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Impact of Childbirth Education on Delivery Mode and Maternal Anxiety in Low-Risk Primiparous Women: An Integrative Review

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Impact of Childbirth Education on Delivery Mode and Maternal Anxiety in Low-Risk Primiparous Women: An Integrative Review

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Abstract

Introduction: Motherhood is a significant rite of passage; however, many pregnant people feel underprepared. The prevalence of cesarean birth among nulliparous women due to pregnancy-related anxiety is a major concern of perinatal care providers. The current prevalence estimate for having at least one anxiety disorder during pregnancy or the postpartum period is one in five. The prevalence of anxiety in childbearing women and cesarean rates continue to rise. A rapid increase in cesarean birth with no medical indication, also known as cesarean section by maternal request, is occurring and projected to continue an upward trend of 29% by 2030 due to its overuse and the unmet educational needs of pregnant people.

Research Aim: To identify the impact of enhanced antenatal education on delivery mode and maternal anxiety in low-risk primiparous women.

Methods: A keyword search with Boolean operators was conducted using SCOPUS and PubMed databases. Results were assessed for inclusion and resulted in the extraction of 15 original studies. Respective study findings and demographics were organized according to themes of the social cognitive model.

Results: Results from studies including 14,630 pregnant women concluded that enhanced antenatal education prepared women for childbirth through psychological preparation for labor, thus building maternal confidence in their ability to labor and give birth vaginally. The results also found that enhanced antenatal education aided in coping with fears and anxiety related to childbirth, thus decreasing maternal anxiety. This integrative review demonstrated that attendance to an antenatal education course impacted mode of delivery by increasing vaginal births, decreasing maternally requested cesarean births and decreasing maternal anxiety.

Discussion: Based on these results, enhanced antenatal education should be offered to childbearing women who desire to have a vaginal delivery and/or decrease their perinatal anxiety. The concept of standardizing the content of childbirth education courses warrants further inquiry. More randomized controlled trials dedicated to each of the outcomes would impact the quality of this body of literature.

Keywords: "antenatal education", "childbirth education", "midwifery", "obstetrics", "childbirth", "delivery mode", "maternal anxiety", "fear of childbirth"," integrative review"

Impact of Childbirth Education on Delivery Mode and Maternal Anxiety in Low-Risk Primiparous Women: An Integrative Review

Introduction

Motherhood is a significant rite of passage; however, many pregnant people feel underprepared. Newly pregnant people face numerous mental and physical changes during pregnancy. Changes are naturally linked to uncertainty which is why even the most significant and exciting change such as birth can lead to fear and anxiety. The current prevalence estimate for having at least one anxiety disorder during pregnancy or the postpartum period is one in five, contributing to the pregnant population being considered susceptible to maternal anxiety and unnecessary cesarean births (Lee-Carbon et al., 2022). In the last few decades, the percentage of births via cesarean birth has escalated in an unprecedented way (World Health Organization, 2021). This can be attributed to cultural- and country-specific factors (World Health Organization, 2022). Some wide-ranging reasons behind the increase in rates are that cesarean birth have been discerned as less traumatic for the newborn, convenient to schedule a birth that is fitting for the provider or family, or an opportunity to avoid the fear of pain from uterine contractions (World Health Organization, 2021). The prevalence of cesarean births among nulliparous women due to pregnancy-related anxiety is a major concern of perinatal care providers. The observation of enhanced antenatal education outside of the standard education presented during routine prenatal appointments and its possible impact on maternal anxiety and delivery mode; are what led to this review.

Anxiety is one of the most common emotional experiences in pregnant women. The most common negative emotions among this population include fear of pregnancy, fear of delivery,

and concerns regarding the health of the newborn and motherhood (Mahini et al., 2023). Despite being a normal adaptation to a new experience, anxiety can affect maternal quality of life. Serious consequences of anxiety during pregnancy include preterm delivery, preeclampsia, low birth weight and spontaneous abortion (Mahini et al., 2023).. Extended antenatal education may have a positive impact by decreasing maternal anxiety.

Fear of childbirth (FOC) is an extreme version of anxiety that takes place among multiparous, primiparous, and nulliparous women and has implicated health consequences that affect pregnancy, labor and the puerperium (Rúger-Navarrete et al., 2023). Fear of childbirth is defined as a fear of pregnancy and childbirth and is considered a health condition also known as tokophobia (Louis-Jacques et al., 2023). The prevalence of a high level of FOC has been found to be as high as 40% in new mothers and over 30% in multiparous women (Rúger-Navarrete et al., 2023). Fear of childbirth can range from mild to severe; however, a 2021 study found that fear in pregnancy can be reduced with explanation of the process of childbirth, creation of an environment that fosters support and care after delivery, appropriate educational training, and by improving the hospital environment (Yoosefi Lebni et al., 2021).

The first documented cesarean birth occurred in 1020 AD and now is the most common surgery performed in the United States (Sung et al., 2023). Increase in worldwide cesarean rates are a global concern (Suwanrath et al., 2021). The international cesarean rates have increased from 7% in 1990 to 21% in 2023, surpassing the ideal cesarean rate of 10%-15% set by the World Health Organization (WHO) (World Health Organization, 2015). A rapid increase in cesarean births with no medical indication, also known as “cesarean section by maternal request,” is occurring and is projected to continue an upward trend of 29% by 2030 due to overuse and unmet educational needs of pregnant people (Angolile et al., 2023). Cesarean births

are a major abdominal surgery that has been overly normalized in the world of perinatal care. The prevalence of maternal morbidity and mortality is higher after cesarean in comparison to vaginal delivery (Sandall et al., 2018). As with any surgery, there is an increased time for healing and risk for excess bleeding. There is known evidence that cesarean births are linked to increased risk of abnormal placental placement, stillbirth, ectopic pregnancy, preterm birth, and uterine rupture in subsequent pregnancies (Sandall et al., 2018). The rate of birth among women over 35 years old has also significantly increased in the last 40 years and studies have shown an increase of complications from cesarean in this population (Hochler et al., 2023). There is also emerging evidence that babies born via cesarean have an altered physical, hormonal, bacterial, and medical exposures that can subtly impact neonatal physiology (Sandall et al., 2018). Overall, cesarean births are a useful intervention for newborns and mothers in need of alternative delivery mode but should be reserved for when medically necessary.

The positive impact of childbirth education within the antepartum period is supported but not clearly known (Mueller et al., 2020). Enhanced antenatal education courses have grown popular over the last few decades and are hypothesized to aid improvements of maternal outcomes. Antenatal education, also known as childbirth education courses, are incremental lessons focused on improved prenatal self-care, coping with childbirth, postpartum recovery, and newborn care. Pregnant individuals take the time to understand the process of labor and delivery and comfort measures that coincide with the event of having a baby. Today there are numerous variations of childbirth education courses offered worldwide. The standardization of prenatal education has the potential to improve the overall quality and content of courses offered as well (Mueller et al., 2020). Studies have shown that childbirth education can aid in the relief of client

anxiety, decrease pain medication use, allow patients to feel more in control, build maternal confidence to have a vaginal delivery, and help couples feel empowered (Mueller et al., 2020).

Perinatal providers tend to have less time to spend educating clients on childbirth preparation in the clinical setting due to patient load and burnout; especially in highly populated cities (Mueller et al., 2020). This leaves an unmet need that can be fulfilled by extended antenatal education in a formal format.

Advocating, collaborating with other disciplines, and offering childbirth education classes during the antenatal period can aid in meeting the needs and wants of pregnant people who desire a vaginal birth. Fostering a space where they leave feeling less anxious, less scared, and therefore decrease their odds of a non-medically indicated cesarean births. This integrative review was conducted to systematically discover findings pertaining to the impact of antenatal education courses on delivery mode and maternal anxiety.

Methods

Critical Appraisal

This integrative review exercised the methodological framework defined by Whittemore & Knafl (2005) which allows the researcher to retrieve the most comprehensive research and extend awareness of an identified breach in understanding, therefore deeming it the most well-rounded review method. This review was completed by discovering an area of interest, conducting a detailed literature search, extracting imperative information, analyzing the collected information, and synthesizing the findings. Critical data assessment of all primary articles protected methodological rigor, data relevance, and trustworthiness, by using appraisal tools

developed by John Hopkins Nursing Evidence-Based Practice (EBP) Models and Guidelines. The John Hopkins Nursing EBP Levels of evidence tools were used to determine the strength of evidence and quality of evidence of each article screened during the research process. This strategy aimed to improve the quantity of applicable research on this topic by effectively integrating distinct designs and methodologies, applying rigor to synthesis of findings and data analysis, inclusion of ethical considerations as well as limitations in study design and bias.

Search Strategy

Deliberation with an academic librarian was conducted in January of 2024 to intensify specificity and depth of the literature search. In February of 2024, one systematic search was completed within two comprehensive online scholarly databases: PubMed and SCOPUS. The following terms were used with Boolean operators: (prenatal education OR childbirth education OR childbirth classes OR antenatal education OR Lamaze OR hypnobirthing OR Bradley method OR the alexander technique) AND (maternal anxiety, fear of childbirth, mode of delivery, vaginal delivery, cesarean section). The literature search was restricted to include the English language. Only primary quantitative research articles published in the last ten years (2014-2024) that examined the relationship between any form of enhanced childbirth education in correlation to its impact on maternal anxiety, fear of childbirth, cesarean section rate and vaginal delivery, were utilized to insert modern and pertinent research into this study.

Covidence Systematic Review Software (2014) was utilized to increase accuracy and standardize author decision making via the software's screening process. Articles were assessed and chosen to address the research topic. Each article pertained to what is currently understood regarding the impact of extended antenatal education courses on delivery mode and maternal

anxiety. Numerical results were generated in the software and a Preferred Reporting Items for Systematic Reviews and Meta-Analyses [PRISMA] (see Appendix A) was created. The PRISMA diagram illustrates the author's screen technique and demonstrates the process utilized to find pertinent studies and eradicate non-applicable and duplicate research.

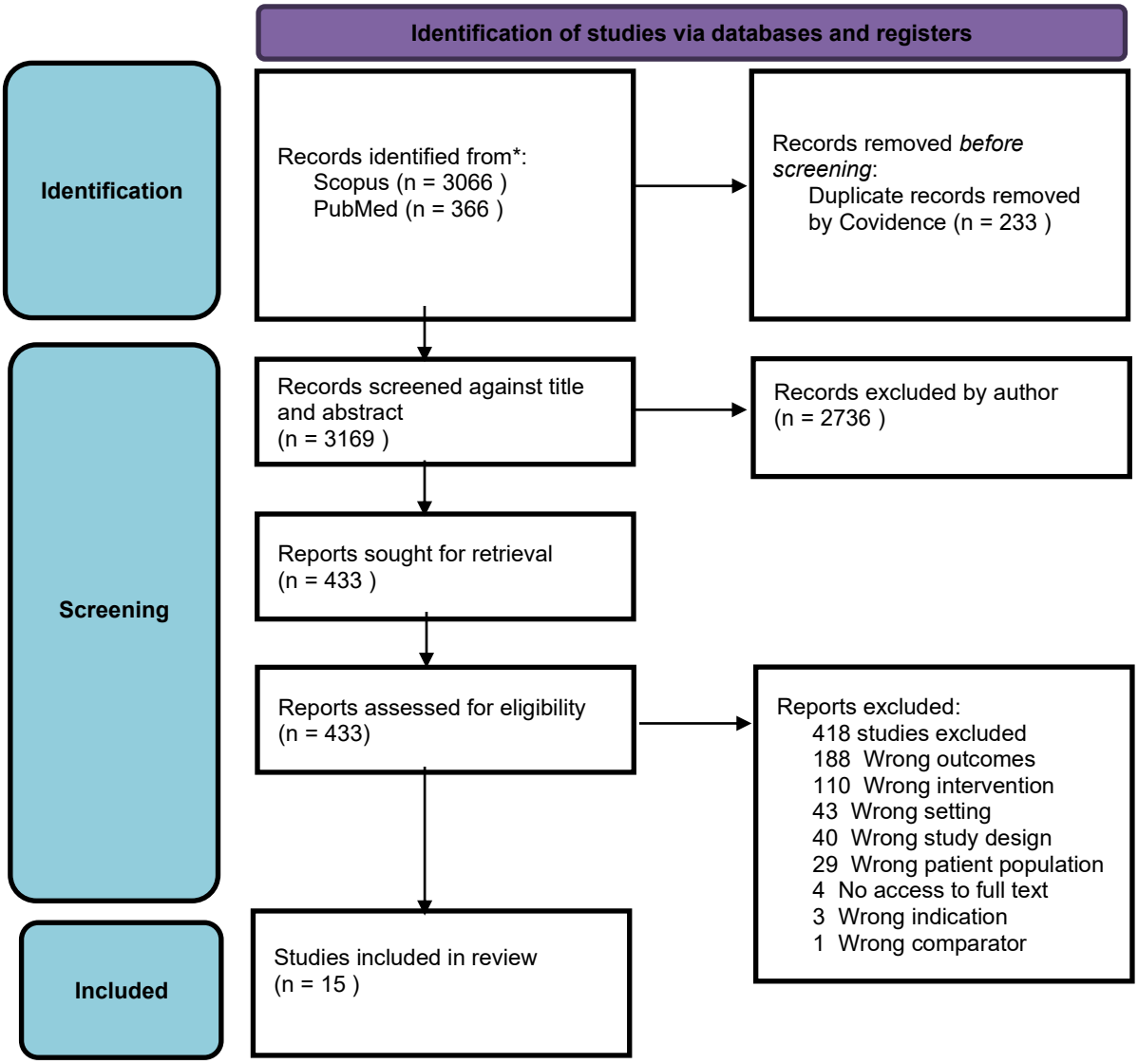
The initial search resulted in 3,402 articles (SCOPUS = 3,066; Pubmed = 47; 289 = unspecified source), and 233 duplicates were removed by Covidence. The author screened each of the remaining 3,169 studies. After the screening process, 2,736 studies were irrelevant and 433 met the criteria to be examined in full-text. This process resulted in 418 studies excluded and fifteen studies utilized for integration in the probing of current research literature.

The fifteen research articles that met inclusion criteria were analyzed to find the study's outcomes regarding implication of a formal antenatal education course. The literature matrix compiles each study's: author, year of publication, location, purpose, method, sample size, results, recommendations, and quality approval (see Appendix B).

Studies were then categorized based on quality of research components, data integration, relevance, and study limitations. This final step was based on the John Hopkins Nursing Evidence-Based Practice appraisal tool.

Appendix A

Preferred Reporting Items for Systematic Reviews and Meta-Analyses [PRISMA] DIAGRAM



Appendix B

Matrix of Studies Included in the Integrated Review`

Author/Date/Location	Purpose	Method and analysis	Sample	Results	Recommendations	Quality Approval
Haapio et al. (2017) Tampere, Finland	Assess how extended childbirth education classes can affect first time mothers fear of childbirth and its manifestation in pregnancy	Random Control Trial Two subscales from the questionnaire 'Feelings of Fear and Security Associated with Pregnancy and Childbirth' sent via mail Measured the extensity and intensity of FOC and the variations during pregnancy. Descriptive statistics Pearson (binary variable) , Mantel-Haenszel (ordinal variables) chi-square test Logistic regression analysis and Multivariable logistic regression analysis	*N* = 463 Primiparous women *n* = 235 intervention group *n* =228 control group first time mothers	Intervention group has fewer moderate and severe childbirth related fears in comparison to the control group. FOC was improved and worsened less in the intervention group.	Childbirth education serves as an important communication tool. CBE should be recommended for all first-time mothers. Seeing the birth setting positive influenced participants.	Level I, High
Shand et al. (2022)	To determine if	Experimental Cross	*N* = 505	In comparison to	Prophylaxis	Level I,

Sydney, Australia	the type of antenatal education course attended, impacts mode of delivery	sectional antenatal Combined data from a self-reported pregnancy survey, self-reported postnatal survey and hospital pregnancy outcome data Descriptive statistics , Pearsons's squared tests or Fishers exact tests and Kruskal-Wallis tests , Multivariable logistic regression, sensitivity analysis	nulliparous women with a singleton pregnancy	women who did not attend childbirth education class, women who attended psychoprophylactic antenatal education were approximately twice as likely to have a vaginal delivery. After adjusting for maternal characteristics, hospital and birth factors, the association was weakened likely due to low numbers. There was no association between attendance to any antenatal education course and mode of delivery.	couple-based education classes should be offered to nulliparous women who desire a vaginal birth Random control trials needed to determine if psychoprophylaxis education can improve birth outcomes and decrease cesarean section rates. Future high-quality RCTs in a broader range of population comparing different types of antenatal education course without economic barriers to attending class are required to conclude whether psychoprophylactic antenatal education can improve obstetric outcomes	good quality

Vanderlaan et al. (2022) Nebraska, New Jersey, Montana, Pennsylvania; USA	To determine if childbirth education is linked to improvements in outcomes for national maternal child health goals in the United States	Experimental – Secondary Analysis Survey respondents Chi-square analysis , logistic regression using same backward selection models as the main analysis, removing the control variable for race or insurance as appropriate	*N* = 2256 respondents delivered in the last 4 months at 37 weeks or greater	Attending CBE classes associated with reduced likelihood of primary cesarean section.	CBE is a community intervention that may aid in achieving maternal and child health goals that include reducing primary cesarean sections	Level II, High
Afshar et al. (2016) Los Angeles, California; USA	Assess whether delivery mode is linked to attendance of a CBE or a birth plan	Experimental - Retrospective cohort study Descriptive statistics, Chi squared or Fishers exact test Logistical regression analysis	*N* =14,630 deliveries met inclusion criteria with an average gestational age of 39+4/7 weeks	Women who attended CBE were older and more likely to be nulliparous had higher odds of giving birth vaginally Women in CBE and birth plan groups were more likely to be older, nulliparous, lower BMI, and were less likely to be black Women who attend a CBE or had a birth plan had higher chances of vaginal	CBE should be offered to nulliparous women who desire a vaginal delivery	Level II, High

				delivery. No stronger combined effect of birth plan and CBE was found		
Hands et al. (2021) United States	Purpose is to examine the effect of hospital-based CBE on birth outcomes in nulliparous women	Quasi experiment Medical record review Statistical Package for Social Sciences version 25, Chi-square analysis	Nulliparous women who gave birth at the same facility N =222 Intervention group *n* =111 Control group *n* =111	Women who attended CBE were more likely to have a vaginal delivery	Quality CBE classes are a low-cost intervention to increase improved maternity outcomes and decrease cost of care. Hospitals and practice entities that support or offer prenatal education programs are contributing to the improved wellbeing of newborns and women	Level II , high quality
Cantone et al. (2018) Caserta, Italy	To determine whether women who attend a standardized CBE class during pregnancy have a lower cesarean rate	Experimental - Retrospective cohort study Descriptive analysis for all variables Crude relative risks with 95% confidence intervals Multivariate regression	*N* = 1000 subjects who delivered at two of the selected hospitals	Non-attendees showed a higher rate of cesarean rate than those who participated , 56.2% v 23.1% Moderate efficacy of CBE classed with an approximate 10% reduction in use of CS	Institutions should recommend that pregnant women participate in antenatal classes to increase their capacity for autonomous management of their own health.	Level III, High

				A standardized antenatal class created with strict criteria and offered in areas with high rates of CS significantly reduce the CS rate even after adjustments for potential confounders		
Shi et al. (2015) Hunan Providence, China	Assess the participation, implementation and effect of CBE provided by Chinese hospitals and to provide evidence for the improvement of prenatal education	Non-experimental, Cross sectional survey , two staged cluster sampling method used to enroll participants self administered , structured questionnaire. Consistency test conducted to assess the main section (prenatal education curriculum) of the questionnaires Chi- squared tests used to identify whether prenatal education curriculum had an influence on mothers' prenatal examination	*N* = 604 participants who delivered in the chosen hospitals who were not diagnosed as high risk	No statistical difference in the delivery mode between women who attended CBE and those that did not Overall cbe participation was very low due to lack of time or access to the curriculum or not knowing classes were offered Self administered assessment may cause recall error – questions given to those who gave birth within the year	In China, a standard and convenient prenatal education class provided by hospital is appropriate for prenatal education	Level III, High

		utilization, delivery mode and recovery status from the latest delivery				
Tang et al. (2021) Huangpu, China and Shanghai, China	Investigate whether CBE classes influence delivery mode in the largest tertiary women's hospital in China	Experimental - Retrospective study Chi square test p values of <0.05 were considered significant	*N* = 4778 women who delivered at the same hospital Intervention group *n* =644 Control group *n* = 4,134	Increased number of attempted vaginal deliveries in attended vs non attendees 87% v 60% , cesarean request was 23% in women who attended pre-natal education course	Attending CBE course influences mode of delivery and decreases unnecessary c section. Promotion of CBE class is imperative to reduce cesarean rates in China. Providers and health policy makers should take part in course promotion	Level III, high
Cantone et al. (2017) Campania, Italy	Assess whether participation in antenatal classes during pregnancy reduces rate of cesarean delivery	Experimental - Retrospective cohort study Questionnaire Crude relative risk Stratified analysis and Mantel-Haenszel weighted RR , multivariate regression model	*N* =1893 primiparous women	Moderate efficacy of CBE class reduced the occurrence of CS by about 10%	CBE classes should be offered to those who desire a vaginal delivery	Level III, High
Hassanzadeh et al. (2020)	Compare fear of childbirth,	Non-experimental, Mixed methods	*N* = 204 primiparous	Rates of fear of childbirth, anxiety and	CBE class can reduce fear,	Level I, High

Tabriz, Iran	anxiety and depression during pregnancy in three groups of primiparous pregnant women who were either not attending, irregularly attended and did not attend CBE classes	Cluster sampling Demographic and obstetric questionnaire, Kolmogorov-Smirnov Chi- Squared test and Fishers exact test Bivariate analysis and general linear model	women	depression were significantly lower in women regularly attending classes in comparison to those who did not. No significant difference between irregular and regularly attending groups	anxiety, depression in primiparous women. CBE should be incorporated into prenatal care to improve maternal health	
Yörük et al. (2022) Western Turkey	Assess the effect of attending antenatal classes on fer of childbirth and antenatal stress in nulliparous women	Nonrandomized Quasi experimental Face-to-face interview Nonparametric tests Shapiro-Wilk test Mann-Whitney U test Pearson's chi-square test Wilcoxon signed-rank test	*N* = 133 nulliparous women	Correlation found between antenatal class attendance and having a high educational level and intended pregnancy. Fear of childbirth score decreased significantly with intervention, no effect on stress of pregnancy	CBE classes should be offered to aid in the decrease of FOC	Level I, Good
Khademioore et al. (2023) Tehran, Iran	Assess the effectiveness of an interactive mobile health application that	Random control trial Self-report instruments Cronbach's alpha Independent T-test,	Primiparous women *N* = 70 Intervention group n =35 Control	There was a significant decrease in fear of childbirth in women who had the intervention in comparison to the	A mobile application focused on CBE can be considered supportive to treat women with	Level I, High

	focused on childbirth education and continuous care on FOC, self-efficacy and childbirth mode in primiparous women	Chi-square test, and Fisher's exact test Repeated analysis of variance (ANOVA) Linear regression and Logistic regression model	group *n* =35	control after eight weeks of intervention and 8 weeks after birth. The intervention group had a lower CS rate. The results showed that the odds of having a CS were approximately 3.27 times higher in the control group Slightly higher rate of vaginal delivery in educational group 71.1% v 68.7%	diagnosis of FOC and aid in decreasing risk of CS	
Hatamleh et al. (2019) Amman, Jordan	To assess the impact of childbirth education course on nulliparous women and their birth outcomes	Randomized control Trial Pre-test/post-test design Statistical analysis Chi-square test Independent t-test Analysis of Covariance	*N* = 133 low-risk nulliparous women	Childbirth education course had a positive effect on three birth outcomes and increase in women in the intervention group had spontaneous onset of labor The findings suggest that the childbirth education courses increased the possibility of pregnant women experiencing spontaneous onset of labor and arriving to a	It is recommended that providers, administrators, and policymakers aid in encouraging childbirth preparation courses to be implemented into antenatal care to improve neonatal and maternal health.	Level I, High

				hospital in active labor. There was no effect found on other birth or neonatal outcomes.		
Karabulut et al. (2016) Istanbul, Turkey	Assess the impact of antenatal education on fear of childbirth, identification with motherhood and pregnancy acceptance	Quasi experimental and prospective study Pre and post education model Prenatal self-evaluation questionnaire Wijima Delivery Expectancy/Experience Questionnaire T- test Chi square test Kolmogorov-Smirnov test Mann-Whitney test U-test Wilcoxon test	*N* =192 pregnant women (education group, *n* = 69 and control group, *n* = 123)	Antenatal education was correlated with reducing fear of childbirth in primiparous women	A systematic antenatal education program provided by healthcare professionals (nurses/midwives) was found to increase pregnant women's AP, reduce their FOC and have no effect on their IMR. formal provision of antenatal education by nurses/midwives, which is not currently included in routine antenatal care services, will facilitate pregnant women's conscious participation in the act of labor by reducing their FOC	Level II, High
Cankaya et al. (2021) Central Anatolia Region, Turkey	Assess the impact of antenatal education on anxiety, depression, fear of	A single-blind, parallel group randomized controlled. Trial Wijimia Delivery Expectancy/Experience	*N* = 120 primiparous women Intervention group *n* =60 Control group	Birth fear of women receiving antenatal education was less than the control group and had more vaginal births.	Accordingly, antenatal education programs should be regarded as a natural part of the routine prenatal education.	Level II, High

	childbirth, stress, childbirth self-efficacy and mode of delivery in primiparous women	Questionnaire Childbirth Self Efficacy Inventory Depression Anxiety and Stress scale utilized Kolmogorov-Smirnov normality test Parametric test	*n* = 60	It was found that an antenatal education. program reduced fear of birth, depression, anxiety, and stress, and increased childbirth self-efficacy. In the postpartum period, we found that it reduced. the fear of birth, depression, anxiety, and stress, and increased. vaginal birth rate	Thus, by reducing the birth fear of pregnant women, conscious participation of the women in labor are facilitated, which may contribute to the reduction of elective cesarean rates	

Data Analysis and Synthesis

The data analysis process included a conceptualized review and building of an analytical link of supporting evidence. A process of data comparison and inductive thematic and literature analysis initiated a versatile method to synthesize and report themes found in the data of the articles selected (Dhollande et al., 2021). With ongoing critical review alongside secondary researchers, the primary themes were clarified to fortify the profile of the data and endorse the purpose of the review. The primary themes are predominantly associated with the key facets of the Social Cognitive theory design.

The social cognitive theory (SCT) suggests that individuals learn from observation, imitation, and modeling of others' behaviors, attitudes, and emotions within a social context (Islam et al., 2023). This framework provides a valuable lens for interpreting the complex interplay between social influences, individual beliefs, and behavior change in the context of childbirth and maternal anxiety. The three main components of this theory are cognitive factors, behavioral factors, and environmental factors (Islam et al., 2023). Social cognitive theory posits that individuals learn by observation and modeling. Social cognitive theory emphasizes the role of self-efficacy, which refers to an individuals' belief in their capabilities to execute courses of action required to attain specific goals (Islam et al., 2023). In the context of enhanced antenatal education and its impact on delivery mode and maternal anxiety, the social cognitive theory is applied to understand the complex interplay between cognitive factors, behavioral factors, and environmental factors.

Articles were synthesized to find themes and contributed to a relevant and new understanding of the impact of extended antenatal education. Three primary themes were

identified during analysis of this literature. The social cognitive theory approach was used to present how antenatal education classes can impact delivery mode and maternal anxiety via observational learning, self-efficacy, and reciprocal determinism. This approach focused on factors that promote health and well-being such as knowledge acquisition, modeled behaviors, empowerment, behavior changes, pursuit of goals, personal and environmental factors.

Results

Included Studies

The fifteen publications included diversified settings, methodologies, and designs that included four random control trials, six experimental, three quasi experimental, and two non-experimental studies. Of the quantitative studies, there were four high-quality randomized control trials (RCT). The articles included for review were published between the year 2014 and 2023. These recent studies reflect the most current research. Of the selected articles, four were conducted in the United States, one in Finland, one in Australia, two in Italy, two in China, two in Iran, two in Turkey, one in Israel, and one in New Zealand. In total, these studies included 22,925 randomized, volunteer women and retrospective cases with a range of 70 to 14,630 participants per trial.

All trials assessed the effect of an extended antenatal education on either delivery mode or maternal anxiety in comparison to standard antenatal education delivered during routine prenatal appointments; however, duration, form and content of the intervention varied among the trials. The duration of courses varied from one two-hour session to 12 sessions totaling eight

hours. Majority of the trials focused on low-risk nulliparous women. In most trials, the control group included standard antenatal care delivered during routine prenatal visits with some controls offering the opportunity to call the perinatal provider with questions.

Six articles were targeted to assess the impact of a formal antenatal education course on maternal anxiety. The remainder of the articles assessed the impact of an enhanced antenatal education course on nulliparous women and their delivery mode. Data was also reported on delivery interventions, patient self-efficacy, maternal, breastfeeding, postpartum depression, and in some articles safe sleeping.

Participant characteristics included primarily primiparous and low risk women. Sample ethnic and racial backgrounds included Asian, Hispanic, Middle Eastern, white, Jewish, and black. The mean age of all participants was 23 +/- 2. Study participants were mostly coupled but also included single parents. Most of the studies required participants to be able to speak the language of the country. It was also common for most participants to have at least a high school degree. Gestational age at time of engaging in interventions ranged from 16-28 weeks. Common exclusions in these studies were high-risk pregnancies, non-cephalic presentation, preterm labor, multiple pregnancy, younger than 18 years old, and older than 40 years old. The risk of bias was assessed in all of the 15 articles. All articles except for one self-reported limitations.

Impact on Delivery Mode: Observational Learning and Self-efficacy

Education is one of the many factors that impact mode of delivery (Hands et al., 2021). The method in which childbirth education impacts delivery mode is like other forms of health education (Vanderlaan, 2022). A common theme was found that women who attended antenatal education class had a higher rate of vaginal delivery in comparison to individuals who attended

no classes at all (Shand et al., 2022; Hands et al., 2021; Cankaya et al., 2021; Shi et al., 2015). Shand et al. (2015) noted a two-fold increase in vaginal delivery with antenatal class attendance. Cankaya et. al (2021) found that nulliparous women receiving an antenatal education intervention may have increased vaginal deliveries attributed to increasing birth efficacy while decreasing depression, anxiety, and stress. Psychoprophylaxis antenatal education prepares pregnant women for childbirth through psychological preparation for labor, thus building maternal confidence in their ability to labor and give birth vaginally (Shand et al., 2022). The Hands et al., (2021) study prioritizes essential Lamaze content, which includes The Six Healthy Birth Practices: let labor happen spontaneously, change positions, and walk in labor, bring a support person for continuous support, avoid interventions unless necessary, avoid giving birth flat on your back and push when you have the urge (Lamaze International, 2018).

The Shi et al. (2015) study incorporates course content that includes a psychological guide to labor and delivery, diet and nutrition information, prenatal care, breastfeeding and neonatal care (Shi et al., 2015). Through this study it was found that participation in extended antenatal education increased the awareness and knowledge of most mothers regarding vaginal delivery, attitudes towards healthcare providers, and ability to connect with healthcare teams (Shi et al., 2015).

It was also determined that antenatal education classes that endorse birth as a normal physiological event can aid in management of expectations, build confidence, and inform women of the risks and benefits of medical intervention, thus increase their willingness to have a vaginal delivery (Hands et al., 2021; Cankaya et al., 2021; Shand et al., 2015)

Two studies concluded that the antenatal education intervention group had lower rates of cesarean (Cantone et al., 2017; Khademioore et al., 2023). Cantone et al. (2017) showed a moderate efficacy of antenatal education classes and reduced rates of cesarean by approximately 10% in comparison to non-attendees. Overall, the odds of cesarean were 3.27 times higher in the control group results (Khademioore et al., 2023). Khademioore et al. 2023 also found that requested cesarean was higher among individuals who did not take part in the antenatal education intervention and that non-attendees were more frightened and anxious about childbirth. These studies attributed these findings to a reduction of fear of childbirth linked to additional education that results in an increased feeling of self-efficacy thus reduction of maternally requested cesarean rates.

Hatamleh et al. did not find an impact of CBE on mode of delivery but discovered a correlation between CBE attendees and an increased occurrence of spontaneous onset of labor and increased dilation upon arrival to the hospital for delivery.

Seven of the eight articles designated to assess the impact of enhanced antenatal education on delivery mode reported the rate of vaginal delivery higher in individuals that attended the intervention in comparison to individuals that did not. One article did not find a significant difference (Hatamleh et al, 2019). All articles utilized univariate, bivariate or multivariate analysis to conclude an association between the intervention and outcome.

Impact on Delivery Mode: Reciprocal Determinism

There was a common theme regarding time, convenience, and interest related to antenatal education class attendance in studies that allowed for self-select of intervention or control group. Seven of the studies reported that the rate of vaginal delivery was higher amongst individuals

who participated in antenatal education intervention groups (Shi et al.,2015; Cantone et al., 2018, Cantone et al., 2017, Tang et al., 2021; Afshar et al.,2017; Vanderlaan et al., 2023; Kademioore et al., 2023). The authors classified antenatal education as an appropriate form of primary prevention of maternally requested cesarean births. It was discovered that the participation rate of antenatal education courses was low mainly due to lack of access to classes in their hospitals, lack of time, or lack of awareness of provided antenatal education courses (Shi et al., 201, Cantone et al.,2017, Cantone et al., 2018).

Cantone et al 2017 concluded that the efficacy of antenatal education courses was dependent on factors such as an evidence-based approach, validity of content, availability of interactive classes, and accessibility of classes.

Tang et al. (2021) found that low attendance of antenatal education courses was attributed to a lack of promotion from perinatal providers at the hospital. Elective cesarean births decreased among intervention attendees in this study (Tang et al., 2021). Shi et al (2015) and Tang et al., (2021) found an increased willingness to engage in learning linked to the participants' providers' advice to take a course.

Cantone et al. (2018), Afshar et al. (2017) and Vandeerlaan (2023) et al. found that antenatal education intervention attendees were more frequently primiparous, had higher rates of employment, and were more educated, less likely to be black, and had private insurance. Bivariate analysis was conducted in this study and found that employed, less educated and multiparous women were associated with increased rates of cesarean (Cantone et al., 2018).

The study concluded that further research is necessary to understand how to improve antenatal education courses with the goal of increasing vaginal delivery rates.

Within the research it was an important finding that variation in structure and content of the antenatal education interventions did not change the impact of increased vaginal deliveries among attendees (Vanderlaan et al., 2023). Results were also related to the fostered environment where attendees could openly ask questions and receive evidence-based responses (Cantone et al., 2018; Tang et al., 2021).

Overall, three articles stated that lack of accessibility (time and awareness of courses) and lack of awareness (promotion from providers) impacted attendance of antenatal education courses. Three of the articles also concluded that attendance to antenatal education courses and decreased cesarean rate were more likely in individuals who were more educated and had higher income.

Maternal Anxiety and Fear of Childbirth: Observational Learning and Self-Efficacy

Six articles assessed the impact of antenatal education courses on maternal anxiety. Five of the six studies concluded that intervention decreased maternal anxiety. The majority of the studies utilized the Wijma Delivery Expectancy/Experience Questionnaire (W-DEQ) which is commonly used to measure childbirth fear (Roosevelt et al., 2023). It was found that fear of childbirth was decreased in the antenatal and postpartum period in those who attended antenatal education (Cankaya et al, Kademioore et al., 2013; Hassanzadeh et al., 2020; Haapio et al., 2017; Yörük et al.,2023; Karabulut et al.,2016). Hassanzdeh et al. (2020) recognized that regularly-attending antenatal course participants had significantly lower anxiety scores than non-attendees. There was no significant difference found between irregular and regular class attendees.

Çankaya et al. (2021) revealed that antenatal education courses can alleviate anxiety and fears by correcting misinformation, providing evidence-based information and positively

changing perspectives regarding childbirth. Canakaya et al. (2021) added that it is imperative to assess and plan the content of such antenatal education courses. Their study included a role-play scenario that allowed participants to reveal their cause of FOC and made them feel supported enough to overcome the fears.

The Kademioore et al. (2023) intervention group received education materials in the form of pamphlets, websites, and articles. This additional information enhanced their knowledge and eliminated misconceptions about birth which assisted intervention groups addressing their concerns about childbirth and creating confidence that their child and themselves would not be in danger. The enhanced education aided in coping with fears and anxiety related to childbirth.

Haapio et al., (2016) reported using two subscales (objects of fear and manifestations of fears) from 'Feelings of Fear and Security Associated with Pregnancy and Childbirth' questionnaire. The most common fear among participants was related to the act of childbirth and being primiparous (Haapio et al., 2016; Yoruk et al., 2022). The second most common fear was related to the well-being of the mother and infant (Haapio et al., 2016). When comparing the intervention and control group, there were fewer moderate and severe child-birth related fears in the intervention group compared to the control group at the end of the study. FOC scores improved more and worsened less in the intervention group. In the Yoruk et al., (2022) study, intervention participants also utilized self-assessment to understand their lack of knowledge and experience in childbirth thus increasing the desire to benefit from the information.

Overall, all six of the studies found that antenatal education courses decreased levels of maternal anxiety as well as fear of childbirth.

Maternal Anxiety and Fear of Childbirth: Reciprocal Determinism

Kademioore et al. (2023) conducted an eight-week study where the intervention group were provided education and support through a tele-midwifery application designed to address maternal anxiety and FOC. Educational content included information related to the mother and baby's health, labor physiology, fear of pain, what to expect in labor and birth, complications of birth, descriptions of labor stages, and misconceptions that have led to distrust of healthcare providers. The information came in the form of attractive audio recordings, videos, and short texts with images that could be understood by women of all educational levels. Increased accessibility allowed participants to have remote access to evidence-based care. This meant that commuting to a class and the possibility of absence from work was decreased for women in lower socioeconomic conditions.

Karabulut et. al.'s 2016 study allowed the education group to self-select. The study found that more educated women were more willing to engage in the antenatal education intervention due to feeling the need for the education.

The W-DEQ versions A and B were used to evaluate scores. With use of a linear regression to compare groups at different points in time, Khademioore et al. (2023) found that the intervention group showed lower scores of FOC after eight weeks of intervention in comparison to the control group. After adjustments for socio-demographic factors, the results remained the same.

Discussion

Childbirth and pregnancy are associated with emotional, physiological, and psychological changes. Lifestyle and education have a strong impact on the health of the mother and child. Antenatal education is an element that has the potential to encourage vaginal delivery and

decrease maternal anxiety. In this integrative review, literature was assessed for the impact of antenatal education interventions on delivery mode and maternal anxiety. Across trials, the control and experimental groups varied in content and format, therefore we assessed the impact of the intervention in 15 different comparison groups. Among the included articles there were four random control trials, six experimental, three quasi experimental, and two non-experimental studies. Nine of 10 articles that compared education interventions to control groups found an increase of vaginal delivery in the intervention group. All six articles that compared education intervention to control groups reported a decrease in maternal anxiety in the intervention group. The heterogeneity of the control and experimental conditions makes it plausible to state that formal antenatal education positively impacts delivery mode and decreases maternal anxiety. Consistency of results were found across the studies proving the impact of the intervention on the outcomes in a logical pattern of effect. In summary, it is possible to draw definitive conclusions on the impact of formal antenatal education courses on the increase in vaginal birth rates and a decrease in maternal anxiety.

Antenatal education courses often aim to enhance women's confidence in their ability to cope with labor and delivery through exposure to coping strategies, evidence-based information and positive birth experiences. Reciprocal determinism is a key concept in social cognitive theory which suggests that cognitive, behavioral factors and the environment interact in a dynamic and bidirectional manner. Cognitive factors such as attitudes, expectations, and knowledge are impacted by enhanced antenatal courses. The results of this study demonstrated how behavioral factors such as skills, practice, and self-efficacy can be altered to impact delivery mode as well as maternal anxiety. Environmental factors such socioeconomic status, time and awareness, support provided by healthcare professionals, physical setting of the birthing facility,

and prevalence of cesarean births can influence women's experience of labor and delivery. This review assessed if individuals are more likely to adopt these strategies and identify barriers to attendance thus changing their attitude and potentially impact their choice of delivery mode and level of anxiety.

Quality of Evidence

The main limitation of these studies are that women voluntarily attending antenatal education class may be more interested in a vaginal delivery. It is possible that increased attention and awareness to gaining antenatal education predisposes the women to lean towards desiring a vaginal birth (Cantone et al., 2018). Thus, the participants in the antenatal education class may have already been set on having a vaginal delivery. Healthcare workers could not be blinded in some studies, but the decision for cesarean was assumed to be a dichotomous decision based on medical necessity or elective (Cantone et al., 2018).

A prevalent theme was that courses included the following course subjects: anatomy and physiology, pregnancy and maternity, nutrition, physiological aspects of pregnancy, labor coping techniques, conception, mother-baby bonding, and postpartum depression. Some of the courses also included hospital tours where individuals were taught pushing positions, learned about labor interventions, and had the opportunity to walk around a labor room. There was no difference in level of impact for regular or irregular attendees of antenatal education courses and length of courses did not have influence.

Impact on Mode of Delivery

Antenatal education courses that promote childbirth as a normal physiological event can manage expectation, build confidence, teach ways to support vaginal delivery (allowing spontaneous labor to occur, staying home during latent labor, position changes, comfort measures and advocacy) and inform nulliparous women of the risks and benefits of medical interventions including cesarean births (Hands et al., 2021). Our findings in this integrative review are also supported by other studies that suggest antenatal education courses have benefits to the increase in vaginal delivery. In the literature, it is stated that voluntary cesarean birth rates can be reduced by eliminating the fear of delivery room, which can be attained through providing adequate information about labor and contractions in the antenatal period (Çankaya et al., 2021; Güleç et al., 2014).

These findings are supported by Kananikandeh et al.'s (2023) and Brixval et al's (2015) systematic review on the effect of antenatal education on delivery mode. Studies have shown that enhanced antenatal education aids in improved management of pregnancy and reduce maternal stress therefore increasing probability of a vaginal delivery (Mohamamdirizi et al., 2018; Shorey & Ng et al.,2020). The results of this integrative review add to an expanding body of research that nulliparous women who attend an antenatal education class have decreased rates of cesarean births. Altogether, the result suggests that attendance of an antenatal education course can impact the mode of delivery.

Maternal Anxiety and Fear of Childbirth

Themes within fear of childbirth were found to impact maternal and newborn health, childbirth and labor pain (Haapio et al., 2021). These types of fears can be alleviated through discussion and normalization. Fears related to mother and infant well-being were more difficult

to change than other factors (Haapio et al., 2021). Which can be understandable because these objects of fear may have deeper emotional meanings that require individualized education. Antenatal education courses improved fears that influenced daily life and were less progressive in comparison to the control group demonstrating that the intervention served as a preventative and treatment measure (Haapio et al., 2021). Thus, antenatal education should be geared towards all pregnant people, not just those with FOC. These findings agree with the wider body of research which does find antenatal education intervention to have an impact on maternal anxiety. In experimental studies covering the same topic it has been expressed that antenatal education training reduces maternal anxiety and fear of birth (Byrne et al., 2014; Çankaya et al., 2021; Serçekuş & Baskale, 2016; Toohill et al., 2014).

These findings are supported by Alizadeh-Dibazari et al.'s (2023) systemic review and Moghaddam et al.'s (2018) systematic review and meta-analysis on the impact of antenatal education interventions on maternal anxiety. Antenatal education interventions based on promoting health behaviors and addressing prevalent causes of maternal anxiety can help women manage their anxiety and subsequently reduce costs related to any potential complications (Kananikandeh et al., 2023; Nillson et al.,2018)

Future Research

This integrative review exemplified that pregnant women are in a state of vulnerability and have unmet antenatal education needs. The concept of standardizing the content of childbirth education courses warrants further inquiry. Further studies are needed to assess the efficacy of interventions to this question. More random control trial studies dedicated to each of the outcomes would impact the quality of this body of literature.

Conclusion

In this integrative review attendance to an antenatal education course impacted mode of delivery by increasing vaginal births and decreasing maternal anxiety. According to social cognitive theory, an individual's behavior and goals are the result of dynamic interactions among an individual's environment, their behavior, and the individual's cognitive thinking (Islam et al., 2023). The belief in one's ability to give birth vaginally can increase the chance that a vaginal birth occurs. Debunking misinformation and clarifying specifics of labor, childbirth and postpartum can aid in the decrease of maternal anxiety. Lastly, articulated fears related to childbirth and receiving accurate education regarding the topic can relieve fear of childbirth.

Based on these results, formal antenatal education courses should be offered to childbearing women who desire to have a vaginal birth, and/or decrease their perinatal anxiety. Anxiety screenings should be conducted at initial prenatal visits. The American College of Obstetricians and Gynecologists (ACOG) now recommends that health providers screen women at least once during the perinatal period for anxiety and depression using a validated tool. Perinatal providers are most familiar with the Edinburgh Postnatal Depression Scale (EPDS) (MGH Center for Women's Mental Health, 2020). Specific items on this assessment can identify anxiety but may not always identify all pregnant people with clinically relevant anxiety (MGH Center for Women's Mental Health, 2020). Western Australian researchers created and tested the Perinatal Anxiety Screening Scale or PASS to specifically assess for a wide range of anxiety symptoms during pregnancy and during the postpartum period (MGH Center for Women's Mental Health, 2020). Therefore, PASS should be considered as an anxiety assessment tool during the initial prenatal visit.

Findings from this integrative review supports the significance of the impact of primiparous women who attend antenatal education classes, regardless of the format—be it free or paid, conducted online or in-person, and whether they opt for full-time attendance or otherwise. These classes provide invaluable knowledge and preparation for expectant people, equipping them with essential information and skills necessary for a smooth and informed childbirth experience. There is room for additional investigation on the impact of enhanced antenatal education on delivery mode and maternal anxiety. Until then, a learning environment where information is debunked, birthing people can ask questions, and self-efficacy is improved upon; serves as an environment to positively impact delivery mode as well as maternal anxiety.

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