (2019) reported that normal CTG has Type 1 deceleration graph, Type II deceleration graph and lastly Prolong deceleration

graph. However, their findings revealed inadequate knowledge of respondents regarding interpretation and diagnosis of different graph in CTG.

5.1.2 Perception Regarding the Use of Cardiotocograph

The current study found that majority (80%) of the respondents agreed that the use of CTG restricts freedom of movement during labour and most (60%) of the respondents agreed that CTG directs the attention of the midwife from the mother to the machine. In the same way, Japsen et al. (2022) reported that the use of the CTG can potentially restrict freedom of movement during labour and midwives perceived a shift in focus from woman to the machine in the birthing room.

Most (66.7%) of the respondents agreed that CTGs are often used unnecessarily and all (100%) the respondents agreed that CTG provides a legal defense in the event of a lawsuit. These findings are supported by Hindley and Thomson (2018), they found that some midwives used electronic monitoring regardless of the clinical need. The midwives' knowledge of the evidence relating to CTG monitoring was based on the perception that using this type of monitoring would provide a legal defense in the event of litigation.

Most (73.3%) of the respondents agreed that nontechnological birth is better than the use of CTG during labour. Similarly, Sinclair and Gardner (2020) reported that majority of midwives indicated that they preferred a nontechnological birth although many pointed to the benefits of technological support when difficulties are encountered.

In the current study, most (60%) of the respondents agreed that medical/midwifery colleagues rely too much on CTGs, most (73.3%) of the respondents disagreed that CTGs are essential for ensuring successful deliveries and less than half (40%) of the respondents agreed that CTGs has ruined the beauty of a birth. In the same way, McKevitt et al. (2018) found that most (62.5%) respondents perceived that medical/midwifery colleagues rely too much on CTGs,

only (5%) of respondents felt that CTGs are essential for ensuring successful deliveries and less than half (35%) believed that CTGs spoil the beauty of a birth.

5.1.3 Strategies to Enhance Midwifery Practice Regarding the Utilization of CTG

In the present study, majority (80%) of the respondents agreed that regular training programmes for midwives can improve the use of CTG. Similarly, Pearson et al. (2018), recommended for regular training programmes for all health professionals involved in intrapartum care. In addition, Tities (2018) found that attendance of midwives at foetal monitoring education programmes increases their foetal monitoring knowledge and CTG interpretation skills. Irrespective of their years of clinical experience and exposure, midwives identified their need for CTG training.

According to Altaf et al. (2020), considerable frustration was expressed by midwives concerning the quality, availability, and maintenance of equipment for foetal heart monitoring. The recent study found that all (100%) the respondents agreed that proper and quick maintenance of equipment's can enhance midwifery practice regarding the utilization of CTG and most (60%) of the respondents agreed increasing the availability of CTG machines can improve the use of CTG.

Majority (93.3%) of the respondents agreed using computerized analysis instead of subjective analysis with the eye can enhance the use of CTG. Equally, Redman and Moulden (2014), maintain that the interpretation of CTG patterns is unreliable when done, subjectively, by eye. Computerized analysis ensures consistency and relates the many patterns to the outcome in an evidence-based way.

Regarding problem related equipment issues, majority (93.3%) of the respondents indicated paper getting jammed in machine followed by damaged belts (66.7%) and poor system for reporting repairs (60%). These findings are in line with the study conducted by Altaf et al.

(2020) which reported that identified problem equipment with CTG included abdominal belt knots, paper getting stuck, having no system for reporting repairs, dirty or damaged belts.

5.2 Conclusion

Respondents demonstrated good knowledge regarding utilization of CTG. Overall perception of respondents regarding the use of CTG was average. Higher percentage of the respondents indicated that proper and quick maintenance of equipment's and using computerized analysis instead of subjective analysis with the eye can enhance midwifery practice regarding the utilization of CTG. The leading related equipment issue with CTG machine was reported to be paper getting jammed in machine followed by damaged belts and poor system for reporting repairs.

5.3 Recommendations

Based on the analysis of data obtained from the field, the following conclusions were drawn.

1. The authorities of the hospital should provide frequent in-service training to health personnel's regarding the use of CTG.
2. Further research is required to establish how some of these perceptions might be addressed to ensure that individual women receive the CTG monitoring they need, so that optimum care is provided to women and their infants.
3. A comparative study can be conducted between nurses in maternity units of different hospitals to assess the effectiveness of Cardiotocography Training Programme.

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APPENDICES

QUESTIONNAIRE

Introduction

This study assesses the determinants of cardiotocography use among midwives in the Senase Community, Berekum. Your response and contribution will be used for academic purposes and no disclosure will be made to any third party. However, you are allowed to discontinue this study at any stage. Kindly answer the under listed questions by ticking (√) the appropriate box or write in the spaces provided. Thank you.

A. Socio-Demographic Data

1. Age (years)

   (a) 21-30 [] (b) 31-40 [] (c) above 40 []

2. Marital status

   (a) Married [] (b) Single [] (c) Divorced/Separated [] (d) Widowed []

3. Educational level

   (a) Certificate [] (b) Diploma [] (c) Degree [] (d) Other (specify): ……………………

4. Religion

   (a) Christian [] (b) Muslim [] (c) Other (specify): ……………………………

5. Labour ward experience

   (a) One-Four [] (b) Five-Ten [] (c) > 10 []

B. Knowledge on Cardiotocograph Utilization

6. What is the primary purpose of CTG?

   a. Prevent adverse maternal outcomes []

   b. Prevent adverse fetal outcomes []

   c. Prevent both adverse maternal and fetal outcomes []

7. CTG is good at

    a. Informing users which fetus is well []

    b. Informing users which fetus is unwell []

    c. Both a & b []

8. What is the baseline FHR for a normal intrapartum CTG?

    a. 90-150 bpm []

    b. 110-160 bpm []

    c. 100-190 bpm []

9. Decelerations of a normal intrapartum CTG is;

    a. Present or late []

    b. Absent or early []

    c. Present or early []

10. How many types of deceleration graphs are there on a CTG?

    a. Two types []

    b. Three types []

    c. Four types []

C. Perception Regarding the Use of Cardiotocograph

11. CTG use restricts freedom of movement during labour.

    (a) Agree [] (b) Disagree [] (c) Undecided []

12. CTG directs the attention of the midwife from the mother to the machine.

    (a) Agree [] (b) Disagree [] (c) Undecided []

13. CTG provides a legal defense in the event of a lawsuit.

    (a) Agree [] (b) Disagree [] (c) Undecided []

14. Nontechnological birth is better than the use of CTG during labour.

    (a) Agree [] (b) Disagree [] (c) Undecided []

15. Medical/midwifery colleagues rely too much on CTGs

    (a) Agree [] (b) Disagree [] (c) Undecided []

16. CTGs has ruined the beauty of a birth

    (a) Agree [] (b) Disagree [] (c) Undecided []

17. CTGs are essential for ensuring successful deliveries

    (a) Agree [] (b) Disagree [] (c) Undecided []

18. CTGs are often used unnecessarily

    (a) Agree [] (b) Disagree [] (c) Undecided []

D. Strategies to Enhance Midwifery Practice Regarding the Utilization of CTG

19. Regular training programmes for midwives

    (a) Agree [] (b) Disagree [] (c) Undecided []

20. Increasing the availability of CTG machines

    (a) Agree [] (b) Disagree [] (c) Undecided []

21. Proper and quick maintenance of equipment's

    (a) Agree [] (b) Disagree [] (c) Undecided []

22. Using computerized analysis instead of subjective analysis with the eye.

    (a) Agree [] (b) Disagree [] (c) Undecided []

23. Indicate some of the problem related equipment issues;

    a. Paper getting jammed in machine []

    b. Damaged belts []

    c. Poor system for reporting repairs []

    d. Others (specify): ……………………………………………….

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Date August 07, 2023

The Manager
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Dear Manager

PERMISSION TO CONDUCT RESEARCH

I wish to introduce to you the under listed names of final year students of the College:

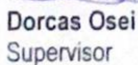
1. **Annor Yeboah Benita**
2. **Owusu Kumi Emmanuella**
3. **Quansah Hameeda**

As part of the pre-requisite for the award of Diploma in Midwifery they are to conduct a research study, on the topic **'Determinants of Cardiotocography use among Midwives in the Senase Community, Berekum'**

I would be grateful if you could assist them with any material or help they may need to accomplish this task.

Thank you

Yours sincerely



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