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Centering Pregnancy: The Maternal and Neonatal Benefits of Group Prenatal Care

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CENTERING PREGNANCY: THE MATERNAL AND NEONATAL BENEFITS OF GROUP PRENATAL CARE

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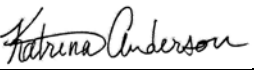
Second Reader Signature:	
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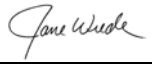
Director of Graduate Nursing Program Signature:	

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Abstract

Title: Centering Pregnancy: The Maternal and Neonatal Benefits of Group Prenatal Care

Background/Purpose: Centering Pregnancy is a type of group prenatal care that allows women to meet and receive their prenatal care together. The groups meet ten times during the pregnancy and focuses on different aspects of prenatal care. This critical review of the literature focuses on maternal and neonatal benefits of group prenatal care over traditional one-on-one care. A secondary analysis looks at how group prenatal care affects adolescents, women of low socioeconomic status, and minority ethnicities.

Theoretical/Conceptual Framework: The Social Learning Theory by Albert Bandura was utilized to look at Centering Pregnancy. The Social Learning Theory states that learning in a group setting allows the participant to learn social norms, physical behaviors, and psychosocial responses to the material being taught. Reflection on group content also enhances the women's learning.

Methods: A critical review of the literature was completed with 24 articles that compared Centering Pregnancy to traditional prenatal care. Studies from all five levels of research were utilized in the review. A literature matrix was completed with the 24 articles to help organize the studies included.

Results/Conclusions: Centering Pregnancy has proven benefits of decreased preterm birth, reduction in low birth weight infants, and increased social networking. Stress reduction and decreased incidence of post-partum depression were also proven. High-risk individuals such as adolescents, LSES, and ethnic minorities show increased benefits when participating in Centering Pregnancy over traditional care.

Implications for Research and Practice: Future research for Centering Pregnancy needs to be done to understand the causal pathways that contribute to its effectiveness. Further research on breastfeeding initiation, effects on post-partum depression, and cost analysis of Centering Pregnancy need to be looked at.

Keywords: Centering Pregnancy, Group care, Pregnancy care, Maternal outcomes, Benefits, Ickovics

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Chapter I: Introduction

Prenatal care is one of the most common health interventions in the United States today (Novick, 2009). The way women relate and react to their prenatal experience has the potential to alter their birth outcomes. Research has identified the most common problems and disappointments women have had with their prenatal care, which include a lack of time with the provider for questions, and lack of awareness obtained from the visit (Novick, 2009). One emerging trend to help combat these problems is the concept of Centering Pregnancy.

Centering Pregnancy is a group format of prenatal care, where 8-12 women gather for 90-120 minutes, and discuss different topics during their pregnancy; this is in lieu of the traditional one-to-one care. During the Centering Pregnancy sessions, women are exposed to topics, such as nutrition, exercise, relaxation techniques, common pregnancy issues, postpartum depression, postpartum contraception, breastfeeding, parenting topics, and childbirth preparation (Massey, Schindler-Rising, & Ickovics, 2006). Massey et al. (2006) stated that Centering Pregnancy "… is based on the philosophy that pregnancy is a process of wellness, and a time when many women can be encouraged to take responsibility for their own health and learn self-care". The model has been proven to help alleviate the fears associated with birth for first-time mothers, as well as alter the birth outcomes for those involved (Ickovics et al., 2003; Kennedy, Farrell, Paden, Hill, & Jolivet, 2011).

Statement of Purpose

The primary question to be addressed through this critical review of the literature is, "Does group prenatal care affect birth outcomes differently than traditional one-on-one

prenatal care?" In addition, this paper will describe how group prenatal care impacts outcomes for the following groups: adolescents, low socioeconomic status, and minority ethnicities. These groups were selected due to their numerous benefits in Centering Pregnancy, such as decrease in preterm birth and reduction in low birth rate, which impact these specific populations the most. These groups were also identified in many of the literature studies, because of their increased risk of repetitive childbearing, with decreased spacing between children, poor health habits, increased stress, and the lack of social support. Adolescents, women with low socioeconomic status, African Americans, and Latinas, statistically have an increased risk of preterm birth and low birth weight (Benediktsson et al., 2013; Grady & Bloom, 2004). Studies in the past have focused on those groups as a means to decrease the negative outcomes. Finally, African Americans and Latinas represent a growing childbearing population in the US, which suffer from increased infant mortality (Robertson et al., 2009; Tandon, Cluxton-Keller, Conon, Vega, & Alonso, 2013). This critical review of the literature will identify the benefits of Centering Pregnancy over traditional prenatal care, as they are in the literature, and how they may make an impact upon these specific groups.

Need for Critical Review

Thielen (2012) conducted a literature review that looked at the group prenatal model of care. In her review, she reported an increased requirement for more research to be done on the effects of group prenatal care. The author chose to specifically detail the specific benefits of group care, and also looked at what groups would benefit the most. Thielen (2012) found that the major benefits from group prenatal care included a longer gestational period and higher birth weights. It was also noted that teens in group prenatal

care showed a decrease in preterm births, and low birth weight issue reduced, when compared to teenagers in traditional prenatal care. Additional research by Tandon et al. (2013) and Baldwin (2006) discussed other benefits, such as engagement in prenatal care, social support, and satisfaction with care that Thielen's (2012) review did not cover. As this review was conducted in 2012, an updated critical review should be provided to understand what further research has been completed with regard to Centering Pregnancy, and to determine the gaps in the literature.

When reviewing the literature, many studies discuss the maternal benefits, with relation to one's social group. Although the studies are limited, the available details demonstrate the need for further review. Literature on Centering Pregnancy is scattered, and a robust study of the effects on maternal outcomes would benefit both participants and providers. Research shows that those involved in Centering Pregnancy have better birth outcomes and a lower rate of cesarean birth (Ickovics et al., 2003; Jafari, Eftekhar, Fotouhi, Mohammad, & Hantoushzade, 2010). While infant mortality has been on a decline, the rates of preterm birth and low birth weight infants have slowly been on the rise over the past decade (Tanner-Smith, Steinka-Fry, & Lipsey, 2014). Therefore, despite the advances in technology, there is still a need for changes to be made in prenatal care. By using a model of prenatal care that highlights the social outcomes and relationships, the nurse-midwives can change their approach to prenatal care.

Significance to Nurse-Midwifery

Understanding the maternal and neonatal benefits for group prenatal care is meaningful for midwifery, as Centering Pregnancy is presently becoming a more widespread option for prenatal care (Bell, 2012). Centering Pregnancy can provide an

alternative to traditional care, with increased social and relationship-based care (Massey et al., 2006). The philosophy of midwifery traditionally means 'with women', and Centering Pregnancy is based on the theory of relationship-based care (Bell, 2012). Being 'with women' implies that nurse-midwives come beside women and support them in their choices and in their care. In addition, midwifery encompasses the art of teaching, and Centering Pregnancy combines teaching with prenatal care in a group setting, which allows nurse-midwives to use their skills, such as interpersonal communication and relational care. Weldon and Crozier (2005) state that "Education can take place during any interaction and this gives nurse-midwives huge scope to provide an educational experience for women each time they meet" (p. 216).

Through a deeper understanding of the benefits of Centering Pregnancy, more nurse-midwives have started to utilize a group prenatal model to better benefit their patients. Bell (2012) found that Centering Pregnancy allows the patients to become active participants in their prenatal care.

Positive birth outcomes become the result of patient empowerment. While this model can be used within any OB office, traditionally, nurse-midwives are developing relationships with their patients, which draw them into Centering Pregnancy. Another advantage is that women from many different arenas can be brought to one place, in order to learn together. Camaraderie and shared beliefs encourage participation from all group members, even from those who are socially less outgoing (Bell, 2012).

Looking at the specific social groups mentioned above will allow the nurse-midwives to target those individuals during the patient's initial prenatal visit. Klima et al. (2009) lists the benefits, such as improved attendance at prenatal visits, increased

independence with participants, and higher patient satisfaction, which are important factors while working with at-risk populations. An awareness of population-based benefits allow more opportunities for Centering Pregnancy, by targeting the at-risk populations. One study showed that African American women participating in the Centering Pregnancy groups were more likely to demonstrate an increase in their prenatal knowledge, breast-feeding initiation, and they also felt more prepared for labor (Ickovics et al., 2007). The importance of increasing positive behaviors cannot be emphasized upon enough in at-risk populations.

Theoretical Framework

The theorist who is most closely aligned with the Centering Pregnancy model is Albert Bandura and the Social Learning Theory. The Social learning Theory states that certain behaviors, such as social attitudes, psychosocial responses, and physical behaviors, can be learned by observing others in a learning situation (McLeod, 2011). Group care, as seen in the case of Centering Pregnancy, invites the woman to not only look at her ideas and responses during the learning process, but also to see how those ideas are received and validated by others in a group. Reed et al. (2010) discusses social learning with regard to it's meaning and its evolution. In Bandura's initial work (1977) Social Learning is described as individuals who learn in a social setting and are built up by the social norms of the group (Reed et al., 2010). It is important to note that social learning is enhanced through one's reflection of an experience. Reflection is important, because it allows the learner to internalize the information and then process how it affects them. By reflecting upon the information, learners become active participants in their learning. In Centering Pregnancy, group members are able to discuss pregnancy and labor

experiences with one another, which allow all the members to learn from those experiences. Mezirow (1995) states that learning new skills in a group setting and being able to communicate the same to a group also constitutes the Social Learning Theory, because members are able to share their thoughts. According to Reed et al. (2010), in order to demonstrate effective social learning, the participants need to demonstrate that a change in understanding has taken place, and the learning needs to "go beyond the individual to become situated within wider social units or communities of practice within society" (p. 5).

The Social Learning Theory, with its wide array of definitions, serves to explain how women learn and benefit from group experiences. By allowing these women extended time to talk and share with one another, they can enhance their learning, when compared to traditional prenatal care (Massey et al., 2006). Since Centering Pregnancy groups are generally made up of primigravida and multigravida women, they are able to share not only helpful hints which are related to their pregnancy, but also about their previous birth experiences. This allow the first time mothers to ask questions which they may not have otherwise known to ask.

Social Learning Theory can also be applied to different patient demographics and social groups which are seen within Centering Pregnancy. Teenagers are constantly accessing social media and electronic forms of media to augment their learning thus implying that they learn better in a social forum. Social learning states that the participants benefit from learning not only concepts, but from the larger practices they develop. Latina women benefit from the social aspect of Centering Pregnancy by

improving follow-up care and greater patient satisfaction (Trudnak, Arboleda, Kirby, & Perrin, 2013).

Social learning indicates that the collective norms of a group can be transferred to individuals who are learning within the group (Reed et al., 2006). Heberlein et al. (2015) recently looked at the psychosocial benefits of Centering Pregnancy, and determined that those with low socioeconomic status (SES) showed a significant decrease in post-partum depression, as well as reduced stress throughout their pregnancy. The conclusion drawn is that reinforcement of what is normal reassures patients that they are not alone. The increased knowledge presented from multiple group members allow for decreased stress among its participants.

Summary

As the goals of Healthy People 2020 draw closer, the Center for Disease Control (CDC) is looking at new ways for prenatal care to meet their goals. With the current goals still focused on the reduction of preterm birth, decreased low birth weight of infants, and increased adequate prenatal care, Centering Pregnancy is an option that one cannot afford overlooking (U.S. Department of Health & Human Services, 2014). This is even more important for nurse-midwives, because they value their relationship-based care with their patients. This chapter introduced the reader to Centering Pregnancy and discussed its importance in prenatal care. The need for a critical review, the importance of this topic to midwifery, and the theoretical framework behind Centering Pregnancy were further described.

Chapter II will discuss the search methods utilized for this review. A description of how the included articles were evaluated, using the Johns Hopkins method, is

included. Inclusion and exclusion criteria for the studies in this critical review are listed, followed by a brief look at the number and types of articles found during the search.

Chapter II: Methods

This chapter will look at the process used while conducting the literature review and its subsequent assessment. Explanations will be provided about the search strategies used to answer the questions. Inclusion and exclusion criteria for studies will also be explained. This chapter will also review the types and numbers of studies found when researching Centering Pregnancy. The last component of this chapter will look at the level and quality of evidence included in this review.

Search Strategies

The intent of this literature review was to look at the effects that group prenatal care has on maternal and neonatal outcomes. Initially, the review hoped to analyze the data which looked specifically at teen pregnancy and group care. The search criteria elicited very few results, and therefore, the review was expanded to include the effects of group prenatal care across the board. The initial search was conducted using the Cumulative Index to Nursing and Allied Health Literature (CINAHL) database, after entering the words "Centering Pregnancy" and "outcomes". The search resulted in finding 19 articles. The search criterion was changed to "group prenatal care" and "outcomes", and 866 articles were shown as a result. A second search was completed using Scopus, and it resulted in 89 articles on Centering Pregnancy. Searching Scopus for "group prenatal care" resulted in over 10,000 hits, most of which were random articles on groups or prenatal care in general. Analyzing the literature revealed that many of the articles found were generalized information on Centering Pregnancy, and not research studies. Sifting through the articles on both search sites revealed certain common search topics such as "maternal outcomes", "benefits", "pregnancy care", and "group care."

Articles for analysis were condensed down to 31. A few key authors were noted, and a Scopus search of "Ickovics" and "pregnancy" was made, with a result of 74 articles. As articles were reviewed for their content validity, the reference lists were also utilized to determine more search criteria.

Evaluation of Research Studies

Two separate books were used to help evaluate the research studies: *Johns Hopkins Nursing Evidence-Based Practice: Model and Guidelines* (Dearholt & Dang, 2012) and *Nursing Research: Methods and Critical Appraisal for Evidence-Based Practice* (LoBiondo-Wood & Haber, 2014). These were used to determine the evidence level of the studies, as well as their quality. The Johns Hopkins model provided guidelines for the level of evidence evaluated in a research study. A level I research study is comprised of an experiment or randomized controlled trials (RCT). These studies may or may not be accompanied by a meta-analysis (Dearholt & Dang, 2012). A level II research study is generally found to be quasi-experimental, or a combination of quasi-experimental and RCT's. Again, they may or may not have a meta-analysis. A level III research study is non-experimental. A combination of non-experimental, quasi-experimental, or RCT's, with or without meta-analysis would also be a level III study. A level IV study consists of clinical practice guidelines, consensus panels, and authoritative opinions. A level V study is made up of literature reviews and case reports (Dearholt & Dang, 2012).

Quality of the evidence is broken down into High quality, Good quality, and Low quality. Dearholt and Dang (2012) offer a description for the different levels of evidence presented. High quality studies are expected to have generalizable and consistent results.

Information should be applicable, have consistent recommendations, and have a substantial review of the literature. Good quality studies need to have sufficient sample sizes, some control, and reasonably consistent results. Low quality, also known as majorly flawed studies, show little evidence, with inconsistent results and insufficient sample sizes (Dearholt & Dang, 2012).

The research studies in this review utilized the articles' aim, the research design, sample sizes, and the results to determine their eligibility. Whether or not the study addressed the research question was also reviewed. Literature reviews of the articles were looked at when the studies were between two quality levels.

Inclusion and Exclusion Criteria

The matrix for this research study included articles from all levels. Due to the limited nature of level I and level II articles, all were included to analyze the gaps in the research. High and good quality guided articles were included in the matrix. Many of the initially found articles were discarded, as they did not relate to the research question. Several articles were more knowledge-based on Centering Pregnancy, and were, therefore, excluded. Literature reviews were looked at for additional article selection, but were not included in the final matrix. Articles that discussed maternal benefits and neonatal benefits were included in the study.

Studies for the Review

Articles on Centering Pregnancy and group prenatal care were reviewed based on maternal and neonatal benefits. Studies that looked specifically at teenagers, socioeconomic status, and ethnicity were also reviewed for their outcome benefits. Studies were organized based on the outcome that they addressed, quality guide, and

evidence levels. Low level articles were eliminated from the studies. Among the 25 final studies included there were: five level one studies, three level two studies, eleven level three studies, three level four studies, and three level five studies.

A literature matrix was used to organize the articles used in the study. Matrix article headings were: citation, purpose, sample, design, measures, results/conclusions, recommendations, and level/quality. The Appendix shows the studies included in the final review.

Summary

Despite all the literature found, there are still large gaps and some discrepancies in the research on Centering Pregnancy. The largest gap noted is related to the-casual pathways within Centering Pregnancy which have not been researched. Tanner-Smith et al. (2014) discussed the need for research on causal pathways, leading to the mechanics behind Centering Pregnancy, in order to strengthen the effects it has over traditional prenatal care. In addition, many authors noted certain discrepancies in the benefits reported. One explanation for this was the changing demographics of participants in the Centering Pregnancy groups, which yielded different benefits than what were previously reported (Ickovics et al., 2011; Robertson et al., 2009).

This review included 25 articles in the final matrix. These studies consisted of a wide variety of maternal benefits and included different socioeconomic statuses. This chapter provided information used on the evaluation process, along with the inclusion and exclusion criteria for the research studies. Chapter III will serve to provide an in-depth review of the studies included in the critical review, as well as their strengths and weaknesses.

Chapter III: Literature Review and Analysis

This chapter serves to review and analyze the studies related to Centering Pregnancy and the maternal and neonatal benefits that the participants receive over traditional prenatal care. Group prenatal care was initially developed in the 1970s, at the Childbearing and Childrearing Center of the University of Minnesota. At this time, group care was intended for couples, and covered the third trimester through three months post-partum (Manant, 2011). In 1993, Sharon Schindler-Rising, a nurse-midwife from Minnesota, further developed the program, and made it into the Centering Pregnancy program. Since then, Centering Pregnancy has been analyzed for more than just relational care, and has been further studied for its benefits. This analysis will provide a synthesis of the findings with regards to maternal and neonatal benefits of Centering Pregnancy over traditional prenatal care. Both the strengths and the weaknesses of this appraisal, along with the different research studies, will also be included.

Synthesis of the Matrix

A matrix format was used to organize the research studies and to look at the trends among them. Maternal and neonatal benefits of Centering Pregnancy were evaluated. The 25 articles included in the matrix were organized with the following headings: citation, purpose, sample, design, measurement, results/conclusions, recommendations, and level/quality (Appendix). The studies included in the matrix were organized based on their evidence level. The highest level studies were listed first, and then the articles were organized according to their year of publication.

The studies included were evaluated based on the matrix headings, as well as their relevance to the research question. Studies that were of low quality were excluded from

this study, as well as non-peer reviewed studies. Each research study was analyzed individually, and then, the findings from all the articles were synthesized. Practice implications were also identified.

Synthesis of Major Findings

The literature in this review supports the benefits of Centering Pregnancy over traditional prenatal care for all women, specifically for the identified subgroups. Articles were noted to look at both early and later research. The studies in the early research focused more on reduction of prenatal births and low birth weight infants, while the later studies looked at other maternal benefits, such as decreased stress in group-care participants and an increase in breastfeeding initiation. This critical review will discuss the following findings: reduction of preterm birth, effect on low birth weight infants, patient satisfaction, and social support. The synthesis of findings will also discuss how these benefits can be related to different social groups previously mentioned: adolescents, low socioeconomic status, and minority ethnicities.

Preterm Birth. Premature birth is defined as an infant who is born prior to the start of the 37th week of pregnancy (AGOC, 2014). Infants born before 34-weeks gestation are at an increased risk from preterm birth. Ickovics et al. (2007) conducted a randomized controlled trial to look at the effects of Centering Pregnancy on preterm birth. Study results showed that the participants of group prenatal care were significantly less likely to experience preterm births than those in traditional care (Ickovics et al., 2007). Research further showed that the participants of group prenatal care were significantly less likely to experience preterm births than those in traditional care. Two

studies demonstrated preterm birth rates to be 9.8% and 6.3% for group care, versus 13.8% and 9.7% in traditional care (Ickovics et al., 2007; Jafari et al., 2010).

A retrospective chart review show the patients enrolled in Centering Pregnancy versus traditional care, and evaluated preterm birth rates between these two groups. Their study looked specifically at the gestational ages of the infants born, and how that was compared between the groups. Women who had group prenatal care demonstrated higher gestational ages overall than those in traditional care (Tanner-Smith et al., 2014). A post-hoc analysis was done, which looked at the specific gestational ages of the infants who were born preterm. Results showed both statistical and clinical significance in the Centering Pregnancy group, with a decreased incidence of preterm birth, and by an average increase of two weeks gestation for those born preterm (Tanner-Smith et al., 2014). A retrospective cohort study, looking at preterm birth and Centering Pregnancy, revealed a 47% reduction in preterm birth for Centering Pregnancy patients over those in traditional care (Picklesimer, Billings, Hale, Blackhurst, & Covington-Kolb, 2012). Sub-analysis of nulliparous women in this study revealed that this reduction was applicable across the board, and not swayed by the women with a history of preterm birth (Picklesimer et al., 2012).

Klima et al. (2009) looked at the preterm birth rates when Centering Pregnancy was started at a Midwest public health clinic, and did not find any statistically significant decreases in the preterm birth rates. While this contradicts with what the majority of the studies found, it is important to note that the small sample size of only 61 participants may have created an impact upon the results. However, the authors did note that of those

infants born premature, the infants born to the mothers of Centering Pregnancy were born at a later gestational age (Klima et al., 2009).

Low Birth Weight. A second benefit that Centering Pregnancy literature uncovers is their correlation with low birth weight infants. Low birth weight (LBW) is defined as an infant weight of less than 2,500 grams (Picklesimer et al., 2012). Several similar studies were reviewed which looked at prematurity also looked at infant weights. Tanner-Smith et al. (2014) looked at birth weights in a retrospective chart review, and indicated significantly higher birth weights, by an average of 30 grams, for women involved in Centering Pregnancy over traditional care. When weights were combined with prematurity, the study revealed that these patients experienced an increase of 300 grams over the traditional care premature infants. In this study, the Centering Pregnancy patients showed a lower incidence of LBW infants as well (Tanner-Smith et al., 2014).

Ickovics et al. (2003) performed a prospective matched cohort study that looked specifically at birth weights. The study revealed that not only did infants born to mothers of group prenatal care have higher weights than those in traditional care, but, when looking specifically at LBW, mothers in the Centering Pregnancy groups were less likely to have LBW infants. Preterm infants were evaluated separately, and were found to have a higher overall birth weight when their mothers participated in Centering Pregnancy (Ickovics et al., 2003). Additionally, Ford et al. (2002) looked at LBW infants among adolescents and reported lower rates of LBW infants with adolescents who are involved in Centering Pregnancy.

Lastly, Jafari et al. (2010) looked at birth weights as part of their RCT and maternal benefits of Centering Pregnancy. In this study, women involved in Centering

Pregnancy were less likely to have LBW infants and were inclined to have higher birth weights (Jafari et al., 2010). LBW infants in the group care were 6.3%, while those in individual care were 9.1% (Jafari et al., 2010). An earlier study by Grady & Bloom (2004) showed that women who enrolled in Centering Pregnancy care had lower LBW infants than those in traditional care.

Satisfaction & Adequate Care. Novick (2009) stated: "If prenatal care (PNC) is redesigned to meet women's needs, then it is critical to develop a clearer understanding of women's PNC experiences… (p. 227)". Improved patient satisfaction was also noted in this review, as an additional benefit of Centering Pregnancy over traditional care. Overall, patients in Centering Pregnancy were happier with their care than those in traditional care (Novick, 2009). In a qualitative study from 1996-2007, Novick (2009) identified six themes, in relation to prenatal care, which women reported regarding their prenatal care: Incentives, Setting, Time Spent, Components of Care, Relationships, and Receipt of Information. Each theme was looked at in relation to patients in Centering Pregnancy and those in traditional care. Centering Pregnancy showed improved satisfaction in each of the six themes evaluated. Specifically, Novick (2009) reported that many of the participants who favored this were from low income, low social support, and physically depressed settings.

Teate, Leap, Rising, and Homer (2009) looked at the patient satisfaction in a pilot study of Centering Pregnancy in Australia, and reported that women were happier when they had participated in Centering Pregnancy care over conventional prenatal care. Participants in this study also reported feeling better about their prenatal care in general, and more prepared for birth. This finding was supported by an additional study by Klima

et al. (2009), where participants also reported being happier with Centering Pregnancy than traditional care.

One final component of patient satisfaction is how adequate the women felt their prenatal care was. Four studies in this review specifically looked at the adequacy of prenatal care. Kennedy et al. (2009) and Kennedy et al. (2011) found that Centering Pregnancy patients reported an increased adequacy of prenatal care over traditional care. Participants enrolled in it also demonstrated higher scores on the Kotelchuck Index, which indicates perceptions of more adequate prenatal care (Picklesimer et al., 2012). Trudnak et al. (2013) found similar results in their study of patient adequacy. Women in both Centering Pregnancy and traditional care groups were given a prenatal care adequacy index (APNCU), and women in the Centering Pregnancy groups reported an increase in adequate prenatal care over traditional care patients (Trudnak et al., 2013).

Psychosocial Benefits. The final benefit identified in this critical review was psychosocial. These included benefits such as social support, social networking, stress reduction, and impact on post-partum depression. Massey et al. (2013) explains that one of the goals of Centering Pregnancy is to provide a social support network for women, including emotional support. Seven articles in the review discuss the social outcomes, or networking, that is involved in Centering Pregnancy.

Social support. One benefit of Centering Pregnancy is that the patients feel free to share their stories and feel supported from the other mothers (Klima, et al., 2009). In fact, one participant commented, “I got more attention and got more out of the group than a one-on-one” (Klima et al., 2009, p. 31). Participants also identified feeling more prepared for labor and supported in their choices (Klima et al., 2009). In Grady and Bloom’s

(2004) study of adolescents and Centering Pregnancy, teens stated that they felt more supported and enjoyed learning from the social interaction of Centering Pregnancy.

Ickovics et al. (2007) looked at the social outcomes in their study, and demonstrated that women felt more prepared for labor and birth as a result of Centering Pregnancy over traditional care. This study also showed that they felt that they had a better social structure than those in individual care, due to the increased visits and participation of the providers (Ickovics et al., 2007). Likewise, in Ickovics et al.'s (2003) study, women felt that more psychological aspects of pregnancy were addressed due to the increased time spent during Centering Pregnancy visits. Participants also reported healthier behaviors during their pregnancy, which was related to increased social support from Centering.

Social networking. Wedin, Molin and Svalenius (2010) looked specifically at social networking within Centering Pregnancy care groups. In phone interviews six months after delivery, women in both groups were asked if they still had connections with others, from either their Centering Pregnancy groups or with women they had met during their pregnancy. Women in Centering Pregnancy groups reported that 28 out of 35 women in the groups still met at least two and half times a month (Wedin et al., 2010). In follow-up questions, one mother discussed that the solidarity in her group strengthened with each Centering Pregnancy visit, and further increased as they met with each other and their infants (Wedin et al., 2010). Furthermore, Tandon et al. (2013) reported that the participants in the Centering Pregnancy demonstrated increased engagement with others in group care.

One example of a patient group that benefits from the psychosocial aspect of Centering Pregnancy are the military wives. In 2005, the Department of Defense conducted a survey to determine if the military families were happy with their birth care. A total of 2,124 women were included in the study, less than half of them were satisfied with their care, and even less would recommend their care to families or friends (Harriott, Williams, & Peterson 2005). Kennedy et al. (2009) conducted a study that looked at military wives who were involved in Centering Pregnancy over traditional care. It was reported by the women in the Centering Pregnancy groups that they felt more supported and showed increased learning when compared to those in traditional care (Kennedy et al., 2009). Kennedy et al. (2011) further conducted a RCT with military women to study the effects of Centering Pregnancy. The results were similar, where women were six times more likely to enjoy their prenatal experience with Centering Pregnancy over traditional care.

Stress Reduction. Heberlein et al. (2015) addressed stress reduction as a psychosocial benefit of Centering. Stress reduction was not generalized across all participants. Women who reported low social support at the start of their pregnancy benefitted from group care more than the others (Heberlein et al., 2015). The study demonstrated that women with low levels of personal coping or increased stress levels also benefitted from group prenatal care over traditional care. Participants with a history of depression also showed improvements in coping during pregnancy, and in the postpartum period, while participating in Centering Pregnancy (Herberlein et al., 2015).

Ickovics et al. (2011) revealed that women with elevated stress levels had an increase in their self-esteem, and a decline in their social conflict when being a part of

group prenatal care, over those in traditional prenatal care. Participants also admitted to feeling a decrease in their stress level during pregnancy (Ickovics et al., 2011). Benediktsson et al. (2013) also established that the patients of group prenatal care demonstrated lower levels of stress, decreased symptoms of anxiety, and were less likely to be depressed.

Post-partum Depression. Finally, the participants in group prenatal care displayed a decrease in post-partum depression symptoms (Heberlein et al., 2015). These results were similar in the studies by Benediktsson et al. (2013), Ickovics et al. (2011), and Kennedy et al. (2011). In Kennedy et al.'s (2011) study, women also reported feeling less guilt and shame with regards to having Post-Partum Depression, when involved in Centering Pregnancy. Although this area needs additional research, these four studies show that post-partum depression can be positively impacted, when patients are involved in Centering Pregnancy.

High Risk Populations. Several groups in the literature were highlighted due to their increased risk of preterm birth and low birth weight infants. Adolescents, socioeconomic status, and minority ethnicities were all noted to have increased risk factors. When conducting the literature review, many studies looked specifically at these groups, to determine the impact that Centering Pregnancy had on them over traditional one-to-one care.

Adolescents. Teenagers are known to have increased risk factors with pregnancy, including preterm birth, LBW, increased risk cesarean, and decreased prenatal education (Chen et al., 2007). Many of the studies included in this review specifically focus on adolescents and pregnancy. Adolescence is an intense time, when the teen undergoes

rapid physical changes, along with intense emotional changes (Grady & Bloom, 2004). For adolescents who become pregnant, personal and emotional growth halts, while the teen tries to understand their rapidly changing body and begins to bond with their baby (Grady & Bloom, 2004).

Grady and Bloom (2004) showed that teenagers responded well to Centering Pregnancy, and had higher patient satisfaction rates than those who were involved in traditional care. Teenagers also reported learning from one another, and the social interaction within the group settings of Centering. Additionally, teenagers admitted to not feeling alone and reported an increased self-esteem from being involved in group care (Grady & Bloom, 2004). In this study, adolescents in Centering Pregnancy also showed a decreased rate of preterm birth and LBW infants, when compared to those in traditional prenatal care. One final benefit noted is that the initiation of breastfeeding was higher in the adolescents involved in Centering Pregnancy over traditional care (Grady & Bloom, 2004).

In another study of adolescents and pregnancy, Ford et al. (2002) found that the mothers in the Centering Pregnancy group had a decreased rate of LBW infants over those in traditional prenatal care. In the Centering Pregnancy group, 6.2% participants had a LBW infant, while 12.5% of participants had LBW infants in the control group. In addition to LBW infants, this study looked at the educational patterns of adolescents and found that those in the Centering Pregnancy group had increased rates of continued education, not only during their pregnancy, but during the post-partum period as well (Ford et al., 2002). Finally, Ford et al. (2002) noted a decrease in unplanned pregnancy at

the one year mark for adolescents who were involved in Centering Pregnancy over traditional care.

It is interesting to note that Bloom (2005) looked at adolescent behaviors in Centering Pregnancy and found that there were minimal differences between the groups. The study was a pre-test/post-test trial, which looked at a pilot program run inside a school. Bloom (2005) surmised that due to the small sample size of only 63 girls, self-selection, and only 10 participants involved in Centering, any statistical significance was difficult to obtain.

Socioeconomic status. Despite the changes made for better prenatal care, not all socioeconomic classes benefit equally from them (Benediktsson et al., 2013). This review noted three studies which specifically addressed low socioeconomic status (LSES). Participants in Centering Pregnancy represented a different demographic makeup when compared to traditional patients, and were noted to be younger, of LSES, and minorities (Benediktsson et al., 2013). Even with these disparities, the participants of Centering Pregnancy displayed increased psychosocial benefits over traditional care (Benediktsson et al., 2013). Picklesimer et al. (2012) reported reduction in preterm births as well as lessening of early preterm births, which was less than 32 weeks, in the women who had LSES and attended Centering Pregnancy.

Women of LSES who participated in Centering Pregnancy demonstrated lower signs and symptoms of anxiety, stress, and lower rates of depression and postpartum depression (Benediktsson et al., 2013; Heberlein et al., 2015). Heberlein et al. (2015) also demonstrated that the greater the social support needed by a patient, the greater impact Centering Pregnancy care had on her.

Ethnicity. Increased diversity in the United States prompts research into different ethnicities with regard to prenatal care. Currently, Hispanics are the second largest ethnic minority, with African-Americans being the first (Robertson et al., 2009). African-Americans have an increased rate of infant mortality over Caucasians, and Hispanics are at risk, due to their low socioeconomic status and increased knowledge deficit (Robertson et al., 2009). This review of the literature revealed five studies that looked at the ethnicity of these women, and how Centering Pregnancy specifically affected them. Two studies specifically looked at Hispanic and Latina women, while the remaining three looked at African-Americans.

Hispanics. Robertson et al. (2009) made the initial study that looked specifically at Hispanics. The study noted that there was not enough statistical significance to note that preterm births and LBW infants were affected by Centering. It is believed to be due to the limited number of participants. The sample size started at only 49 women, 24 in Centering Pregnancy and 25 in traditional, and dropped to only 33 women, by the time the follow-up surveys were completed. The researchers also noted that other studies that looked at ethnicity also looked at the age and socioeconomic status at the same time. When the Hispanic ethnicity is isolated in the research, they are actually believed to have better birth outcomes, with regards to weight and gestational age (Robertson et al., 2009). The author explains that this is generally due to the increased community support and strong family network of the Hispanic population. Robertson et al. (2009) also found that patients involved in Centering Pregnancy had greater satisfaction with their care, and were more engaged into it.

Tandon et al. (2013) also studied Hispanics and their relationship to Centering Pregnancy, and again found increased engagement for the Centering Pregnancy patients. Hispanics reported feeling more prepared for childbirth with Centering Pregnancy, and were more inclined to attending the follow-up visits (Tandon et al., 2013). Differences in breastfeeding and the number of vaginal births between Centering Pregnancy and traditional care were not noted in either study (Robertson et al., 2009 & Tandon et al., 2013). A third study by Trudnak et al. (2013) found similar results to both Tandon et al. (2013) and Robertson et al. (2009). One difference that Trudnak et al. (2013) noted was that the patients involved in Centering Pregnancy care were more likely to have a vaginal birth. This was felt due to the fact that participants were all low-risk women, and may have felt more open to discussions about low intervention births (Trudnak et al., 2013).

African Americans. Klima et al. (2009) looked specifically at the African-Americans, and how they benefited from Centering Pregnancy. The study found that African-Americans who were enrolled in Centering Pregnancy felt more prepared for childbirth than those in traditional care (Klima et al., 2009). Participants in Centering Pregnancy also felt better equipped to deal with labor, pain, and birth. Women also reported feeling more supported, less worried, and believed that they received better care than those in traditional care (Klima et al., 2009). While statistical significance was not reached concerning the birth outcomes, the discrepancy in sample size, 61 in Centering Pregnancy versus 207 traditional care, was thought to be the reason.

Ickovics et al. (2003) showed a predominately African-American population in their cohort study, and demonstrated statistically higher birth weights and a reduction in

LBW infants. Further studies by Ickovics et al. (2007) discovered that when evaluating the African-Americans alone, the reduction in preterm births was strengthened.

Contradictions in Literature. It is important to note that not all of the literature agrees about the birth outcomes for patients who had attended group prenatal care. Kennedy et al. (2011) conducted a randomized control trial of military women and found no statistical difference for preterm birth or low birth weight infants. The study attributes to the lack of diversity in the groups, as well as the small sample size, to their results. Trudnak et al. (2013) also recognized the lack of significance with Centering Pregnancy care on preterm birth and LBW outcomes. Since this study looked primarily at the Hispanic women, the authors felt that a lower rate of preterm birth for this population had more to do with their culture than any ineffectiveness of Centering Pregnancy. Robertson et al. (2009) found similar results in their study of Latina women and preterm birth. Both studies contributed largely to a bigger social network and increased family support to be the reasons for decreased effectiveness in Centering Pregnancy with the Hispanic population (Robertson et al., 2009; Trudnak et al., 2013).

Ickovics et al. (2007) noted the decreased rates of preterm birth, and did not find statistical significance in LBW infants for the mothers in Centering. This is a change when it is compared to the matched cohort study done by Ickovics et al. (2003). One major factor in this difference is that the 2007 study was a randomized controlled trial, while the 2003 study was a matched cohort design. Jafari et al. (2010) found an increase in the breastfeeding rates among Centering Pregnancy patients, while Trudnak et al. (2013) found an increase in formula usage among them. Trudnak et al. (2013) stated that the difference in breastfeeding versus formula feeding in their study was unknown. The

authors felt that this may have been a result of the decreased discussions around breastfeeding in their Centering Pregnancy groups, since Hispanics are generally known for breastfeeding their infants. They also speculated that the increase in formula feeding was related to many Hispanic women not visiting a lactation consultant, either while in Centering Pregnancy or during their stay at the hospital (Trudnak et al., 2013).

One final contradiction in the literature involves adolescent benefits. Bloom (2005) showed no statistical significance in the birth outcomes or self-esteem between Centering Pregnancy and traditional prenatal care. She attributed the lack of significance to a small sample size and self-selection.

Critique of Strengths and Weaknesses

The first strength is that this critical review of the research was done using the studies from a nurse-midwifery and a medicine point of view. Many of the studies were conducted by nurse-midwives who had worked directly with Centering, while other studies were performed by the medical staff. Evidence levels were determined by the Johns Hopkins Research Evidence Appraisal (Dearholt & Dang, 2012). Based on this criteria, five level I studies were identified, three level II studies, and eleven level III studies. Due to the limited amount of studies available, three level IV studies and three level V studies were also included into the review. All studies were of high and good quality, which were included in the critical review. Sharon Schindler-Rising was involved with the work on several included studies. Since she was the originator of Centering, her contribution helped to keep the work in the same continuum. Many of these studies broke down the participant's information into various social groups for further analysis. This allowed the studies to have additional insights into the outcomes for

the select social groups reviewed. Studies that were ultimately chosen for the matrix were those that included outcomes that were related to maternal or neonatal benefits, as a result of Centering Pregnancy.

Strengths noticed in the individual studies focused on population based care. Malabarey, Balayla, Klam, Shrim, and Abenhaim (2012) conducted a retrospective study which looked at all births between 1995 and 2004, with the exclusion of those who were born before 24 weeks and those with congenital malformations. This allowed them to pull participants from the National Center for Health Statistics and created a larger database to work with. This large sample from a national source also eliminated the selection bias (Malabarey et al., 2012).

There were many weaknesses which were noted in the studies. The most notable weakness which was seen was that many of the studies had smaller sample sizes. Another size-related weakness was noted with regards to self-selection. More women typically chose traditional prenatal care, and often, the study group's sizes were mismatched. Several studies identified that their results were not consistent with other studies. Since the outcomes varied so greatly, generalizability was difficult. Also, a number of studies were conducted at different locations: different countries, military bases, private offices, and public health clinics, further decreasing generalizability. Therefore, the studies could not be applied to a large group of people, but only to a small subsections of those who were studied. Nurse-midwives would have a hard time implementing Centering Pregnancy to the general population, especially if the program only worked for a small subset of women.

Another weakness to this review is the fact that several of the studies are more than ten years old. Older studies were included to understand the original research on the topic, but also because not many new studies were available. Validity of the information is called into question where the information is outdated. Newer articles that were found tended to be literature reviews instead of new research. While a few research articles were noted to be from the last five years, the focus of that research shifted from looking at preterm infants and birth weight, to the psychosocial aspects of Centering Pregnancy. Original topics of interest tended to be looked at in post-hoc analysis, rather than through original research.

Looking specifically at the literature, several themes of limitations were noted. The first limitation was the sample size (Baldwin, 2006; Bloom, 2004; Klima et al., 2009; Robertson et al., 2009). Regardless, the studies with smaller sample sizes contained valuable information, as they often looked at a specific sub-population. Several studies mentioned that self-selection into Centering Pregnancy versus traditional care was a problem, as many woman chose traditional care (Robertson et al., 2009; Shakespeare et al., 2010; Tandon et al., 2013; Trudnak et al., 2013; Wedin et al., 2010). Reasons listed for choosing traditional care over Centering Pregnancy care related to time, childcare, and unfamiliarity with it (Robertson et al., 2009; Trudnak et al., 2013).

Summary

Centering Pregnancy has many proven benefits over traditional one-to-one care. Decreased preterm birth rates, reduction in LBW infants and increased social networking are just a few of the benefits noted in the literature. The benefits are further enhanced when applied to adolescents, women on LSES, and ethnic minorities. Chapter IV will

cover the current trends in Centering Pregnancy, gaps in the research, and areas where future research is needed. Finally chapter IV will address how Centering Pregnancy impacts nurse-midwifery.

Chapter IV: Discussion, Implications, and Conclusions

Chapter IV will discuss the details of the critical review of the literature. The purpose of this review was to determine what benefits Centering Pregnancy offered over traditional one-on-one care. Nurse-midwives, who utilize Centering Pregnancy, are able to offer increased social support to their patients, and answer questions in a group environment more easily when compared to traditional care. This chapter will look at the information included in the literature synthesis, discuss the gaps in it, and what implications this has for nurse-midwifery. It would also provide recommendations for future use of Centering Pregnancy, and for application of the theoretical framework.

Literature Synthesis

The research question that directed this research study is: "Does group prenatal care affect birth outcomes differently than traditional one on one prenatal care?" Group prenatal care was looked at under the context of Centering Pregnancy model of care. Studies from social groups determined as high-risk, as defined in Chapter I, were also looked at for outcome evaluations in Centering Pregnancy. Early literature reviews showed multiple maternal benefits of Centering Pregnancy, but further study is needed to show how those benefits are applicable.

Current Trends

Current trends will look at how Centering Pregnancy presently affects those who utilize it over traditional care. Centering Pregnancy offers the nurse-midwives a chance to work in a group setting that teaches and socializes with the participants. Centering Pregnancy is group care that connects 8-12 women who have similar due dates, and allows them to learn from one another, while the nurse-midwife and support staff

facilitates the conversation (Bell, 2012). Currently, Centering Pregnancy is used inconsistently in the United States, as not all nurse-midwives have seen its value. Depending on the patient population, more or less support is given to group prenatal care. Some midwifery practices feel that they are too small to make Centering Pregnancy work at their institution; others believe that due to the cultural variances in their practice, Centering Pregnancy would not be effective (Klima et al., 2009; Massey et al., 2006).

As of 2011, over 300 sites in the United States use Centering Pregnancy as a group prenatal care model, along with seven foreign countries (Baldwin & Phillips, 2011). Nurse-midwives using this model have given mixed reviews on it. Baldwin and Phillips (2011) conducted a study to look at the perceptions of nurse-midwives who utilized Centering Pregnancy. Themes of the study included fear of implementation, not wanting to upset the current practice, confidence and empowerment within the program, and wanting to sustain Centering Pregnancy at their sites (Baldwin & Phillips, 2011). Implementing changes in a long-standing practice is difficult. Despite the benefits of Centering Pregnancy, many, therefore, shy away from the cost and stay within the comfort zone of what they know.

There are many benefits of Centering Pregnancy over traditional care. Consistency among those benefits is more difficult to determine, and must be acknowledged. Reduction of preterm labor is one of the initial benefits that were found when reviewing Centering Pregnancy. Ickovics et al. (2003) noted a reduction in preterm birth by 33% in the patients who attended Centering Pregnancy over traditional prenatal care, along with decreased LBW infants. In a randomized controlled trial, Jafari et al. (2010) replicated this information, again confirming the benefits of Centering Pregnancy

on preterm labor. While working with adolescents, Klima et al. (2009) did not show a statistical difference in reducing the preterm labor rates, but they did show that mothers in the Centering Pregnancy group had longer gestations. Grady and Bloom (2004) were able to prove that adolescents in Centering Pregnancy benefited by having decreased rates of LBW and fewer preterm births.

As the research advanced, more studies were dedicated to the psychosocial aspect of Centering Pregnancy, and less on the physical benefits (Heberlein et al., 2015; Ickovics et al., 2011; Kennedy et al., 2009; Kennedy et al., 2011; Tandon et al., 2013; Tanner-Smith et al., 2014). These studies showed that the increased social support provided to women in Centering Pregnancy benefits their prenatal behaviors. The networking involved in it allows women to have instant feedback from others in their group, to validate what they might be feeling. Behaviors such as smoking, drinking, weight gain, and stress, all leave an impact (Tanner-Smith et al., 2013). Overall, women in Centering Pregnancy had less weight gain in pregnancy, especially those who were obese to start with, and subsequently, had infants with lower birth weights (Tanner-Smith et al., 2013).

As there are many gaps in the literature, not all of the benefits of Centering Pregnancy are understood. Kennedy et al. (2011) reports that women in the military who chose Centering Pregnancy were less likely to suffer from post-partum depression than those in traditional care. Heberlein et al. (2015) also reported about post-partum depression and pregnancy distress, and found that women with low social support and socioeconomic status benefitted the most from it. Several studies looked specifically to the high-risk populations, as described in Chapter I, and found that the benefits were

much higher compared to those patients involved in Centering Pregnancy over traditional care (Benediktsson et al., 2013; Heberlein et al., 2015; Ickovics et al., 2007; Klima et al., 2009.) This implies that nurse-midwives who practice in high-risk areas would have a greater impact if they offer and promote Centering Pregnancy to their patients.

Gaps in the Literature

Currently, several gaps exist in the research regarding Centering Pregnancy. To begin with, there are inconsistencies in the data regarding the reduction of preterm births. This critical appraisal revealed seven studies that reported the reduction of preterm birth and decrease in LBW infants (Ford et al., 2002; Grady & Bloom, 2004; Ickovics et al., 2003; Ickovics et al., 2007; Jafari et al., 2010; Picklesimer et al., 2012; Tanner-Smith et al., 2013). Robertson et al. (2009), Bloom (2005), and Trudnak et al. (2013) reported no statistical differences in preterm birth and LBW infants who were involved in Centering Pregnancy over traditional care. There are several other articles that simply do not address the specific infant benefits of Centering Pregnancy over traditional care. The majority of the research found after 2010 looked at the psychosocial benefits of Centering Pregnancy over traditional care. Topics among these articles varied in their focus of psychosocial topics and support. Limited quantitative data was present among these articles, and they relied mostly on follow-up surveys.

Among the studies reviewed, lack of research on cost analysis was noted. Ickovics et al. (2007) was one of the few studies that discussed cost, and they reported that there was no change in cost between traditional care and Centering Pregnancy. Another study in the review hinted that nurse-midwives could save money by seeing 8-12 patients in the

time span of Centering Pregnancy, instead of the 6-8 they may see in a typical clinic setting. However, no cost analysis was made.

Finally, some information on breastfeeding and post-partum depression is not consistent in the literature. Several articles stated that breastfeeding was increased in Centering Pregnancy patients (Ford et al., 2002; Jafari et al., 2010; Robertson et al., 2009), while Trudnak et al. (2013) reports that there was an increase in formula usage. Besides having differing outcomes, the majority of the studies failed to address breastfeeding. Likewise, post-partum depression was mentioned in relation to military wives and those in high-stress situations, but not for the majority of the participants.

Implications for Nurse-Midwifery Practice

Although there are numerous gaps in the research, there is enough evidence to support Centering Pregnancy as it shows decreased rates of preterm birth and LBW infants, with an increased rate of reduction when looking at high-risk women (Bloom & Grady, 2004; Heberlein et al., 2015; Ickovics et al., 2003; Ickovics et al., 2007). Nurses can assist nurse-midwives to identify those individuals at a higher risk for preterm labor or LBW. Nurse-midwives can also target Centering Pregnancy or group prenatal care towards individuals who are at an increased risk. Individuals with a history of high stress during pregnancy, or those with limited social support are also at an increased risk and would benefit from Centering Pregnancy over traditional care. Nurse-midwives, as its facilitators, can encourage women to interact with one another, and develop new social supports. Midwifery is known for its relationship-based care and support for women. Centering Pregnancy allows nurse-midwives to build on their relationships with women and support them in a different setting rather than traditional care. As Centering

Pregnancy becomes more mainstream, nurse-midwives can help lay the foundation for a new type of prenatal care.

Future Research

There is an immense need for further research, which needs to be completed, concerning Centering Pregnancy, especially when compared to traditional prenatal care. Many studies in this review identify the research areas, which, despite new research, are still lacking. Recommendations for future research include studies with larger sample sizes, more randomized controlled trials, attention to high-risk groups, cost analysis of Centering Pregnancy, effects on breastfeeding and post-partum depression, and more research into the psychosocial benefits.

One area that is agreed upon by almost all the authors in the studies examined in this review is that research with larger sample sizes is a must (Bloom, 2005; Ford et al., 2002; Ickovics et al., 2003; and Klima et al., 2009). Wedin et al. (2010) further recommended that a large-scale research project on the benefits of Centering Pregnancy should be conducted. Baldwin (2006) concluded that not only should larger sample sizes be used, but, a study should be conducted with multiple sites and different nurse-midwives to see if the information could be generalized to a larger population.

Studies that looked specifically at high-risk groups, such as adolescents, also need further research. This review noted several studies that look at adolescents in a post-hoc analysis, to determine if they benefitted differently from Centering Pregnancy when compared to traditional care. On the other hand, several studies noted that adolescents did benefit, but the studies were not robust and self-selection was a problem. By identifying the true benefits from Centering Pregnancy, nurse-midwives will be able to guide

adolescents into a Centering Pregnancy class, where they would get the most benefit. Similar studies looking at the socioeconomic status or ethnicity of the participants would also be a benefit. Heberlein et al. (2015) proposed specific recommendations on those who would benefit most from Centering Pregnancy, which should be included in all future research.

Another area of research to look at is the psychosocial benefits of Centering Pregnancy. More recent research has looked at some benefits, such as increased social support and preparation for labor, but has not looked at stress reduction. Heberlein et al. (2015) looked at women with low social support, and concluded that the participants of low SES would benefit from Centering Pregnancy. Together with that knowledge, they challenged the researchers to look specifically at stress reduction methods within Centering Pregnancy (Heberlein et al., 2015). Benediktsson et al. (2013) also commented that learning from others in a group setting proved to be beneficial, but further research to understand the psychological implications behind that group care is still needed.

Another area, which requires future study, is cost analysis. Several studies in this review discuss researching cost analysis. Cost analysis of Centering Pregnancy care over traditional care per person should be assessed. Nurse-midwives who are interested in beginning a Centering Pregnancy program need to know the cost breakdown of Centering Pregnancy, in order to determine if it is worth starting. Research should compare not only the cost of providing Centering Pregnancy to the patients, but also the extra time that the nurse-midwives may spend preparing for these patients. Centering Pregnancy may allow the provider to see more patients in a two-hour period initially, but it may change as those groups begin weekly visits. Part of this cost analysis should include how many providers

are needed, in order to generate revenue if Centering Pregnancy is offered at a practice. One final area pertaining to cost-analysis is the need to look at the cost reduction, in order to decrease preterm infants. In 2012, Picklesimer et al. reported the annual cost of complications from preterm birth in the United States, which was greater than 26 billion dollars. When considering the reduction of preterm births, as a result of Centering Pregnancy, one must also consider the reduction of treatment costs that would result from it.

Additionally, minimal research has been done on breastfeeding rates and post-partum depression. Research into these topics may further encourage the nurse-midwives to suggest Centering Pregnancy to the patients who have a history of post-partum depression or antenatal depression, if their benefits were found. While many studies noted increased social networking, post-partum depression should also be looked at, to determine if it was positively affected by the increase in social support. Grady and Bloom (2004) discussed that research into Centering Pregnancy and breastfeeding would further enhance the benefits that could be offered to the adolescents. While breastfeeding was mentioned in a couple of articles reviewed, it was also noted that this was not specifically studied and further research was needed.

One final area that the studies recommend for future research is for understanding the causal pathways involved in Centering Pregnancy. Tanner-Smith et al. (2014) encourage future studies to understand how increased social support within Centering Pregnancy creates better birth outcomes. The authors also state that by understanding these causal pathways, the nurse-midwives can alter the health behaviors and outcomes of the mothers as well. Causal pathways refer to the cause and effect behind the idea. For

example, decreased stress leads to reduced inflammatory response, which, in turn, can decrease preterm labor. Understanding causal pathways of Centering Pregnancy will also allow the nurse-midwives to determine what type of patient would benefit from Centering Pregnancy, and allow them to target high-risk individuals.

Integration and Application of the Theoretical Framework

Social Learning Theory implies that physical behaviors, as well as one's psychosocial response, can be modified, by observing others in a social setting (McLeod, 2011). Centering Pregnancy is relationship-based care, and includes social networking to support participants (Bell, 2012). The Social Learning Theory by Albert Bandura captures the heart of Centering Pregnancy, where people learn from one another and integrate other participants' feedback into their care.

Reed et al. (2010) notes that reflection on social learning allows one to enhance the learning experience. When women are in a social setting, such as Centering Pregnancy, they are able to internalize the ideas, receive feedback from other women, and achieve greater knowledge about the topic. Wedin et al. (2010) found that women who participated in Centering Pregnancy displayed ongoing learning and networking, even after the classes had finished. This study noted that the intervention group got together 2.4 times a month, even after their classes were complete, while the traditional care mothers rarely met (Wedin et al., 2010).

As nurse-midwives choose to integrate Centering Pregnancy, or group prenatal care, into their practice, understanding the Social Learning Theory will help with implementation. Social Learning Theory will allow the nurse-midwives to facilitate acceptance of the social norms of the group into their patients' learning, as well as

expand upon the topics brought to class. When risk factors are identified for high-risk behaviors or individuals, utilizing the group to reinforce normal and expected behavior may have a positive impact on the patient outcomes.

Conclusion

Nurse-midwives have the ability to influence patients in their day-to-day interactions, by utilizing an alternative form of prenatal care that goes beyond the basics, and allow nurse-midwives to focus on those patients who need extra support. When Centering Pregnancy is compared to traditional care, many mother and infant-related benefits are seen. Reduction in preterm birth rates, reduction in LBW infants, and increased social support are just a few of these benefits that Centering Pregnancy can offer to the patients. Implementation of Centering Pregnancy for high-risk patients, such as adolescents, women of low socioeconomic status, low social support, and minorities, offer an increase in the benefits discussed.

While the research is not without limitations, this review can help focus on future research, especially into cost analysis, breastfeeding, and post-partum depression, which would only strengthen the benefits that Centering Pregnancy could provide. Additional research, with randomized controlled trials, would further increase the strength of the benefits listed. By creating research that can be generalized to a larger population of people, more nurse-midwives and providers may begin to implement Centering Pregnancy in their own practices.

Lastly, this review also discusses how the Social Learning Theory incorporates networking and social support into learning, and allows the patients to learn from peer feedback. Social norms of the given topic are discussed, allowing the learner to feel

normal in their given situation with the aid of Social Learning Theory. This theory is the essence of Centering Pregnancy, which allows mothers to bond together and learn from one another.

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Appendix

Citation	Purpose	Sample	Design	Measurement	Results/ Conclusions	Recommendations	Level & Quality
Ickovics, J. R., Reed, E., Magriples, U., Westdahl, C., Rising, S. S., & Kershaw, T. S., (2011). Effects of group prenatal care on psychosocial risk in pregnancy: Results from a randomized controlled trial. *Psychology and Health 26*(2), 235-250. doi: 10/1080/08870446.2011.531577	To determine if an integrated group prenatal care intervention can improve psychosocial outcomes when compared to traditional care *Specifics: increased self-esteem & social support, and decreased stress, social conflict and depression	N= 1047 all gathered from 2 public hospitals and equally randomized into three groups: TC, CP, and CP+	Blocked Randomized control trial Stratified by site and expected month of delivery Individuals were placed based on computer randomization *CP and CP+ were matched cohorts with CP acting as the control.	10 pt. Perceived Stress Scale (PSS) Self-esteem scale Social Relationship scale for social support and social conflict Affect only of the CED-D scale *Chi-square and analysis of variance were conducted for differences between groups and demographic data. **Hierarchical linear regression, missed regression or multilevel models were used to assess effectiveness of the interventions. ***Moderators of age, race, & stress were also tested.	High Stress participants in group care showed increased self-esteem, decrease in stress, and decline in social conflict and depression up to one yr. post-partum. There was no statistical significance on the psychosocial factors on a whole between the 3 groups. Differences were seen in the CP/CP+ groups for high stress women. High stress was noted more with those of African American race, & age 14-19	Use of a group prenatal care for high risk psycho-social patients should be considered d/t the benefits on self-esteem and depression. Further research needs to look at how interventions can affect all involved and how to target the at risk groups. Further research also needed to see how the psychosocial impact relates to the biological impact of group care.	Level: I Quality: A

Citation	Purpose	Sample	Design	Measurement	Results/ Conclusions	Recommendations	Level & Quality
Kennedy, H. P., Farrell, T., Paden, R., Hill, S., & Jolivet, R., (2011). A randomized clinical trial of group prenatal care in two military settings. *Military Medicine 176*(10), 1169-1177. Retrieved from http://search.proquest.com/docview/898419723?accountid=8593	To compare the effects of group prenatal care to individual care on the outcomes of family health care readiness. Perinatal health behaviors, perinatal and infant health outcomes and family health outcomes were also looked at	322 women randomized to either GPC or IPC. 162 to IPC 160 to GPC Criteria: 1 Pregnant <16 wks 2. 18 or older 3. no severe medical problems 4. able to speak and understand English 5. willingness to randomization	Randomized control trial Utilized Mixed methods.	Linear mixed models of analysis All variables were tested with two-tailed alpha-confidence interval t-tests and Chi-square analysis were used.	GPC were 6 times more likely to have adequate prenatal care and pt's were more satisfied with care No statistically significant different in: birth outcomes for preterm birth, low birth weight, and birth weight. No difference in neonatal outcomes. No difference between the groups in regards to breast-feeding. No initial difference in PPD, but GPC reported less shame & guilt with PPD.	Future research should look at breastfeeding retention for both groups of pt's. Future studies should have more frequent measurements during the study, and more assessment points Military should look to implementation of GPC and there were no adverse outcomes and women in GPC felt more adequately prepared and were more satisfied.	Level: I Quality: B

Citation	Purpose	Sample	Design	Measurement	Results/ Conclusions	Recommendations	Level & Quality
Jafari, F., Eftekhar, H., Fotouhi, A., Mohammad, K., & Hantoushzadeh, S., (2010). Comparison of maternal and neonatal outcomes of group versus individual prenatal care: A New experience in Iran. *Health Care for Women International 31*,571-584. doi:10.1080/07399331003646323	To determine if group prenatal care would be more effective than individual care in regards to education and support components	678 enrolled: Final: 323 group care, 302 ind care -7 lost to pp in group care -8 lost to pp in ind care. 14 health centers in Zanjan that provided 12 women each Inc Criteria: -Early pregnancy to 2 mo pp -Preg < 24 wk no severe medical prob -Willing to be in study	Cluster Randomized controlled trial Prospective study	Background info: student's t-test and X2 tests STATA used w/ logic link fx with calculating odds action and 95% confidence interval p level	1. Less likely to have low birth weight, preterm birth, or IUGR in group care. 2. Birth weight on a whole was higher in the group prenatal care group 3. No significant different in maternal outcomes: UTI, PROM, PIH, vag infection 4. No different in Apgar scores 5. Group participants were more likely to take Prenatal MVI and iron 6. Breast feeding was higher at birth and at 2 mo PP in group participants.	Further study to determine what aspects group care help women to be healthy Further look at social support and education given to family members should be considered.	Level: I Quality: B

Citation	Purpose	Sample	Design	Measurement	Results/ Conclusions	Recommendations	Level & Quality
Ickovics, J. R., Kershaw, T. S., Westdahl, C., Magriples, U., Massey, Z., Reynolds, H., & Rising, S. S., (2007). Group prenatal care and perinatal outcomes: A Randomized controlled trial. *Obstetrics & Gynecology 110*(2 Pt 1), 330-339. doi: 10.1097/01.AOG.0000275284.24298.23	To determine if group prenatal care leads to better reproductive health outcomes, improved psychosocial outcomes and patient satisfaction, and to examine potential differences in health care costs.	Pregnant women age 14-25 Sample size: 1,047 Women were taken from two different publicly funded clinics and randomly assigned to standard or group prenatal care.	A multisite randomized controlled trial *Block randomized controlled design for group selection.	Chi-squared and t-tests comparing study conditions: demographics, medical hx, & major study Structured interviews (Audio-CASI) before session 1 of group care and before 24 wk visit for ind. care Prenatal adequacy was rated using Kotelchuck Index General Linear Model and Logistic Regression Analysis.	Group care showed significantly dec rate of preterm births. Post hoc analysis showed that when comparing African Americans alone, the reduced risk of preterm birth from group care was strengthened. Group Care: no change in gestational age and birth weight comparison. Group Care: significantly less likely to have inadequate care Group Care: better social outcomes, felt more prepared for labor, and higher satisfaction with prenatal care. No change in raw costs between the groups.	Replication of retrospective study in a more diverse population will help to determine who would best be served with group care. Future studies should look at mechanisms to enhance community healthy behaviors as well as stress reduction techniques. Efforts should look at cost effectiveness of group care.	Level: I Quality: B

Citation	Purpose	Sample	Design	Measurement	Results/ Conclusions	Recommendations	Level & Quality
Ford, K., Weglicki, L., Kershaw, T., Schram, C., Hoyer, P.J., & Jacobson, M.L., (2002). Effects of a prenatal care intervention of adolescent mothers on birth weight, repeat pregnancy, and education outcomes at one year postpartum. *The Journal of Perinatal Education 11*(1), 35-38. doi: 10.1624/105812402X88588	Evaluate a peer-centered prenatal care program for adolescent mothers.	282 urban pregnant adolescents -94% AA -4 % Cauc. -2% other Recruited from 5 clinics in Detroit, MI 98% participants were not married. 38% had been pregnant before.	Randomized Control Trial	X2 tests to evaluate change before and after interventions. Followed by logistic regression models to examine findings.	1. Mothers in experimental group decreased rate of low birth weight 2. Increased rate of continued education during pregnancy and PP year for experimental group 3. Slight decrease in unplanned pregnancy at 1 yr. in experimental group.	Better f/u for participants after delivery needs to be stronger, this may also provide better data for preventing repeat pregnancy Further study on group care and interventions is needed Study needs to be repeated with a larger sample size.	Level: I Quality: B

Citation	Purpose	Sample	Design	Measurement	Results/ Conclusions	Recommendations	Level & Quality
Heberlein, E. C., Picklesimer, A. H., Billings, D. L., Covington-Kolb, S., Farber, N., & Frongillo, E.A., (2015). The comparative effects of group prenatal care on psychosocial outcomes. *Archives Womens Mental Health.* doi: 10.1007/s00737-015-0564-6	To compare psychosocial outcomes of women in CP versus traditional care. Specifically looking at high risk groups, low social support, high pregnancy distress, s	124 women in CP 124 women in traditional care	Prospective cohort study	Prenatal distress questionnaire (PDQ) Planning preparation coping (R-PCI) Perceived Stress Scale (PSS) Positive Affect & Negative Affect (PANAS) Depression Scale Barkin Index Maternal Functioning (BIMF) Maternal Postnatal attachment scale (MPA) Pregnancy related empowerment scale Surveys given at 12.5, 32 wks, and at 6 wk postpartum. *two-tailed ind sample t-tests, Chi-square tests, and multiple regression	Group care did not confer psychosocial benefits across all participants. Women who were had low social support, and pregnancy-specific distress benefitted from group care. Decrease in post-partum depression symptoms and higher maternal functioning was noted in the CP group.	Further study to see if stress reduction during pregnancy will lead to decreased preterm birth. This may be more beneficial to those in low SES status, and low social support. Specific focus should include implementation of CP and then focus on who would benefit from CP. Other benefits found by previous studies should not be excluded and psychosocial benefits should not be placed above them.	Level: II Quality: B

Citation	Purpose	Sample	Design	Measurement	Results/ Conclusions	Recommendations	Level & Quality
Robertson, B., Aycock, D. M., & Darnell, L. A., (2009). Comparison of Centering Pregnancy to traditional care in Hispanic mothers. *Maternal Child Health Journal 13*, 407-414. doi: 10.1007/s10995-008-0353-1	To compare maternal & infant perinatal outcomes in Hispanic women receiving the CP model with those receiving traditional care	49 women: 24 enrolled in CP and 25 enrolled in traditional care Participants were self-selected into groups from a hospital based clinic. Inclusion criteria: 1. self-ID of Hispanic identity 2. age > 18 years 3. abiltiyt to read & speak English or Spanish	Quasi-experimental prospective comparative design	Data collection included: 1. Initial visit: Demographics, Pregnancy hx scale, and Rosenberg Self-Esteem scale, 2. 34-36 wks: Pre/Postnatal care knowledge and Pregnancy relevant health behaviors, 3. Post-partum Eval: Infant outcomes, Breastfeeding Behavior scale, Rosenberg Self-Esteem scale, Depression scale, and Pt Participation & Satisfaction scale. CP pts were also given a centering evaluation. Chi-square and t-tests were used, as well as paired t-tests	This article found that maternal and infant outcomes were similar for both the CP group and the traditional group. No statistical differences were found, despite previous literature that discusses better birth outcomes. Self-selection landed more primigravids and those with fewer living children to pick the CP route. Overall there was great satisfaction with centering pregnancy.	A larger more randomized trial is needed to see if there are benefits to having Hispanic women in CP over traditional care. Childcare as well as more flexible times of day should be offered as this eliminated patients who may have benefited from CP. Overall CP is a great and supportive option, but doesn't lend to better outcomes in the Hispanic population.	Level: II Quality: B

Citation	Purpose	Sample	Design	Measurement	Results/ Conclusions	Recommendations
Ickovic, J. R., Kershaw, T. S., Westdahl, C., Rising, S. S., Klima, C., Reynolds, H., & Magriples, U., (2003). Group prenatal care and preterm birth weight: Results from a matched cohort study at public clinics. *Obstetrics & Gynecology 102*(5 Pt 1), 1051-1057. doi: 10.1016/s0029-7844(03)00765-8	To examine the impact of group versus individual prenatal care on birth weight and gestational age.	458 pregnant women entering prenatal care at <24 wks. Matched by clinic, age, race, and parity. 229 group care, 229 individual care. 80% A.A, 15% Latina Most women were LSES.	Prospective matched cohort study	Chi-square and t-tests were used to analyze tad. A significance level was set at P=0.05	Group prenatal care resulted in higher birth weights, especially in preterm infants. Group prenatal care infants were less likely to be low birth weight. Longer time spent during group visit resulted in the nurse and midwife to address more psychological, social, and behavior factors lending to healthier pregnancies and decreased neonatal loss.	Further research to look at the future of group prenatal care needs to be done. Larger sample sizes to address more specific birth outcomes such as low birth weight and neonatal loss should be looked at.

Citation	Purpose	Sample	Design	Measurement	Results/ Conclusions	Recommendations	Level & Quality
Benediktsson, I., McDonald, S. W., Vekved, M., McNeil, D. A., Dolan, S. M., & Tough, S. C., (2013). Comparing centering pregnancy to standard prenatal care plus prenatal education. *BMC Pregnancy and Childbirth 13*(Supp 1). doi: http://www.biomedcentral.com/1471-2393/13/S1/S5	To compare group prenatal care (Centering Pregnancy) versus prenatal education classes	724 women recruited through All Our Babies Study in Alberta Canada. 619 women in the Birth and Babies prenatal classes and 106 women in Centering Pregnancy program	Prospective Cohort study	3 separate surveys were used were mailed to the participants: 1. Baseline survey <25 wks 2. 34-36 wks 3. 4 months post-partum Chi-square tests for categorical variables and Fischer's exact test were used.	Women in CP were of lower SES, lower education. CP reported inc. in education on nutrition, smoking, & alcohol use No difference in the group in: 1. stop smoking 2. alcohol use 3. following a specific diet 4. weight gain 5. recall regarding education topics Prenatal Ed classes were found to have lower s/sx anxiety, depression, and stress. No difference seen at 4 months between the groups.	Study should be repeated with groups that have similar socioeconomic statuses and education levels. CP should be recommended for all, but especially for low SES. While differences were not staggering the fact that the CP group had lower ed and similar results proves they are learning and benefitting from care. Further research to determine more effects should be done	Level: III Quality: B

Citation	Purpose	Sample	Design	Measurement	Results/ Conclusions	Recommendations	Level & Quality
Tandon, S. D., Cluxton-Keller, F., Colon, L., Vega, P., & Alonso, A., (2013). Improved adequacy of prenatal care and healthcare utilization among low-come Latinas receiving group prenatal care. *Journal of Women's Health 22*(12), 1056-1061. doi: 10.1089/jwh.2013.4352	To examine the effective-ness of the CP group prenatal care model in improving maternal and child health outcomes, satisfaction with prenatal care, and engagement in prenatal care.	198 women in CP 92 women in traditional care All women were from 2 Palm beach county public health clinics and: 1. Self-ID as Hispanic or Mayan 2. <20 wks gestation 3. Con-firmed pregnant 4. Self-selected to the groups	Retrospective Cohort Study	PPSQ data was abstracted and measured in terms of Standard Deviations. A p value was calculated for analyzed data.	Improved engagement in Prenatal care, improved follow up to care and felt more prepared for childcare. Moms were more likely to set up a home medical practice for their child prior to birth, and have less trips to the ER in the first yr. of life. Limitations included self-selection resulting in a larger CP than traditional group	The author was happy with study results. Further exploration of all Latina centering groups should be looked at, as well as a RCT.	Level: III Quality: B

Citation	Purpose	Sample	Design	Measurement	Results/ Conclusions	Recommendations	Level & Quality
Tanner-Smith, E. E., Steinka-Fry, K. T., & Gesell, S., (2013). Comparative effectiveness of group and individual prenatal care on gestational weight gain. *Maternal Child Health Journal 18*, 1711-1720. doi: 10.1007/s10995-013-1413-8.	To study differences in gestational weight gain for women in CP and individual prenatal care. Post-hoc analysis was used to determine wt gain on preterm birth and newborn birth weights.	569 obstetric charts were reviewed 242 CP 327 individual care Propensity scores were used to create matched groups.	Retrospective Chart Review	Logistic coefficients and odds rations were calculated. Weighted multinomial logistic regression models were used.	CP women were less likely to have excessive weight gain and no difference on low weight gain. **Results were more significant for those who were obese to start with. Overweight women in CP has infants with lower birth weights.	Further study on a more generalized population as this study was done on predominately African American women (77%). Further studies need to look at casual pathways to that are affected by CP, to see what is really making these changes.	Level: III Quality: B

Citation	Purpose	Sample	Design	Measurement	Results/ Conclusions	Recommendations	Level & Quality
Trudnak, T., Arboleda, E., Kirby, R. S., & Perrin, K., (2013). Outcomes of Latina women in Centering Pregnancy group prenatal care compared with individual prenatal care. *Journal of Midwifery & Women's Health 58*(4), 396-403. doi: 10.1111/jmwh.12000	To compare pregnancy outcomes of Latina women with completed CP versus those who completed ind care. Main Obj: -look at preterm birth, LBW, and birth method -maternal cond. of wt gain, adequacy of care, and attendance at PP visit	487 Latina women from a public health clinic 247 women in CP 240 women in individual care. Participants self-selected their groups	Retrospective Cohort Study	Chi-square and t-tests were used. Confidence intervals were collected. Logistic regression and the APNCU index for adequacy of prenatal care.	1. No statistical significant difference found for preterm birth or LBW. 2. CP women more likely to have vaginal birth 3. CP women less likely to gain below the recommended weight gain 4. Increase in "adequate" prenatal care in the CP women 5. Increase in women attending a 6 wk PP visit in CP group 6. Inc in formula feeding in CP group	Qualitative interviews with participants in the study is critical to next step research to inquire about some of the difference noting between this study and other main stream studies. This will help determine if the differences noted is due to Hispanic nature. Further research understand cost and further implementation strategies would be helpful. Important to fill gaps in Hispanic women	Level: III Quality: B

Citation	Purpose	Sample	Design	Measurement	Results/ Conclusions	Recommendations	Level & Quality
Picklesimer, A. H., Billings, D., Hale, N., Blackhurst, D., & Covington,-Kolb, S., (2012). The effect of centering pregnancy group prenatal care on preterm birth in a low-income population. *American Journal of Obstetrics & Gynecology 206*, 415e1-7. Doi: 10.1016/j.ajog.2012.01.040	Evaluate the impact of group prenatal care on rates of preterm birth.	3767 women who self-selected traditional prenatal care and 316 women who self-selected group prenatal care. * Study was limited to low-risk women	Retrospec-tive Cohort Study	Multiple logistic regression analysis. X2 analysis for categorical data was used and student t-test for continuous data. All statistical analysis were performed with SAS statistical software Multivariate logistic regression modeling that controlled for variations in patient population.	1. Group care members more likely to be younger, minority, and nulliparous 2. Preterm delivery <37 wks: 7.9% group care, 12.7% traditional 3. Preterm delivery <32 wks: 1.3% group care, 3.1% traditional care. 4. Group care participants demonstrated more adequate prenatal care measure by Kotelchuck Index 5. No statistical difference found in LBW < 2500g.	Further testing is needed to help tease out the benefits for race and low income patients. Further study should focus on 2 factors: A. Enhanced level of social support to reduced stress, increase coping, and B. By decreasing stress are we lowing inflammatory mediators that contribute to the cascade for preterm labor	Level: III Quality: B

Citation	Purpose	Sample	Design	Measurement	Results/ Conclusions	Recommendations	Level & Quality
Shakespear, K., Waite, P. J., & Gast. J., (2010). A comparison of health behaviors of women in centering pregnancy and traditional prenatal care. *Maternal Child Health Journal 14*, 202-208. doi: 10.1007/s10995-009-0448-3.	To determine if pt in group prenatal care have better: 1. Health practices as scored on a behavioral index 2. Report changing health behaviors during pregnancy 3. Do women value their prenatal care more with centering?	Women age 18 and up, gestational age 28-42 weeks, Attended first prenatal appt prior to 12 weeks. A convenience sample of participants from a southern US clinic 125 total surveys, 50 CP, and 75 traditional. Pt's self-selected their group	Correlational, cross-sectional two-group design.	Power analysis was performed using G*Power software Lindgren's Health Practices Questionnaire II and HPQ-34 were used A Likert Scale was also used to identify how happy patients were with their prenatal care A Wilcoxon Rank Sum test was used and a Chi-Square test for nominal data.	Overall the Health Index shows that pt's involved in CP had lower scores than those involved in traditional care. -No significant difference was found in asking about appropriate weight gain, -There was no significant different in smoking between the two groups. Line item analysis showed that possibly there was no health improvement in the CP group and this had more to do with their lower scores.	Further advancement of health promotion including smoking cessation and weight gain would be greatly beneficial to those who participate in centering. Further content should be included to make sure that women feel comfortable asking questions, reporting concerns, and seeking further help should also be included. Studies which include more minorities and how health promotion affects birth weight and preterm labor should be addressed.	Level: III Quality: B

Citation	Purpose	Sample	Design	Measurement	Results/ Conclusions	Recommendations	Level & Quality
Wedin, K., Molin, J., & Crang Svalenius, E.L., (2010). Group antenatal care: New pedagogic method for antenatal care-a pilot study. *Midwifery 26,*389-393. doi: 10.1016/j.midw.2008.10.010	To determine the effects of group antenatal care on women's social networks compared with traditional antenatal care.	45 women in the group prenatal care 85 women in the traditional care model. Women were chosen from 5 different antenatal clinics. Those in group care, were self-selected.	Quasi-experimental After-only non-equivalent control group.	A posttest was done at 36 weeks on all participants (in both groups) as well as a 6 month follow up call. Information was analyzed using a Likert type scale.	1. Study found that group care participants did show an affinity for ongoing networking. 2. Both groups felt that there was not good follow up or discussion on post-natal care and breastfeeding. 3. Group care offered time saving for the midwife and participants in group care still felt they were given plenty of time for discussion and questions.	Further research into post-natal care should be addressed to see where the fall out is. Group prenatal care is a good option for women in Sweden to meet other women and continue to make pregnancy normal. Larger scale research needs to be done. Central distribution of surveys would be beneficial to make sure all women received them.	Level: III Quality: B

Citation	Purpose	Sample	Design	Measurement	Results/ Conclusions	Recommendations	Level & Quality
Kennedy, H. P., Farrell, T., Paden, R., Hill, S., Jolivet, R., Willetts, J., & Rising, S. S., (2009). "I wasn't alone"—A Study of group prenatal care in the military. *Journal of Midwifery & Women's Health 54*(3), 176-183. doi: doi:10.1016/j.jmwh.2008.11.004	To describe the results of a qualitative study of women's experiences with the CP model of group care	234 women from 2 different Air Force bases completed the trial. 322 women initially enrolled.	Qualitative Randomized Clinical Trial with 3 month follow up interviews	Interviews were transcribe with ATLAS.ti Coding was done on the interviews by multiple reviewers and then thematic analyses were performed.	1. CP's felt more supported than individual care, enjoyed friendships formed, and felt that they learned more than those in individual care. 2. CP's felt more privacy was needed during personal screening, and felt the providers should be available outside of class 3. INC expressed concerns that they were blown off by provider and that they felt rushed during appointments.	Further research to look at Quantitative information from CP Research partners perceptions of CP Implementation of CP as an option for women in the military	Level: III Quality: B

Citation	Purpose	Sample	Design	Measurement	Results/ Conclusions	Recommendations	Level & Quality
Klima, C., Norr, K., Vonderheid, S. & Handler, A., (2009). Introduction of centering pregnancy in a Public health clinic. *Journal of Midwifery & Women's Health 54*(1), 27-34. doi: 10.1016/j.jmwh.2008.05.008	Looked at acceptance of CP in a public health clinic by staff, providers, and participants Look at birth outcomes for CP on African American women.	Public health clinic in Midwest. 61 women in CP groups. 207 women in control group. Age 21-38, exclusively African American, <18 wks gestation at entrance to CP. 3 focus groups were also created with these patients.	Mixed methods Prenatal/Postnatal medical record reviews Focus Groups	Individual t-tests and Chi-square analysis were used to look at perinatal outcomes.	No statistical differences were reached in regards to preterm birth, inc birth weights, or breast feeding after discharge. Thought to be due to low sample. Late PNC affected entrance into CP (>18 wks). Focus groups showed that overall staff and participants were happy with CP. Pt's felt well prepared for labor, pain, & birth. Pt's felt supported, less worried, and felt they received better care in CP Staff/midwives felt implementation was difficult.	Suggest implementation of CP in African American women, lower SES areas. Study should be repeated with a larger sample to show true statistical differences.	Level: III Quality: B

Citation	Purpose	Sample	Design	Measurement	Results/ Conclusions	Recommendations	Level & Quality
Baldwin, K. A., (2006). Comparison of selected outcomes of centering pregnancy versus traditional. Journal of Midwifery & Womens Health *51*(4), 266-272. doi:10.1016/j.jmwh2005.11.011	To compare and contrast CP versus traditional care in regards to: knowledge, social support, perception of health locus of control, and perceptions of participation and satisfaction of care.	98 healthy pregnant women between ages 18-42 were included. All participants were English speaking 48 in the traditional group and 50 in CP	Pretest-Posttest design	Data collection used the following instruments: *Rising pregnancy Review sheet *Fetal Health Locus of Control by Walton & Wollaston *De Vellis's Health Locus of Control tool *Prenatal Psychosocial Profile *Participation and Satisfaction tool by Curry, Campbell & Christian A Chi-squared analysis of variance & covariance were assessed. Pretest was the covariant.	In regards to knowledge of pregnancy being greater with CP was supported. Increased knowledge showed a larger improvement from pre to post test in the CP group. Increased social support and inc health locus of control was no supported and show no significant improvement in CP over traditional pregnancy. Scores related to satisfaction of care showed no difference in the CP and the traditional care model of pregnancy.	A larger sample size along with a different posttest would be helpful. Exploration of more social questions and interactions would better assess level of change between the two groups. Study should be repeated at different sites to see if the difference changes with different midwives. Further study to determine if CP would benefit teens and ethnic minorities would be helpful.	Level: III Quality: B

Citation	Purpose	Sample	Design	Measurement	Results/ Conclusions	Recommendations	Level & Quality
Bloom, K. C., (2005). Use of centering pregnancy program in school-based clinic: A pilot study. *Clinical excellence for Nurse Practitioners* *9*(4), 214-218. . Retrieved from: http://www.springerpub.com/journals.html/	To evaluate selected outcomes of CP in a school-based adolescent group	63 total girls from a Young Parents Center. 10 in CP 53 in traditional care Criteria: -age 12-29 -enrolled as a student -< 22 wks gestation -low risk patients Pt's self-selected their group	Non-equivalent control group Pre-test/Post-test	Pregnancy, Birth and Baby Knowledge Pre/Post Test Self-Esteem Inventory Health Locus of Control Questionnaire	No statistical significant in Self-Esteem between the two groups were noted. No statistical significance between the two groups for birth and health outcomes **Important to note that both groups lost a significant number of girls to follow up testing. The control group had 3 preterm births with none in the CP group. However since numbers were small significance could not be obtained.	Future research to include larger sample sizes and looking at cost analysis of CP verses traditional care. Future research needs to look at education level for appropriateness to age Implementation of CP seems to be a good option in a school like this, but needs much more research	Level: III Quality: B

Citation	Purpose	Sample	Design	Measurement	Results/ Conclusions	Recommendations	Level & Quality
Tanner-Smith, E .E., Steinka-Fry, K. T., & Lipsey, M.W., (2014). The effects of Centering Pregnancy group prenatal care on gestational age, birth weight, and fetal demise. *Maternal Child Health Journal 18*,801-809. doi: 10.1007/s10995 -013-1304-z	To provide further evidence by examining group care versus traditional care. Specifically looking at gestational age, birth weight, and fetal demise outcomes.	Propensity matched methods were used 651 CP 5,504 traditional care **High risk patients and those with rare medical conditions were excluded from the study.	Retrospective Chart Review	Gestational age was measured in weeks and other variables were looked at using binary variables. Weighted logistic regression models were used. Confidence intervals and Standard Deviations were calculated.	1. CP group had significantly higher gestation ages than traditional care 2. Significantly higher birth weights for CP group. Post-hoc analysis showed higher weights for pre-term infants and LBW infants for those in CP 3. No difference in odds of preterm birth between groups 4. Lower incidence of LBW in CP group 5. Lower odds of fetal demise in CP group	Further study to look at the mechanics behind why CP works. Study of the casual pathways that relate to CP model should be looked at such as social support, improved health behaviors etc.	Level: IV Quality: B

Citation	Purpose	Sample	Design	Measurement	Results/ Conclusions	Recommendations	Level & Quality
Teate, A., Leap, N., Rising, S. S., & Homer,C., (2009). Women's experiences of group antenatal care in Australia—The Centering pregnancy pilot study. *Midwifery 27*(2011), 138-145. doi:10.1016/j.midw.2009.03.001	To determine the experiences of women in CP in Australia in order to see if implementation in Australia is possible.	33 participants in CP from two suburban hospitals in Sydney, Australia	Descriptive Study Antenatal and Postnatal surveys	Qualitative data was analyzed using Statistical Package for Social Science format. PPSQ questions were looked at. Retrospective look at birth records.	Overall women were happy that participated in care. Times of appointments, lack of child care, an work commitments were the top reasons women did not participate in GPC #'s were not analyzed against a control group but there was only 1 preterm birth at 36 wks and subsequently only 1 baby below 2500 grams.	CP is safe and an acceptable form of prenatal care. A large scale research project should be done to look at other factors related to CP. CP should be implemented in Australia.	Level: IV Quality: C

Citation	Purpose	Sample	Design	Measurement	Results/ Conclusions	Recommendations	Level & Quality
Grady, M. A., & Bloom, K. C., (2004). Pregnancy outcomes of adolescents enrolled in a Centering Pregnancy program. *Journal of Midwifery and Women's Health 49*(5), 412-420. doi: 10.1016/j.jmwh.2004.05.009	Describe the implementation and evaluation of a CP program designed to facilitate positive outcomes in an adolescent population that traditionally has more adverse outcomes.	Urban hospital based clinic. 124 women who gave birth after going through the centering program.	Observation Study	2 Evaluations were done using a 0-10 scale. The evaluation was developed by Sharon Rising to develop client satisfaction during CP. 2 outside comparison groups of same age teens were used for comparison groups and a Chi-Square analysis was used to evaluate the data between the three groups.	CP group showed a low rate of LBW infants (8.9%) as well as low rate of preterm birth (10.5%). When compared the CP group had lower no show rates appts Overall satisfaction with CP and prenatal care was 9.2 on 0-10 scale. Most teens felt that they learned from other teens and enjoyed the social interaction of learning. Rates for picking a pediatrician prior to birth and breast-feeding were higher in the CP patients.	Author recommends a full RCT to further evaluate the data. Future needs should also include more than one PP visit to ensure that mom and baby are adjusting well during the first year.	Level: IV Quality: B

Citation	Purpose	Sample	Design	Measurement	Results/ Conclusions	Recommendations	Level & Quality
Bell, K., (2012). Centering Pregnancy: Changing the system, empowering women and strengthening families. *International Journal of Childbirth Education 27*(1), 70-76. doi:	To inform others about Centering Pregnancy and its benefits.	N/A	N/A	N/A	This article calls us to be with women and for women instead of in-charge of women. Benefits mentioned are reduced preterm births, reduced LBW infants, increased breastfeeding rates, increased perceived support.	Centering Pregnancy should become more mainstream and all women should be invited to participate. Advocates of CP are challenged to make sure it is holistic, nurturing, and empowering in nature. Readers are encouraged to inquire about starting their own centering groups.	Level: V Quality: B

Citation	Purpose	Sample	Design	Measurement	Results/ Conclusions	Recommendations	Level & Quality
Thielen, K., (2012). Exploring the group prenatal care Model: A critical review of the literature. *The Journal of Perinatal Education 21*(4), 209-218. doi: 10.1891/1058-1234.21.209	To answer the questions: "Does group prenatal care produce better perinatal outcomes over individual prenatal care?"	34 total articles from 1998-2009. 17 research articles and 17 review articles	Critical Review of the Literature	Results were synthesized in regards to Qualitative versus quantitative information. Information comparing group to individual care as well as outcomes such as gestation age length, birth weight, and preterm birth were all listed in a comparative table.	Longer gestations and higher birth weights in infants born to mothers in group care was reported. Higher birth weight in preterm babies. Teens involved in group care had decreased preterm births and decreased low birth weights. However teens had a hard time making the time commitment to centering appointments.	Increase research comparing group care and individual care is needed. Larger samples and randomization is needed for full understanding.	Level: V Quality: B

Citation	Purpose	Sample	Design	Measurement	Results/ Conclusions	Recommendations	Level & Quality
Novick, G., (2009). Women's experience of prenatal care: An integrative review. *Journal Midwifery & Womens Health 54*(3), 226-237. doi: 10.1016/j.jmwh.2009.02.003	To provide a critical synthesis of research on women's prenatal care experiences that will illuminate gaps in knowledge and provide direction for further research.	67 articles between 1997-2007 That met the inclusion criterion.	Integrative Review	Descriptive Qualitative Analysis assisted by ATLAS.ti	6 themes identified: 1. Incentives/Barriers 2. PNC Setting 3. Time Spent 4. Components of Care. 5. Relationships w/ staff & clinicians 6. Receipt of Information Overall there were mixed reviews depending on ethnicity, income status, and psycho-social services received. Pt's in group care overall rated higher sores for PNC in satisfaction as well as decreased adverse effects.	Further research needed to understand women's experiences and to develop women-centered approaches to prenatal care. Research in how to make prenatal care more accessible as well as in how to modify care for patient's needs to enhance prenatal care and lower adverse effects.	Level: V Quality: B