

# The potential of midwife led care in high- and middle-income countries in reducing unnecessary caesarean sections in uncomplicated pregnancies – a scoping review

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## **Abstract**

**Introduction** Caesarean sections can be a lifesaving procedure that can prevent maternal and perinatal morbidity. While potentially lifesaving in certain circumstances, they can pose long and short-term health risks for mothers and their offspring when medically unnecessary. The global caesarean section rate has significantly risen since the 1990s and continues to rise, surpassing the recommended ideal rate for caesarean sections of 10-15% at population level put forward by the World Health Organisation. This indicates that a big proportion of caesarean sections are performed unnecessarily. Midwife led care has shown to offer a means to decrease unnecessary caesarean sections. This is due to the midwife philosophy they follow, focusing on normal birth that is in contrast to doctor led care, which is the standard form of maternity care in most countries.

**Aims and objectives** This study aims to investigate the potential of midwife led care in reducing unnecessary caesarean sections in low-risk women. The ‘potential’ of what midwife led care can offer to the reduction of caesarean sections is split into the three main aims of this study. Firstly, to identify the evidence for midwifery led in reducing unnecessary caesarean sections in low-risk women. Secondly, to identify how midwife led care has a different approach towards care of pregnant women and birth compared to doctor led care. And lastly, to discover the theoretical models or interventions used by midwifery led care that may be utilised for reducing caesarean sections.

**Methods** A scoping review was conducted on PubMed and Web of Science using a tailored search strategy for each database to identify literature on publications which reported on caesarean sections and midwifery led care, in order to catch all relevant literature. The Bramer method was used to de-duplicate studies which were found through database searching. Subsequently, collected studies were screened based on pre-established inclusion and exclusion criteria. Key information was extracted from the remaining papers on a custom standardised data extraction and findings were summarised narratively to map the existing literature.

**Findings** Nineteen studies reported on caesarean section outcomes of low-risk women receiving either midwife led care or obstetrician led care, revealing mixed results. Further, there were six studies which reported on the experience of women receiving midwifery led care, revealing themes of maternal empowerment, fear and anxiety, satisfaction with pregnancy and childbirth and satisfaction with the environment under midwifery led care. Discussion on theoretical underpinnings were sparse in the literature. Lastly, interventions such as midwife led counselling and psycho education were shown to help reduce elective caesarean sections.

**Discussion/Conclusion** This study reveals that effective midwifery led care with its underlying midwifery philosophy of normal physiological birth may have significant contributions in increasing vaginal normal birth in low-risk women and thus reducing the rate of unnecessary caesarean sections. Furthermore, it demonstrates the importance of theory in informing practice.

## **Foreword**

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– Yarra A. Worang  
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## **1.0 Introduction**

This thesis attempts to explore broadly, in a scoping review fashion, the research pertaining to the potential in regard to midwifery led care in high- and middle-income countries in reducing unnecessary caesarean sections in uncomplicated pregnancies. The sustained and unparalleled rise in worldwide caesarean sections rates, which has not been accompanied by significant maternal or perinatal benefits, has brought up the need for evidence-based recommendations on ways to reduce them.

### ***1.1 Background***

#### *History*

Caesarean sections have been performed on women for well over four centuries. The way in which it is performed, the reasons for it and public perception have changed over the course of the years it has been carried out (Cheyne, Abhyankar and McCourt, 2013). The origins of the term “caesarean section” come from the lex Regia, which is the Roman legal code from the eighth century BC. Enclosed in the lex Regia, it was advised that dying mothers before giving birth; should have their babies cut out of them from the womb (Simpson and Weiner, 1989) (Wolff, 1951). In the ancient and medieval times, caesarean sections were performed primarily for the sake of rescuing a child from the womb, as it was the case that the mother was either dead or dying. This was an often occurrence, as the mothers would die from complications, such as from haemorrhage or infections, after a caesarean section, due to the state of medical knowledge at the time (Todman, 2007). In the early modern era, caesarean sections were not advocated in the medical community as a lifesaving procedure due to the risks that were involved. However, it was during this time that significant knowledge and medical advances were achieved, particularly towards the understanding and benefit of the female anatomy. At this time, people in the medical field had access to body cadavers, which allowed them to learn more about the human body. The development of anaesthesia, the knowledge of closing the uterus after a caesarean section with silver material sutures and advances in asepsis had made the procedure safer for the birthing mother (Carter and Durietz, 1986) (Todman, 2007). Subsequently through these medical advances, the maternal mortality rate significantly fell; from approximately between 65-75% in the beginning of the era to between 5-10% towards the end (Munro Kerr, 1954). From the twentieth century

onwards, there were several other advances in obstetrics which has made the caesarean section procedure even more safe for mother and baby. Advances included accessibility to blood transfusions, where and when best to use sutures, lower segment incision, the development of epidural anaesthesia and oxytocin, improvement in patient care and postoperative care. These advances simultaneously, made the procedure safer as complications became more and more uncommon (Sellheim, 1908) (Latzow, 1909) (Liu *et al.*, 2007). Throughout history, there has been a significant change in the perception of the caesarean section. In the past it was seen as a last resort solution when the baby was unable to be birthed naturally through the vagina and nearing the present time; the procedure is viewed largely as an elective procedure due to how safe medical advancements have made it.

### *Current state*

At present, a caesarean section is a surgical procedure that is defined as the foetal delivery through an incision made in the abdomen and uterus (Sung and Mahdy, 2022). It is important to state early on that this paper does not intend to discourage caesarean sections; when medically necessary they can be a life-saving procedure for both mother and new-born and can prevent maternal and perinatal morbidity. There is no official worldwide caesarean section rate, however, the World Health Organization since 1986 has been recommending an ideal rate for caesarean sections to be between 10-15% at population level. Based on the evidence, a rate that is above 15% is not justified as there are no clear health or other benefits directed towards women and their babies (WHO, 2015). More recently, in 2015, the World Health Organization found that caesarean section should be performed for medically indicated reasons, and that caesarean section rates which are greater than 10% at national level are not associated with improved maternal and new-born outcomes; suggesting many are performed unnecessarily. Additionally, apart from being unnecessary, women and their offspring are without the benefits of natural birth through the vagina (Betran *et al.*, 2021). Despite the above-mentioned recommendation, caesarean section rates have surpassed the ideal rate and continues to increase in high- and middle-income countries. The global caesarean section rate was approximately 7% in 1990 and in 2021 it had risen to 21%, with the number projected to increase into the year 2030. In the Caribbean and in Latin America, 43% of births are via caesarean section. In countries such as the Dominican Republic, Cyprus, Egypt, Brazil and Turkey, caesarean section has outnumbered vaginal delivery; this

is a clear indication that a significant portion of surgeries lack medical indication for their execution (WHO, 2021).

### *Reasons for the increase in caesarean sections*

The reasons for the increase in caesarean section rates are vast and are controversial among researchers. The increase may be attributed to obstetrician and their experiences, hospital protocols, the ability for the mother to request a caesarean section without a medical indication and health care provider payment system of different countries. Firstly, a thematic analysis study by Fenwick *et al.* (Fenwick *et al.*, 2010) reported factors and influences that made women with low risk/ normal pregnancies prefer caesarean section. The study included 210 women from Queensland and Western Australia who had requested their health advisors for a caesarean section without having a medically indicated reason. The study identified four substantial themes. A major reason for a caesarean was the fear of giving birth naturally through the vagina; women were worried that vaginal delivery would bring about physical pain and damage to their bodies. Some participants had the belief that vaginal birth was harmful to the baby, because of bad experiences from their friends or family; and thus, caesarean section was viewed as the safest mode of delivery. Further, caesarean sections offered these women control over the birthing experience. They were able to orchestrate when they would give birth with having the right medical personnel or professional right at their grasp. It was apparent that their obstetrician did not try to understand or consult with them after the women had requested a caesarean section without clinical indication; the obstetrician was encouraging and accepted their request. The women in the study did not view birth as a natural process or a meaningful experience, rather they viewed birth as a means to get a baby out of their body. Birth was not viewed as something happening to them but more as a distant and cold process that had to happen to expel the baby out of their bodies. Lastly, when the women were asked to recall the risks of a caesarean section; majority of the women downplayed the risk or could only identify a few risks from what their obstetrician had told them about the surgery. Many women believed that the risks of a caesarean birth would not happen to them as it was overshadowed by their trust in the medical skills and experience of their obstetrician. Interestingly enough, it did not deter the women from getting an unnecessary caesarean section in the future even though they had experienced surgical complications from it in the past; they downplayed their complication and accepted that it was a possible risk of a surgery (Fenwick *et al.*, 2010). There are other

major factors other than maternal request, as mentioned earlier, influence the increase in caesarean section rates. In a study, it was found that women who did not want to undergo a caesarean section at the beginning of their pregnancy did so after obstetrician given advice even though they did not have a listed indication according to the official guidelines. It was found that some caesarean sections that were obstetrician defined were not guideline indicated, suggesting that obstetricians have their own interpretation of the guideline, which may result in women having unnecessary caesarean sections. It was also reported by Gao et al. (Gao *et al.*, 2013), that obstetricians in China for example; had a problem of over diagnosing maternal and foetal risk; which contributed to them advising pregnant women to go through a caesarean section. Further, there are major problems worldwide of obstetrician being monetarily incentivised to perform caesarean sections, due to financial incentives such user charges, fee for service and general healthcare operation costs. The obstetrician effectively; gains more income by performing more surgeries (i.e., more caesarean sections) (Neuman *et al.*, 2014) (Einarsdóttir *et al.*, 2013)). Moreover, doctors and hospitals have a fear of getting sued over potential practice risks and try their best to avoid maternal death when delivering a baby. Therefore, this incentivizes them to perform more caesarean sections as they have more control over the outcome if any complications arise during the birthing process (Sorrentino *et al.*, 2022). This does not cover all of the existing reasons for the increase in caesareans sections, however it tries to give a brief summary.

#### *Short- and long-term consequences of a caesarean section for mother and child*

As previously stated, caesarean sections can be lifesaving, however when they are unnecessary; vaginal birth can be safer as the alternative exposes mothers and their babies to avoidable risks and disadvantages. When compared to vaginal delivery, there are many short-term and long-term health effects of caesarean section for women and their children. The risk of maternal mortality is rare in high resource settings; however, the risk of mortality is increased in future births after a caesarean section; attributed to an increased risk of abnormal placentation and uterine rupture (Gregory *et al.*, 2012)(Deneux-Tharoux *et al.*, 2006). Compared to women who deliver vaginally, women who deliver via caesarean section are at increased risk of complications that arise from birth, such as requiring a hysterectomy, complications due to anaesthesia, uterine rupture, haemorrhage, cardiac arrest, acute renal failure, thromboembolism, hematoma, and puerperal infection (Liu *et al.*, 2007). The long-term effects of caesarean section for mothers include pelvic organ prolapse, sexual



dysfunction, pelvic adhesions, menorrhagia, chronic pain, and small bowel obstruction. Additionally, the prevalence of developing adhesions after caesarean sections increases with each subsequent operation (Abenhaim *et al.*, 2018), as well as decreased future fertility has been associated with caesarean sections (O'Neill *et al.*, 2013).

In terms of the effects on child health; there may be extensive consequences for short term and most importantly long-term health which may carry over to adulthood. It has been investigated that due to being born by caesarean section, these children may eventually develop features of metabolic syndrome, such as autoimmune diseases, risk of obesity, type 1 diabetes, adiposity, asthma, allergies, and changes to liver function (Metsälä *et al.*, 2008; Cho and Norman, 2013). There are underlying mechanisms are elucidated by various theories. Briefly there is the gut dysbiosis theory which says that the mode of delivery effects the type of bacteria that colonizes the gut of the infant, which affects the development of their immune system (Bäckhed *et al.*, 2015). Infants born vaginally are exposed to maternal vaginal bacteria and colonized with commensal bacteria which is crucial for proper gut colonization; lack of; may lead to systematic immune and metabolic disorders. Secondly, the stress and the hypothalamic-pituitary-adrenal axis theory (Lagercrantz and Slotkin, 1986), states that foetal hypoxia and the contraction of the uterus during vaginal delivery stimulates a large amount of stress hormones activate the hypothalamic-pituitary-adrenal axis. Stress hormones have strong anti-inflammatory properties and have an important role of developing and regulating the immune system. Finally, the hygiene hypothesis, proposes that children that are born through a caesarean section are less likely to be exposed to infection than those born vaginally, therefore increasing their risk of developing autoimmunity, as a result of inadequate stimulation of innate gut cells (Hyde *et al.*, 2012).

Considering the health risks that caesarean sections may affect mothers and their children, it is important to reduce their frequency in uncomplicated pregnancies, defined in this review as a singleton gestation without maternal or foetal risk factors (NICE, 2019). This study will focus on midwife-led care and their potential in decreasing the frequency of caesarean section performed on low risk/ uncomplicated pregnancies in middle- and high-income countries, this is in comparison to other more widely used models of care; obstetrician or family doctor led models of care.

### *What is a midwife and what is midwifery led care?*

According to the World Health Organization (WHO), International Confederation of Midwives (ICM) and the International Federation of Obstetricians and Gynaecologists (FIGO), a midwife is somebody who has successfully completed an education program in midwifery based on "the ICM Essential Competencies for Basic Midwifery Practice and the framework of ICM Global Standards for Midwifery Education", and they are recognized in the country which it is in; and has obtained the qualification to be legally licensed and registered to practice midwifery (International Confederation of Midwives, 2017). Midwives are competent providers of care; specifically trained in the care of a woman with normal pregnancies and births (Fullerton *et al.*, 2003) (ICM/WHO/FIGO, 1992).

Midwifery led care is care where the midwife is the lead professional in the planning, delivery, and organization of the care given to a pregnant woman from initial booking to post-natal period, unlike in obstetrician or family doctor led models of care. They have the responsibility of assessing the pregnant woman's needs, planning her care, giving her referrals to other professionals and for provision of maternity services. The universal philosophy of midwives highlights normal physiologic pregnancy and labour, as well supporting women to give birth without unnecessary intervention (International Confederation of Midwives, 2013). Respectively, midwifery led care is an umbrella term whether the care provided, is using the midwifery-led continuity model of care or whether care is received in a midwifery led unit. Midwifery led continuity models provides care to women from the same midwife or a team of midwives throughout the whole pregnancy and birth (Sandall *et al.*, 2016). Whereas midwifery led units are an example of how midwifery led care model is being integrated into existing healthcare systems. They provide spaces where the midwife is allowed to be the primary healthcare professional caring for low-risk pregnancies unlike on traditional obstetric settings, which is the case in most middle- and high-income countries. Nevertheless, in this review, midwifery led care includes all care that is provided by a lead midwife who is in charge of all aspects of their patients care. Midwifery led care emphasizes and promotes a bio-psycho-social model of care, also referred to as social model of care, which is in contrast to the bio-medical model promoted by traditional obstetric care (Walsh and Newburn, 2002). This will be clarified further below.

## ***1.2 Analytical approach: social and medical model of care/birth***

### *The 'ideal type' and the changes in the perception of childbirth and pregnancy*

Before proceeding, we must put forward the mental construct of the 'ideal type' coined by Max Weber. The medical and social model can be viewed as ideal types in the conduct of health and illness or generally in the health domain. The ideal type is not something we strive for or find perfect, nor is it meant to be a moral ideal. In our ideal types of medical and social model, we try to simplify reality by taking characteristics and elements of the given phenomena (i.e., the differences in how healthcare is given and practiced in the two models) and place it into a constructed ideal. Though these ideal types, do not match the chaotic and less transparent nature of reality, it serves as a starting point in social science to describe a basic method for comparative study (Weber, 1949).

The potential that midwives can offer to decrease unnecessary caesarean section procedures is rooted in the two opposing schools of health and illness: through a medical or social model lens. (Chang and Christakis, 2002)(Helman, 1985)(MacKenzie Bryers and van Teijlingen, 2010). These two approaches are extended into pregnancy and childbirth. Prior to the 20<sup>th</sup> century, pregnancy and childbirth was seen as a natural process; placing emphasis on the importance of the birthing woman's family and herself in the process. Childbirth was shown and accepted as an emotional and social event which took place in the birthing woman's home. The rapid growth in science and medicine in the industrialized world during the 20<sup>th</sup> century, along with the popularity of rationalism and the growth of hospitals as institutions and the proliferation of medical professions, led to the medicalisation of pregnancy and birth. What was once viewed as a natural event, is viewed as a pathological event through the process of medicalisation. Through medicalisation, pregnancy and childbirth is seen through a medical model, whereby midwives and women themselves are pushed out of the birthing process and it is the medical professional that develops and controls knowledge within pregnancy and birth. As such, women lose the autonomy over their own bodies as control is transferred to doctors and their body is as an incubator for carrying and developing an unborn child. This view of pregnancy and childbirth is the predominant view of maternity care that is

practised in majority parts of the world (Neiterman, 2013) (Johanson, Newburn and Macfarlane, 2002).

### *The medical model of care*

Pregnancy and childbirth are physiological and biological events, which are embedded in a social setting. However, they are controversial socially and medically, as it is unclear whether to view pregnant women as ill or as well. Medical professionals, other than those dealing with pregnancy, have an easier time recognising whether someone is ill or not as diagnosing illness in their field is more straightforward. As such, it makes it easier for medical professionals in this case to intervene medically (van Teijlingen, 2017; Scarf *et al.*, 2018). The majority of women who are pregnant will experience a normal pregnancy without any risk. However, it is the possibility of risk in pregnancy and childbirth that lends to the normality of medical interventions in the medical model of care. In this view, medical control in childbirth is needed to guarantee safety through monitoring which allows the use of intervention in the possibility of the development of risk. Thus, risk cannot be selected out nor can it be predicted, justifying viewing pregnancy as an illness. Viewing pregnancy and childbirth pathologically similarly to disease, implies that the most appropriate response is found within the medical model of medical intervention

The medical model of care is predominantly practised by medical practitioners, i.e., doctors, obstetricians, and physicians. Medical practitioners through medical school are socialised into thinking, practising, and behaving according to the medical model. Generally, the medical model has a mechanical view of illness, disease, and the human body. It is purely based on biology and physiology. At the operational level, pregnancy and childbirth is viewed as a medical process practiced mainly by obstetricians. Pregnancy and childbirth is viewed scientifically, where it is considered a normal event only after the fact that nothing has gone wrong. The medical model of birth focuses on consequentialist ethics, which supposes that the correct moral response is solely related to consequence of an act. Therefore, an obstetrician will strictly pursue an action which will result in the greatest good for the greatest outcome, the maximisation of health (Savulescu and Wilkinson, 2019). This pursuit may affect the way in which obstetricians interact with their patients, as well as the way in which they view birth. The relationship between obstetrician and patient may be described as a dominant-subordinate relationship where care received is brief, depersonalised, and lacking

emotional support. The main aim for the obstetrician is quantitative, such as focusing on reducing maternal and infant mortality. The patient is therefore viewed as a number or a statistic (Teijlingen, 2005). Additionally, the medical model is concerned with task-oriented goals, which in this case is to treat the disease and to anticipate problems, rather than the promotion of health and welfare. It focuses on interventionism, such as the treatment of individuals and does not concern itself with the social conditions surrounding the patient. The disease is viewed as part of the patients which brings about an individualistic approach to diagnosis and treatment. Pregnant women are seen as objects, whereby procedures must be done to them to ensure minimal risk and the outcomes of a healthy mother and new-born (Walsh and Newburn, 2002). Within obstetrics, childbirth is viewed as a production facility. Women are seen as the machine that produces the final product of a new-born. The medical professional is seen as the operator or as the mechanic that 'fixes' the woman when a mechanical part or process is not working as it should (when risk arises). This technocratic view of childbirth is written vastly by feminist sociologist, Barbara Katz Rothman, who describes the body as a machine, needing technical solutions in the face of technical problems (Katz Rothman, 1982). The woman is the broken machine that is to blame if problems arise during birth or pregnancy.

### *The social model of care*

Within the social model of care, pregnancy and birth are viewed as normal processes, viewed as a natural event and part of a woman's life cycle. In this view, most women who are pregnant have a normal and safe pregnancy and childbirth with minimal intervention. As such, women who fall out of this majority, who are not expected to have a normal pregnancy, may be selected out and may receive the necessary medical interventions needed. Risk selection is therefore possible within this model of care (Teijlingen, 2005).

The social model of care is also known as the midwifery model of care, as it is midwives who predominantly practise it. Broadly speaking, the social model of health believes in the social determinants of health, which argues that it is the inter-dependency of the conditions in the environments where people are born, grow, work, live and age and the wider set of forces and systems that influence health. From this perspective, disease is viewed as a part of a patient that is determined by their social environment. Disease and health is viewed multidimensionally and cannot be solved using individualistic solutions (van Teijlingen,

2017) (Walsh and Newburn, 2002) (WHO, no date). The social model focuses on a different approach to ethics than the medical model, known as duty-based ethics. Within duty-based ethics, there are certain actions that can be morally right or wrong, regardless of the consequences they bring about (Tseng and Wang, 2021). In maternity care, this is reflected in the fundamental aims of the social model of care of a healthy mother and new-born but also the emphasis on the satisfaction of the mother and the family. Additionally, the social model takes on a holistic and life enhancing approach that places significance on the personal experience of health. This approach to care, provides a different relationship between care provider and patient than the medical model of care. The relationship is characterised by shared decision making between birthing woman and care giver, strong emotional support, and personalised care. Another way to look at the social model of care is that it is concerned with process-oriented goals, emphasising the experience of care provided rather than the outcome. In midwifery, the central idea is based on the women's perspective and experience of birth, the process rather than the goal. Birthing is far more significant than the expulsion of a baby from a female body, it is a process which has spiritual significance attached to it. The experience and the sense of power of the mother actively participating in the birth of her child is as important as the birth of a healthy infant child (MacKenzie Bryers and van Teijlingen, 2010) (Ekström and Thorstensson, 2015). Pregnant women are more than passive incubators, they are people with their own emotions, thoughts and complex social backgrounds which interact together to bring about a unique experience of pregnancy and childbirth and thus needs to be treated in such a way. It is increasingly documented that through the use of the social model of birth, women may feel more supported through the critical moments of pregnancy and birth, which helps to support women's overall wellbeing and the promotion of vaginal delivery (normal birth) (Shaw, 1984; Misago and Murphy-Lawless, 2000; Stjernholm *et al.*, 2021).

The presentation and the analysis of the results brought forth by this scoping review will be guided by the above-mentioned theoretical approaches of the medical and social model of care.

#### *Evidence for the social model of care*

There is high quality evidence to support midwife-led care for women with uncomplicated/ low risk pregnancies in high income countries as they as they found no statistically

significant impact on infant mortality and lower odds of obstetric intervention and maternal morbidity (Scarf *et al.*, 2018). A study conducted in Lithuania, showed that midwife-led care in younger women was associated with significantly decreased odds for CS when compared to obstetrician led group (Bartuseviciene *et al.*, 2018). However, there are gaps in the literature. Most of the studies on midwife led care, do not focus solely on caesarean section outcomes but mainly on other perinatal outcomes, such as neonatal hospitalization, opiate analgesia, postpartum haemorrhage, etc. (Jiang *et al.*, 2018) (Chapman *et al.*, 2019). Further, studies which compare obstetric led care and midwife led care are geared towards the financial cost saving aspects of midwife led care, not so much the benefit of the patients (Attanasio, Alarid-Escudero and Kozhimannil, 2020) (DeJoy *et al.*, 2020). An explanation of the contribution of and in what ways midwifery led practice can promote the reduced usage of caesarean sections is sparse in the literature. Additionally, there is a lack of systematic analysis of the scope of midwifery led practice and how it can reduce caesarean sections in one review.

### ***1.3 Research question and aims of the review***

Using the scoping review methodology, the research question to be answered is the potential of midwife led care in high- and middle-income countries for reducing unnecessary caesarean sections in uncomplicated pregnancies. To operationalise ‘potential’, it is split into the three main aims of this review. Firstly, the aim of this review is to identify the evidence for midwifery led care in reducing unnecessary caesarean sections in middle- and high-income countries in uncomplicated pregnancies. The second aim is to identify gaps in the knowledge and investigate how midwife led care can have a different approach towards care of pregnant women and birth in contrast to doctor led care. The third and last aim, to discover the theoretical model/s or interventions by which the midwifery model of care may utilize; that makes it fundamentally different from doctor led care.

## 2.0 Methods and methodology

A scoping review was selected as the most appropriate method given the lack of organized literature and studies solely on the topic of the scope of midwifery led care in reducing caesarean sections. The Johanna Briggs Institute and Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) Checklists were used as methodological guides (JBI, 2022).

To identify the main concepts in the primary review question, we used the PCC (Population (or participants)/ Concept/ Context) framework; which was also used to inform the search strategy (Pollock *et al.*, 2021). Once again, the review question is: “*The potential of midwife led care in high- and middle-income countries in reducing unnecessary caesarean sections in uncomplicated pregnancies – a scoping review*”, this was broken down to these elements shown below in Table 1.

**Table 1.** PCC framework

<b>PCC element</b>	
<b>Population</b>	Women with uncomplicated/ low risk pregnancies
<b>Concept</b>	Midwifery led care used to decrease unnecessary caesarean sections
<b>Context</b>	In middle- and high-income countries

### 2.1 Developing the protocol

#### Eligibility criteria

Subsequently, a preliminary search was conducted using the key phrases “midwifery led care” and “caesarean section” on Google Scholar to validate the research question and to get a sense of synonyms and important key words to put in our search strategy. The search strategy and the inclusion and exclusion criteria were decided upon prior to initiating the data



base search. There were no limits placed on year of publication. Below is a complete list of **the inclusion and exclusion criteria and limitations** (table 2).

**Table 2.** Inclusion, exclusion criteria and limitations

<b>Inclusion criteria</b>	<b>Exclusion</b>	<b>Limitations</b>
Full text available	Full text unavailable or abstract only papers	English Language
No limitation on publication date	Studies exclusively on low-income countries	Human studies
Middle- and high-income countries	Complicated/ high risk pregnancies (valid indication for a caesarean section) *applied to comparison of outcome studies for caesarean section outcomes	
Uncomplicated/low risk pregnancies	Studies which do not include care models related to midwife led care	
Multiparous, nulliparous, and primiparous women	Vaginal delivery after caesarean section studies (VBAC)	
Comparison of outcome (which include caesarean section outcomes (not including elective or emergency) studies of midwifery led care with doctor led/ or obstetrician led maternity care (physician or any synonyms for a doctor)	Use of midwives in homebirths	
Maternity care that is led by a midwife not just a midwife present	Midwives in collaborative care with doctors/ obstetricians	
Studies on woman's experiences or perception with midwifery led care (does not have to specify low risk women)	Cost-effectiveness studies	

<p>Studies on midwives' perception of mothers' experiences with midwifery led care (does not have to specify low risk women)</p>	<p>Reviews, articles in Press, note, editorial, conference review, chapter, book, book chapter, tombstone, retracted, guidance, policy, comment, address, autobiography, bibliography, biography, Clinical Trial, Veterinary, comment, congress, consensus development conference, consensus development conference NIH, dataset, dictionary, directory, duplicate publication, electronic supplementary materials, English abstract, festschrift, guideline, historical article, interactive tutorial, interview, introductory journal article, lecture, legal case, legislation, letter (with caution), news, newspaper article, observational study (veterinary), overall, patient education handout, periodical index, personal narrative, portrait, practice guideline, Preprint, Published Erratum, Research Support, American Recovery and Reinvestment Act, Research Support, N.I.H., Extramural, Research Support, N.I.H., Intramural, Research Support, Non-U.S. Gov't, Research Support, U.S. Gov't, Non-P.H.S., Research Support, U.S. Gov't, P.H.S., Research Support, U.S. Gov't, Retracted Publication, Retraction of Publication, Scientific Integrity Review, Technical Report, Validation Study, Video-Audio Media, Webcast, protocol, authors reply</p>	
<p>Studies on midwife scope of practice or interventions to support normality of birth/ support vaginal birth (does not have to specify low risk women)</p>	<p>Studies on perception of midwifery led care of women who have not experienced it or midwives who have not provided midwifery led care</p>	
<p>Studies which report on caesarean section outcomes, not planned or emergency caesarean sections</p>		

Studies which were included in the scoping review had these characteristics, full text available, no limitation on publication date, middle income or high-income country, women with uncomplicated pregnancies, multiparous women, care led by a midwife or a group of midwives, comparison of outcome studies of different care model, no time limits places on individual studies, studies which included birthing outcomes and primary and secondary studies. Restrictions were placed on human studies and the English language. Additionally, articles in Press, note, editorial, conference review, chapter, book, book chapter, tombstone and retracted were excluded from the review. Studies which were on women's experiences or perceptions of midwifery led care did not need to state that their participants were low risk as it can be assumed that the participants were not of high risk, as such they would be referred to the normal/ obstetric maternity unit. It is usually the case whereby, low risk women have the choice of midwife-led care or obstetric unit and women with high risk are put in obstetric maternity unit; as they have higher chances of obstetric complications (Bolten *et al.*, 2016; Voon *et al.*, 2017) (National Academies of Sciences *et al.*, 2020).

In studies which did not specify any exclusion criteria, it can be assumed that the participants were not of high risk, as such they would be referred to the normal/ obstetric maternity unit. It is usually the case whereby, low risk women have the choice of midwife-led care or obstetric unit and women with high risk are put in obstetric maternity unit; as they have higher chances of obstetric complications (Bolten *et al.*, 2016; Voon *et al.*, 2017) (National Academies of Sciences *et al.*, 2020).

*Definitions of terms and rationale of key words, phrases, and concepts.*

To aid in the screening process, certain terms are defined below. The classification for middle income and high-income country are according to the World Bank definition.

**Middle income country:**

Middle income economies are those with GNI per capita, calculated using the World Bank Atlas method, of between \$1,086 and \$13,205 (including lower middle income and upper middle-income countries) – this definition is sourced from the World Bank for the current 2023 fiscal year (The World Bank, 2023).

**High income country:**

High income economies are those with a GNI per capita, calculated using the World Bank Atlas method, of \$13, 205 or more – this definition is sourced from the World Bank for the current 2023 fiscal year (The World Bank, 2023).

**Rationale for choosing middle- and high-income countries.**

This study chooses to select studies that include middle- and high-income countries as there is a clear relationship between c-section coverage and wealth at an ecological level in terms of increasing national wealth. In lower income countries (countries which nationally have CS rates below the recommended 10% level), unnecessary caesarean sections occur rarely at national level as access to safe caesarean sections is not guaranteed; they do however occur in wealthier household groups. Furthermore, middle income and high-income countries were chosen as they have rising caesarean section rates well above the recommended level; and it is assumed that a large proportion of them are not medically indicated (Josi, 2019; Laurita Longo *et al.*, 2020; Getzgz, 2022).

**Normal/ uncomplicated/ low risk pregnancy:**

There currently no universal definition of low-risk pregnancy, with definitions varying slightly between countries and institutions, however, in this review it will be defined as when there are no active complications and that there are no maternal or foetal factors that place the pregnancy at increased risk for complications. Additionally, it is deemed normal when the pregnancy is vertex and as a singleton. (Board on Children, Medicine and Council, 2013) (NICE, 2019).

**Caesarean section:**

It is defined as a surgical procedure that defined as the foetal delivery through an incision made in the abdomen and uterus (Sung and Mahdy, 2022).

**What is an unnecessary caesarean section?**

The World Health Organization recommends C-section delivery when medically necessary based on the mother's physical conditions and position of the foetus. Studies have shown that caesarean section rate above 10% is not associated with lower maternal and new-born

mortality in any nation at population level. Therefore, any caesarean section that is not medically called for is deemed unnecessary. (Nahar *et al.*, 2022).

### **Midwifery led care:**

Briefly, as it was mentioned above. We are interested in midwifery led care, whereby the care provided is led by a midwife; and they are responsible for the planning, organization and the delivery of care given to a woman from the initial booking of antenatal visits through to the care during the postnatal period. Midwifery led care is an umbrella term, encompassing midwifery continuity model and midwifery led unit (International Confederation of Midwives, 2013).

## ***2.2 Information sources***

The main literature search was conducted on two electronic databases using MEDLINE, through PubMed, and Web of Science. The databases were searched on the *28 March 2023* by the author using keywords and MESH terms.

## ***2.3 Search strategy***

The search strategy was built based on the PCC framework, with alternate search terms appropriate for each acronym. Research on this particular topic is not abundant, therefore the search strategy could not be very detailed, as this would limit the number of papers yielded in the database search. Six search strategies were tried on PubMed before a final was chosen, in order to conceive how broad or how narrow each strategy would yield and to discern important phrases or words in this field; that may be crucial to add in the first strategy. First strategy was using **(midwifery led care) AND (unnecessary caesarean section)**, this was too specific and yielded only 8 results. It was decided that unnecessary caesarean section was going to be excluded from the search strategy and will be decided upon during the inclusion and exclusion stage. The second search strategy carried was **(midwife) AND (caesarean section)**, using midwife was too broad as it may include papers in which the midwives are used as consultants or as assistants in giving birth; instead of as leaders. The final search strategy is shown below (table 3.)

**Table 3.** Concept table for search strategy

<b>Midwifery led care</b>	<b>AND</b>	<b>Caesarean section</b>
Midwifery led care Midwifery led continuity model* Midwifery led unit Midwifery led unit*		Caesarean section Caesarean section* Cesarean section Cesarean section* Caesarean Caesarean* Cesarean Cesarean* Surgical Birth Surgical Birth* Abdominal delivery Abdominal deliver* Surgical delivery Surgical deliver* Caesarean delivery Caesarean deliver* Cesarean delivery Cesarean deliver* C-section C-section*

When performing the search, alternate search terms were used using the Boolean search command ‘OR’; next they were combined with ‘AND’. This was to ensure a comprehensive search; to capture a wide range of papers. PubMed and Web of Science have different subject headings, and as such; search strategies were adapted accordingly and included free text terms. Further, to broaden then search, free text terms were truncated to include various word endings, plurals, and spellings. The literature search conducted using MEDLINE, through PubMed, used the following strategy

Concept	Midwifery led care	Caesarean section
Free Text Terms	Midwifery led care Midwifery led continuity model Midwifery led continuity model* Midwifery led unit Midwifery led unit*	Caesarean section Caesarean section* Cesarean section Cesarean section* Caesarean Caesarean* Cesarean Cesarean* Surgical birth Surgical birth* Abdominal delivery Abdominal deliver* Surgical delivery Surgical deliver* Caesarean delivery Caesarean deliver* Cesarean delivery Cesarean deliver* C-section C-section*
MeSH terms	Midwifery	Cesarean section

Some words or phrases have an asterisk as PubMed does not create plurals for words or phrases. Additionally, synonyms for “Midwifery led continuity model” and “Midwifery led unit” were not specified in the search strategy as PubMed already uses all the synonyms for continuous and model. ALL Fields was used when adding terms to the query box.

Additionally, human and English were placed as limitations. The complete search strategy for PubMed was:

```
(((("midwifery"[MeSH Terms] OR "midwifery"[All Fields]) AND "led"[All Fields]
AND "care"[All Fields]) OR (("midwifery"[MeSH Terms] OR "midwifery"[All Fields])
AND "led"[All Fields] AND ("continual"[All Fields] OR "continually"[All Fields] OR
"continuance"[All Fields] OR "continuation"[All Fields] OR "continuations"[All
Fields] OR "continue"[All Fields] OR "continued"[All Fields] OR "continuer"[All
Fields] OR "continuers"[All Fields] OR "continues"[All Fields] OR "continuing"[All
Fields] OR "continuities"[All Fields] OR "continuity"[All Fields] OR "continuous"[All
Fields] OR "continuously"[All Fields])) AND ("model"[All Fields] OR "models"[All
Fields] OR "modeled"[All Fields] OR "modeler"[All Fields] OR "modeler s"[All
```

Fields] OR "modelers"[All Fields] OR "modeling"[All Fields] OR "modelings"[All  
 Fields] OR "modelization"[All Fields] OR "modelizations"[All Fields] OR  
 "modelize"[All Fields] OR "modelized"[All Fields] OR "modelled"[All Fields] OR  
 "modeller"[All Fields] OR "modellers"[All Fields] OR "modelling"[All Fields] OR  
 "modellings"[All Fields] OR "models"[All Fields])) OR (("midwifery"[MeSH Terms]  
 OR "midwifery"[All Fields]) AND "led"[All Fields] AND ("continual"[All Fields] OR  
 "continually"[All Fields] OR "continuance"[All Fields] OR "continuation"[All Fields]  
 OR "continuations"[All Fields] OR "continue"[All Fields] OR "continued"[All Fields]  
 OR "continuer"[All Fields] OR "continuers"[All Fields] OR "continues"[All Fields]  
 OR "continuing"[All Fields] OR "continuities"[All Fields] OR "continuity"[All Fields]  
 OR "continuous"[All Fields] OR "continuously"[All Fields]) AND "model\*"[All  
 Fields]) OR (("midwifery"[MeSH Terms] OR "midwifery"[All Fields]) AND "led"[All  
 Fields] AND "unit"[All Fields]) OR (("midwifery"[MeSH Terms] OR "midwifery"[All  
 Fields]) AND "led"[All Fields] AND "unit\*"[All Fields])) AND ("caesarean section"[All  
 Fields] OR "cesarean section"[MeSH Terms] OR ("cesarean"[All Fields] AND  
 "section"[All Fields]) OR "cesarean section"[All Fields] OR ("cesarean"[All Fields]  
 OR "caesareans"[All Fields] OR "cesarean"[All Fields] OR "cesareans"[All Fields])  
 AND "section\*"[All Fields]) OR ("caesarean section"[All Fields] OR "cesarean  
 section"[MeSH Terms] OR ("cesarean"[All Fields] AND "section"[All Fields]) OR  
 "cesarean section"[All Fields]) OR ("cesarean"[All Fields] OR "caesareans"[All  
 Fields] OR "cesarean"[All Fields] OR "cesareans"[All Fields]) AND "section\*"[All  
 Fields]) OR ("caesarean"[All Fields] OR "caesareans"[All Fields] OR "cesarean"[All  
 Fields] OR "cesareans"[All Fields]) OR "caesarean\*"[All Fields] OR ("caesarean"[All  
 Fields] OR "caesareans"[All Fields] OR "cesarean"[All Fields] OR "cesareans"[All  
 Fields]) OR "cesarean\*"[All Fields] OR ("surgical procedures, operative"[MeSH  
 Terms] OR ("surgical"[All Fields] AND "procedures"[All Fields] AND "operative"[All  
 Fields]) OR "operative surgical procedures"[All Fields] OR "surgical"[All Fields] OR  
 "surgically"[All Fields] OR "surgicals"[All Fields]) AND ("birth s"[All Fields] OR  
 "birthed"[All Fields] OR "birthing"[All Fields] OR "parturition"[MeSH Terms] OR  
 "parturition"[All Fields] OR "birth"[All Fields] OR "births"[All Fields])) OR  
 ("surgical procedures, operative"[MeSH Terms] OR ("surgical"[All Fields] AND  
 "procedures"[All Fields] AND "operative"[All Fields]) OR "operative surgical  
 procedures"[All Fields] OR "surgical"[All Fields] OR "surgically"[All Fields] OR  
 "surgicals"[All Fields]) AND "birth\*"[All Fields]) OR ("cesarean section"[MeSH



**Terms] OR ("cesarean"[All Fields] AND "section"[All Fields]) OR "cesarean section"[All Fields] OR ("abdominal"[All Fields] AND "delivery"[All Fields]) OR "abdominal delivery"[All Fields]) OR (("abdomen"[MeSH Terms] OR "abdomen"[All Fields] OR "abdominal"[All Fields] OR "abdominally"[All Fields] OR "abdominals"[All Fields]) AND "deliver\*"[All Fields]) OR (("surgical procedures, operative"[MeSH Terms] OR ("surgical"[All Fields] AND "procedures"[All Fields] AND "operative"[All Fields]) OR "operative surgical procedures"[All Fields] OR "surgical"[All Fields] OR "surgically"[All Fields] OR "surgicals"[All Fields]) AND ("deliveries"[All Fields] OR "delivery, obstetric"[MeSH Terms] OR ("delivery"[All Fields] AND "obstetric"[All Fields]) OR "obstetric delivery"[All Fields] OR "delivery"[All Fields])) OR (("surgical procedures, operative"[MeSH Terms] OR ("surgical"[All Fields] AND "procedures"[All Fields] AND "operative"[All Fields]) OR "operative surgical procedures"[All Fields] OR "surgical"[All Fields] OR "surgically"[All Fields] OR "surgicals"[All Fields]) AND "deliver\*"[All Fields]) OR ("cesarean section"[MeSH Terms] OR ("cesarean"[All Fields] AND "section"[All Fields]) OR "cesarean section"[All Fields] OR ("caesarean"[All Fields] AND "delivery"[All Fields]) OR "caesarean delivery"[All Fields]) OR (("caesarean"[All Fields] OR "caesareans"[All Fields] OR "cesarean"[All Fields] OR "cesareans"[All Fields]) AND "deliver\*"[All Fields]) OR ("cesarean section"[MeSH Terms] OR ("cesarean"[All Fields] AND "section"[All Fields]) OR "cesarean section"[All Fields] OR ("cesarean"[All Fields] AND "delivery"[All Fields]) OR "cesarean delivery"[All Fields]) OR (("caesarean"[All Fields] OR "caesareans"[All Fields] OR "cesarean"[All Fields] OR "cesareans"[All Fields]) AND "deliver\*"[All Fields]) OR ("cesarean section"[MeSH Terms] OR ("cesarean"[All Fields] AND "section"[All Fields]) OR "cesarean section"[All Fields] OR "c section"[All Fields]) OR "c section\*"[All Fields])) AND ((humans[Filter]) AND (english[Filter]))**

The literature search conducted using Web of Science Core Collection, used the following search strategy:

<b>Concept</b>	<b>Midwifery led care</b>	<b>Caesarean section</b>
<b>Free Text Terms</b>	Midwifery led care Midwifery led continuity model* Midwifery led unit*	Caesarean section* Cesarean section* Caesarean* Cesarean* Surgical birth* Abdominal deliver* Surgical deliver* Caesarean deliver* Cesarean deliver* C-section*
<b>No Indexing Terms</b>		

All fields were chosen when adding terms to the query box. English was used as a filter to only retrieve English written papers. The complete search strategy for PubMed was:

**#1 = ((ALL= (Midwifery led care)) OR ALL= (Midwifery led continuity model\*)) OR ALL= (Midwifery led unit\*)**

**#2 = (((((((((ALL= (Caesarean section\*)) OR ALL= (Cesarean section\*)) OR ALL= (Caesarean\*)) OR ALL= (Cesarean\*)) OR ALL= (Surgical birth\*)) OR ALL= (Abdominal deliver\*)) OR ALL= (Surgical deliver\*)) OR ALL= (Caesarean deliver\*)) OR ALL= (Cesarean deliver\*)) OR ALL= (C-section\*)) (((((((((ALL=(Caesarean section\*)) OR ALL=(Cesarean section\*)) OR ALL=(Caesarean\*)) OR ALL=(Cesarean\*)) OR ALL=(Surgical birth\*)) OR ALL=(Abdominal deliver\*)) OR ALL=(Surgical deliver\*)) OR ALL=(Caesarean deliver\*)) OR ALL=(Cesarean deliver\*)) OR ALL=(C-section\*))**

Queries **#1** and **#2** were then combined with using the filter 'English' for article languages.

## **2.4 Study records**

### *Importing references and deduplication process*

All reports which were identified through database searching were imported into Endnote referencing programme (*EndNote / The best reference management tool*, no date). The exporting of references and the deduplication of papers were informed by the Bramer method

(Bramer *et al.*, 2016). First, settings are changed in the display field on EndNote and custom filters and export formats are installed. This is to be able to add pages in the display field and to convert abbreviated page numbers to an expanded format; specifically, to convert the formatting of papers exported from MEDLINE via PubMed library formats. These steps are done prior to the deduplication process. Second, references were imported from PubMed first into an empty EndNote library using the corrected pages filter, then records from the remaining databases were imported as per usual using the RIS format. Finally, settings for the field preferences on EndNote were changed seven times according to the table below (table 4.) in order to search for and detect duplicates, this was followed by the removal of probable duplicates using Bramer’s steps to remove duplicates.

**Table 4.** Field preference setting according to the Bramer method

<b>Set field preferences</b>	
<b>Step</b>	<b>Preferences</b>
A	Author, year, title, secondary title (journal)
B	Author, year, title, pages
C	Title, volume, pages
D	Author, volume, pages
E	Year, volume, issue, pages
F	Title
G	Author year

### *Screening*

The final de-duplicated remaining reference list was imported on Rayyan desktop to screen titles and abstracts based on the pre-established inclusion and exclusion criteria (Ouzzani *et al.*, 2016). Papers which did not meet the inclusion criteria were excluded from the review. Further papers which were retrieved as full text were subjected to full text screening on the web-based software platform Covidence (*Covidence - Better systematic review management*, no date). The papers which were excluded in this stage were divided into exclusion groups; giving reasons of why they were excluded. Lastly, the bibliographies of each included paper were examined to scan for any relevant research which was not identified in the initial search, a technique called snowballing.

These exclusion groups are most often due to full text being unavailable, wrong type of publication, wrong language, and wrong population.

### *Selection process*

Titles and abstracts were screened by one reviewer (YW) following the pre-established inclusion and exclusion criteria for the review, with subsequent removal of those which did not fit criteria. Moreover, full text screening was completed by the same reviewer (YW), excluding articles which did not meet the inclusion criteria.

### **2.5 Data extraction and synthesis – Charting process**

A custom standardised data extraction sheet was created on Excel and eligible studies were assessed independently by one reviewer (YW) to extract information from the included studies, table 5. **Data extraction included the description of the study (author, country, income level, (as defined by the world bank) (The World Bank, 2023), aims, study population), key findings, stated theoretical approach, data collection method and model of care, intervention type/duration.** Reporting of the scoping review findings follow the PRISMA-ScR (Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews) format (JBI, 2022). Findings were further summarised narratively into key thematic patterns to map the existing literature.

Study (Country)	Study design, source	Study population, sample size	Study period	Aim of the paper	Philosophy of care in midwife led care/ interventions	Income level of the country	CS outcome	Adjustment variable	Experience/intervention outcome	Key findings

**Table 5.** Extraction preview

A formal review of the quality of the included studies was not undertaken as this is not a systematic review with the aim of establishing the effectiveness of midwifery led care in reducing caesarean sections; this study focuses on how and why they may be able to reduce the desire for unnecessary caesarean sections. Further, a meta-analysis was also not undertaken.

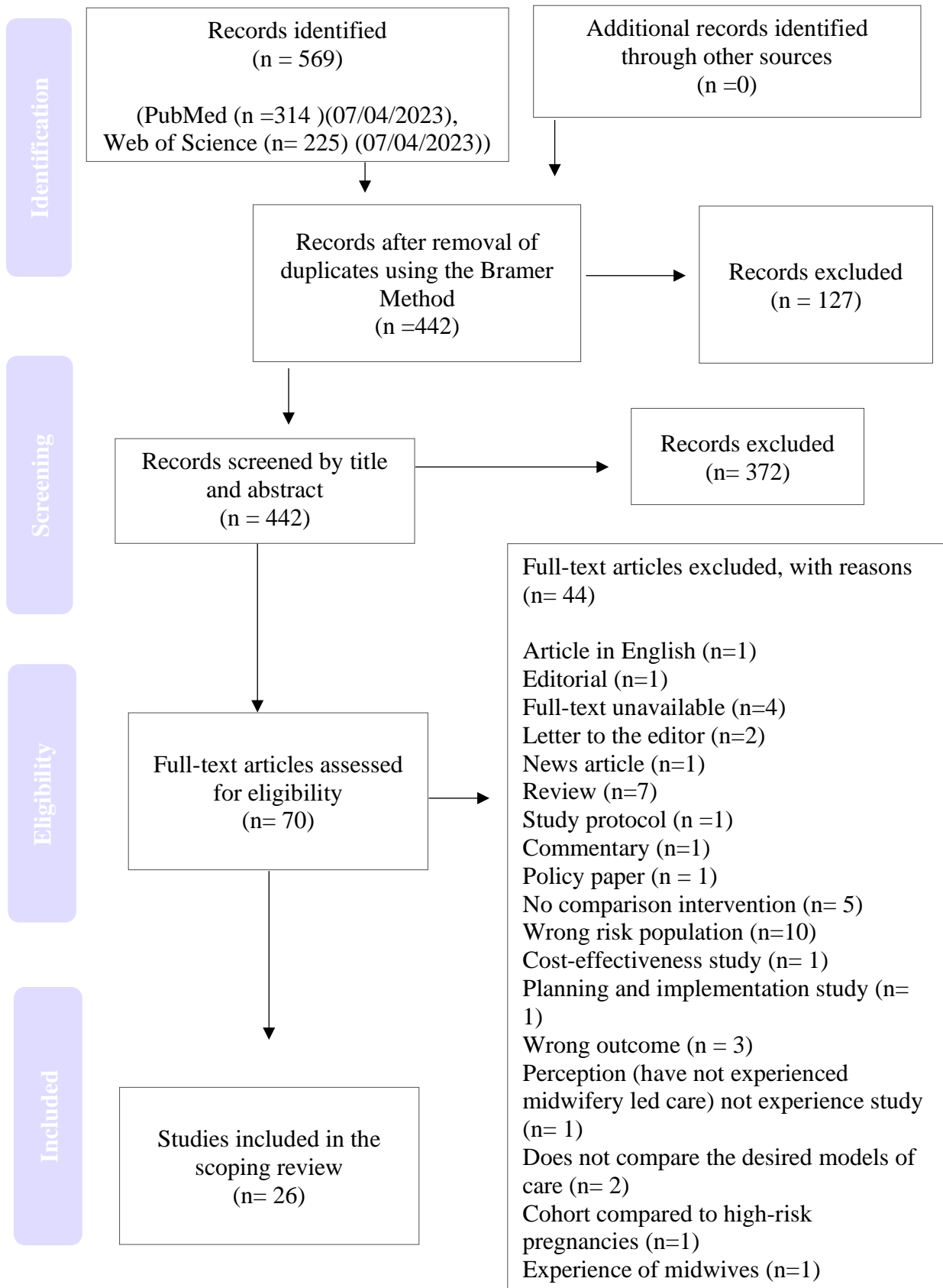
## 3.0 Results

This chapter is divided into the search results and the findings of the scoping review. The findings will be discussed according to the three main aims of this review, guided by the different theoretical models of birth, social and medical model.

1. To identify the evidence for midwifery led care in reducing unnecessary caesarean sections in middle- and high-income countries in uncomplicated pregnancies.
2. To identify gaps in the knowledge and investigate how midwife led care can have a different approach towards care of pregnant women and birth in contrast to doctor led care.
3. To discover theoretical model/s or interventions by which the midwifery model of care may utilise; that makes it fundamentally different from doctor led care.

### 3.1 Search results

A total of 586 articles were identified relevant to the research question; this included 331 and 255 articles from PubMed and Web of Science; respectively. After applying filters “Human” and “English” on PubMed and only “English” on Web of Science, a total of 569 articles were identified, including 314 and 255 articles from PubMed and Web of Science: respectively. After the deduplication method using the Bramer method, which uses seven step field preference setting on EndNote to filter out duplicate papers; 127 papers were removed, and we were left with a total of 442 articles. Following deduplication, these articles were screened according to title and abstract by one reviewer (YW), which resulted in 372 articles being excluded. Articles were removed due to common reasons such as, economic evaluation study, cost-effectiveness study, nurse led care, water births, vaginal delivery after caesarean section, wrong study population, home birth using midwives, protocols, attitudes of midwives towards midwifery led care and perceived barriers by midwives to practice midwifery care. Full text articles were retrieved for the remaining 70 articles and imported to Covidence (*Covidence - Better systematic review management*, no date), in order to assess their eligibility according to the pre-specified inclusion criteria. Figure 1 below, outlines the process of data gathering.



**Figure 1.** Flow Diagram of results of literature search

Details of the included papers are shown in table 6. Most of the studies included were conducted in high income countries (n= 18) (McLachlan *et al.*, 2008; Eide, Nilsen and Rasmussen, 2009; Begley *et al.*, 2011; Bernitz *et al.*, 2011; Suzuki *et al.*, 2011; Symon *et al.*, 2011; Fenwick *et al.*, 2015; Larsson *et al.*, 2016; Thiessen *et al.*, 2016; Christensen and Overgaard, 2017; Loewenberg Weisband *et al.*, 2018; Wiegerinck *et al.*, 2018; M. M. J. Wiegerinck *et al.*, 2020; Damiano *et al.*, 2020a; Merz *et al.*, 2020; Welffens *et al.*, 2020; Yu *et al.*, 2020; Tietjen *et al.*, 2021). There were three studies which were conducted in low middle-income countries and five which took place in upper middle-income countries. A large portion of the papers included were set in Europe and Asia. One study was conducted in Oceania and one in North America. There were recurrent study settings in the included papers, two in Norway, four in China, three in Australia, two in the United States of America, two in Netherlands and two in Iran. All were published between 2003 and 2021, with one in 2003, one in 2009, five in 2011, one in 2015, three in 2016, one in 2017, five in 2018, one in 2019, five in 2020 and three in 2021. Further, studies which compared midwife-led care with standard maternity care, regardless of whether it was obstetric, or doctor led care, included pregnant women which were judged as low risk in their study population. In studies which described the experience of women receiving or midwives giving midwifery led care, the study population was not specified as low-risk pregnant women, however, participants were excluded if they had for example any history of infertility, mental or physical chronic diseases, had a foetal diagnosis of major abnormality or incompatibility with life. Two of the most common study designs in the included papers were randomized control trials and retrospective cohort studies. Other study designs included were matched cohort study, prospective non-randomized observational study, retrospective observational study, concurrent cohort study, unpaired cohort study, prospective multicentre study, cross-sectional and qualitative studies. Data for the studies was mainly collected by hospital registry, national medical database or registry, hospital records, electronic departmental database, interviews, or questionnaires. In four studies (Christensen and Overgaard, 2017; Wiegerinck *et al.*, 2018; M. M. J. Wiegerinck *et al.*, 2020; Damiano *et al.*, 2020b) participants which received midwifery led care and those that received doctor/ obstetrician led care were matched. In which three studies used propensity scores to match their participants. The most common variables which were used for matching were maternal age, parity, socioeconomic status, foetal, gender, birth weight and ethnicity. Additionally, in studies which did not use matching between their cohorts but performed an adjusted regression using adjustment variables; the most common used variables were maternal age, smoking status, smoking

before pregnancy, gestational weeks/ age, income, education, and socio-economic status.

Other adjustment variables which were used in the included studies are stated in table below.



**Table 6.** Characteristics of Included studies

Study (country)	Study design, source	Study population, sample size	Study period	Aim of the paper	Philosophy of care in midwife led care/ interventions	Income level of the country	CS outcome	Adjustment variable	Experience/ intervention outcome	Key findings
(Bartuseviciene <i>et al.</i> , 2018) Lithuania	Retrospective cohort study, hospital registry	A total of 1,348 and 1,283 low risk delivering women	2012 and 2014	To compare midwife-led and obstetrician-led care and their relation to caesarean section and obstetric and neonatal outcomes in low-risk births		Upper middle income	Proportion of caesarean births was 4.4% in midwife-led and 10.7% in obstetrician led group			Midwife led care for women with low-risk birth reduced the caesarean section and several medical interventions with no increase in immediate adverse neonatal outcomes compared with obstetrician-led care
(Begley <i>et al.</i> , 2011) Republic of Ireland	Two group, two-centre, pragmatic randomised trial, Data was collected manually from women's and neonates' charts	1,653 low risk women from 2 maternity hospitals in Ireland	July 2004- June 2007	The aim was to compare the effects of midwifery led care in a midwifery led unit with consultant-led care for healthy women without risk factors for labour and delivery, on rate interventions, maternal satisfaction, and neonatal and maternal outcomes. In addition, the costs of both types of care were to be measured and compared		High income	No statistically significant difference was found between midwifery led care and consultant led care – (1163 [14.8% vs 84 [15.2%]; relative risk 0.97 [95% CI 0.76 to 1.24]			Midwife led care for women with low-risk birth reduced caesarean section and several medical interventions with no increase in immediate adverse neonatal outcomes compared with obstetrician-led care
(Bernitz <i>et al.</i> , 2011) Norway	Randomized control trial, Data from the Medical Birth Registry of Norway	1,111 women who were assessed to be low risk		The aim was to investigate if there were differences in operative delivery rates in low-risk women giving birth in an alongside midwifery led unit, compared with obstetric units		High income	Midwife led unit vs normal unit RR (95% CI) 1.01 (0.58-1.75)			There was no statistically significant difference in mode of delivery in the birthing units in the study
(Christensen and Overgaard, 2017) Denmark	Matched cohort study, data from the Danish birth centre study	839 low risk women attending birth in a freestanding midwifery unit and 839 low risk woman in an obstetric unit (individually matched control group) from two freestanding midwifery and two obstetric units in North Denmark Region	March 2004- October 2008	The purpose of the study was to determine whether the effect of birthplace on perinatal and maternal morbidity and use of obstetric interventions different by parity among low-risk women intending to give birth in a freestanding midwifery unit (FMU) or in obstetric unit (OU)		High income	FMU/OU (OR 0.5; CI 0.3-0.9) – FMU less likely to have caesarean section than women in OU group	Matching criteria were low-risk status, parity, body mass index (BMI), age, smoking status, ethnicity, cohabitation status, education level and occupation level		Compared with their counterparts attending birth in an obstetric unit, women attending birth in freestanding midwifery unit were less likely to require caesarean section)
(Danniano <i>et al.</i> , 2020b) United States	Retrospective cohort study, hospital data, propensity score	There were in total 1,7877 low risk women in the study. The midwife service managed 1,111 of total deliveries, and obstetrician led service managed 1,116 of total deliveries	January 2015 – December 2017	To evaluate the difference in odds of caesarean delivery in term, singleton, vertex pregnancies between the midwife and obstetrician led services at the same rural tertiary care centre		High income	Rate of caesarean delivery was 20.7% (n=172) in the obstetrician led service. In the matched sample, the odds of caesarean delivery were lower in the unadjusted and adjusted analyses (OR 0.62, 95% CI 0.47-0.81, adjusted [aOR] 0.58, 95% CO 0.44-0.80)	Propensity score matching was used to adjust for potential differences in baseline demographic and clinical characteristics between patients cared for by the midwife or obstetrician-led services		At a single rural tertiary centre, patients on the midwife service have significantly lower adjusted odds of caesarean delivery than patients in the obstetrician led service

(Eide, Nilsen and Rasmussen, 2009) Norway	Prospective, non-randomized observational study. pregnancy and hospital records	252 and 201 women were included in the midwife led (MLW) ward and conventional delivery ward (CDW), respectively. Among the 252 women in the MLW, 178 and 275 women completed their labour at the MLW and CDW, respectively.	Between November 2001 and October 2002	The aim was to compare intervention rates associated with labour in low-risk women who begin their labour in midwife-led unit and a conventional care unit	Supporting natural childbirth, written philosophy of care	High income	The rates of operative delivery in the cohorts were statistically equal, the caesarean section rate was 6-7%. Did not show the adjusted rate in their table	Maternal age, smoking, education, and marital status	They did not find evidence that starting delivery in the midwife-led setting offers the advantage of lower operative delivery rates.
(Hua <i>et al.</i> , 2018) China	A concurrent cohort study design, hospital data	1730 low risk women recruited from 9 hospitals	1730 low risk women recruited from 9 hospitals	The aim of this study was to explore the effects of midwife led care at delivery (MCD) and continuity midwifery care (CMC) on the delivery mode and rate of breastfeeding within the first 24h in primiparous women when compared with obstetrician led maternity care (OMC) under China's one-child policy	Upper middle income	Upper middle income	Odds of caesarean section were decreased significantly with CMC (OR 0.30; 95% CI:0.22 to 0.40) and with MCD (OR 0.17;95% CI: 0.11 to 0.25). After adjusting for baseline differences and other confounders at delivery or postpartum period the rates of caesarean section in CMC (OR 0.30; 95% CI:0.23 to 0.41) and MCD (OR 0.16;95% CI:0.11 to 0.25) groups also decreased	Maternal age, education, vacation, method of payment, gestational age at delivery and birth weight	CMC significantly improved vaginal birth rate, breastfeeding rate, maternal satisfaction, and overall wellbeing in pregnant women
(Jiang <i>et al.</i> , 2018). China	Single centre randomized controlled parallel group clinical trial, demographic and clinical data were collected from the patients' healthcare records.	Single centre randomized controlled parallel clinical trial, demographic and clinical data were collected from the patients' healthcare records.	Between February 2012 to February 2014	The study aimed to determine the effects of midwife led care during labour on birth outcomes for healthy primiparas	Normal birth	Upper middle income	Proportion of caesarean births was 10.27% (34) in intervention group and 19.56% (62) in control group	groups were comparable at baseline age, gestational weeks, parity, hospital anxiety and depression scale)	Midwife-led care can reduce the caesarean section rate, promote normal birth, improve birth outcomes, and promote maternal and child health.
(McLachlan <i>et al.</i> , 2016) Australia	Two arm randomized controlled trial design, self-administered questionnaire completed at recruitment, medical record, postal questionnaire	Two arm randomized controlled trial design, self-administered questionnaire completed at recruitment, medical record, postal questionnaire	Between September 2007 and June 2010	To determine the effect of primary midwife-led care (caseload midwifery) on women's experiences of childbirth	High income	High income	Proportion of caesarean births was 3.1% (984) in caseload group and 3.7% (828) in standard group	first baby or not, age, education, marital status, country of birth, English as first language, income, smoking before pregnancy	Compared with standard maternity care, caseload midwifery may improve women's experiences of childbirth.
(Merz <i>et al.</i> , 2020) Germany	Retrospective cohort study, electronic departmental database	612 low risk women were admitted for labour, the control group consisted of 612 women in standard obstetric care and 612 were in the alongside midwifery unit (AMU)	Between January 2010 to December 2017	The aim was to compare the maternal and perinatal outcomes of women registered for birth in the AMU with births of low-risk women in standard obstetric care in the same period of time and to investigate causes for and outcome of births of women who were transferred from AMU to standard obstetric care during or immediately after birth.	High income	High income	Proportion of caesarean births was 9.3% (57) in AMU and 8.5% (52) in obstetric care	parity, maternal age, maternal BMI, and birthweight	Comparison of the maternal and perinatal outcome of births planned in AMU with standard obstetric care revealed the non-inferiority and safety of the midwife-led model.

(Rana <i>et al.</i> , 2003) Nepal	Unpaired comparison study, maternal and infant records, and record review 8 weeks after delivery	988 low risk women, 550 at the birthing centre (BC - midwife led) and 438 at consultant led maternity unit (CMU)	Between November 1997 and February 1998	To evaluate Nepal's first independent midwifery unit, the Pokan Hospital Birthing Centre (BC), as a model for training and service provision for low risk deliveries. Specifically, to compare its efficacy with that of an adjacent Consultant-led Maternity Unit (CMU).	Lower middle income	Risk ratio (95% CI for RR) 0.37 (0.18-0.74)	Women at low risk of obstetric complications, intrapartum and early postpartum care by midwives is associated with a reduction in iatrogenic procedures, perineal trauma, and foetal distress. Of particular note is the reduction in use of oxytocin (and the putative reduction in associated morbidity) that results from such care, a finding which secondarily supports the use of management protocols by all cadres involved in intrapartum care. Within the study parameters midwife-led care appears no less safe than physician-led care.
(Suzuki, 2012) Japan	Retrospective cohort study, hospital data	1031 initially considered low risk, 878 were in midwife led care and 153 were in shared care, however 364 of the were transferred to share care	Between April 2008 and March 2010	To examine the obstetric outcomes of low risk pregnant women under the midwife-led delivery care compared with those under the obstetric shared care	High income	Proportion of caesarean births was 3.3% (5) in shared care and 2.2% (19) in midwife care	There were no significant differences in other obstetric or neonatal outcomes between the two groups.
(Thiessen <i>et al.</i> , 2016) Canada	Retrospective cohort study, Data came from the Population Health Research Data Repository at the Manitoba Centre for Health Policy in Winnipeg, Manitoba	83, 774 low risk women	Between 2001 and 2012	The objective was to compare maternal and neonatal outcomes of low-risk pregnant women whose birth was attended by three health provider groups: registered midwives, obstetric-physicians/gynaecologists, or family practice physicians in Manitoba from 2001/02 to 2012/13	High income	Proportion of caesarean births was 13.8% (538) in OB/GYN attended live birth and 1.7% (68) in midwife care. Midwife vs OB/GYN aOR (95% CI) (0.13 [0.10-0.16])	Midwife-attended births were associated with lower odds of interventions such as episiotomy, epidural use, neonatal resuscitation, NICU admission, instrumental vaginal delivery, and caesarean delivery. Midwifery care was associated with higher breastfeeding rates and lower perinatal mortality rates, consistent after controlling for socio-demographic and birth-related variables.
(Tietjen <i>et al.</i> , 2021) Germany	Prospective, controlled, multicentre study, hospital records	391 low risk women in alongside midwifery unit (AMUs) and matched controls of 391 in obstetrician led care	From November 2018 to September 2020	The aim of our study was to compare the maternal and perinatal outcome of births taking place in (AMUs) in North Rhine-Westphalia (NRW), Germany's most populous federal state, with the outcome of carefully selected low-risk women giving birth in obstetrician-led care at the same unit.	High income	Proportion of caesarean in study group was 7.2% (28) whilst in the control group 13.3% (52). For mode of birth (Caesarean/ instrumental vaginal birth), the analysis revealed superiority for the study group (5.66%, 95% CI 0.42% - 10.88%)	Comparison between care in AMU and obstetrician-led care with respect to mode of birth and other outcomes confirmed the superiority of the midwifery care model for low-risk women
(Loewenberg Weisband <i>et al.</i> , 2018) United States	Retrospective observational cohort study, electronic health records	A total of 8779 low risk women were included into the analysis	January 2012 into December 2015	The objective was to compare birth interventions, maternal outcomes, and neonatal outcomes between women with a low-risk pregnancy who received prenatal care from midwives and those who received prenatal care from physicians	High income	Proportion of caesarean births was 16.3% (117) in midwife led care and 30.5% (2416) in physician care. Unadjusted RR (95% CI) Caesarean birth 0.53 (0.45-0.63). Adjusted RR 0.66 (0.57-0.78).	Women who received prenatal care from a midwife had a 34% lower risk of having a caesarean birth (aRR, 0.66; 95% CI, 0.57-0.78) and 42% lower risk of preterm birth (aRR, 0.58; 95% CI, 0.42- 0.79) compared with similarly low-risk women who received prenatal care from a physician. Among women with low-risk pregnancies, midwifery care was associated with substantially fewer preterm births and labour interventions.

(Welfens <i>et al.</i> , 2020) Belgium	Retrospective cohort study, hospital electronic registration system	590 in the Cacoon pathway of care and 394 traditional pregnancies	March 2014 - February 2016	The aim was to compare maternal and neonatal outcomes of women with a low-risk pregnancy attending the "Cocoon," an alongside midwifery-led birth centre and care pathway, with women with a low-risk pregnancy attending the traditional care pathway in a tertiary care hospital	Normal birth	High income	10.3% of low-risk women under midwifery-led care had a caesarean birth, compared with 16.0% under physician-led care ( $P < .001$ ). OR 95% CI, 0.61 (0.42-0.88) and aOR 95% CI, 0.42 (0.25-0.69)	age, BMI, parity, level of education, household income, and origin	Women planning their births in the midwifery-led unit, the Cocoon, experienced fewer interventions with no increase in adverse neonatal outcomes
(Wiegerinck <i>et al.</i> , 2018) Netherland	Retrospective cohort study (propensity score matched), data from the national perinatal register (PRN), together with additionally retrieved medical data from hospitals and midwifery practices	In the unmatched cohort, 46764 women in midwifery-led care and 10 632 in obstetrician-led care. 10632 low risk women in obstetrician-led care and a total of 10 632 low risk women in the midwifery-led care group for propensity score analysis.	January 2005- December 2007	To compare intrapartum and neonatal mortality in low-risk term women starting labour in midwifery-led versus obstetrician-led care.		High income	OR (95% CI) 0.25 (0.23 to 0.28), aOR (95% CI) 0.26 (0.22 to 0.29)	Propensity scores were generated by using the following patient variables: maternal age, birth weight, parity, ethnicity, gestational age, socioeconomic status, and gender of the child	Intervention rates were reduced in the midwifery led care group even after propensity score matching
(Melanie M. J. Wiegerinck <i>et al.</i> , 2020) Netherland	Unmatched and a propensity score matched cohort study, national perinatal audit registry (PAN) and from the national perinatal registry (PERINED) of the Netherlands	After matching, low-risk women in midwifery-led care (n = 52 569) and low-risk women in obstetrician-led care (n = 52 569)	January 2010 and December 2012	To compare intrapartum and neonatal mortality rates in midwifery-led (primary) vs obstetrician-led (secondary) care at the onset of labour in low-risk term women.		High income	Odds ratio (95% CI) 0.29 (0.28-0.30), aOdds ratio (95% CI), 0.32 (0.30-0.34)	gestational age, parity, ethnicity, socio-economic status, foetal gender, and birthweight	In the midwifery-led care group there were significantly fewer neonates with low Apgar scores, and significantly lower instrumental delivery and caesarean section rates.
(Yu <i>et al.</i> , 2020) Australia	Retrospective cohort study, population-based dataset	There were 364,667 births, including 27,696 births in birth centres	2001-2012	Aim of this study is to provide high-quality estimates of the impact of birth centres on intervention outcomes.	Normality of birth	High income	Women choosing birth centres were less likely to have instrumental deliveries or caesarean sections, which led to a downward bias in the single probit estimates		After accounting for selection effects, the impact of birth centres is to substantially reduce intervention rates
(N. F. Cheung <i>et al.</i> , 2011) China	Semi-structured interviews, questionnaires, and cross-comparison with hospital data	30 women who have given birth in a midwifery-led normal birth unit	August to December 2008	To explore Chinese women's and health professionals' views of the first midwifery-led normal birth unit in China to facilitate normal birth and enhance midwifery practice.	Medicalization of birth vs normality of birth	Upper middle income	The women in the MINBU were less likely to undergo a caesarean section (8.4% vs 38.5% ** not specified if in low-risk women		Women appreciated the midwifery-led service, which provides an environment where they are more likely to aim to give birth without intervention. This model of care is good for its association with increased satisfaction in a context of extraordinarily high caesarean rates.
(Fenwick <i>et al.</i> , 2015) Australia	A two armed non-blinded parallel (1:1) multi-site randomised controlled trial, questionnaire that sought data about demographic characteristics, obstetric history, and psycho-social factors	Three hundred and thirty-nine (n = 339) women who had high childbirth fear were randomised (intervention n = 170; controls n = 169). Women in the intervention group received psycho-education sessions at 24- and 34-weeks gestation by telephone at a scheduled time convenient to them whilst women randomised to the control group received usual maternity care at their chosen facility.	Between May 2012 and June 2013	The study aimed to investigate whether receiving midwifery led telephone psycho education during pregnancy would report improved postnatal mental health six weeks after birth, experience higher levels of vaginal birth (reduced CS) and prefer a vaginal birth in a subsequent pregnancy compared to the control group	Psycho-education intervention	High income	Fewer women in the intervention group had a CS (34 % vs. 42 %, p = 0.27		There were no differences between the groups for depressive symptoms (EPDS: Mean 6.2 vs. 5.5 p = 0.30) or parenting confidence (Mean 32.4 vs. 33.3 p = 0.32). Fewer women in the intervention group, however, reported having flashbacks (p = 0.05). Women in the intervention group reported they gained more from the decision aid booklet compared to women in the control group (p = 0.02).

(Firoozan <i>et al.</i> , 2020) Iran	Randomized control trial, questionnaire	80 first-time pregnant women with childbirth fear participated in the study. The participants were randomly assigned into intervention (n = 40) or control groups (n = 40). Intervention group received birth emotions - looking to improve expectant fear (BELIEF)	February to September 2019	The aim of the study was to investigate the effectiveness of psychoeducational intervention by midwives (birth emotions - looking to improve expectant fear (BELIEF)) on decreasing childbirth fear and self-efficacy	Psycho-education intervention	Lower middle income	-	The intervention group showed significantly more reduction in childbirth fear and more increase in childbirth self-efficacy compared to the control group. In addition, more women in the intervention group reported that they preferred to give normal vaginal birth than women in the control group	BELIEF protocol could be an effective approach in reducing childbirth fear and increasing childbirth self-efficacy among first-time pregnant women who are afraid of giving birth
(Larsson <i>et al.</i> , 2016) Sweden	Cross-sectional survey, Questionnaire, national survey	all obstetric clinics in Sweden (n = 45); a total of 43 clinics responded, 4 responded to the supplemental questions	2012	To study comprehensiveness, content, and organization of the midwife-led counselling for childbirth fear in all obstetric clinics in Sweden.	Counselling	High income	-	During counselling, the following six approaches were used by the midwives at all 43 clinics: strengthening the woman in her belief in herself and her ability to give birth, information about the birth process, promise of early pain relief, such as epidural analgesia, information about pros and cons of birth methods (i.e., vaginal vs. caesarean section), a written birth plan and a review of the past birth record (when applicable) through a joint discussion between the individual woman and the midwife.	The midwife led counselling conducted at the different Swedish obstetric clinics. Showed considerable disparities. Women with childbirth fear would benefit from care on equal terms irrespective of place of residence
(Liu <i>et al.</i> , 2021) China	Cross-sectional survey, self-administered questionnaire addressing items related to women's experience during childbirth	4192 women who had natural birth in a maternity care centre, Shanghai, China	March-June 2019	Primary objective of this study is to describe the experience of Chinese women receiving midwife-led maternity care, and to report their satisfaction level of the experience.	Counselling, postpartum guidance, labour companion	Upper middle income	-	The univariable analysis showed that midwife-led prenatal counselling, presence of doula and family member at delivery, Lamaze breathing techniques, warm perineal compresses with red-bean bags, epidural anaesthesia, free position during the first stage of labour, episiotomy, laceration of perineum, midwives' postpartum guidance, perineum pain two hours after delivery, and perineum oedema two hours after delivery were significantly related to women's satisfaction with childbirth.	Women in this survey generally had high satisfaction with midwife-led maternity care. This satisfaction is probably felt because of the prenatal counselling by the midwife and allowing a doula and a family member in the room during childbirth. Other intangible factors to improve the satisfaction level were Lamaze breathing techniques, warm perineal compresses, epidural anaesthesia, free positioning during first stage of labour, and early skin to skin contact.
(Shahinfar <i>et al.</i> , 2021) Iran	Qualitative study, Interviews, settings were a private midwifery clinic and two hospitals (Sina Hospital and Alameh Karami Hospital)	15 low risk women	October 2019 to August 2020	Aims to explore women's perception of continuity of team midwifery care in Iran	-	Lower middle income	-	Two themes, four main categories and nine sub categories emerged from data analysis, the themes were " Maternal empowerment" and " Mother's satisfaction during the transition from pregnancy to motherhood" .	Findings of this study emphasize the effectiveness of continuity of team midwifery model of care for pro- moting empowerment and satisfaction in women during pregnancy, birth and postpartum.
(Symon <i>et al.</i> , 2011) United Kingdom	Postal return survey, self-completion questionnaire	559 mothers and 521 partners responded	2004-2005	Aims to explore mothers' perceptions of care and environment in midwife-led and obstetric-led units	-	High income	-	Care was rated on 1-10 scale, mothers rated their care more highly in midwifery led units than in obstetric led unit, mean 8.94 with 8.31, respectively. Midwives in MLUs were more likely to be rated as ' supportive' ) $\chi^2 = 4.364$ , $df = 1$ , $p = 0.037$	Findings showed that mothers and partners were less positive if the birth had occurred in an obstetric unit.

The aim of the comparison studies was similar, they aimed to compare the effects of midwifery led care with doctor led care (physician or obstetric) in low-risk healthy women or to detect the differences in operative delivery rates between them. These studies did not solely focus on caesarean section outcomes; they also reported on rate interventions, obstetric interventions, breastfeeding rates after 24 hours, neonatal and maternal outcomes and intrapartum and neonatal mortality. Only one study focused on caesarean section outcomes (Begley *et al.*, 2011). In studies which described the experience of women receiving or midwives giving midwifery led care or midwifery intervention/ theory studies, the aim was to either explore the experience of mothers and midwives who have received or given midwifery led care or to investigate the effectiveness of said intervention. Outcomes were mainly reported as risk ratios or odds ratios. The largest study cohort comprised of 259, 211 low risk women recruited from the national perinatal registry (PERINED) of the Netherlands (M. M. J. Wiegerinck *et al.*, 2020).

### ***3.2 Main findings***

#### ***Evidence of midwifery led care reducing the number of unnecessary caesarean sections compared to doctor/ obstetrician led care***

Nineteen studies which were included in the review reported caesarean section outcomes from low-risk pregnant women receiving either midwife led care or doctor/ obstetrician led care. To note, midwifery led care may be provided in different settings in the included studies or it is stated in different ways than “midwifery led care”, however in all cases, maternity care is provided by a lead midwife that has full autonomy, following the definition stated in this review. Similarly, the term “doctor/ obstetrician led care” may not be used, but instead it may be mentioned as normal unit or physician; regardless, in all cases it is when a medical doctor is the lead in care and has full autonomy. In four studies, they found a statistically non-significant difference between midwife led care and consultant/ conventional delivery ward/ obstetric unit. In a two group for example, two-centre pragmatic trial in the Republic of Ireland, the relative risk between midwifery led care and consultant led care was 0.97 with a 95% confidence interval (CI) of 0.76 to 1.24 (Begley *et al.*, 2011). Similarly in two studies in Norway, found no difference in midwife led unit vs the normal/ conventional

unit, with one study reporting relative risk of 1.01 95% CI (0.58-1.75) (Bernitz *et al.*, 2011) and the other reporting statistically equal caesarean section rates between the two wards (Eide, Nilsen and Rasmussen, 2009); in this study an exact estimate was not given for caesarean section in their table of results. Further, there are sixteen studies that reported a statistically significant difference between midwife led care and doctor/ obstetrician led care, eleven of which occurred in high income countries. In a two arm randomized controlled trial design, it was found that there was a higher proportion of caesarean section in the midwifery group compared to the doctor group, with the proportion of caesarean births being 3.1% (984) in caseload group and 3.7% (828) in standard group, this was an unadjusted estimate (McLachlan *et al.*, 2016). In another randomized control study, they found a much lower proportion of caesarean births in the midwifery led group 10.27% (34) than the doctor led group. In this study, the two study arms were comparable at baseline, using age, gestational weeks, parity, hospital anxiety and scores on the depression scale (Jiang *et al.*, 2018). Further, in four studies they used matching in the two cohorts to calculate adjusted odds ratios (OR). In all four studies, they found a statistically significant odds ratio even after matching was done. In a Danish study, they found an odds ratio of 0.5 ( CI 95% 0.3-0.9), meaning that women giving birth in midwifery led units are less likely to undergo a caesarean section than women on the obstetric led unit (Christensen and Overgaard, 2017). In a study conducted in United States, it was revealed that in the matched sample; the odds of caesarean delivery were lower in the midwife led centre; with an unadjusted and adjusted analyses of (OR 0.62, (95% CI 0.47-0.81) and aOR 0.58, (95% CO 0.44-0.80), respectively (Damiano *et al.*, 2020a). Two studies in Netherlands that used a propensity score matched cohort study also revealed a reduced odds of caesarean sections in women receiving midwifery led care, even in the propensity score matched analysis. The results are as follows, OR (95%CI) 0.25 (0.23 to 0.28), aOR (95%CI)0.26 (0.22 to 0.29) (Wiegerinck *et al.*, 2018) and OR (95% CI) 0.29 (0.28-0.30), aOR (95% CI), 0.32 (0.30-0.34)(M. M. J. Wiegerinck *et al.*, 2020). Only one study was conducted in a lower middle-income country, Nepal, which showed that women of low risk of obstetric complications were at decreased risk of having a caesarean section (Risk ratio (95% CI) 0.37 (0.18-0.74); these results however are unadjusted for confounding variables (Rana *et al.*, 2003). Other notable studies was done by (Hua *et al.*, 2018), which explored not only general midwifery led care but also continuity midwifery care on the delivery mode of low risk women when compared with obstetrician led maternity care. In the study they used a concurrent cohort study design using hospital data of 1, 730 low risk women from nine hospitals in Shanghai, China. Results showed that the odds of caesarean

section decreased significantly with midwifery led (OR 0.17;95% CI: 0.11 to 0.25). After adjustment for potential confounders (hospitals, maternal age, education, vacation, method of payment, gestational age at delivery and birth weight), the results still showed a significant decrease (OR 0.16;95% CI:0.11 to 0.25).

### ***Women's own experience with midwifery led care and their experience through midwives***

There were six studies that reported on the experience of midwifery led care for women who have received it and midwives who had given it (N. F. Cheung *et al.*, 2011; Symon *et al.*, 2011; McLachlan *et al.*, 2016; Hua *et al.*, 2018; Liu *et al.*, 2021; Shahinfar *et al.*, 2021).. These studies mainly collected data in the form of questionnaires, surveys, and interviews. There were two studies which reported on overall satisfaction with midwifery led care. In a study by (Liu *et al.*, 2021), they reported on women's satisfaction of the childbirth experience using a 1-10 scale, with 1 being not satisfied and 10 being completely satisfied. Women's satisfaction was reported on thirteen experience items, including prenatal counselling, presence of doula and family member at delivery, Lamaze breathing techniques, warm perineal compresses with red-bean bags, epidural anaesthesia, free position during the first stage of labour, episiotomy, laceration of perineum, midwives' postpartum guidance, perineum pain two hours after delivery. All items were reported to be significantly related to women's satisfaction with childbirth in midwifery led care. The average score for women's satisfaction with midwifery led care was 9.0 with standard deviation of 0.8. Further, another study by (McLachlan *et al.*, 2016), showed that women who were allocated in the midwifery led group in comparison to the doctor led group, experienced a higher odds of a positive childbirth experience after adjustment for first baby or not, age, education, marital status, country of birth, English as first language, income, smoking before pregnancy, aOR 1.50 (95% CI 1.19-1.83). Differently, a study by (Hua *et al.*, 2018), did not see the satisfaction levels increase with general midwifery led care. Analysing included papers revealed re-occurring themes, which can be divided into maternal empowerment, fear and anxiety, satisfaction with pregnancy and childbirth and satisfaction with the environment under midwifery led care.



### 1. *Maternal empowerment*

It was revealed that care led by a midwife may improve maternal empowerment, this is a woman's ability to take the lead in her own process of maternity care. Women gained more confidence in themselves as well as improving self-efficacy; this was achieved through antenatal education classes where they were able to increase their knowledge and skills, emotionally accept the normality of birth and to be able to handle new situations. Participants in a study done by (Shahinfar *et al.*, 2021), noted their satisfaction of antenatal classes as they had limited knowledge on pregnancy and childbirth. Further, due to the antenatal classes, participants were able to learn about how to manage and accept childbirth pain. They were able to accept the challenges of the physiological process of pregnancy and birth. The participants confidence was improved due to an effective midwife-mother interaction. They also felt that they could share any concerns with their midwives and ask any of their questions freely. In midwife led care, information and learning to change the perception of pregnancy and birth is seen as a major contributor to a successful pregnancy and birthing experience. The care received by a midwife, is in tune with the social model of care, whereby it is the experience and the satisfaction of the process care given rather than the outcome of the care. Additionally, participants felt that the process of giving birth was a partnership between them and the midwife; where they trusted and had confidence in the advice given by the midwives (Shahinfar *et al.*, 2021). Trust and confidence are factors which affect the experience of pregnancy and birth, highlighting once again the process-oriented approach of the social model of care. A logistic regression analyses in an Australian study comparing the difference in outcome between caseload (midwife led) and standard care (doctor led) showed (after adjusting for any difference in women's demographic factors) higher odds of coping physically due to self-empowerment (aOR 1.33, 95% CI 1.11–1.64), feeling free to express their feelings (aOR 1.82, 95% CI 1.43–2.28), feeling proud of themselves (aOR 1.65, 95% CI 1.31–2.10) and control in labour (aOR 1.48, 95% CI 1.19-1.83) in the caseload group (McLachlan *et al.*, 2016).

### 2. *Fear and anxiety*

In a study conducted in China (N. F. Cheung *et al.*, 2011) it was reported that participants who had a midwife at birth felt re-assured and were able to cope with their contractions. Participants were advised by midwives in different birthing positions, in being more mobile and in different breathing techniques that helped to relieve the pain of childbirth or to make it more bearable. Many women in the study also reported that hot and cold packs, relaxation

and massage provided by the midwife helped them in managing their pain (N. F. Cheung *et al.*, 2011). Majority of women who had given birth in a midwifery clinic in Iran reported that attending antenatal classes notably helped them to reduce their anxiety and fear surrounding the childbirth process. These classes reported to increase their pain tolerance, change their attitude towards pregnancy and birth and to answer any misconceptions they might have had about childbirth. Moreover, women who were allocated in the midwifery led group in comparison to the doctor led group in a study done by (McLachlan *et al.*, 2016), were shown to be less anxious (aOR 0.78, 95% CI 0.64-0.98) and more likely to have a positive experience of pain (aOR 1.39, 95% CI 1.10-1.75) than their counterparts. This highlights the holistic approach taken by midwife led care in addressing the underlying reasons for fear during birth which may then promote natural birth; thus, decreasing unnecessary caesarean sections.

### 3. *Satisfaction with the pregnancy period and childbirth period*

Iranian women who received continuity of team midwifery care during pregnancy, birth and post-partum reported satisfaction with the care they received as they were able to avoid unnecessary medical interventions through the help of the midwife's expertise and experience which positively encouraged the women to give birth naturally and to avoid having an unnecessary caesarean section. Additionally, a participant reported that they felt grateful for the midwife's ability to assess her baby and her pregnancy without using an ultrasound; it made her feel more at ease with process. The women explained that having a midwife throughout their pregnancy and childbirth helped them to have a pleasurable physiological birthing experience, as they were there to reassure the women through every step of the birthing process which in turn gave them more self-confidence and re-assurance to give birth naturally (Shahinfar *et al.*, 2021).

### 4. *Satisfaction with the environment under midwifery led care*

In terms of satisfaction with the environment, women in the (N. F. Cheung *et al.*, 2011) study reported high levels of satisfaction with giving birth in a midwife led normal birthing unit; as they felt the birthing unit had a homely environment which made them more relaxed in the space. Another study (Symon *et al.*, 2011) reported a similar finding, whereby the women in midwifery led units perceived the environment as more homely and calming, as well as less institutionalized and medical than their counterparts. Participants in this study also shared that they felt that they were being cared for more attentively in the midwifery led unit; as well

as feeling that they had more privacy. Moreover, participants under midwifery were more likely to rate their midwife as ‘warm’, ‘supportive’, ‘kind’ and ‘considerate’; and less likely as ‘insensitive’ and ‘unhelpful’.

### ***Models (theory)/ interventions used by midwives within midwifery led settings***

There were three studies that reported on interventions used in midwifery led care that could potentially reduce unnecessary caesarean section procedures. As mentioned before in the methods section, these studies did not mention the inclusion of strictly low risk women; however, we presume women who received any form of midwifery led care are not of high risk. Even so, these papers do mention that women who had a foetal diagnosis, history of infertility, incompatibility with life or mental or physical chronic diseases were not included in their studies. Moreover, one study included midwives which have provided midwifery led care as their participants (Larsson *et al.*, 2016). Interventions which were mentioned in these studies were all related to reducing childbirth fear. Childbirth fear is an important factor for low-risk women when choosing caesarean section for giving birth. It is mentioned that the emotional and psychological state of a women highly affects her perceptions of birth. If women are in a poor mental state, it is associated with increased childbirth fear; and women who have high childbirth fear are more likely to prefer a caesarean section over vaginal birth even without medical indication (elective caesarean section) (Nieminen, Stephansson and Ryding, 2009; Rouhe *et al.*, 2009). Interventions mentioned in the included studies were general midwife led counselling which could consist of different counselling techniques; motivational interviewing, basic and advanced counselling skills, psychotherapy and cognitive behaviour therapy (Larsson *et al.*, 2016). Two studies (Firouzan *et al.*, 2020) (Fenwick *et al.*, 2015) focused solely on the midwife led psychoeducational approach that was developed by Australian researchers in 2013. It was developed to improve expectant fear to target childbirth fear (BELIEF). BELIEF is a telephone-based counselling approach which uses psychoeducation helping women manage their emotions and expectations surrounding childbirth. In a randomised control study done by (Fenwick *et al.*, 2015), women in the intervention group received psycho education sessions at 24 and 34 weeks’ gestation via telephone call, lasting on average one hour. Women in the control group received usual maternity care. Results showed that those women who received psychoeducation had a clinically meaningful reduction in overall caesarean section compared to their counterparts (34% vs 42%,  $p = 0.27$ ); this was however not statistically significant. Additionally, women

who received psychoeducation reported that the decision aid helped them to reduce their fear of birth (14% vs 26%,  $p = 0.05$ ) and that they reported fewer flashbacks compared to their counterparts (53% vs 37%,  $p = 0.02$ ). A similar study (Firouzan *et al.*, 2020) found that the women receiving the BELIEF intervention helped significantly to reduce childbirth fear and increased childbirth self-confidence. It also showed their preference for normal vaginal birth in women receiving the BELIEF intervention. The literature was sparse in terms of theoretical models with only a few studies mentioning midwife led care emphasizes the normality of birth and conventional maternity care is interventionist and promoted the medicalization of birth (Eide, Nilsen and Rasmussen, 2009; Ngai Fen Cheung *et al.*, 2011; Jiang *et al.*, 2018; Welffens *et al.*, 2020; Yu *et al.*, 2020).

### ***3.3 Summary of findings***

In brief, the key finding of this review reveals that midwifery led care in comparison to doctor led care has shown to have positive contributions towards reducing the number of unnecessary caesarean sections. This can be attributed to the social model of care that characterises the way in which midwives practice and think. The emphasis on a positive experience of pregnant women receiving care, through midwife led interventions and ideology, shows that care given by midwives is in line with the duty-based ethics and process-oriented approach of the social model of care.

## ***4.0 Discussion***

### ***4.1 Introduction***

Recently, there has been a growing concern regarding the overuse of medical interventions, specifically the use of caesarean sections on women who have no clinically indicated reason to have this procedure done on them. Though safe in most in developed countries, a caesarean section is still a medical procedure with short term risk of operative complications and long term risk for both the mother and the child (Keag, Norman and Stock, 2018).

Midwife led care has been shown in a growing number of literature to have the potential of promoting the normal physiological concept of birth and to reduce the caesarean section rate (Ashcroft *et al.*, 2003; Renfrew *et al.*, 2015).

The discussion is informed by the overarching research question of the potential of midwife led care in high- and middle-income countries in reducing unnecessary caesarean sections in uncomplicated pregnancies, organised in terms of the three main aims of the review.

Following this, the chapter continues with a discussion on the general remarks of this study, the analytical approach and finally, the implications of the findings.

### ***4.2 Discussion on the evidence of midwifery led care reducing the number of unnecessary caesarean sections compared to doctor/ obstetrician led care***

As mentioned previously, there were nineteen papers which were comparison studies that reported on caesarean section outcomes. Notably, studies which utilised a randomized control trial or a matched cohort study, reported a statistically significant decreased odds of having a caesarean section in the group which received a form of midwifery led care. Although these studies cannot confirm an association; they have statistical power at attempting to argue for causality. Randomised control trials have high internal validity due to randomization that occurs between the two treatment arms. The randomization breaks any links between the exposure and any potential confounders, making the two groups fairly comparable: thus, reducing bias (Hariton and Locascio, 2018) Similarly, when participants are matched in cohort studies, this forces the participants to be constant on all levels of the decided matched factors; which causes the association between the confounders and the exposure to be broken;

giving a more statistically precise result (Skelly, Dettori and Brodt, 2012). However, the studies must be taken with caution as each study has different circumstances that lead to their particular result and thus, they are not transferrable to all situations in which women receive midwifery led care. Results may differ between studies as their definition of what is low risk is slightly different to one another, which may result in differences in caesarean section outcomes. Not all studies accounted for the same confounding variables, which may produce different results. Additionally, not many studies accounted for marital status, whether the women worked during pregnancy or if they had attended extra antenatal classes outside their visits, which may have affected women's request for a caesarean section.

Marital status has shown to have increased the odds of having a caesarean section compared to those who are single (Manyeh *et al.*, 2018). Participation in antenatal classes outside of usual maternity care may help women to increase their capacity to manage their own health during pregnancy and birth and may give them more confidence in birthing vaginally; thus reducing unnecessary caesarean sections (Cantone *et al.*, 2018). Further, this study did not differentiate between parity of the low-risk women, which may have affected the results. Some studies did account for parity and found that increased parity may be associated with decreased odds of caesareans section delivery (Damiano *et al.*, 2020a). Differences in parity may be important to account for as it is well established that primiparas and multiparas are very different each other; with primiparas being more likely to opt for a caesarean section as they lack experience of pregnancy and birth (Hua *et al.*, 2018). Despite these limitations of not including some confounding factors, these studies demonstrate that there is a possibility of promoting midwifery led care for low-risk pregnancies to try and reduce the number of caesarean sections preformed in women who do not need them. Moreover, the different ways in which maternity care is organised and viewed in each country may affect how caesarean sections and midwives are utilised. For example, in several developed countries such as Australia, United Kingdom, the Netherlands and New Zealand, midwife led care is considered a recommended practice for pregnancies that are low risk; as they have shown to reduce unnecessary medical interventions (Cheyne, Abhyankar and McCourt, 2013). As it is standard practice, it may be that women feel safe to give birth in midwife led environments. Contrary to, in China maternity care is largely in the hands of obstetricians and they have a shortage of midwives who have limited autonomy in caring for pregnant women. As maternity care is limited to obstetrician led; it may have an impact on the birthing outcome.

Obstetricians or physicians view birth in a different way than midwives do as they view birth more as a medical process through the medical model rather than a natural process through the social model. Under this lens, pregnant women are more likely to receive obstetric intervention which may lead to a caesarean delivery (Hua *et al.*, 2018). There are also differing barriers to access midwifery led care in different countries. In Japan for example, though they have a system of Nurse Midwifery with midwives legally having full autonomy to practice independently; in Japanese hospitals and private clinics however; deliveries are managed by obstetricians with midwives having limited autonomy (Page, 2001). Further, it is also difficult to do comparison outcome studies in such cases as in Germany; where obstetric departments have no legal obligation to report outcome of births in midwifery led units (alongside midwifery units in Germany) (Merz *et al.*, 2020). In the two studies conducted in Norway, no difference in caesarean section rates were found between the midwife led units and the normal conventional units. The lack of difference between the two cohorts may be due to the fact that the risk of operative delivery in Norway is generally low. Therefore, it can be argued that a lower caesarean section in the midwife cohort would be unlikely in such a country (Eide, Nilsen and Rasmussen, 2009). In the other Norwegian study, they found an equally high caesarean section rate in the three birthing units of the same department of obstetrics and gynaecology. This result may be due to the high operative delivery rate of 29.2% compared to other hospitals in Norway, at the department of obstetrics and gynaecology at the Østfold Hospital trust during the study period (Bernitz *et al.*, 2011).

#### ***4.3 Discussion on women's own experiences with midwifery led care and their experience through midwives***

Women are inclined to opt for caesarean sections during birth as a way to avoid birthing pains, however, caesarean sections are not without pain, and it carries potential negative maternal and perinatal outcomes. It has been reported that lack of social support and labour pain are the most significant reasons for women to request caesarean sections without medical reason (Wang and Hesketh, 2017). This study has found that midwife led care has been shown to increase maternal empowerment and to decrease fear and anxiety for birthing women. It has been shown by previous studies that midwifery led care with its focus on a supporting birthing environment and focus on normal birth, can make a significant difference

in allowing greater number of vaginal deliveries in low-risk pregnant women; thus decreasing caesarean operations (Jackson *et al.*, 2003).

Another significant observation from the included studies is that midwifery led care includes antenatal classes which has shown to improve women's self-efficacy. This is line with results from a study done by (Byrne *et al.*, 2014), which found that participants who engaged in childbirth education programs had better knowledge to be able to cope with birth; as well as increasing their emotional acceptance towards natural birth. This is especially true in primiparous women as they have limited experience and knowledge on what to expect during pregnancy and birth. Through classes, inexperienced first time mothers are able to gain knowledge to feel included in the decision making throughout their pregnancy; as well as gain a feeling of safety and control in the process (Aannestad, Herstad and Severinsson, 2020). Antenatal education and the philosophy of midwifery has shown to be important to achieve positive experiences of women during their pregnancy; however, it is apparent that the effectiveness depends highly on midwife-mother interaction as well as midwives' communication. This is supported by a study that found communication-based care increases birthing satisfaction and it enhances women's belief in managing their own birthing experience. Further, midwife-mother interaction is key for effective maternity care as it helps to foster trust between them. Having midwifery knowledge is not enough to build trust between the mother and midwife, the midwife along with being knowledgeable, must be compassionate, empathetic, and kind to be able to develop a sense of trust with the woman they are taking care of. When midwives have positive characteristics; they provide an environment whereby women are able to freely talk and ask questions about their care. In turn, women feel valued and respected when they are heard; providing an environment which allows them the chance to have a normal physiological delivery (Shamoradifar *et al.*, 2022).

Further, another important factor that may facilitate trust between midwife and mother and the provision of good quality care is the use of continuous midwife led care. This study did not differentiate between different types of midwife led care; however, it may have had an impact in the effective use of the care provided. A study done by (Leap *et al.*, 2010) reported that continuity of care provided by midwives allowed the continuous encouragement and support of women to be able to cope with their birth. Continuity of care is an approach that stems from primary care where the care of individuals is provided by the same care provider over time. Within maternity care, midwife-led continuity of care is therefore the care of a



pregnant woman by the same midwife, or a small team of midwives throughout pregnancy, labour, birth, and the postnatal period. Continuity of care is important as seeing the same familiar faces throughout the pregnancy period allows for enough time for patients to develop trusting relationships with the same midwife. Further, as continuity refers to using the same midwife, it allows for mental health issues to be recognised more easily, for conversations to progress and deepen and to provide a more stable environment for the woman throughout pregnancy (Bradford *et al.*, 2022).

Caution must be applied when interpreting these results, as these experience studies draw sources of information from surveys, questionnaires, and interviews. Drawing information from these sources may introduce several biases in their studies. Surveys for example are an important source of public health information however they are prone to bias that may be introduced from how the questionnaire is designed, the way it is administered or how individual questions are constructed (Choi and Pak, 2004). Generally, qualitative research is crucial in research as it enables a deeper understanding of phenomena and experiences of the participants perspectives and interpretations that is particularly useful in this present study. However, results generated from qualitative means are not generalizable, rigor is difficult to maintain and responses from participants may be biased due to responder or interviewer bias (Anderson, 2010). Also, results from these studies need to be interpreted carefully, as differences in culture may affect views on pregnancy and birth; thus, the effectiveness of midwifery led care. The focus on birthing environment, antenatal classes, communication and relationship of midwife and mother in the midwife led care shows the importance of the processes leading up to birth instead of solely placing emphasis on the birth itself. This way of practice and thinking is in line with the social model of care.

#### ***4.4 Discussion on the models (theory)/ interventions used by midwives within midwifery led settings***

Studies focusing on interventions; solely focus on interventions relating to childbirth fear. Childbirth fear was shown to be a major reason for women to request for a non-medically indicated caesarean sections, it is estimated that severe fear of childbirth affects 6 to 10% of pregnant women (Areskog, Uddenberg and Kjessler, 1981). Due to the big influence fear plays in dictating women's birthing decisions, it is important to find ways to help fearful women in coping with childbirth. Midwife led care may offer helpful interventions for fearful

women, such as by offering psychoeducation and forms of counselling alongside standard midwife care. It has been investigated in a randomised control study that psychoeducation had reduced pre-birth fear levels in women and improved childbirth self-efficacy (Fenwick *et al.*, 2015)

In the Scandinavian countries, fear of childbirth in women is recognised and is routinely treated for by team of midwives; however, it has not garnered attention in other high- and middle-income countries. Similarly, counselling for childbirth fear has been introduced in Sweden since the 1980's and is offered in most hospitals since 1990s by experienced midwives. Midwife led counselling has proven to have an effect in reducing childbirth fear and decreasing caesarean sections. It is important to note however that not all counselling will be effective in reducing childbirth fear. A national survey conducted by (Larsson *et al.*, 2016), showed that all obstetric clinics included in their study offered counselling for childbirth fear but there are major differences in the comprehensiveness of care provided in each of the clinics that may suggest differences in the effectiveness of the counselling. For example, some clinics in Sweden offered outsourcing counselling to psychologists, that was beyond standard midwifery led care, if they recognised the woman needed more psychological help.

Childbirth fear is associated with mental illness and if a woman is placed in a clinic that offers further treatment for it; it may improve her chances of getting past her fear of childbirth (Rouhe *et al.*, 2009; Storksen *et al.*, 2012). Surprisingly, the mention of the differences in theoretical models between midwife and doctor led care was sparse in the included literature. The studies mainly included outcomes on different care models, and the specific experiences of participants receiving them; however, they did not explain why there were differences between the two groups receiving the different care. This would be important to mention, as the difference in results between the care given to participants by doctor or by midwife may stem from differences in the theoretical underpinnings of each care model that characterises the treatment and care received during the prenatal, intranatal and postnatal period. The differences in theoretical approach and how birth is predominantly viewed medically stems from the history of maternity care. In the past childbirth was viewed solely as a female domain whereby they had special understanding of the birthing process. It was not until the 1700s when science became increasingly popular and turned childbirth into a medical profession in the male domain and midwifery was seen as a dangerous and an

outdated practice. It was then when childbirth was seen as a mechanical process rather than a physiological one. This also coincides with when women were seen as below men, which resulted in the argument that midwives, because they were women, did not have the necessary knowledge and capacity to understand the mechanisms of birth. As such, it was doctors, exclusively men during these times, that dealt with birth. Due to this shift, the process of giving birth changed drastically, now women were seen as naturally passive in the birthing process and the use of obstetric instruments was the norm, which is seen even today.

In the present day, there has been an unprecedented increase in the medicalisation of birth that has led to an increase of unnecessary medical interventions, including caesarean section operations, and bringing back midwifery led care is a way to go back to the physiological processes of birth (Johanson, Newburn and Macfarlane, 2002). This is in line with feminist theory, as midwifery is seen as a way to bring back women's reproductive rights from the medicalisation of birth (Shaw, 2013). These differences in theory between the different care models may affect the outcomes of caesarean sections. How birth is viewed is different depending on whether the practitioner is using a medical or social model of care when administering care. Care delivered by a doctor is underpinned by the medical philosophy, whereby having a child is seen as something that happens to a woman. The medical model of birth focuses little attention on the natural physiology of birth and views the woman as a patient who needs to be treated. It is characterised by the use of medical interventions and procedures; that are sometimes unnecessary. Doctors focus on what could go wrong in pregnancy and birth, and therefore view it as a medical condition. Whilst the midwifery philosophy of care is underpinned by the social model of care which views pregnancy and birth as normal life events for a woman and thus requires very minimal intervention unless absolutely necessary. The main aim for midwife led care is to support the woman so that she is able to successfully give birth on her own. Birthing does not require technical solutions but is an integrated holistic approach, which the midwifery model provides (Davis-Floyd, 2022).

#### ***4.5 General remarks***

As this paper is a scoping review, there are inherent limitations in the scoping review methodology. Firstly, the included papers were not assessed for risk of bias or for their quality. Secondly, at the expense of providing depth, this paper provides more breadth on this

certain topic of the potential of midwife led care. However, this method was appropriate for this particular study as the aim was not to provide evidence for clinical guidelines or to assess rigor of the studies; but to map the existing literature on this topic. Additionally, the aim was to also identify the gaps in the research. Limitations that relate to this specific scoping review is that the inclusion criteria specified to only include studies which were conducted in the English language, and thus this scoping review may miss critical sources of information relating to this topic (Tricco *et al.*, 2016) Regardless, a significant strength of scoping reviews is their ability to use a methodological and reporting framework that follows the reporting standards which are applied to systematic reviews using the PRISMA-ScR (JBI, 2022). This makes the study transparent and reproducible.

#### ***4.6 Discussion on the theoretical models***

There are different perspectives and theoretical understandings when it comes to health topics. The two main models of illness and health are the social model and the medical model. These two models represent differing perspectives on health.

The medical model is largely based on physiology and biology, emphasising the mechanical view of disease. It focuses on cure rather than prevention and places a large emphasis on throughput numbers. Additionally, it focuses on the treatment of the individual rather than the social conditions of the individual. Whilst the social model represents a holistic approach to health. It believes in the social, socio-economic, environmental, and cultural factors that intersect to bring about a person's health status.

The social model emphasises personal experience, rehabilitation, prevention, and recovery in the care of a person. These two opposing models are reflected in the domain of pregnancy and childbirth, through the differences between doctor led care and midwife led care of pregnant women. Doctor led care is practiced largely by doctors, which is based on the ideology of the medical model of care. On the other hand, midwife led care is practiced by midwives, which is based on the ideology of the social model of care. These two differing professions, fuelled by the opposing theoretical underpinnings of their practice, have

contradictory ideas and beliefs on birth and pregnancy. Based on the results and the discussion of this paper, it is evident the importance of the underlying theoretical model that informs how a doctor or a midwife practices care.

Theoretical models are more than just abstract and academic, they are translated into practical ways of doing things and they have implications on outcomes, i.e., number of caesarean sections. Pregnant women receiving care from obstetricians, who operate within the medical model of care, may not help in reducing unnecessary caesarean sections due to the interventionist and goal-oriented approach of the medical model of care. From the findings, it is revealed that the holistic and qualitative approach taken by midwife led care, informed by the social model, may help to reduce caesarean section operations. This is mainly due to the emphasis on improving the pregnancy and birthing experience for women, which may lead them to want to take part in the natural birthing process (promotion of vaginal delivery).

#### ***4.7 What are the implications from this study?***

It is clear from the studies that the provision of midwifery led care to be able to have an impact in reducing unnecessary caesarean sections, it must be of high quality. Midwife led care with its social model view of birth is not synonymous with the effectiveness of achieving physiological normal birth in women. Good communication, positive values and beliefs of the midwife has shown to have a significant role in women's satisfaction of their care within a model of midwifery led care. In practice, midwives should be provided with workshops or classes that will build effective interpersonal communication and counselling skills to be able to help women at their maximum capacity to achieve the main goal of normal birth.

Midwives will encounter difficult situations where they will need active listening skills, motivational tools, goal setting, counselling skills and problem-solving skills that they learn in supplementary classes as these qualities are not inherent in all midwives. Further, another important finding is the differences in treatment of childbirth fear in maternity clinics offering them. Counselling is highly valued, especially in women with significant fear of childbirth; therefore, there needs to be an effort to standardise counselling in countries which have clinics that offer counselling for childbirth fear.

Comparable care for women ensures that all women who need counselling are served and are being given the best possible of care in order to achieve a more positive birthing experience. To offer quality midwife care, this review helps to see the advantages of not only midwife led care, but continuous midwife led care in fostering trust between midwife and woman. As mentioned, there are significant benefits for maternity wards to implement continuous care to achieve normality of birth to achieve the goal of decreasing the number of elective surgical births. By having the same team of midwives throughout the prenatal, intranatal and postnatal period, women receive continuous pregnancy and labour support which makes them more confident in their innate ability to give birth. Receiving continuous care ensures that the mother is taken care of physically, psychologically, and spiritually throughout the pregnancy cycle. Additionally, for women who are classified medium risk or high risk at the start of pregnancy and become low risk by the end, continuous care offers an easy transition from obstetric care to midwife led care. Thus, making it more accessible for all women to receive midwife led care (Sandall *et al.*, 2016).

As it has been discussed, there are different ideologies that exist in maternity care, the medical model and the midwife model with their differing ideologies and assumptions regarding the childbirth continuum. Understanding the differences in theory is key to understanding how maternity care is provided to women. A key take away from this study is that not all midwives practise under a midwife model, and not all doctors adhere to the medical model. It may be useful to have doctors or obstetricians practise a more holistic view of birth, especially in women who do not need excessive medical interventions and present as low risk. Childbirth without fear should be the norm in low-risk births and should be supported by women, midwives, and doctors. Unnecessary caesarean sections that are requested without medical indication may pose a risk to the woman and the child, but equally as important it takes away resources from public healthcare that may have been used for something that had a medical indication and was necessary. In this regard, doctors should do a better job in ascertaining the reasons for elective caesarean sections, as well as providing unbiased information to the best course of care or treatment (Devendra and Arulkumaran, 2003)

## 5.0 Conclusion

To conclude, the scoping review intends to answer the encompassing research question of the potential of midwife led care in high- and middle-income countries in reducing unnecessary caesarean sections in uncomplicated pregnancies, in terms of the three main aims. It is not the paper's purpose to dismiss caesarean sections, we recognise that when medically indicated they are a life-saving procedure that can effectively prevent maternal and perinatal morbidity and mortality. However, the significant increases in caesarean sections above the recommended rate put forward by the World Health Organization suggests that a significant portion of them are not necessary as they are not medically justified. This increase may be attributed to the medicalisation of birth due to advances in reduction of maternal mortality and advances in maternal care. The widespread medicalisation of birth has led women who are low risk to receive unnecessary medical interventions, including caesarean sections. It is often not emphasised enough that a caesarean section is a medical procedure, with inherent surgical complications, but also a procedure that may lead to short- and long-term health consequences for women and their offspring.

This study sought to map the evidence on the potential of midwife led care in reducing unnecessary caesarean sections in low-risk women. Our findings adds to the literature on care of pregnant women as it found that midwifery led care may play a large role in reducing non-medically indicated caesarean births due to the underlying midwife philosophy they follow, and because they are equipped with the techniques and training to promote the normal physiology of birth. Additionally, this study gathers clinical evidence from studies in comparing the different models of maternity care, as well as showing in what ways and through what means midwife led care may reduce operative birth outcomes in low-risk women. There are several multifactorial and complex factors which play into a low-risk woman's decision to request for a caesarean section, this may be cultural, socioeconomic, previous experience or psychosocial factors for example, and not only due to opting for midwife led care during pregnancy. Nevertheless, this review provides a broad overview of what and how midwife led care could help in promoting normal vaginal deliveries in low-risk women; and help to work through the several reasons of why women request for a caesarean sections. Future research should focus on exploring the different variations of midwife led care, in order to see what the most effective mechanisms are to provide sufficient care to pregnant women. More research needs to be undertaken to explore the theoretical

underpinnings of the different maternity care models, to investigate the different association between several factors which lead to the best outcomes. From this study, effective midwifery led care has shown to have benefits in helping to reduce requests for caesarean sections in low-risk women, and as such it should be made accessible by health policy makers in high-and-middle income countries.

The main contribution of this study is the significance of theory in practice, which should be highlighted more in medical care related professions. The findings revealed through the scoping review shows that the theoretical model of care which one operates under, whether it be the social or medical model, matters. It matters for the reason that it is the theoretical model that informs the approach and practice one takes towards childbirth and pregnancy. In turn this affects the type of care received by the woman, which has implications for birthing outcomes. As such, this study demonstrates the positive effects of the social model of care in potentially reducing unnecessary caesarean section in low-risk women, due to the process-oriented foundation of the model in regard to health.



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