



Review Article

Midwives' Proficiency in Electronic Fetal Heart Monitoring: A Comprehensive Review

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Abstract

Electronic Fetal Heart Monitoring (EFM) is a critical component of perinatal care, necessitating a nuanced understanding of midwives' knowledge and skills in its application. This study introduces a comprehensive examination of midwives' proficiency in EFM, addressing a gap in current literature. The novelty lies in its multi-faceted approach, encompassing theoretical understanding, practical skills, and contextual challenges. The aim is to identify strengths, areas for improvement, and effective interventions to enhance midwives' competence. Methodologically, a series of studies spanning from 1993 to 2023 employ cross-sectional analyses, simulation-based evaluations, longitudinal assessments, qualitative exploration, and a comparative analysis of educational interventions. Preliminary findings underscore variations in midwives' theoretical knowledge, the importance of simulation-based training, ongoing skill progression, and contextual challenges. The conclusion emphasizes the need for tailored educational interventions, addressing contextual challenges, and fostering a collaborative approach.

Keywords: Electronic Fetal Heart Monitoring, Midwives, Proficiency, Perinatal Care, Simulation-Based Training, and Contextual Challenges.

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Introduction

Background

Electronic Fetal Heart Monitoring (EFM) has emerged as a critical tool in modern obstetric care, revolutionizing the way healthcare professionals monitor the well-being of the fetus during pregnancy and labor. The advent of electronic monitoring in obstetrics can be traced back to the mid-20th century, with significant advancements occurring over the years. Initially introduced in the 1960s, EFM has undergone substantial technological improvements, enhancing its accuracy and reliability in assessing fetal well-being. The comprehensive

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evaluation of fetal heart rate patterns and uterine contractions through EFM has become an integral part of perinatal care, aiding healthcare providers in timely interventions and decision-making.

Electronic fetal heart monitoring (EFM) is a technique used to monitor the fetal heart rate during labor (NHS, 2023). The use of EFM has been a topic of debate in the medical community, with some studies suggesting that it may not be necessary for low-risk pregnancies (Lamé et al., 2023). However, the National Institute for Health and Care Excellence (NICE) guidelines recommend offering intermittent auscultation to women at low risk of complication during labor, while EFM is the recommended option in the presence of certain signs or conditions specified in the guidelines (Lamé et al., 2019). The guideline covers the physiology of hypoxia, clarifies when EFM should be used as an appropriate method of monitoring the fetal heart in labor, and standardizes the classification of cardiotocographs (CTG) (NHS, 2023). It provides guidance on actions to be taken when abnormalities are detected.

In recent years, multiple reports have highlighted concerns about care in labor and safety concerns over inconsistent approaches to CTG categorization, with three different classifications in use (Heney et al., 2022). The new guideline on fetal monitoring emphasizes that women are the decision-makers, and clinicians support decision-making. Risk assessment should be performed hourly in labor for all women. When inducing or augmenting labor, monitoring and managing contraction frequency is key to reducing intrapartum hypoxia (Heney et al., 2022).

Over the decades, numerous studies have contributed to the understanding of EFM's effectiveness (Alfirevic et al., 2017; Ashwal et al. 2019) and limitations (Heelan, 2013 Alfirevic et al., 2017; Hébert, 2022), shaping its application in clinical settings. Research by Hon and Calhoun (2009) delves into the historical development of EFM, highlighting key milestones in its evolution. Furthermore, the work of Clark et al. (2015) emphasizes the technological advancements that have refined EFM's ability to detect and respond to fetal distress.

The significance of EFM lies in its potential to identify early signs of fetal compromise, enabling timely interventions to prevent adverse outcomes. In the context of obstetric care, the accurate interpretation of fetal heart rate patterns is crucial for identifying fetal distress and guiding appropriate clinical interventions. This significance is underscored by the potential impact on both maternal and neonatal outcomes, making EFM a cornerstone in the monitoring of high-risk pregnancies and labor.

In the realm of midwifery, understanding and effectively utilizing EFM is paramount. Midwives, as primary care providers for many pregnant individuals, play a pivotal role in overseeing pregnancies, childbirth, and postpartum care. The integration of EFM into midwifery practice necessitates a comprehensive understanding of its principles, applications, and implications. As midwives increasingly collaborate with obstetricians and other healthcare professionals in multidisciplinary teams, their role in EFM becomes even more crucial for achieving optimal perinatal outcomes.

The scope of this review encompasses an in-depth exploration of the role of midwives in electronic fetal heart monitoring. It involves an examination of midwives' knowledge, skills, and attitudes towards EFM, as well as the challenges they may encounter in its implementation. Additionally, the article will explore the collaboration between midwives and other healthcare professionals in utilizing EFM for enhanced perinatal care.

It is important to acknowledge the potential limitations of this article. The findings may be influenced by the specific healthcare settings, regional variations in midwifery practices, and the evolving landscape of obstetric care. Additionally, the perspectives and experiences of midwives may vary, impacting the generalizability of the results.

Despite the established importance of EFM, there remains a gap in the literature regarding the specific role of midwives in its application. Understanding how midwives contribute to the use of EFM, both independently and in collaboration with obstetricians, is essential for optimizing perinatal care. This review is crucial for advancing our understanding of the collaborative dynamics between midwives and other healthcare professionals in the context of EFM. By identifying the challenges, best practices, and potential areas for improvement, this reviews aims to contribute valuable insights that can inform training programs, clinical guidelines, and policy decisions related to the role of midwives in EFM. Therefore, this study seeks to address the following question:

Research Question

What is the role of midwives in electronic fetal heart monitoring, and how does their involvement impact perinatal outcomes?

Aim and Objectives

Aim: To review and understand the role of midwives in electronic fetal heart monitoring and its impact on perinatal outcomes.

Objectives:

1. To review the knowledge and skills of midwives in electronic fetal heart monitoring.
2. To understand the attitudes of midwives towards the use of electronic fetal heart monitoring.
3. To discuss the challenges faced by midwives in the implementation of electronic fetal heart monitoring.
4. To review the collaboration between midwives and other healthcare professionals in utilizing electronic fetal heart monitoring.
5. To discuss the impact of midwives' involvement in electronic fetal heart monitoring on perinatal outcomes.

This review aims to bridge the existing gap in literature and provide evidence-based insights into the role of midwives in optimizing electronic fetal heart monitoring practices for improved perinatal care.

Theoretical Frameworks

Electronic Fetal Heart Monitoring (EFM) is a crucial component of modern obstetric care, providing real-time information about the fetal heart rate and uterine contractions during pregnancy and labor. This theoretical framework aims to elucidate the key concepts, principles, and factors influencing EFM, with a focus on its role in enhancing maternal and fetal outcomes.

Maternal-Fetal Physiology

Understanding the physiological basis of EFM is essential for interpreting monitoring data accurately. The framework encompasses the dynamic interplay between maternal and fetal physiological parameters, including the impact of maternal cardiovascular status, uterine contractions, and fetal oxygenation on the fetal heart rate.

Technological Advancements

The rapid evolution of EFM technologies, from Doppler ultrasound to modern electronic monitors, is a critical aspect of the framework. This section explores the historical progression, current state-of-the-art technologies, and emerging innovations, such as wireless monitoring and artificial intelligence applications, to improve the precision and reliability of EFM.

Clinical Guidelines and Protocols

Effective EFM implementation relies on evidence-based guidelines and protocols. This section examines the diverse recommendations provided by obstetric organizations, such as the American College of Obstetricians and Gynecologists (ACOG) and the Royal College of Obstetricians and Gynaecologists (RCOG), highlighting the consensus on monitoring techniques, interpretation criteria, and the integration of EFM with other clinical assessments.

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Interpretation and Decision-Making

Interpreting EFM data demands a nuanced understanding of normal and abnormal patterns. This component of the framework delves into the various fetal heart rate patterns, including baseline variability, accelerations, and decelerations. It explores the significance of these patterns in clinical decision-making, emphasizing the importance of timely interventions when deviations from the norm are detected.

Human Factors and Communication

The effective use of EFM is not solely contingent on technological proficiency; it involves human factors and communication skills. This section addresses the role of healthcare providers in EFM, including the necessity for proper training, communication among the healthcare team, and effective patient engagement. It also explores potential challenges and strategies to enhance teamwork and communication in a high-stakes obstetric environment.

Ethical and Legal Considerations

As with any medical intervention, EFM raises ethical and legal considerations. This part of the framework examines issues such as informed consent, patient autonomy, and the delicate balance between maternal and fetal interests. It also addresses potential legal implications in cases of adverse outcomes despite adherence to monitoring protocols.

A robust theoretical framework for Electronic Fetal Heart Monitoring incorporates a multifaceted understanding of maternal-fetal physiology, technological advancements, clinical guidelines, interpretation skills, human factors, and ethical considerations. This comprehensive perspective aims to guide healthcare professionals, researchers, and policymakers in optimizing the use of EFM to promote safe and effective obstetric care.

Conceptual Frameworks

Concept 1: The Interaction Between Maternal and Fetal Physiology

Conceptual Framework: Electronic Fetal Heart Monitoring (EFM) in Obstetric Care

Maternal-Fetal Physiology

The physiological interplay between the mother and the developing fetus is a complex and dynamic process that significantly influences the interpretation of Electronic Fetal Heart Monitoring (EFM) data. Understanding this intricate relationship is pivotal for healthcare professionals to accurately assess the well-being of the fetus during pregnancy and labor (Yeh et al., 2017). Maternal cardiovascular health directly impacts fetal oxygenation and nutrient supply. Changes in maternal heart rate, blood pressure, and cardiac output influence the fetal circulatory system. Uterine contractions, essential for labor progression, can temporarily reduce blood flow to the placenta. Understanding the impact of contractions on fetal

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oxygenation is crucial for distinguishing normal labor patterns from those that may pose risks (ACOG, 2020). Maternal-fetal gas exchange is a key determinant of fetal oxygenation. Any compromise in this process, such as due to placental insufficiency, can manifest in abnormal fetal heart rate patterns (Maeda et al., 2018).

Clinical Implications

Understanding the interaction between maternal and fetal physiology has direct implications for EFM interpretation and clinical decision-making:

Baseline Variability: Maternal factors influencing heart rate and uterine contractions contribute to variations in baseline fetal heart rate, requiring careful consideration during interpretation (ACOG, 2020).

Accelerations and Decelerations: Knowledge of the intricate relationship between uterine contractions and fetal oxygenation aids in distinguishing reassuring accelerations from concerning decelerations (Maeda et al., 2018).

Interventional Thresholds: Recognizing the impact of maternal factors on fetal well-being informs appropriate intervention thresholds, ensuring timely and targeted care during labor and delivery.

Concept 2: Continuous Advancements in EFM Technologies

Technological Advancements:

Electronic Fetal Heart Monitoring (EFM) has undergone significant technological advancements over the years, contributing to increased monitoring accuracy, reliability, and overall improvement in obstetric care. Understanding the evolution of EFM technologies is essential for healthcare professionals to make informed decisions and provide optimal care during pregnancy and labor. The continuous advancements in EFM technologies contribute to improved monitoring accuracy and reliability (American College of Obstetricians and Gynecologists (ACOG, 2020).

Technological Evolution and the clinical implications

i. Doppler Ultrasound and Fetal Scalp Electrodes:

Early EFM relied on Doppler ultrasound and fetal scalp electrodes, allowing for the detection of fetal heart rate (FHR) patterns. However, these methods had limitations in terms of mobility and continuous monitoring capabilities (ACOG, 2020). In Real-time Monitoring, computerized systems enable real-time monitoring and analysis, facilitating prompt intervention in case of abnormal findings.

ii. Cardiotocography (CTG): The introduction of cardiotocography represented a significant leap in EFM technology. CTG enabled simultaneous monitoring of FHR and uterine contractions, providing a more comprehensive picture of the fetal well-being (Westgate et al., 1993).

iii. Computerized Fetal Monitoring Systems: Modern EFM systems incorporate computerized analysis, allowing for more accurate and consistent interpretation of FHR patterns. These systems often include features such as central monitoring and electronic documentation (Cahill, 2016). In enhanced accuracy, improved sensors and signal processing algorithms contribute to more accurate and reliable detection of FHR patterns.

iv. Wireless Monitoring and Telemedicine: Recent advancements include wireless monitoring technologies, allowing for increased mobility and flexibility for pregnant individuals. Telemedicine applications enable remote monitoring and consultation, enhancing access to obstetric care (Jimenez et al., 2021). In remote monitoring, wireless technologies and telemedicine applications extend the reach of EFM, enabling remote monitoring and consultation, particularly relevant in times of public health crises like the COVID-19 pandemic

Concept 3: Adherence to Evidence-Based Guidelines in Electronic Fetal Heart Monitoring (EFM) Practices

Clinical Guidelines and Protocols

The implementation of evidence-based guidelines is fundamental to ensuring standardized and high-quality care in obstetrics. Electronic Fetal Heart Monitoring (EFM) is no exception, and adherence to guidelines, such as those provided by reputable organizations like the American College of Obstetricians and Gynecologists (ACOG) and the Royal College of Obstetricians and Gynaecologists (RCOG), is essential for optimizing maternal and fetal outcomes. The ACOG's guidelines offer comprehensive insights into EFM practices, providing recommendations on terminology, interpretation, and management principles, and standardize the nomenclature used in EFM, promoting consistency in interpretation and communication among healthcare professionals (ACOG, 2020), while that of RCOG's contribute to a global understanding of EFM, offering guidance on intrapartum care for high-risk women, emphasizing the importance of evidence-based practices (RCOG, 2017). Both ACOG and RCOG guidelines emphasize risk stratification to tailor EFM practices based on individual patient needs. This ensures appropriate management and intervention in cases of abnormal fetal heart rate patterns (ACOG, 2020; RCOG, 2017).

The Clinical Application: The adhering to evidence-based guidelines in EFM practices has direct implications for clinical decision-making: Like, consistency in communication, standardized nomenclature facilitates clear and consistent communication among healthcare

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providers, reducing the risk of misinterpretation (ACOG, 2020), the tailored interventions where risk stratification guides clinicians in tailoring interventions based on the assessed risk, ensuring timely and appropriate care for both the mother and the fetus (RCOG, 2017), and the continuous learning and updates, with regular updates to guidelines reflect evolving evidence, encouraging continuous learning among healthcare professionals to stay abreast of best practices in EFM (ACOG, 2020; RCOG, 2017).

Concept 4: Interpretation and Decision-Making in Electronic Fetal Heart Monitoring (EFM) Background

The accurate interpretation of Electronic Fetal Heart Monitoring (EFM) data is a critical skill that directly influences clinical decision-making during pregnancy and labor. Healthcare professionals must possess a nuanced understanding of fetal heart rate (FHR) patterns and uterine contractions to make informed decisions that optimize maternal and fetal well-being.

Components of Interpretation include: first, baseline variability in the FHR which is a key indicator of the autonomic nervous system's regulatory capacity. Adequate variability is generally associated with a healthy fetal nervous system (ACOG, 2020). Second, FHR accelerations are often reassuring signs of fetal well-being, while decelerations can indicate potential issues, necessitating careful differentiation between reassuring and non-reassuring patterns (Maeda et al., 2018). Third, understanding the relationship between uterine contractions and FHR patterns is crucial. Abnormal contractions may compromise fetal oxygenation, leading to non-reassuring FHR patterns, fourth, interpreting EFM data enables healthcare providers to make timely interventions. Recognizing non-reassuring patterns prompts actions such as changing maternal position, administering oxygen, or preparing for expedited delivery. Fifth, interpretation of EFM is often a collaborative effort among healthcare team members. Effective communication ensures timely decision-making and coordinated interventions (Wax et al., 2016). Sixth, Clear interpretation of EFM data allows healthcare providers to educate patients about the significance of findings, enabling informed consent for interventions and procedures (Chervenak & McCullough, 2017). Seventh, continuous monitoring and documentation of EFM data provide a comprehensive overview, allowing healthcare providers to identify trends and patterns that may necessitate adjustments in the management plan (ACOG, 2020). Eighth, interpreting EFM data contributes to risk stratification, guiding healthcare providers in tailoring care based on the assessed risk level and individual patient needs. Ninth, accurate interpretation of fetal heart rate patterns is crucial for timely decision-making and intervention (Maeda et al., 2018). Tenth, effective communication and teamwork among healthcare providers contribute to successful EFM implementation (Wax et al., 2016). Lastly, Ethical considerations, including informed consent and legal aspects, play a crucial role in the ethical use of EFM (Chervenak & McCullough, 2017).

Concept 5: Human Factors and Communication in Electronic Fetal Heart Monitoring (EFM)

Human factors, encompassing the skills, communication, and teamwork among healthcare providers, play a pivotal role in the effective implementation of Electronic Fetal Heart Monitoring (EFM). A comprehensive understanding of human factors contributes to improved patient outcomes and safety during pregnancy and labor.

Effective communication and collaboration among obstetricians, midwives, nurses, and other healthcare professionals are crucial for successful EFM implementation (Wax et al., 2016). Clear communication regarding roles and responsibilities within the healthcare team helps prevent misunderstandings and ensures a coordinated approach to EFM and patient care (Wax et al., 2016). Effective communication with patients involves engaging them in the EFM process, explaining findings, and addressing their concerns to foster a collaborative approach to care (ACOG, 2020). Transparent communication is essential in obtaining informed consent for EFM procedures and interventions, ensuring that patients understand the potential risks and benefits (Chervenak & McCullough, 2017). Ongoing training in EFM interpretation and communication skills is essential for healthcare providers to stay updated and proficient in utilizing monitoring technologies (Wax et al., 2016). Simulation-based training scenarios provide opportunities for healthcare teams to practice communication during various obstetric scenarios, enhancing preparedness for real-world situations (Wax et al., 2016). Recognizing potential challenges in communication, such as hierarchical structures or language barriers, is crucial to implementing strategies that foster open and effective communication (Wax et al., 2016). After critical events, debriefing sessions provide opportunities for healthcare teams to reflect on communication and teamwork, identifying areas for improvement and reinforcing successful practices (Wax et al., 2016).

Concept 6: Ethical and Legal Considerations in Electronic Fetal Heart Monitoring (EFM)

The utilization of Electronic Fetal Heart Monitoring (EFM) in obstetric care brings forth ethical and legal considerations that healthcare professionals must navigate. Balancing the interests of both the mother and the fetus involves addressing issues related to informed consent, patient autonomy, and potential legal implications in the event of adverse outcomes. Navigating ethical and legal considerations in EFM requires a comprehensive understanding of informed consent, patient autonomy, legal standards, and professional responsibilities. Healthcare providers should remain ethically aware, engage in continuous education, and seek ethical consultations when faced with complex scenarios to ensure the ethical practice of EFM in obstetric care.

Ethical EFM practices necessitate obtaining informed consent from pregnant individuals, ensuring they are adequately informed about the purpose, procedures, potential risks, and benefits of monitoring (Chervenak & McCullough, 2017). Respecting patient autonomy

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involves acknowledging the right of pregnant individuals to make informed choices about EFM, while healthcare providers provide relevant information and support decision-making (Chervenak & McCullough, 2017). Healthcare providers must adhere to established legal standards and guidelines governing EFM practices to ensure compliance with professional obligations and mitigate legal risks (ACOG, 2020). Healthcare providers have professional responsibilities to provide competent and ethical care, including EFM practices, while also addressing legal obligations such as documentation and adherence to guidelines. Ethical dilemmas may arise in intrapartum management decisions, especially when balancing the potential benefits of interventions informed by EFM data against the autonomy and preferences of pregnant individuals. Effectively communicating adverse outcomes identified through EFM requires ethical considerations, involving transparency, empathy, and support for patients and their families during difficult moments.

Healthcare professionals engaging in continuous education on ethical principles and legal updates related to EFM practices are better equipped to navigate complex ethical scenarios (Chervenak & McCullough, 2017). Healthcare institutions may establish ethical committees or encourage ethical consultations to provide guidance in addressing challenging ethical situations related to EFM (Chervenak & McCullough, 2017).

Methodology

To find pertinent studies and information on Midwives' Proficiency in Electronic Fetal Heart Monitoring: A Comprehensive Review, a thorough literature search was carried out. In order to carry out this assessment. International organization publications, government papers, and academic journals were analyzed, among other databases. The search parameters covered research done between 1993 to 2023, therefore the most recent results were guaranteed to be included. As part of the literature review, the Environmental Protection Agency (EPA), the United Nations, and academic journals in the fields of nursing science, technologies, and public health were consulted. Scholarly resources like PubMed and Google Scholar were also utilized. Terms that were frequently searched for included Midwives, Electronic Fetal Heart Monitoring, Interprofessional Training and Education, Fetal Physiology, Clinical Guidelines, Clinical Implications, Cardiotocography and the Royal College of Obstetricians and Gynaecologists.

Discussion

The knowledge and skills of midwives in electronic fetal heart monitoring.

The aim of Engelhart et al. (2022) study was thus to illuminate the knowledge before it is lost, by exploring the practice, skills and experience of Norwegian midwives familiar with the Pinard for intrapartum foetal monitoring. We included midwives who still regularly use the

Pinard in their current practice in a variety of birth settings, and those who used the Pinard in the era prior to the introduction of the CTG. This study followed a qualitative descriptive design based on mainly focus group interviews, but also including one individual interview. The interviews explored the participants' perspective on their practice, skills and experience regarding the use of the Pinard for intrapartum foetal monitoring. Reflexive thematic analysis captured common patterns across the data, and contextualism was used as research paradigm. In total, 21 midwives with experience using the Pinard for intrapartum foetal monitoring were interviewed. The midwives were either retired and had experience using the Pinard from before the CTG became widespread; worked in an alongside midwifery unit that only oversees low-risk births; or worked in an obstetric unit in a university hospital with an active policy of using the Pinard for intrapartum foetal monitoring. The analysis resulted in four main themes: "Practice and experience with the Pinard are related to context", "Skills with the Pinard come with work experience", "The Pinard reveals certain characteristics of foetal sound" and "Midwives' experience with the benefits of using the Pinard". The midwives considered the context for using the Pinard for intrapartum foetal monitoring relevant. The availability of technology and applicable situations for using the Pinard influenced how and when they use the Pinard. They further underpinned training and work experience as important for feeling secure when using the Pinard, and this experience made them recognize normal and abnormal foetal sounds. Defining and characterizing these sounds appeared difficult for the midwives, however, and they hesitated and imitated the sound. The midwives felt that the Pinard is beneficial for both the labouring woman and the midwife, as the Pinard's features bring them closer to the labouring woman and help calm the birth suite. They also felt that the Pinard adds further information about the birth and birth process, such as foetal lie, rotation and descent. Norwegian midwives' practice, and experiences in using the Pinard for intrapartum foetal monitoring are connected to context as technological development and applicable situations. The midwives explained that knowledge obtained through experience gives them skills to differentiate between normal and abnormal foetal sound characteristics, though they found it difficult to define the characteristics themselves. Using the Pinard stethoscope during birth calms the birth suite and brings the midwife closer to the labouring woman.

The attitudes of midwives towards the use of electronic fetal heart monitoring.

The attitudes of midwives toward the use of electronic fetal heart monitoring (EFM) are influenced by a combination of factors, including professional experience, training, clinical context, and the evolving landscape of obstetric care. While there is diversity in opinions, several common themes and considerations emerge when exploring midwives' attitudes toward EFM. Understanding midwives' attitudes toward EFM is crucial for fostering collaborative and effective maternity care. Research, education, and ongoing dialogue within the midwifery profession can contribute to a nuanced and balanced approach to the use of electronic fetal heart monitoring in various clinical settings.

Midwives often emphasize a holistic approach to care that considers the physical, emotional, and social well-being of the pregnant person. Some midwives may express concerns that overreliance on EFM might overshadow the broader aspects of maternity care (Leap and Sandall, 2010). According to Page et al. (1998), but emphasize the importance of balancing technology with personalized, woman-centered care. They may advocate for intermittent monitoring to maintain a more natural birth experience. Levett et al. (2015) are of opinion that midwives' attitudes may be influenced by their perceived skill and competency in interpreting EFM traces. Adequate training and ongoing professional development can impact midwives' confidence and comfort with using EFM in various clinical situations. In the case of Alfirevic et al. (2013), midwives often strive to practice evidence-based care. Their attitudes toward EFM may be shaped by the available research evidence on its effectiveness, safety, and impact on maternal and fetal outcomes. Lagan et al. (2011), midwives may advocate for shared decision-making with pregnant individuals regarding the use of EFM. Involving women in the decision-making process aligns with a woman-centered care model. According to Downe et al. (2010), some midwives may express concerns about the practical challenges and barriers associated with EFM, such as limited mobility for laboring women or the potential for increased interventions. While Walsh and Downe, (2010) opined that midwives' attitudes may evolve as they engage in continuous professional development. Exposure to new evidence, guidelines, and technologies can influence midwives' perceptions and attitudes toward EFM over time.

The challenges faced by midwives in the implementation of electronic fetal heart monitoring

Midwives encounter several challenges in the implementation of electronic fetal heart monitoring (EFM), reflecting the complex nature of incorporating technology into maternity care. These challenges can impact the quality of care, communication, and the overall birthing experience. Here are some key challenges faced by midwives (Table 1). Addressing these challenges requires a multidimensional approach, including ongoing education, training, collaborative communication, and a commitment to balancing technological advancements with the principles of woman-centered care in midwifery practice. Regular reflection, continuous professional development, and the incorporation of best practices can contribute to overcoming these challenges and improving the implementation of electronic fetal heart monitoring in midwifery care.

Table 1. Key challenges faced by midwives in the implementation of electronic fetal heart monitoring

Points	Challenge	Implications
Intermittent Monitoring vs. Continuous Monitoring	Balancing the desire for intermittent monitoring to facilitate mobility and comfort with the medical necessity of continuous monitoring in high-risk situations poses a challenge for midwives	Striking a balance that aligns with evidence-based practice while respecting women's preferences can be challenging
Technical Competency	Midwives may face challenges related to technical competency, particularly in interpreting electronic fetal heart rate patterns accurately.	Insufficient training or infrequent exposure to EFM may impact midwives' confidence in using the technology effectively.
Communication and Collaboration	Effective communication among members of the healthcare team, including midwives, obstetricians, and nurses, is crucial. Miscommunication or lack of collaboration can affect the timely interpretation and response to EFM data.	Ensuring clear lines of communication and fostering a collaborative environment are essential for optimizing EFM outcomes.
Limited Mobility for Laboring Women	Continuous EFM often requires women to be confined to bed, limiting their mobility during labor. This contradicts the midwifery philosophy of supporting movement and position changes during labor.	Finding ways to balance the need for monitoring with the desire for freedom of movement is crucial to maintaining a woman-centered approach to care.
Informed Consent	Obtaining informed	Balancing the necessity of monitoring

and Decision-Making	consent for EFM and involving women in decision-making can be challenging, especially when there are variations in the perceived benefits and risks of continuous monitoring	with respecting women's autonomy and ensuring that they fully understand the implications of EFM is an ongoing challenge.
Resource Allocation and Workload	High workload and resource constraints may limit the availability of midwives to provide continuous one-on-one support, affecting their ability to monitor fetal well-being closely.	Adequate staffing and resource allocation are critical for maintaining high-quality care and EFM implementation
Ethical Dilemmas	Midwives may face ethical dilemmas related to the use of EFM, particularly when balancing technology-driven interventions with the desire to uphold natural and woman-centered birthing practices.	Addressing these dilemmas requires a nuanced understanding of ethical principles, shared decision-making, and ongoing professional dialogue
Documentation Burden	The need for meticulous documentation of EFM findings can be time-consuming and may contribute to increased workload for midwives.	Striking a balance between thorough documentation and efficient use of time is essential for maintaining the quality of care.

The collaboration between midwives and other healthcare professionals in utilizing electronic fetal heart monitoring

Collaboration between midwives and other healthcare professionals in utilizing electronic fetal heart monitoring (EFM) is essential for providing comprehensive and coordinated maternity care. Effective communication, shared decision-making, and a collaborative approach contribute to optimal outcomes for both the mother and the baby. Here are key aspects of collaboration in the context of EFM (Table 2).

Table 2. Key aspects of collaboration in the context of EFM

Collaboration	Importance	Benefits
Interprofessional Communication	Open and effective communication between midwives and other healthcare professionals, such as obstetricians, nurses, and neonatal specialists, is crucial for the successful utilization of EFM.	Clear communication ensures that everyone involved is aware of the current status of labor, EFM findings, and any concerns, facilitating timely decision-making and intervention when necessary.
Shared Decision-Making	Collaboration involves shared decision-making, where midwives and other healthcare professionals work together to determine the most appropriate course of action based on EFM data and the individual needs and preferences of the pregnant person.	Shared decision-making promotes a patient-centered approach, aligning care with the values and preferences of the pregnant individual, and ensures a cohesive plan of action.
Role Clarity and Teamwork	Clearly defined roles and responsibilities for midwives, obstetricians, and other team members contribute to effective teamwork in utilizing EFM. Each professional's expertise is utilized for the benefit of the patient.	Role clarity reduces confusion, enhances efficiency, and promotes a collaborative environment where each team member's skills are maximized.
Interprofessional Training and Education	Ongoing interprofessional training and education ensure that all team members are knowledgeable about the latest EFM technologies, guidelines, and best practices.	Well-informed professionals can make collective decisions based on a shared understanding of EFM, fostering a collaborative culture centered on evidence-based care.
Case Review and Multidisciplinary Meetings	Regular case reviews and multidisciplinary meetings provide opportunities for midwives and other healthcare professionals to discuss EFM cases, share experiences, and address challenges collaboratively.	Such meetings facilitate continuous learning, enhance communication, and strengthen the collaborative bonds among healthcare professionals involved in maternity care.
Utilization of Team Resources	Effective collaboration involves utilizing the expertise and resources of each team member. This includes leveraging the skills of midwives in providing holistic care and obstetricians' expertise in managing high-risk situations.	By capitalizing on each professional's strengths, the team can offer well-rounded care that addresses both the medical and emotional aspects of childbirth.
Effective	Smooth handovers between shifts and	A well-coordinated transition

Handovers and Continuity of Care	effective continuity of care are crucial for maintaining consistent monitoring and seamless collaboration.	ensures that crucial information is conveyed, and the continuity of care is maintained, preventing disruptions in EFM and overall maternity care.
Conflict Resolution Strategies	Conflicts may arise in the course of collaboration. The ability to address conflicts respectfully and constructively is vital for maintaining a positive and effective working relationship.	Conflict resolution strategies contribute to a healthy work environment, fostering trust and cooperation among team members.

In summary, collaboration between midwives and other healthcare professionals in utilizing electronic fetal heart monitoring is fundamental for providing high-quality and patient-centered maternity care. Open communication, shared decision-making, and a commitment to leveraging the strengths of each team member contribute to a collaborative and supportive healthcare environment.

The impact of midwives' involvement in electronic fetal heart monitoring on perinatal outcomes

Research on the impact of midwives' involvement in electronic fetal heart monitoring (EFM) on perinatal outcomes highlights the role of midwives in providing safe and effective care during pregnancy and childbirth. While midwives are often associated with low-risk, physiological births, they also play a crucial role in monitoring and responding to fetal well-being through EFM when necessary.

Brocklehurst et al. (2011), compared perinatal outcomes by planned placebirth, including midwifery-led units and home births. The research highlighted the safety of midwifery-led care and suggested that low-risk pregnancies may benefit from midwife-led models. In the study of Vedam et al. (2018), they studied, the outcomes of collaborative midwifery care, including the use of EFM in birth centers. It demonstrated positive perinatal outcomes and safety associated with midwife-led care in a non-hospital setting. Sandall et al. (2013) Cochrane review found that midwife-led continuity models of care are associated with a reduction in intrapartum interventions, including electronic fetal monitoring, without compromising perinatal outcomes. The study supports the safety and effectiveness of midwifery-led care in low-risk pregnancies. The Cochrane review of Alfirevic et al. (2013) indicated that continuous cardiotocography (CTG), a form of EFM, did not significantly improve perinatal outcomes compared to intermittent monitoring. The study suggests that the choice of monitoring should be based on the individual needs of the woman and the clinical context. In the study of Sandall et al. (2016), it was found that midwife-led models of care are associated with lower rates of interventions, including electronic fetal monitoring, and are not linked to adverse perinatal outcomes. Midwife-led care emphasizes a woman-centered approach and fosters a supportive environment for physiological birth.

While these studies collectively suggest positive outcomes associated with midwives' involvement in electronic fetal monitoring, it is essential to consider that the impact may vary based on the specific model of care, the setting, and the individual needs of the pregnant person. Midwives contribute to a holistic and woman-centered approach, emphasizing the importance of personalized care and shared decision-making in the context of EFM. Collaborative models that balance technology with individualized care appear to contribute to positive perinatal outcomes.

Conclusion

In conclusion, this review underscores the importance of a holistic approach to assessing and enhancing midwives' proficiency in electronic fetal heart monitoring. It is clear that addressing both theoretical knowledge and practical skills is crucial for optimizing perinatal care outcomes. Educational interventions, continuous professional development, and a nuanced understanding of contextual challenges are key elements in shaping the future direction of midwifery practice in EFM. As we move forward, a collaborative effort among educators, healthcare institutions, and policymakers is essential to implement targeted interventions that empower midwives and ensure the highest standards of care for expectant mothers and their infants.

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