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## Obstetrical Nursing Care and Cesarean Section Delivery Rates in Laboring Women: An Integrative Review of Literature

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OBSTETRICAL NURSING CARE AND CESAREAN SECTION DELIVERY  
RATES IN LABORING WOMEN:

AN INTEGRATIVE REVIEW OF LITERATURE

By

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A thesis submitted in partial fulfillment of the requirements  
for the Honors Undergraduate Thesis Program in Nursing  
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## Abstract

**Background:** An overuse of non-emergent C-sections (CS) currently exists throughout the United States. The majority of research surrounding CS overuse focuses on the physician's role, locations of high occurrence, hospital policies, and the reason why the CS is being performed. Little research focuses on the nurse's influence on CS outcomes, although nurses spend the longest amount of time with the patient. **Methods:** Data for this literature review examined 13 research articles between 1992 to 2021, exploring factors relating to the overuse of CS, specifically, data relating to the correlation between CS and the nurse's role. **Results:** Recent research has shown that factors such as short staffing affect nursing care provided to patients. Likewise, a nurse's attitude towards patient care has influenced the level of attention and advocacy patients receive regarding CS. Experience level of nurses can also influence the outcome of CS deliveries. For example, experienced nurses showed higher CS rates among patients and were less likely to utilize therapeutic amounts of Oxytocin (Pitocin) during labor compared to newer nurses. **Conclusion:** The nurse's influence also has implications on the outcome of CS delivery and requires further research. As the main advocate for patients, understanding how the nurse can help avoid unnecessary CS procedures is of great importance.

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## **Introduction**

Annually, in the United States (US), approximately 3.5 million babies are welcomed into the world. According to the Centers for Disease Control (CDC), 31.7% of all babies born in 2019 were delivered by CS (2021). Even more concerning is the 86.2% of CS performed on women who previously had a CS. The criteria for undergoing a CS varies greatly and can be determined by the physician and woman prior to birth. While CS have greatly reduced mortality rates in the US during delivery of the fetus, controversy has continued to grow as the CS rates remain relatively high. Several theories investigate the reason for high incidence of CS even though a slight decrease each year is apparent (CDC, 2021). To decrease the rate of CS deliveries, examining actions leading up to the birth of the infant and measures implemented through nursing care of the woman in labor, have yet to be explored.

While a considerable number of variables contribute to the overuse of CS, one of the main focuses is on the culture within the maternity unit in hospitals. Maternity unit culture includes the attitudes, habits, and preference of the staff members on a particular unit. Research suggests differences in CS rates not only occur in the state in which they are performed but also the facility where they are performed (White et al. 2019). According to the CDC, there is a high variation in CS rates per state (2021). For example, in 2017 Alaska ranked last with a CS rate of 21.9 percent. The three states with the highest rates were Mississippi (35.1%), New Jersey (36.3%), and at the top Louisiana (36.8%).

Another contributing factor to CS rates in some health care facilities relates to physicians' attitudes and behaviors towards infant delivery. For example, the time that it takes for a CS is significantly less than the variable time of vaginal births and can save physicians time while also

earning the same, if not more financial compensation. However, even with specific interventions that have been implemented to reduce the number of CS the overall CS rate in the US has declined very little in the past decade. One factor that has been alluded to by some researchers is the role obstetrical nurses might have in a physician's determination for a CS delivery based on medically necessary circumstances (Simpson, 2017). The difference between a medically necessary CS and an elective CS is the risk of potential harm to the mother and/or baby that could occur with a vaginal delivery. An elective CS may or may not be medical and in some cases poses no risk to the mother or baby should a vaginal delivery occur. Elective CS do not allow for naturally occurring birth process to begin and are often scheduled ahead of time. This thesis focuses on the role that obstetrical nurses may or may not have in the decision for the necessity of CS among laboring women.

Studies suggest births by in CS can be influenced by labor and deliver nurses caring for laboring mothers (Simpson 2017). Nurses in labor and delivery settings have the potential to promote awareness of predisposing factors that can promote or deter a medically necessary CS as opposed to an elective CS. Advocating for a woman in labor by a nurse or nurses can greatly influence the fetal well-being after delivery, as well as a decision by the pregnant woman to have an expecting CS. Such nursing intervention can facilitate the labor process and ultimately could influence the physician's decision as to whether a CS is medically necessary in each situation. With time being a critical factor in the laboring process, it is crucial for nurses to implement evidence-based care to promote a naturally progressing labor. In this thesis, factors relating to the nursing care of a woman in labor will be evaluated as well as the overall influence on the delivery method used based on that care. With time being a critical factor in the laboring process, it is crucial for nurses to implement evidence-based care to aid in naturally progressing labor.

Factors relating to the nursing care of a woman in labor will be evaluated by a review of the literature, as well as the overall influence on the delivery method used based on that care. These factors include staffing shortages and inexperience. This thesis will critique and analyze the research literature regarding nurses' activities that can influence on the delivery method, i.e., natural delivery versus non-elective CS delivery.

## **Problem Statement**

Describe the relationship between the obstetrical nursing care provided to laboring women and nonelective CS rates.

## **Purpose**

The purpose of this literature review is to critique and analyze the research literature focusing on the relationship between obstetrical nursing care provided to laboring women and non-elective c-section rates.

# Background

## Introduction

Recent concern exists over excessive use of non-emergent C-sections in the United States and other developed countries. Research has been conducted to investigate the reasoning behind the sharp increase of CS's. While some factors have been identified, the CS rates have only seen a slight reduction. Research should be conducted regarding and the nurse's role in the decision-making process and outcome. Nurses spend the most time with patient's, therefore insight is important regarding this relationship.

Historically, C-sections became a favorable method for complicated deliveries in the 1940's. In the 1960's, a notable rise in CS occurred and has yet to decline to a desirable number since then. According to Birth Injury Help Center (2021), between 1965 and 1985, a 400% increase in C-sections occurred. Currently, of every 3 babies delivered in the US, one is born via CS. While C-sections can prevent some undesirable outcomes, there are many risks associated with having a CS, among others a CS can also compromise the health of the mother that she may or may not be aware of. Some of these risks associated with CS include hemorrhage, infection, and anesthesia related complications (WHO, 2018). C-sections have also been attributed to complications related to infant outcomes including respiratory problems, asthma, and obesity (WHO, 2018). Several studies have investigated theories related to higher than desirable CS rates and have led to implementation of measures to help reduce these numbers.

## Factors Attributed to High CS Delivery Rates

- Physician (Medical) influence
  - Lack of training/inexperience
  - Financial Gain/ For-profit hospitals

- Great Distances to an OB provider
- Threats of lawsuits for less-than-optimal fetal outcomes
- Technological influence
  - Electronic Fetal Monitoring
- Nursing Care Factors
  - Staffing shortages
  - Experience level

### **Physician (Medical) Factors**

*Lack of training/ inexperience:* A study published by the Institutional Journal of Gynecology and Obstetrics investigating breech deliveries resulting in CS rather than vaginal deliveries, concluded that physicians and midwives that felt they had received adequate training for complicated deliveries were more comfortable attempting a vaginal delivery (Lawrence, 2021). A healthcare provider without adequate training or experience for complicated deliveries can result in a higher probability for preference towards CS deliveries.

*Financial gain/ for-profit hospitals:* Another study found that financial gain is correlated with the amount of C- sections occurring (Penna, 2003). C-sections result in a longer hospital stay and in certain healthcare systems hospitals make higher profits for deliveries resulting in CS rather than vaginal delivery. Insurance companies throughout the country continue to reimburse hospitals more for CS than vaginal deliveries. In particular, for-profit hospitals have shown to have a significantly higher CS rate than non-for profit.

*Great distance to an OB provider:* A study conducted by the Journal of the American Board of Family Medicine (2021) found that rural areas that were less likely to have an obstetrician in the area had significantly higher C-section rates than those who had an accessible

obstetrician. Due to factors such as distance, lack of transportation, and other disadvantages that often times affect those living in rural areas CS are often a resulting measure. The article also mentioned that patients who don't receive routine prenatal care have a higher chance of having a CS due to insufficient data relating to the health of the pregnancy. This is often the case in rural areas compared with mothers who have easier access to care (Tong et al., 2021).

*Threats of lawsuits for less-than-optimal fetal outcomes:* Vaginal deliveries hold many risks like C-sections. There is great variation in the timing and results of a vaginal delivery. If there are concerns or factors that could increase a less than optimal delivery a CS may be preferred. Yang et al. (2009) research concluded that malpractice premiums were greater for vaginal birth after cesarean section than for C-section and that it does influence the decision to move forward with a C-section.

### **Technological Factors**

Electronic Fetal Monitoring (EFM) is a non-invasive way to measure a fetal heartrate as well as maternal contractions. These two factors combined can determine the overall health of the fetus during the labor process. An Australian based study by Turnbull et al., (2019) investigates the connection between EFM and C-sections alone compared with the CS rates with the use of EFM and ST analysis of the electrocardiogram. Specifically, use of EFM is routine for women in the laboring process and is used in 60-70 percent of all deliveries in Australia, and EFM can determine the status and well-being of the fetus. This study found with EFM alone up to 60% of cases where fetal distress resulted in a "false positive". With fetal distress, specifically late decelerations are an indicator for having an emergency CS. While the trial is still underway, it hypothesizes a greater reduction in CS with the inclusion of ST segment analysis compared with EFM alone (Turnbull et al., (2019).

## **Nursing Care Factors**

*Nursing shortage:* Research shows nursing shortages affect many areas of nursing care (Hughes, 2008). When staff shortages exist, communication or miscommunication can impact patient care. Nursing hand-offs have shown a lack important details, patient and family communication is poor, and interdisciplinary communication is lacking. Time is also a major factor. For example, when there is a shortage of nurses, there is less time to provide care for patients. Lack of time can lead to the nurse not observing or not reporting pertinent subjective/objective patient information. Lastly nursing shortages have been shown to increase medication errors (Hughes, 2008).

*Experience level:* A study published by Obstetrics & Gynecology (2018) revealed that nurses with more experience compared to newer nurses, had higher CS rates and a lower, more conservative dosage of Pitocin. The study further explains that without the correct amount of Pitocin mothers laboring for an extended period of time may not reach the needed dilation or contraction effort necessary for vaginal delivery, resulting in a CS. On the other hand, having clinical experience allows nurses to predetermine possible problems and work quickly towards a solution. For example, for a woman is having variable decelerations on the electronic fetal monitor, a nurse with more clinical experience may more quickly intervene, such as turning the patient, compared with a less experienced nurse. Critical thinking and timely evidence-based practice are essential in the care of the women in labor.

## **Reduction Measures Currently in Place**

Several states have taken measures to reduce C-section rates. In California, for example, three hospitals were able to reduce CS rates by 20% within a year's time (California Health Care Foundation, 2021). One of the measures in place are engaging the patients in all aspects of their

care. Making sure laboring mothers are aware of both the benefit and risk of all outcomes regarding the delivery process is essential. Another issue addressed is the difference in cost. Several California organizations made efforts to reduce the cost difference and offer incentives for results that result in vaginal deliveries. Florida state government agencies recognized and created incentives for Florida hospitals achieving lower CS rates (Florida's Agency for Health Care Administration and Department of Health, 2021). Nineteen Florida hospitals were recognized and awarded for meeting the Healthy People 2020 goal for C-section reductions (Florida's Agency for Health Care Administration and Department of Health, 2021). Many other states have implemented strategies to help reduce c-sections.

### **Proposed Topic**

While all the previous research has been instrumental in the reduction of C-section deliveries, the desired decrease has yet to be met. One of the lightly researched topics is the nurses influence on C-section deliveries. When it comes to labor it is important for nurses to not only be receptive but also responsive. If arising laboring complications and their solutions are already planned for, complications that lead to CS can be avoided all together. Bedside care is an important way to gather both subjective and objective data from patients. If nurses properly implement care and gather detailed and pertinent information there is a possibility to plan for complications related to this data.

Nursing is constantly evolving, and new nurses are working along seasoned nurses. New nurses require extensive training regarding maternal nursing and a major focus is complications. A residency program needs to be implemented to ensure all necessary steps are being taken within the nursing process to foresee and avoid complications such as emergency c-sections.

Seasoned nurses require continuing education and training to avoid unnecessary routine and complacency.

With adequate staffing nurses can also tend to patients and be active participants in patient activities such as walking, which helps to speed up the birthing process. As prolonged labor is one of the main reasons for having a CS, with proper staffing nurses can implement more complimentary interventions to help aid in a natural delivery.

## **Relevance and Importance of the Research**

This research literature will aid in the exploration of nursing factors contributing to higher than desired C-section deliveries in the US. Exploring the nurse's role can determine areas of strength in the nursing care process and areas that could use improvement leading to increased patient safety and improved satisfaction.

## **Methodology**

A literature search was performed to identify articles published between 1991 to 2021 focusing on nursing factors influencing cesarean sections. Databases used to search for articles include EBSCOhost databases, Cumulative Index to Nursing and Allied Health Literature (CINAHL), Google Scholar, and PubMed. Searches will use a combination of the following terms: 'C-section', 'nursing influence', 'nursing interventions', 'C-section overuse', 'Nurse experience', 'C-section reduction', and 'Labor and Delivery nurse'. Inclusion criteria will consist of 1) research articles published from 1991-2021, 2) and written in the English language 3) and selected 13 articles (see Appendix A). Exclusion criteria included articles focusing on the patient's role in C-sections and elective CS information.

Each article was individually read and critiqued. Subsequently, the critiques were recognized to identify consistent and inconsistent findings, along with gaps in literature (see Appendix A, B, & C).

## **Results**

Of the eighteen research articles, thirteen were utilized for research and applied to the literature review. The other five articles were either non-research articles or meta-analysis research used to provide information regarding CS. All the articles correlate with CS and factors that may or may not increase their incidence. Of the thirteen articles, eleven provided a positive or negative correlation in the results section. Of the two research articles remaining, one provided inconclusive research because the study has not yet concluded. The last article didn't have results varying enough for substantial evidence. Very few studies have been conducted focusing on the relationship between CS and the nurse's role. Some mention nursing, however, they do not solely emphasize the nurse's influence alone.

## **Discussion**

The articles critiqued for this literature review provide further understanding into the increase in CS deliveries and factors that are suggested to correlate with a caesarian delivery. Research suggests factors including physicians, technology, and nurses all have implications on the rise of CS's in the United States. While the factors greatly vary, the results of most articles provide substantial evidence suggesting the researched factors do in fact have an impact on the resulting delivery method.

### **Consistent**

Three studies were consistent in research on the effects of Pitocin, and both showed statistical significance to support research. Adkins and Dziadosz (2008) found a positive correlation exists between the amount of Pitocin given and the delivery outcome. Another study conducted by Edmonds et al (2017) further investigated Pitocin, as well as a connection between the amount of Pitocin given and the nursing process. The study showed a significantly higher rate of CS for more experienced nurses compared with newer obstetrician nurses. The study also found that more experienced nurses were less likely to provide the therapeutic range of Pitocin for effective vaginal delivery support compared with newer nurses. The last study by Maeder (2020) explored the titration amount of Pitocin required to properly aid in a successful vaginal delivery. The study found that many nurses did not reach that titration level in a timely manner and that night shift nurses in particular took longer to reach the desired titration amount.

Four studies explored how attitude affects the delivery outcome. Hughes (2008) conducted a study on both midwives and obstetricians on their attitudes regarding performing complicated vaginal deliveries. Majority of respondents reported that they were uncomfortable performing complicated vaginal deliveries or felt they had inadequate training in the same regard. Sauls

(2007) investigated the attitude of nurses and how that affected care of expecting mothers. The study found significant data suggesting both attitude and social pressure influenced on the quality-of-care mothers received. As behavioral intent increased, the length of labor decreased. A third study by White (2019) compared the attitudes of both nurses and doctors totaling 1,718 respondents from 70 hospitals. Researchers found that when the nurse and doctor had differing attitudes a negative correlation was present regarding an increase in CS deliveries. Lastly, research conducted by Yang (2009) found that malpractice rates were significantly higher for VBAC pregnancies than for CS's resulting in preference of CS deliveries compared with vaginal. This is highly concerning because it creates potential for C-sections to occur for reasons outside of emergent decisions on behalf of the mother and baby.

### **Inconsistent**

Of the 6 remaining articles, a few provided inconclusive data and the others were not well researched. A study conducted by Boeckmann (2020) revealed that a low compliance existed during CS procedures. While this information can be of use to many research topics, it is not helpful in this case. Also, the research was conducted in Turkey, which may have differing safety standards compared with the United States and other developed countries. California Health Care Foundation (2021) implemented research into 3 California hospitals and found a significant decrease in CS rates. The study suggested transparency and improved communication were two factors that greatly affected outcomes. However, the study was solely based in California and further implementation in hospitals in other areas would provide more conclusive results. The CDC published research on the C-section rates by state (2019). This research was valuable in identifying the areas with high rates but left out causative factors.

Lo (1998) conducted a case control study and found that healthier and younger women had more vaginal deliveries. The study also found that more CS's occurred on the weekend compared with the weekdays. The second finding provide enough significant statistical evidence and requires further research. Sebastian's 2021 study followed practitioners who serviced rural areas and found a higher CS rate in areas with no gynecologist. Further research is needed to find out why the lack of a local gynecologist results in CS's. Finally, a study by Turnbull (2019), is currently investigation how electronic fetal monitoring and its readings result in higher CS rates. Data relating to technology is significant to non-emergent CS deliveries, the study has not yet concluded.

### **Gaps in Literature**

Research has shown how many factors have influenced the outcome of deliveries among pregnant women. However, the research fails to tie the information together and how each factor affects the other. The existing research also has little focus on nurses, who spend the longest amount of time with patients. Much of the research addresses staff attitudes and a strong correlation among CS rates, however, fails to address suggestions or components to negate such attitudes. The root cause of a lot of research appears to be related to a need for further education. Research on implemented education is needed to make a concrete connection.

## **Implications for Nursing**

### **Education**

Education within nursing is needed for both new and experienced nurses. A refresher on the titration rates as well as recurrent training on the uses of Pitocin is necessary. Education is also needed regarding attitudes toward patients and delivery method. Patient advocacy needs to be addressed when the patient and doctor have differing interests. Research found many physicians are uncomfortable performing complicated vaginal deliveries (Hughes, 2008). Nurses need continued education on patient advocacy to avoid instances such as physician preference or comfortability.

### **Clinical Practice**

In the clinical setting, nurses and doctors need to closely monitor the effectiveness of the Pitocin titration and anticipate changes that need to be made before a CS is necessary. Nurses should be aware of personal bias in the clinical setting and avoid applying opinion and judgement when caring for expecting mothers. Transparency and communication, as well as patient education should be provided to every patient ensuring an educated decision is made.

### **Policy**

Policies should be in place for a standardized titration rate of Pitocin. Malpractice insurance should not have additional costs for VBAC compared with a CS delivery. All financial incentives to perform a CS delivery should be removed. Lastly, the cost to have a CS should be minimally different compared with vaginal deliveries.

### **Research**

Currently most research focuses on the physician's connection to c-section rates or outside variables separately. Rarely is research conducted based on the interdisciplinary care

received from both doctors and nurses. More specifically, there is little research reflecting the nurses influence on c-section rates. Further research into the nurse's role will help strengthen the theory of the causative factors leading to high c-section rates.

## **Limitations**

There is currently very little research analyzing the relationship between CS rates and nursing care. Furthermore, even less research exists on the interdisciplinary factors that affect CS rates. Variation occurs among each hospital and suggests limitations regarding results from specific hospitals.

## **Conclusion**

C-Sections are a routine result in the laboring process regardless of whether the procedure is emergent or not. The influences of nursing care and CS rates are being investigated in an effort to reduce non-emergent CS rates. This literature review analyzed thirteen articles determining nursing factors such as Pitocin administration, nursing attitude in relation with laboring mothers, and length of employment all correlate with CS rates. This literature review concludes that further education, medication administration, patient advocacy, and transparency will aid in the reduction of CS rates. However, little research exists focusing on nurses during the laboring process indicating a need for further research. Nursing implications were derived and evaluated. Limitations and suggestions were made based on the relevance to nursing.

**APPENDIX A: TABLE 1: TABLE OF EVIDENCE**

Last name of first author/ Location/ year	Study design/ dates	Sample size/ data collection method	Categories	Participant's characteristic	Key findings	Was the research question answered?
Adkins/ New Jersey/ 2018	Retrospective data review  2018 (2-month period)	Medical record review over a 2-month period	<ul style="list-style-type: none"> <li>-Delivering mothers</li> <li>-Experience level of nursing care</li> <li>-Maternal and infant characteristic</li> <li>-Procedure performed</li> </ul>	Inclusion: 37+ weeks Singleton pregnancy 18-40 years old  Exclusion: Poor uterine surgery Previous c-section Planned c-section	Experienced nurses were most likely to have deliveries result in c-sections and use less than the maximum allowed Pitocin administration during labor.	Yes
Boeckmann/ Brazil/ 2020	Cross sectional descriptive, and analytical study  2018	n=220 c-section births  Tukey test and analysis of variance	<ul style="list-style-type: none"> <li>-Monitoring caesarean surgeries.</li> <li>-Compliance lists were used to guide surgical safety.</li> </ul>	Inclusion: C-section patients displayed fetal distress, gestational diabetes, previous c-section, interactivity, and preeclampsia	A low compliance of surgical safety during c-section procedures.	Yes
California Health Care Foundation/ California/ 2021	Observational study of quality improvement efforts  2014-2019	N= 679,086 births in California  Pilot testing	<ul style="list-style-type: none"> <li>-Nulliparous</li> <li>-Term</li> <li>-Singleton</li> <li>-Vertex</li> </ul>	Inclusion: Nulliparous, term, singleton, and vertex  Exclusion: Multiple pregnancies or twins, breach position	With interventions such as transparency and improved communication 3 California hospitals were able to reduce C-sections from 26% to 22.8% between 2014 and 2019.	Yes

CDC/ United States/ 2019	Retrospective review  2019 Trend data from 2010-2019 for certain categories.	N= 3,747,540 births  Review of registered birth certificates.	-Birth certificates of US born children, including the US Virgin Islands and Puerto Rico -Fertility rate -Maternal age -Method of delivery -Marital status of mother	Inclusion: US Citizens  Exclusion: Non- US Citizens	US states listed in order from highest to lowest based on the number of c-section deliveries in 2019.	Yes
Edmonds/ United States/ 2017	Retrospective cohort study  2017	N= 72 nurses/ 3031 births  Hospital data	Labor and delivery nurses caring for -Nulliparous -Singleton -Term -Vertex mothers	Labor and delivery nurses divided by length of time worked. Inclusion: Nulliparous, singleton, vertex, term. Exclusion: Multiparous, breech, planned c-section, twins, or multiples	Nurses with more experience were found to have higher result of c-sections and lower doses of Pitocin are used than newer nurses.	Yes
Hughes/ Ghana/ 2008	Cross comparison  2008	N=93 obstetricians/ gynecologists/ 162 midwives  Survey	-Ghanaian obstetricians/ gynecologists -Ghanaian midwives.	Obstetricians, gynecologists, and midwives	Obstetricians and gynecologists were less confident performing breech deliveries and felt their training was inadequate compared with midwives.	Yes
Lo/ Taiwan/ 1998	Case-control study,	N= 274 hospitals/ 391 clinics	-Date of birth -Age of mother -Gestational age	Expecting mothers and	Healthier, younger women were more likely to have a healthy	Yes

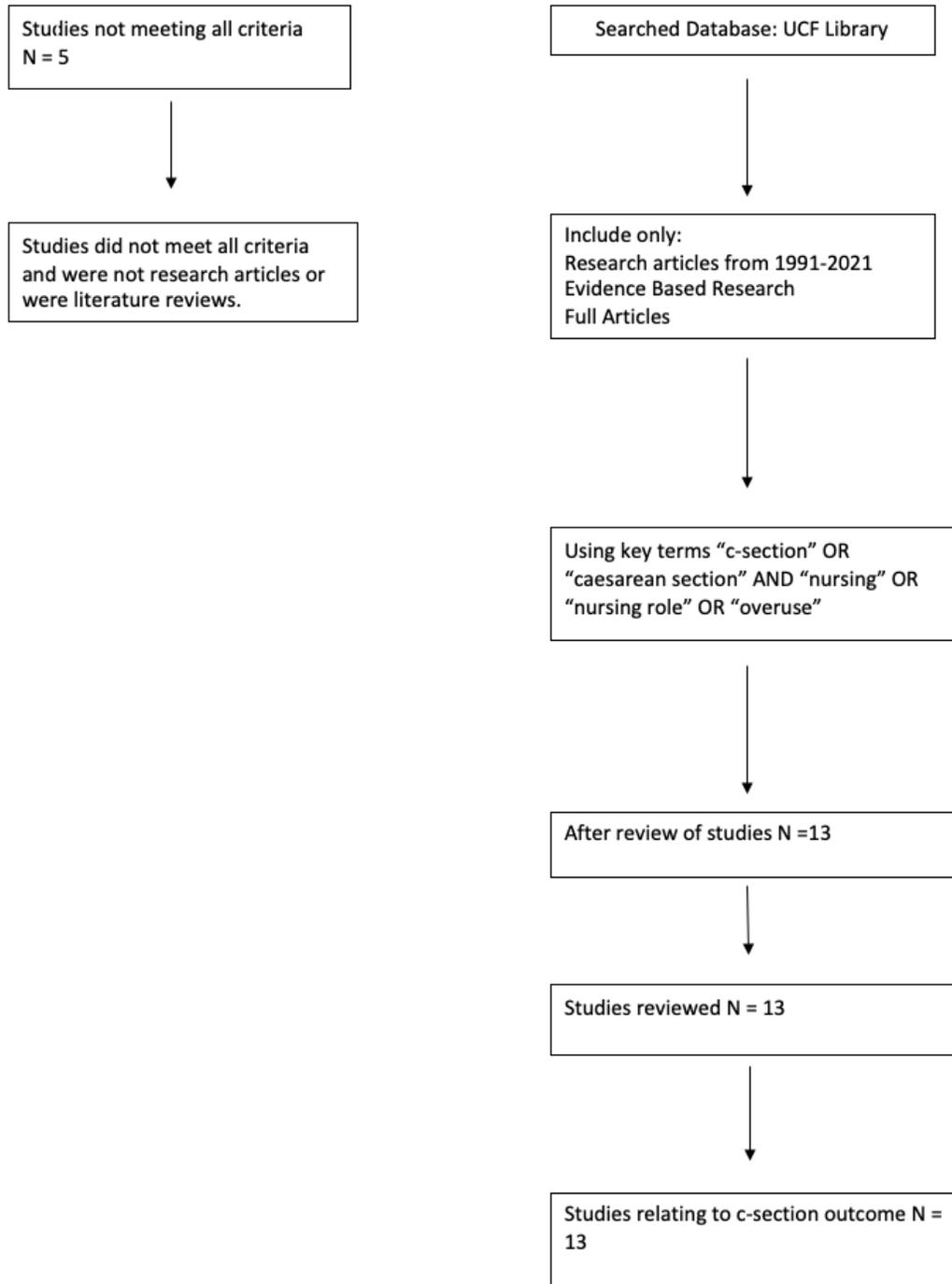
	1996-1998	offering delivery services. Birth certificates	-Anti/intrapartum risks -Day of the week	healthcare providers.	vaginal birth. Providers working the weekends were more likely to perform c-sections.	
Maeder/ United States/ 2020	Secondary analysis  2020	N=163 women	- Mean patient age: 28.8. - Mothers in active labor.	Inclusion: Mothers induced with oxytocin. Exclusion: Mothers not induced with oxytocin.	Oxytocin needs to be titrated appropriately to aid in labor delivery for timely vaginal delivery. The time to reach appropriate titration took longer on the night shift than the day shift. Nurses require further education on proper titration.	No
Sauls/ United States/ 2007	Retrospective study  Mar-Apr 2007	N=39 RN's N= 419 nurse patient dyad's  Survey	Theory of planned behavior was used to measure behavior intent of registered nurses.  Relationship between behavioral intent, predicted variables, and health outcomes.	Registered nurses  Nurse patient duo in labor and delivery.	Attitude and social pressure both played a significant role in nurses providing labor support to mothers. As behavioral intent increased, length of labor decreased.	Yes
Tong/ United States/ 2021	Retrospective study  2017-2018	N=17,171  Questionnaire	Family practitioners that provided obstetrician care.  Practitioners that performed c-sections	Family practitioners continuing certification.	FPs perform a higher number of c-sections in rural areas without obstetrician/Gynecology care.	Yes

			Practitioners who performed c-sections in rural areas.  Practitioners who performed c-sections in non-rural area.			
Turnbull/ Australia/ 2019	Retrospective study  2019-2022	N=1818 birthing women  Single-center, parallel-group, randomized controlled trial	Term mothers giving birth.	Inclusion: term labor,  Exclusion Planned c-section, pre-term labor	Date has not fully been collected yet, but it is hypothesized that proper training and ST-analysis of fetal monitoring will reduce the rate of c-sections	No
White/ United States/ 2019	Retrospective study	N= 1718 respondents.	Hospital attitude and culture.	Attitudes of both physicians and nurses associated with c-sections.	Differing attitudes between doctors and nurses have a negative correlation regarding increased c-sections.	Yes
Yang/ United States/ 2009	state-level longitudinal mixed-effects regression models	N=  1991-2003	Malpractice rates V-BAC rates C-section rates	N/a	Rates for c-sections were lower than rates for V-BAC which had influence on the outcome of delivery.	Yes

**APPENDIX B: FIGURES: TABLE 2: TABLE OF EVIDENCE: NON-RESEARCH**

<b>Last name of First Author/year/Country</b>	<b>Topic/Research/Summary</b>	<b>Key Statements</b>
Birth Injury Help Center/ N/A/ N.D./ US	History of C-sections  Non research  The evolution and use of c- section throughout the years is compared, as well as the evolution of the safety of the procedure.	<ol style="list-style-type: none"> <li>1. C-section rates remaining under 5% until the 1960's</li> <li>2. Between 1965 and 1985 there was an increase in c-sections by 400%</li> <li>3. 1-3 deliveries in the US results in c-section.</li> </ol>
CDC/ 2019/ United States	C-section rates by state: 2019  Non research  Southern states had significantly higher c-section rates than northern states.	<ol style="list-style-type: none"> <li>1. Louisiana had the highest c-section rates in 2019.</li> <li>2. Utah had the lowest c-section rates in 2019</li> </ol>
Chen/ 2018/ Multiple countries	Literature review evaluating the effectiveness of methods in place to reduce c-sections  Literature review of 29 studies across several countries.	<ol style="list-style-type: none"> <li>1. Interventions in place such as mandatory second opinion, audits, and education successfully reduced c-section rates.</li> </ol>
Silva/ 2018/ Brazil	Exploring the systemization for nursing care in c-section procedures.  Quantitative/ Descriptive/ Exploratory study	<ol style="list-style-type: none"> <li>1. Most c-section diagnosis resulted from safety and tolerance to comfort.</li> <li>2. It is necessary for nurses to have a systematic approach to care of women in labor to avoid c-sections.</li> </ol>
Wilson/ 2021/ United States	Exploring the relationship between nurse staffing and patient care outcomes. Specifically, labor and delivery nurses and the correlation between nurse staffing and c-section outcomes. Retrospective descriptive study	<ol style="list-style-type: none"> <li>1. The optimal staffing model showed a decrease in c-sections.</li> </ol>

## APPENDIX C: FIGURE 1: CONSORT FLOW DIAGRAM



## References

- Adkins, C. B., Dziadosz, M. (2008, May). *Level of nursing experience and its link to cesarean birth rate*. *Obstetrics & Gynecology*. doi: 10.1097/01.AOG.0000533155.55009.48
- Birth Injury Help Center. (n.d.). *History and evolution of cesarean sections*. Retrieved November 19, 2021, from <https://www.birthinjuryhelpcenter.org/c-section-history.html>.
- California Health Care Foundation. (2021, April 30). *Reducing unnecessary c-sections in California*. Retrieved November 30, 2021, from <https://www.chcf.org/project/reducing-unnecessary-c-sections/#related-links-and-downloads>
- Centers for Disease Control. (2021, February 9). *Stats of the states- cesarean delivery rates*. [https://www.cdc.gov/nchs/pressroom/Sosmap/Cesarean\\_births/Cesareans.Htm](https://www.cdc.gov/nchs/pressroom/Sosmap/Cesarean_births/Cesareans.Htm). Retrieved December 2, 2021, from [https://www.cdc.gov/nchs/pressroom/sosmap/cesarean\\_births/cesareans.htm](https://www.cdc.gov/nchs/pressroom/sosmap/cesarean_births/cesareans.htm)
- Centers For Disease Control and Prevention. (2021, March 2). *Births-method of delivery*. FastStats. <https://www.cdc.gov/nchs/fastats/delivery.htm>
- Chen, I., Opiyo, N., Tavender, E., Mortazhejri, S., Rader, T., Petkovic, J., Yogasingam, S., Taljaard, M., Agarwal, S., Laopaiboon, M., Wasiak, J., Khunpradit, S., Lumbiganon, P., Gruen, R. L., & Betran, A. P. (2018). *Non-clinical interventions for reducing unnecessary caesarean section*. *The Cochrane database of systematic reviews*, 9(9), CD005528. <https://doi.org/10.1002/14651858.CD005528.pub3>  
NMC.0000000000000308. PMID: 27879502.
- Edmonds, J. K., O'Hara, M., Clarke, S. P., & Shah, N. T. (2017). *Variation in Cesarean Birth Rates by Labor and Delivery Nurses*. *Journal of obstetric, gynecologic, and neonatal nursing: JOGNN*, 46(4), 486–493. <https://doi.org/10.1016/j.jogn.2017.03.009>

- Hughes, R. G. (Ed.). (2008). *Patient safety and quality: An evidence-based handbook for nurses*. Agency for healthcare research and quality (US). Lawrence, E. R. (May 1, 2021). OBGYN. Obstetrics and Gynecology. <https://obgyn.onlinelibrary.wiley.com/doi/abs/10.1002/ijgo.13478>
- Lo J. C. (2003). Patients' attitudes vs. physicians' determination: implications for cesarean sections. *Social science & medicine* (1982), 57(1), 91–96. [https://doi.org/10.1016/s0277-9536\(02\)00301-5](https://doi.org/10.1016/s0277-9536(02)00301-5)
- Maeder, A. B., Park, C. G., Vonderheid, S. C., Bell, A. F., Carter, C. S., & McFarlin, B. L. (2020). Maternal and system characteristics, oxytocin administration practices, and cesarean birth rate. *Birth* (Berkeley, Calif.), 47(2), 220–226. <https://doi.org/10.1111/birt.12482>
- Sauls D. J. (2007). Nurses' attitudes toward provision of care and related health outcomes. *Nursing research*, 56(2), 117–123. <https://doi.org/10.1097/01.NNR.0000263972.54619.4a>
- Silva, R., Bezerra, I., Monteiro, C., Adami, F., Souza, H., Jr, & Abreu, L. C. (2018). Nurses' knowledge and practices in the face of the challenge of using the systematization of nursing care as an instrument of assistance in a first aid in Brazil. *Medicine*, 97(33), e11509. <https://doi.org/10.1097/MD.00000000000011509>
- Simpson KR, Lyndon A. (2017) Labor Nurses' Views of Their Influence on Cesarean Birth. *MCN Am J Matern Child Nurs*. 2017 Mar/Apr;42(2):81-87. doi: 10.1097/NMC.0000000000000308
- Tong, T. S., Eden, R. A., Morgan, J. Z., Bazemore, A. W., Peterson, E. L. (2021, January). *The essential role of family physicians in providing cesarean sections in rural*

*communities*. The Journal of the American Board of Family Medicine Jan 2021, 34  
(1) 10-11; DOI: 10.3122/jabfm.2021.01.200132

Turnbull, D., Salter, A., Simpson, B., Mol, B. W., Chandraharan, E., McPhee, A., Symonds, I., Benton, M., Kuah, S., Matthews, G., Howard, K., & Wilkinson, C. (2019). *Comparing the effect of STan (cardiotocographic electronic fetal monitoring (CTG) plus analysis of the ST segment of the fetal electrocardiogram) with CTG alone on emergency caesarean section rates: study protocol for the STan Australian Randomised controlled Trial (START)*. *Trials*, 20(1), N.PAG. <https://doi.org/10.1186/s13063-019-3640-9>

White VanGompel E, Perez S, Datta A, Wang C, Cape V, Main E. (2019) *Cesarean overuse and the culture of care*. *Health Serv Res*. 2019 Apr;54(2):417-424. doi: 10.1111/1475-6773.13123. Epub 2019 Feb 20. PMID: 30790273; PMCID: PMC6407356.

Wilson, B. L., & Butler, R. J. (2021). Identifying optimal labor and delivery nurse staffing: The case of cesarean births and nursing hours. *Nursing outlook*, 69(1), 84–95. <https://doi.org/10.1016/j.outlook.2020.07.003>

World Health Organization. (2018). *WHO recommendations non-clinical interventions to reduce unnecessary caesarean sections*. World Health Organization. <https://apps.who.int/iris/handle/10665/275377>. License: CC BY-NC-SA 3.0 IGO

Yang, Y. T., Mello, M. M., Subramanian, S. V., & Studdert, D. M. (2009). *Relationship between malpractice litigation pressure and rates of cesarean section and vaginal birth after cesarean section*. *Medical care*, 47(2), 234–242. <https://doi.org/10.1097/MLR.0b013e31818475de>