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An interpretive field study of centering pregnancy group prenatal care

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Running Head: *CenteringPregnancy*™ Group Prenatal Care

An Interpretive Field Study of *CenteringPregnancy*™ Group Prenatal Care

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Abstract

This focused ethnography explored *CenteringPregnancy*™ group prenatal care provided by an urban nurse-midwifery practice with a monolingual Spanish-speaking, Medicaid-eligible population of women. Four themes emerged as foundational to *CenteringPregnancy*™ group prenatal care: 1) Social Connections; 2) Educational Focus; 3) Providing Care; and 4) Participatory Care. The findings were found to be consistent both with the Essential Elements of the *CenteringPregnancy*™ model and the midwifery model of care. Cited in prior research studies, *CenteringPregnancy*™ is a novel approach to prenatal care that encourages establishing social support networks within a woman's community, and personal empowerment that could potentially impact a woman's life-course as well as promote grassroots community change.

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Introduction

The current system of prenatal care is not serving its purpose. The United States (U.S.) spends more money per capita on health care than every other country in the world, and more women in the U.S. are receiving prenatal care than ever before (CDC, 2004). However, the U.S. is currently ranked 27th among developed nations for infant mortality rates with significant disparities existing between racial/ethnic groups (CDC, 2004).

In 1985 the Institute of Medicine (IOM) concluded that prenatal care decreased incidence of low birth weight infants, the chief cause of infant morbidity and mortality in the U.S. (Arias, MacDormand, Strobino, & Guyer, 2003). The United States Public Health Services (USPHS) subsequently identified the three basic components of prenatal care as 1) early and continued risk assessment, 2) health promotion, 3) medical and psychosocial interventions and follow-up (USPHS, 1989). In response to these two reports, early and consistent prenatal care, consisting of these three components, has been promoted over the last decade. As a result, the rate of women who receive prenatal care in the first trimester has increased by 10% to an overall rate of 84% by the year 2002, and only 1% received no prenatal care throughout pregnancy (Martin, Hamilton, Ventura, Menacker, Park & Sutton, 2002).

Despite the increased utilization of prenatal care, there has not been a significant impact on birth outcomes; in fact the rates of preterm deliveries and low birth weight infants are increasing (Martin et. al., 2002). Fiscella (1995) reviewed published studies from 1966 to 1994 evaluating prenatal care and found, in contrast to the IOM's report,

there is no evidence that prenatal care improves birth outcome. The value and efficacy of the traditional model of prenatal care is in question.

According to Lu and colleagues (2003), prenatal care is unlikely to improve birth outcomes until it addresses underlying causes of preterm delivery and low birth weight. One theory, the life-course perspective, presented by Lu & Halfon (2003) proposes that low birth weight is a result of exposures to stress that occur early in life and accumulate throughout the life course. These stressors impact a woman's neuroendocrine and immune-inflammatory systems leading to preterm delivery and low birth weight (Lu et. al., 2003). From a life-course perspective, it is therefore not surprising that prenatal care and risk reduction through traditional prenatal care is ineffective as it does little to address neighborhood factors, discrimination, segregation, air and water pollution, availability of healthy food choices, and other contextual determinants of preterm delivery and low birth weight.

A new model of prenatal care called *CenteringPregnancy*™ has been introduced (Rising, 1998) that not only meets the goals established by the IOM's Rule for Health Care Redesign to improve quality of health care (Rising, Kennedy & Klima, 2004), but also at its core encourages social support and empowerment. Establishing community support systems and empowerment of women through prenatal care may increase the psychosocial support of women throughout pregnancy and childbirth, as well as establish a basis for support and change within the community.

CenteringPregnancy™ provides a different dimension to prenatal care that holds promise to impact birth outcomes. It is also conceptually related to the midwifery model of care, one which has been associated with excellent perinatal outcomes (Cragin, 2002;

MacDorman & Singh, 1998). Kennedy and colleagues (2004) suggest that midwifery care is associated with short term (perinatal) and long term (women's health behaviors) outcomes. This suggests the potential to influence a woman's life course perspective. The purpose of this study is to explore the *CenteringPregnancy*™ model of prenatal care through a focused ethnography and to compare the findings to Kennedy and colleagues' (2004) midwifery model of care.

Background

CenteringPregnancy™, as outlined by Rising (1998), is a model of prenatal care that incorporates risk assessment, education and support into a group setting. Eight to twelve women with similar estimated dates of delivery meet for 90 minute prenatal visits throughout the pregnancy. Emphasis is placed on the collective experience of women through discussion and all are encouraged to take responsibility for their own health through means such as weighing themselves, taking their own blood pressures, dipping their own urine and recording results in their charts. A sense of social support and education is fostered through the relationships that develop and discussions that ensue. The model leads to a shift in the client-provider power base with a goal to enhance the woman's sense of empowerment and community.

The model of care was developed based on experience, theory, and research suggesting that women who had early and regular prenatal care had healthier babies (Freeman & Poland, 1992); that women at greater risk of adverse outcomes benefited the most from educational health messages; and that women who received sufficient health behavior information as part of their prenatal care were less likely to deliver low birth weight infants (Kogan, Alexander, Kotelchuck, & Nagey, 1994). Other studies

demonstrated that women with more prenatal social support experienced less stress, reported less substance abuse, progressed better in labor, and delivered babies of higher birth weight and Apgar scores (Collins, Dunkel-Schetter, Lobel & Scrimshaw, 1993). Those dissatisfied with their prenatal support were at greater risk for postpartum depression. A focus group study conducted with 50 low-income women revealed that women wanted education about what to expect during pregnancy and birth, and wanted to socialize with other women (Rising, 1998). Utilizing social support theory, these concepts were developed into a model of prenatal care that emphasizes health education and social support (Rising, 1998). The essential elements listed as fundamental to this new model of care are presented in Table 1.

Review of Literature

In order to understand the potential influence of this model of care it is important to examine the relevant research on health care provided in groups. A total of five studies will be reviewed. Three studies are available examining the *CenteringPregnancy*™ model of care. Because of the paucity of research regarding *CenteringPregnancy*™, two additional studies that analyze a group model of care in medical patient populations will also be reviewed.

CenteringPregnancy™ *Group Prenatal Care*

Rising (1998) conducted a pilot study as an initial evaluation of the *CenteringPregnancy*™ model. Social support theory is implied as a framework for the study. The independent variable was the *CenteringPregnancy*™ group model of care. Dependent variables were 1) safety outcomes for mother and baby, 2) satisfaction of women and staff, 3) third trimester use of the emergency room (ER) and 4) general

knowledge of participants of pregnancy and health issues. The pilot group was compared with a convenience clinic control sample.

The pilot sample consisted of 111 women in 13 *Centering* groups with an average of 8 to 9 women in each group. Three of the groups were comprised of adolescents; however, the majority of women were in their 20s. Of those, 28 were 19 years of age or less and 12 were 30 or older. Most (68%) were primiparas and 32% were multiparas. The majority (70%) started prenatal care in the first trimester and 4% started at 21 weeks or later. Initiation of prenatal care was not listed for 16% of the women. The sample was described as ethnically diverse, although specific ethnic groups were not described. The women were primarily Medicaid eligible. The pilot study was conducted over a 15-month period and overall attendance rate was 86%, and 92% in the teen groups. Inclusion and exclusion criteria were not listed. A description was not given of women in the control group.

Outcomes were measured by four dependent variables: safety, satisfaction, emergency room (ER) visits, and knowledge. Safety was measured by gestational age at the time of delivery, birth weight, length of labor, analgesia used during labor, cesarean births, and Apgar score of less than seven. No significant difference was demonstrated between pilot and control samples for these outcomes. Satisfaction was measured with an evaluation sheet completed during *Centering* sessions six and ten. The validity of this tool was not described. Almost all (94%) stated they were learning a lot about prenatal care and 96% stated they preferred the group model of care. Satisfaction levels were not given for the control group. Women in *Centering* groups demonstrated significantly less third trimester emergency room visits ($p<.001$) than controls. The "Pregnancy Review

Sheet" was developed and used to test participant's basic knowledge of pregnancy, but the validity of this tool was not discussed. No effort was made to identify those who had language difficulty with the test and literacy levels were not discussed. The author also did not discuss if control clients were given the Pregnancy Review Sheet or if any differences in their knowledge levels were observed. Informed consent and ethics review approval were not discussed.

The study had several serious limitations. The control group was not described; it is therefore impossible to discern if outcomes were related to differences in samples, or to the group model of care. The sample was also skewed concerning socioeconomic class and it is unknown if outcomes are generalizable to a more affluent population. The ethnic distribution of clients was not described. Inclusion and exclusion criteria were not stated. The study was a descriptive comparison, not a randomized control trial. Potential confounding factors, usually dealt with by randomization, were not discussed in detail and it is unclear if there really were significant differences between the groups. Larger studies with better controls are warranted to demonstrate significance in regards to safety. Satisfaction levels were either not solicited or not reported from the control clients. Clients in the group model seemed overall satisfied with their care, but it is not demonstrated if the tool was valid, or if there was a difference – better or worse from those receiving care in the clinic. The "Pregnancy Review Sheet" was developed and used to test knowledge, but the validity of this tool is not stated or known. The purpose of this article was to present a potentially transformative model of care. This was the first study of the *CenteringPregnancy*™ model of prenatal care and set the stage for future research.

A study by Grady & Bloom (2004) examined the *CenteringPregnancy*™ model with adolescents. They conducted a retrospective chart review to evaluate the *CenteringPregnancy*™ Prenatal Care Demonstration Project at The Teen Pregnancy Center at Barnes Jewish Hospital in St. Louis, Missouri. The purpose was to address the following three questions: 1) What are the health visit attendance rates for adolescents in *CenteringPregnancy*™ groups? 2) What are the perinatal outcomes for adolescents in *CenteringPregnancy*™ groups? The outcomes of interest were incidence of low birth weight (LBW), defined as infants less than 2500g at birth; preterm delivery rate, defined as delivery at less than 37 weeks gestation; cesarean birth rate; breastfeeding rate, defined by a client report of breastfeeding recorded on the postpartum progress note at discharge from the hospital; and identification of a pediatric provider at the time of delivery recorded on the labor and delivery nursing admission assessment. 3) What is the level of satisfaction for teens in *Centering* groups? This was measured by two instruments, completed at prenatal session seven and at session 10 or at the postpartum session. Information for the research study was collected from March 2001 through April 2003. The Human Studies Committee at Washington University School of Medicine approved the study; informed consent by participants was not discussed.

A total of 159 adolescents enrolled and 124 (78%) completed the *CenteringPregnancy*™ prenatal care. Thirty-five adolescents were not included in data collection or analysis due to transfer to high-risk clinic, preference for traditional care, loss to follow-up after first visit and moving or other issues association with location or days and times of clinic sessions. The sample consisted of teens ages 11 to 17, mean age of 15 to 16; the ethnic distribution was 116 African-American, 6 white, and 1 "other."

The mean number of prenatal visits was 11.5. Socio-economic status, parity and gestational age at entrance to care were not described. Inclusion and exclusion criteria were not listed. A conceptual framework was not given. Perinatal outcomes were compared with two separate convenience samples. The first comparison group included adolescents 17 years of age or younger who gave birth at Barnes Jewish Hospital in 2001, excluding adolescents receiving no prenatal care and teens participating in the *Centering* groups. The second comparison group included all adolescents 17 years and younger who gave birth at Barnes Jewish Hospital in 1998, including those with no prenatal care. A χ^2 analysis demonstrated baseline statistical differences. The 1998 comparison group was a mean of six months older ($p<.05$), and had fewer African-American participants ($p<.05$); the 2001 group was an average of 4 months older ($p<0.05$) than *Centering* participants.

The majority (87%) of adolescents in the *CenteringPregnancy*™ groups returned for a postpartum visit within eight weeks after delivery, 89.5% returned for well-woman care after eight weeks postpartum. The "no show" rate for appointments for those in *CenteringPregnancy*™ was 19%. The "no show" appointment rate for all clinic clients in 1998 was 28%; however, this comparison rate was not adolescent specific. Perinatal outcome data were collected by chart reviews and analyzed using χ^2 analysis. Preterm delivery and low birth weight rates in the *Centering* groups were significantly lower than both the 2001 comparison group ($p<.02$) and the 1998 comparison group ($p<.05$). Breastfeeding rates and identification of pediatrician at discharge were significantly higher than comparison groups ($p<.02$). There was no significant difference in rate of cesarean births among the three groups. The satisfaction level of participants was

classified as overall high (9.2 out of 10) and some of the positive comments by participants were quoted. There was a 69% response rate for the first evaluation (N=100), and a 78% response rate for the second evaluation (N=113). The validity of the evaluation tool was not discussed. Satisfaction was not evaluated for the comparison groups.

There were numerous limitations in this study. Subjects chose to participate in the *CenteringPregnancy*™ group, therefore leaving the potential for self-selection bias. There were 35 adolescents enrolled for whom data were not collected. They transferred out of *CenteringPregnancy*™ for reasons such as complications, preference for traditional prenatal care, and those lost to care, which were some of the outcome measures. Had data been included on these individuals, outcomes may have been affected. Multiple benefits were offered to adolescents for attendance, which may have influenced attendance of the teens more than the *CenteringPregnancy*™ model. There was not a true control group for any category. The comparison groups were four to six months older than the *CenteringPregnancy*™ group, which may have had a confounding effect. Additionally, information was gathered by chart review, which is subject to individual differences in accuracy of health care personnel's charting habits. The span of time could also be a confounding factor when comparing outcomes from 2001 with 1998. Satisfaction rates were measured with a tool of unknown validity. The evaluation was not given to the comparison groups and therefore the significance of the results cannot be determined. This study offers initial data from a demonstration project of teen *CenteringPregnancy*™ groups. The suggestions of decreased preterm delivery, decreased low birth weight infants, increased breastfeeding rates at discharge, and

increased identification of pediatricians is encouraging and indicates a need for future study, utilizing a randomized controlled design in order to more effectively evaluate outcomes.

Ickovics and colleagues (2003) conducted a matched cohort study of group prenatal care at two hospital-based public clinics in Atlanta, Georgia and New Haven, Connecticut. The primary objective of the study was to examine the impact of group verses individual prenatal care on birth weight and gestational age among women receiving care at urban clinics that primarily serve economically disadvantaged and minority women at high risk for adverse perinatal outcomes. The sample consisted of 229 obstetric clients who entered care before 24 weeks gestation and volunteered to receive group prenatal care. Of these, 182 (80%) were black, 35 (15%) were Latina, and 12 (5%) were white. Ninety (39%) were 14 to19 years of age, 104 (45%) were 20 to 25 years, 28 (12%) were 26 to 30 years, and 7 (3%) were 31 years old or greater. One hundred eight (47%) were nulliparous and 121 (53%) were multiparous. The women were randomly matched by computer to 229 clients receiving standard individual prenatal care based on race, age and parity with the closest delivery date possible. There were no significant differences in history of preterm birth or total number of prenatal visits. Clients were excluded from the study if they had severe medical or psychological conditions requiring individual assessment. The socio-economic status of participants was described as low, with all being either Medicaid recipients or self-pay. Institutional review boards at each site approved the study.

Birth weight was significantly greater for infants of patients in group prenatal care compared with individual care ($F=7.68$, $p<.01$). There was no difference in preterm

delivery rates. Birth weight of term infants was statistically the same, but birth weight of preterm infants was significantly greater in group patients than those receiving individual care ($F=5.66$, $p<.05$). Infants of group prenatal care were less likely than infants of individual care to be considered low birth weight (less than 2500g), very low birth weight (less than 1500g), early preterm (less than 33 weeks gestational age at delivery), or to experience neonatal loss, although the overall occurrence was rare and the sample too small to have the power to test for significance. Post hoc analyses indicated that for preterm infants, average gestational age was two weeks greater for infants of group prenatal care patients than individual patients ($p<.001$). There was no group difference for average gestational age at delivery for term infants, or for infants classified as small for gestational age.

The study was limited by a lack of randomization that could have resulted in self-selection bias for women who chose to participate in group prenatal care. The matched design was an effort to reduce this potential bias. The study also excluded clients seeking care after 24 weeks gestation, which may also limit generalizability to the overall population. Since the study focuses only on those of low socioeconomic status, the generalizability to all socioeconomic levels is limited. Individual consent process was not discussed. The study would have been better served by a larger sample to increase the power in order to determine significant differences in occurrence of low birth weight, very low birth weight, early preterm delivery, or neonatal loss. Strengths of the study include the large sample size from multiple sites, targeting women at higher risk for adverse outcome, the prospective, longitudinal design, and outcomes of care that are clinically relevant to perinatal health.

Group Medical Care

Group models of care have also been introduced into other health specialty fields with initial encouraging results. Scott and colleagues (2004) conducted a randomized control trial of group outpatient care for older adults with chronic conditions. Through survey methodology, 2,315 Kaiser members in the Colorado Region aged 60 and older were identified with one or more chronic conditions and 860 expressed interest in participating in the study. Of those, 793 were from a physician's panel with sufficient staffing for group care, and 294 were patients who indicated a strong interest in participating. The 294 patients were then randomized to either an intervention group (N=145) or control group (N=149). The was no significant difference identified between group and control patients in age, gender, marital status, chronic condition, number of prescriptions, mobility limitation, depression, memory status, living alone, activity of daily living deficits, or fair or poor health status. Only those randomized to the intervention, group care, were contacted. Control patients were not aware they were participating in the study.

All patients received health, patient-satisfaction, and self-efficacy surveys at the beginning of the study and 24 months after study enrollment. The validity of these surveys was not discussed. Control patients received the same care from the primary physician that they had received before. Intervention clients met in groups with their primary physician and a nurse every month for 90 minutes. Group meetings consisted of a 15-minute warm-up, 30-minute presentation on specific health-related topics, 20-minute care giving period while other members socialized, and a 15-minute question and

answer period. An additional 60-minute period for patients needing 5-10 minute private office visits followed each group meeting. Administrative databases provided utilization and cost data for the 12 months before enrollment and for 24 months after enrollment, including ER visits, inpatient services, professional services, home health visits, and skilled nursing facility admissions.

An average of 7.7 patients attended a mean of 10.6 group meetings each from a total of 459 group meetings over the 24 month period. This was an overall 41% attendance rate, with a wide variation in attendance by participants; the actual range in attendance was not given by the authors. Over a quarter attended two or fewer group meetings. Non-attenders had few differences in baseline measures from those who attended three or more meetings. A greater proportion of non-attenders reported a history of diabetes mellitus and cancer, they were more likely to live with relatives, and were less likely to have a living will. They had significantly fewer clinic visits and pharmacy fills, but significantly more skilled nursing facility admissions at 24 months. Clinic costs were significantly lower for non-attenders and skilled nursing facility costs were higher. Twenty-four patients from the study sample and 16 control group members terminated their plan memberships during the 24 months of the study. Twenty study participants and 40 controls switched to a non-study physician during the study.

Compared with controls, group participants had fewer ER visits ($\chi^2 = 9.8$, $p<.008$) and fewer inpatient admissions ($\chi^2 = 5.8$, $p<.013$) and fewer professional services than controls ($\chi^2 = 7.5$, $p<.005$). No differences were observed in clinic visits, pharmacy fills, outpatient hospital visits, observation unit admissions, skilled nursing facility admissions or home health visits. Group participants had significantly lower costs associated with

ER visits than controls (t=3.2, p<.001). Seventy-eight percent of patients returned the survey at 24 months. Scores were significantly higher for group participants for satisfaction with their primary care physician ($\chi^2 = 5.27$, p<.022), physician's unhurriedness ($\chi^2 = 7.13$, p<.008), time spent with the physician ($\chi^2 = 3.78$, p<.052), overall quality of care ($\chi^2 = 3.89$, p<.048), and talking to the physician about advanced directives ($\chi^2 = 15.1$, p<.001). Group participants felt they had learned things from the pharmacists to help them manage their medications better ($\chi^2 = 6.87$, p<.009), and learned things from the nurse to better manage their health conditions ($\chi^2 = 3.91$, p<.048). The self-efficacy rating for communication with their physician was significantly greater for group participants than for controls (F = 4.8, p<.002). Comparison of health status and advanced household and basic activities of daily living showed no significant differences between group participants and controls.

There were several limitations with this study. There was a potential loss of adequate power due to a selection of a sub-sample of patients from the larger study population. Therefore, non-significant results for utilization, costs, health status and self-efficacy were open to a type II error. There was a potential self-selection bias since only participants who expressed strong interest in the group model were included. This may have influenced the greater satisfaction and quality of care expressed by group participants. More than 25% of participants attended fewer than three meetings. It is not discussed if these non-attendees completed satisfaction and self-efficacy surveys at 24 months or how those results may have impacted overall satisfaction with the model. Self-efficacy data were not collected at the beginning of the study; it is therefore impossible to measure change in self-efficacy because of utilization of the group model

of care. Validity of tools to measure health status, satisfaction and self-efficacy in this population is unknown. There also may have been a Hawthorne effect because of the additional attention of the group intervention, while control patients were not aware of their participation in the study. Individual informed consents for the study were not discussed.

Wagner and colleagues (2001) conducted a randomized trial to evaluate the impact of primary group visits on the process and outcome of care for diabetic patients in a large health maintenance organization in western Washington. An automated diabetes registry identified all diabetic patients 30 years of age or greater and randomly selected 36 patients from each participating practice. If greater than 36 patients were in the practice, those receiving insulin or oral hypoglycemic therapy were preferentially selected. Patients who were terminally ill, demented or psychotic, or otherwise not able to participate in the study were excluded. Of the total deemed eligible, 707 patients (70%) completed and returned baseline data and consent forms. The rates of nonparticipation did not differ significantly between practices. Each consenting practice was randomized within clinics to either group care (n=14) or to usual care (n=12). Each intervention practice divided participating patients into groups of six to ten and invited them to attend group care at intervals of three to six months. Approximately 35% of patients never attended a single session. The authors state most patients refused at the outset, citing reluctance to participate in groups and/or a concern about the length of the visit, although actual percentages of reasons for nonparticipation are not given. Among patients attending at least one session, two-thirds participated in three to six clinics over the two year period.

Each group session consisted of an assessment, individual visits with the primary care physician, nurse, clinical pharmacist, and a group educational and peer support session. Self-management support was provided through one-on-one counseling with the practice nurse and a group session. Data were collected from self-report questionnaires and administrative data systems. Patient questionnaires were given at baseline, 12 and 24 months by mail (54%); non-respondents (46%) were interviewed by telephone. The baseline telephone interview was shorter and asked about fewer baseline characteristics; the authors did not specify which items were excluded. Follow-up mail and telephone surveys contained the same full set of questions. The survey instruments included questions about receipt of recommended preventive measures and patient education, and well-established measures of health status including general health, physical function, physical role function, bed disability and restricted-activity days, and the Center for Epidemiology Studies Depression Scale. Patient satisfaction measures included medical care satisfaction with overall care, care coordination, and diabetes care satisfaction. Administrative data systems provided information for clinical measures and co-morbidity, health care uses and costs. No differences were found between intervention and control patients. All analyses were performed using either mixed model analysis of variance or a mixed model regression analysis to account for the within-practice correlations resulting from randomization of physical practices.

Follow-up responses were obtained from 87% of surviving intervention patients and 79% of surviving control patients. At 24 months, intervention patients were significantly more likely to report having received preventive procedures ($p<0.02$) and have a microabluminuria test recorded in the diabetes registry ($p<0.04$). They reported

higher rates of use and helpfulness of patient education, both written ($p<0.03$) as well as classes and face-to-face counseling ($p<0.0001$). Intervention patients reported their general health to be significantly better than the control patients ($p<0.03$) with less days confined to bed ($p<0.02$). Rates of foot exams, retinal exams and medication reviews, satisfaction levels, physical function and depression measures were somewhat better for intervention clients, but not significantly different. Mean HbA1c levels increased equally in both groups, cholesterol levels equally decreased in both groups over the course of the study. Group patients visited primary care nearly one more time during the study, approaching statistical significance ($p=0.05$), but the increase cost of the visit was offset by significant reductions in specialty ($p<0.007$) and ER visits ($p<0.04$). There were no significant differences in hospitalization rates or total health care costs. When results were analyzed based on group session attendance, medical care satisfaction ($p<0.0003$) and diabetes care satisfaction increased significantly ($p<0.007$) with number of clinics attended, bed disability days were reduced ($p<0.04$), and HbA1c levels ($p<0.04$) were improved, suggesting a dose-related response. Group attendance did not increase the number of primary care visits ($p<0.33$). There were no significant trends in group attendance by age, sex or chronic disease score.

The study is limited by incomplete baseline data, and decreasing participation. The authors also discuss that the study was conducted at a time of instability in the health maintenance organization. Nearly half of the intervention patients did not attend the group sessions, and the average number of sessions attended by clients who did participate was only three of the six sessions, posing a threat to the validity of the findings. The findings suggest that participation in group care improves processes of care

and results in better health. However, it is unknown if the results are generalizable to the total population, or if there are significant differences between patients who chose to participate and those who did not. The study also specified that patients were divided into groups of six to ten, but after the 35% nonparticipation rate, and the 66% attending only half of the sessions, it was not clarified how many patients actually attended each group session. By inference, some groups could possibly have had only one or two patients at a session, and the question is raised if this is actually a group model or a prolonged individual counseling session.

Although limitations can be found in essentially every study, a preponderance of evidence suggests that a group model of care may be associated with improved outcomes, satisfaction rates, and a decrease in healthcare costs. With such potential, further research is warranted. In particular, there has been no qualitative research on client's experiences of health care conducted in group settings.

CenteringPregnancy™ has been proposed to be a model of care that can transform the way prenatal care is provided (Rising et al., 2004). With the potential to improve the quality of prenatal care in the United States, it is imperative to examine this new model of care. Thus far, few research studies have been conducted evaluating *CenteringPregnancy*™ and group models of care. The three existing studies of *CenteringPregnancy*™ show promising potential with results including decreased preterm deliveries, later gestational age at delivery, higher birth weights, fewer ER visits, and high participant satisfaction ratings. However, these studies are also limited by a lack of randomization, sample sizes insufficient to provide the power for significant results, and unknown validity of instruments used to measure satisfaction. The studies of

group care with medical populations, despite being randomized, are both subject to self-selection bias, demonstrated very low attendance rates, and the potential for a Hawthorne effect. Yet these studies demonstrated increased preventive care services and education and lower ER and specialty visits, with corresponding lower costs and high satisfaction with the model of care. Further study is warranted to test these initial encouraging results.

Randomized control studies are needed with sufficient sample sizes to provide the power to evaluate the true impact of this model of care on outcomes. The *CenteringPregnancy*™ model was developed in a low income, English-speaking population (Rising, 1998) and subsequent studies have all been conducted with similar groups (Grady & Bloom, 2004; Ickovics et al., 2003). The transferability of the model to other racial/ethnic populations as well as other socioeconomic groups has not yet been investigated. Qualitative studies are needed to examine if *CenteringPregnancy*™ can have practical and effective application in different settings. What are the cultural implications of this model of care as it is currently being practiced? The model espouses social support, education and empowerment as central tenets. How are these enacted? Are they perceived by participants? As a model of care designed, promoted, and provided by midwives, it is also essential to explore the role of the midwife in *CenteringPregnancy*™ and how that role it is similar or dissimilar to one described model of midwifery care.

Theoretical Framework

Nurse-midwifery attended births have demonstrated outcomes that are as good as or better than physician attended births for both low and moderate risk populations

(Cragin, 2002; MacDorman & Singh, 1998). Kennedy and her colleagues (2000, 2004) have conducted research to develop a model to describe potential reasons for the differences. Through several qualitative studies, three overarching themes of midwifery practice have been identified and described: 1) the midwife in relationship with the woman, characterized by mutuality and an engaged presence; 2) orchestration of an environment of care to meet the woman's physical and emotional needs; and 3) life journeys, or outcomes, for the woman and the midwife. Kennedy's model will be used as a framework to reflect on the findings of this study.

Method

Study Aim

This focused qualitative study proposed to explore the culture of *CenteringPregnancy*™ and compare those findings to a framework of midwifery care identified by Kennedy and her colleagues (2004). In addition, the findings will be compared to the essential elements of *CenteringPregnancy*™ described by Rising, Kennedy, and Klima (2004). As such, it represents an analysis of a partial data set from a larger ethnography of midwifery practice in the setting.

Ethnography

The question asked with an ethnographic approach is: what is the culture of the group or society of interest? Ethnography is a qualitative method of research that seeks to understand and describe cultures, behaviors and meanings found within groups (Speziale & Carpenter, 2003). Culture is defined by Webster's dictionary as, "the ideas, customs, skills, arts, etc. of a people or group that are transferred, communicated, or passed along. . ."(Agnes & Guralnik, 2001, p. 353). Six characteristics have been

outlined by Speziale & Carpenter (2003) as central to ethnographic research: the researcher as instrument, fieldwork, the cyclic nature of data collection, the focus on culture, cultural immersion, and the tension between researcher as researcher and researcher as cultural member, or reflexivity.

For this study, ethnography was chosen to examine the *CenteringPregnancy*™ model to provide a view into the ideas, customs, and skills of this type of care which can then be compared with an established midwifery model of care. During an ethnographic study, the researcher spends considerable time with the group being studied in order to become familiar with the setting, establish rapport with informants and to be intimately involved in the research process (Speziale & Carpenter, 2003). Data are gathered over time, in multiple settings and by multiple data collectors using many sources of data. The researcher becomes the instrument conducting field observations and event analysis. Prolonged immersion results in reflexivity, as the researcher works to remain objective and focused on research while becoming a member of the culture. The focus is on the ideas, beliefs and knowledge of the connected group and its members. As data are collected and analyzed, questions will emerge resulting in a cyclic interpretation of data.

The focused ethnography was to provide a lens to observe a group model of prenatal care provided by midwives. As such it provided a robust opportunity to observe the interactions of various midwives and women. Through multiple observations the researcher was able to achieve a deeper understanding of the actual culture and behavior of *CenteringPregnancy*™ groups.

Human Subjects Review

The study was approved by the committee on Human Research at the University of California and the Investigational Review Board at SFGH. As an ethnographic study informed consent was not necessary for observations of care as long as no individual data were being collected, such as interviews or demographic/medical information. Flyers were posted in the Women's Clinic that informed women an observational research study was taking place. One of the groups was videotaped and these women provided individual informed consent to be filmed.

Study Setting

Selected *CenteringPregnancy*™ sessions were observed at San Francisco General Hospital (SFGH) in San Francisco, California between January 2003 and February 2005. All sessions were conducted in Spanish by Certified Nurse-Midwives with the Nurse-Midwives of San Francisco faculty practice at SFGH. Each of the *CenteringPregnancy*™ groups met ten times throughout the pregnancy and for a postpartum party after all participants had delivered their babies. At the time of the study the *CenteringPregnancy*™ model of prenatal care was only offered to Latina women at SFGH. This hospital only serves a California Medicaid population.

Study Sample

The purposive sample consisted of observations in four different *CenteringPregnancy*™ groups, led by three different certified nurse-midwives, each assisted by a registered nurse, and a student nurse-midwife. The *CenteringPregnancy*™ groups observed were chosen because they were being conducted with urban, monolingual Spanish-speaking populations, and led by Certified Nurse-Midwives

experienced in the *CenteringPregnancy*™ model. All *Centering* participants were Latina and Spanish was a preferred language of the women for communication. Ages, gravidy and parity, country of origin, and amount of time in the U.S. of *Centering* participants were not available. However, all were eligible for Medicaid and therefore would be considered of low socioeconomic status. All were of childbearing age and groups consisted of multiparous and nulliparous women. Participants were each given the option of group or individual prenatal care and elected to participate in *CenteringPregnancy*™ after an initial individual appointment before 16 weeks gestation with a certified nurse-midwife in the clinic at SFGH. After choosing to participate in group care, eight to twelve women were placed into *CenteringPregnancy*™ Groups based on month of estimated delivery date.

Data Collection

Data were collected in the following manner:

1. Participant observation. Three researchers collected data during participant observation of *CenteringPregnancy*™ sessions over the course of the study. Some of those observations included were from researchers who were both present at the same session to achieve clarity in data collection. Field notes were written to document their observations. There were a total of 19 sessions observed. As one of the data collectors and analyst of this data set, my role was also as a student nurse-midwife in seven of the observed sessions. This dual role as true participant observer required careful reflection after the sessions to describe my observations of the sessions separately from my role as midwife. These observations were discussed in depth with the principal investigator to delineate the roles and provide clarity in the descriptions.

2. Five Centering sessions were videotaped by the Principal Investigator (PI) to document the interactions among women with staff and with other women.

Data Analysis

The videotaped sessions were observed multiple times and then translated to English and transcribed by the author. Transcripts of the sessions and all field notes were entered into the Atlas.ti, Version 4.2 computer program for organization, management, and analysis. All transcripts were initially read by two researchers (the author and the principal investigator). Once the transcripts had been repeatedly read, specific text was then coded. As codes were developed, each was described in terms of its meaning to the data. Codes and memos about analytic decisions were developed independently by the researchers who then compared their findings on several field notes. This assured rigor in checking for consistency in analysis, confirmability of findings, and in the development of an audit trail. Through the iterative process the two researchers achieved consistency in final interpretation of the data. After the initial structural development of codes the primary author completed the remaining analysis with the principal investigator providing member checking on the findings. The last steps in the analysis were: 1) Compare the findings to Kennedy and colleagues' (2004) model of midwifery care that depicts a foundational relationship of the midwife with the woman, orchestration of care to meet her needs within her context, and outcomes of care, termed "life journeys." 2) Compare the findings to the essential elements of the *CenteringPregnancy*™ model described by Rising, Kennedy, & Klima (2004). Comparisons for resonance and dissonance were sought and described.

Results

The presentation of the findings is organized in the following way. The analysis of the field observations and notes of the Centering sessions is first presented to describe the actions and behaviors seen in group settings. Secondly, the observations are compared to the elements considered essential to the *CenteringPregnancy*™ model. Finally, the results are compared to Kennedy and colleagues (2004) model of midwifery care. Data quoted from the text documents are cited with a "P followed by a number" referring to the document from which it was drawn. This is followed by the specific line numbers of the document. Data specifically quoted from the field observation notes and/or videotapes are italicized for ease of reading. Many of the quotes used to support the findings represent direct observations of the researchers written in the field notes.

Thematic Analysis of CenteringPregnancy™

Atlas.ti software was used to analyze and interpret 22 documents in the study which consisted of field notes and transcribed videotaped sessions. Several sessions were observed by two researchers and had more than one set of field notes. Codes were created with numerous memos describing and explaining how they were linked to the data. These in-depth memos provided the foundation for the final interpretation of the data. The codes were thematically clustered into the following areas: a) Social Connections, b) Educational Focus, c) Providing Care, and d) Participatory Care. These themes were chosen for the amount of emphasis and consistent observations of their occurrence across the entire data set. Other codes were identified, and although they provided interesting glimpses into the prenatal group process experience, they were not observed consistently throughout the majority of the sessions.

Social Connections.

The majority of coding supporting this theme included "Interaction", "Support", "Shared Experiences", "Humor", "Enjoys Group" and "Confianza." The group setting permitted unique social interactions not possible with traditional care and was observed consistently throughout all of the *CenteringPregnancy*™ groups. Eight to twelve women were in each group, and at times other family members and children also attended the *CenteringPregnancy*™ group sessions. The atmosphere was often quite loud and social as the group participants greeted and talked with one another. *"They also seemed to have become very familiar and comfortable with each other and a lot of conversations occurred with one another throughout the group"* (P17; 210-214).

Relationships of women with each other often developed as the groups progressed over time. The following was observed at the start of a postpartum reunion party about one month after the last baby from the group had been born,

> *"As we came in everyone had huge smiles on their faces and were obviously glad to see one another. Greetings occurred all around. Comments were on how beautiful each of the babies were, how each woman had lost the pregnancy weight they had gained and how good everyone looked"* (P12; 18-25).

Establishing social connections was encouraged by the midwives facilitating the *CenteringPregnancy*™ sessions, *"[The midwife] said it may be hard here without all of the people in your village helping, a lot of time people don't have much family here, but that you should call on one another to help"* (P18; 83-87). There seemed to be a bonding that occurred as women shared the experience of their pregnancies together. One researcher commented,

"I really am beginning to see what [one midwife] meant by the comment last session that she felt she had really facilitated well . . . when the women did all of the talking. One of the goals of Centering is to help the women build community networks and you can almost see that happening" (P5; 242-249).

The relationships forged through *CenteringPregnancy*™ have the potential to last well beyond the pregnancy, possibly increasing the long term networks and support systems women have within their communities. This appeared to be encouraged by the midwives observed.

"[The midwife] quieted the group for just a moment and stated that her one goal for the [postpartum] gathering was that you all [the Centering participants] set a time to meet together at someone's house or in a restaurant or the park, but that you set a time to get together sometime in the future" (P12; 126-133).

However, there may have been an assumption that the women in the group share enough in common to bond with one another. In the sessions observed, women were grouped based on the month their baby was due and the preference to communicate in Spanish. Yet a vast difference was observed in the cultural and social strata of women attending *CenteringPregnancy*™ groups. One researcher, experienced with Latina cultures noted,

"Looking around the room, it strikes me how different the women are from each other in this group - from their clothing/appearances anyway. There is the very young - probably late teens - very cool couple, dressed really well. There is a woman who looks very "campesina": rural poor, possibly new immigrant judging by her clothing and mannerisms, another woman looks like she is more

middle-class, a little older. There are quite a few women present now, most with partners, and all appear so different. I would be interested to see what kind of interactions develop in the group, mainly because I would not expect to see these women together as friends in another setting" (P19; 156-173).

While these admittedly are judgments based on appearances, this was an observation early in one particular group. Further observations and speaking with the midwife in charge revealed that individuals in this *CenteringPregnancy*™ group really did keep to themselves and she did not think that much connection among the women developed in this particular group and at times it was difficult to get them to talk.

Overall, however, women came to know one another over the months as they shared their pregnancies together. They shared experiences and stories from their lives and friendships appeared to be formed. During a group time, one woman initiated the following discussion of where they feel their babies move,

First Woman: Where do you feel the baby move?

Second Woman: I feel it largely here and right now also here.

Woman: Also. I feel it below and above.

Midwife: on the sides, on the sides . . .

Third Woman: Here below. More here below.

Midwife: Uh-huh.

First Woman: No. I feel it here below and above. And here on both sides a little.

Both sides a little, but above, here below more.

Fourth Woman: For me it moves on the sides, but at times it moves like this (motions, curving upwards with her hand), a part high and it moves down in me (P16; 395-417).

Midwives also contributed to the social connectedness of the group and at times were observed sharing their own experience rather than simply giving medical advice. There was a sense that they were all women having children, rather than the usual provider/client relationship in prenatal care.

"[The midwife] shared that with her first child, he breastfed for nine months and then all of a sudden one day he didn't want to anymore. With her second child, he breastfed for three years and it was really difficult to get him to stop. She finally put band-aids across her nipples and told him they were broken and he accepted that and stopped wanting to breastfeed – the women all laughed and nodded" (P21; 335-343).

"Confianza" is a word that translates to English to mean confidence. It indicates trust in a relationship that lends to comfort with one another, communication, and moving towards a level of intimacy in relationship. Confianza was used as a code as it was seen repeatedly and the word captured the trust that appeared to be established in the midwife's relationship with women in the group. In the *CenteringPregnancy*™ setting, confianza was influenced by continuity - without the same women and providers throughout the group process it is unlikely the women would have developed the same level of trust. A prior Centering client helping out in one group described the process as one that *"unburdens you – you can share your concerns"* (P4; 122-124).

Confianza was demonstrated in multiple ways throughout the observations of social interaction. Women often shared deeply personal information freely in both private interactions with the midwife as well as in the group settings. Women shared intimate physical symptoms, "*[The midwife] then asked, who when they cough or laugh, pee? All of the women laughed and three raised their hands to admit it" (P21; 582-585).* Women also trusted their intimate emotional histories with the group,

> *"The topic for the session was "families of origin" [The midwife] asked women to share what their families that they grew up in were like. [One woman] began, and spoke of a father who drank and hit her mom. As they went around the circle, many discussed dysfunctional families, many fathers drank and domestic violence was present in most of the families"* (P14; 132-140).

Women and partners shared fears with the group about labor and delivery or parenthood that served as both support as well as an education tool as they learned from one another, but this could not have occurred without trust or confianza being built within the group. In turn, the sharing further enhanced the relationships being built among members as well as with the midwife.

The most dramatic display of confianza was the contrast of relationship with other departments or practitioners within the hospital setting. One woman had been referred to receive her prenatal care with the high-risk obstetricians, but continued attending the *CenteringPregnancy*™ sessions because of her desire to stay with the group. During an observed interaction she shared her confusion about the plans being made for her cesarean delivery. The obstetricians presented a plan of care to deliver her at 37 weeks gestation. The woman clearly did not understand why, and was very worried about her

baby being born early. Yet she did not verbalize her questions or concerns to the doctors managing her care and presenting the plan to her. She brought those questions back to a forum where she felt comfortable, and to a provider she trusted; to the midwife with whom she had developed confianza.

Educational Focus.

Education was a dominant theme in the *CenteringPregnancy*™ group sessions observed. Topics spanning pregnancy, fetal development, labor management, domestic violence issues and family planning were emphasized. Because of the group format, sessions last two hours instead of the 15 minute appointments usually allotted in traditional care. Much of the extra time is spent emphasizing education. Codes included in the educational cluster include "Learning From One Another", Group-centered", "Provider-led Care", "Validation", and "Normalization".

There was a set schedule of education topics throughout the sessions with information conveyed through videos, the midwife sharing information both individually, and through group discussion of a topic,

> *"[The midwife] asked, what can you do for the pain? People answer walk, massage, bathe, drink liquids. One woman is smiling like she has something to say and the midwife calls on her. She answers, for me, walking helped a lot and the bath. It was easy. Walking and hot chocolate"* (P19; 271-278)/

Interactive demonstrations were also used.

> *"The midwife then introduces a pain exercise with ice. Baggies with ice are passed around to everyone. The midwife has everyone place the ice on their anterior wrists for 60 seconds. Most just go into their own zone. After the*

> *minute, they shared what helped: breathing, trying not to think about it, relaxing, and one woman said thinking about a cake - everyone laughed. What kind of cake, the nurse asked? Chocolate cake, I love chocolate cake. I'm going to have a chocolate cake as soon as labor is over. She gives a big smile and more people laugh"* (P19; 294-309).

Emphasis during the sessions was placed on group interaction. Other than the individual assessments on the mats, teaching and discussion occurred in a group setting with everyone gathered into a circle. While there was a set agenda for education topics, each group session started with the midwives asking if anyone had any issue they wanted to discuss in the group. *"One of the women talked about having back & hip pain. There was a general discussion and the women all seemed to commiserate with each other about these aches & pains"* (P5; 168-172). The education environments and flexibility seemed to vary among providers as well as with the different groups. Some midwives were at times very directive in their approach to group facilitation, keeping close control of the conversation and where the discussion led. For example, material was at times presented in a mini-lecture format,

> *"[One midwife] talked a little more about depression and how people who have experienced some depression in the past or during pregnancy are at higher risk for postpartum depression. She defined the difference between "tristeza" or post-partum blues and post-partum depression and when to call for help"* (P18; 133-140).

Others stepped back quite a bit more to allow women/participants to lead the discussion and guide the topics. Those that stepped back seemed to let go of the idea of

communicating complete information and education. For example, during a group where the topic was labor pain management, one researcher new to the *CenteringPregnancy*™ model commented,

> *"Unfortunately, [the midwife] did not discuss in depth the medications used in labor. Perhaps it was due to the language barriers? She mainly discussed the risks of the epidural. Four women shared their fears and concerns with the epidural and with not using any medication at all. [The midwife] seemed a little distracted today. She did not directly answer some of questions brought up by the women"* (P10; 71-80).

Yet, the same midwife stated that she believes the less she talks, the more effective she believes the group has been.

Education was continually emphasized in *CenteringPregnancy*™ sessions and was experienced differently for many, *"[Women] stated that they learn more here, in the clinic they are not taught to the extent that they learn here"* (P6; 73-76). While there was variation in personal facilitation style, the group education times were all conducted with women sitting in a circle, and discussion was often encouraged. Validation and normalization was consistently observed throughout the sessions by the midwives both in the group discussions as well as during individual assessment times.

Providing Care.

The theme of providing care describes observations of midwives providing prenatal health care through risk assessment, physical assessment and management, as well as details in creating an environment in which the group care occurred. Codes that described the actual provision of prenatal care within the group, included the "Setting",

"Data Collection", "Assessment", "Plan", "Referral", "Follow-up", "Low Technology", "Use of Hands", and "Personalized Care".

The midwives in the *CenteringPregnancy*™ observations had to work to create a comfortable environment to provide care within the constraints of a public institutional setting. Rather than an exam room, the sessions were conducted in a hospital conference room, and all group activity was conducted in a circle. While perhaps not as comfortable as desired, attempts were clearly made to adapt a stark conference room into an inviting place,

> *"The room is a conference room, the podium and chairs have been pushed aside, stacked at the walls, with a circle of chairs placed in the center of the room. In the northwest corner of the room, two mats, covered with sheets and two pillows are placed with a basket of dopplers and tape measures. There is a table, with food spread out, including a birthday cake for one of the participants whose birthday it is today. There is festive Mexican music playing in the background. Another table is set with a do-it-yourself blood pressure cuff, and an area covered with chuxs, with urine cups and urine dipsticks. A digital floor scale sits next to the table"* (P13; 5-22).

One researcher observed the general atmosphere of the *CenteringPregnancy*™ group as social, casual and comfortable, "*After the room was all set-up and music was playing in the background, the room felt warm and relaxed*" (P6; 116-118).

Various efforts were clearly made to provide a culturally-sensitive environment. The population served at this setting is mostly monolingual Spanish-speaking. Educational material is printed in Spanish, and educational videos are also all in Spanish.

Besides language, efforts were made to create a culturally sensitive environment through both the food and music. Upbeat, Latino music was heard in the background during the beginning of sessions and during breaks. Snacks provided incorporate a mixture of traditional American snack food and snacks seen more in the Latino community such as queso fresca and papaya.

> *"Everyone ate lunch - chicken, bread,[one woman] brought papusas of cheese and chicharon from the restaurant she works at - she had made them for the party, [another woman] came a little late and brought burritos for everyone. All ate, taking turns holding babies so others could eat"* (P12; 109-115).

All *CenteringPregnancy*™ group prenatal care was conducted in Spanish. The midwives observed were not native Spanish-speakers. Although their Spanish ability varied it was strong enough to facilitate group sessions without translators. Some of the assisting nurses were native Spanish-speakers, while others were not, but everyone communicated in Spanish throughout the sessions. The one exception was with a woman whose first language was Portuguese and whose husband consistently spoke English. A vast majority of the time, communication was effective and in the woman's first and preferred language.

Occasionally, however, misunderstandings did occur due to language communication barriers. One note by a native Spanish-speaking researcher described the following,

> *"Both the [midwife and student] have a little difficulty with the verb tenses occasionally, but the women seem to understand. At times, I did notice looks of*

confusion on the faces of the women, I wanted to correct or clarify what was being taught" (P6; 96-99)

Another example included,

"The midwife then asked the group, what do you do if the baby is crying and (she paused for a second, and then said) has cramps. I want you to each list two things to do for cramps. They started around the circle and had a difficult time listing things: They suggested burping the baby, holding and comforting it. (Researcher Notes: I think [the midwife] meant to ask what to do if they baby has colic, but she used the word "colica" which in Spanish means cramps - you would use that word for early contraction pains, for menstrual cramps, or for an upset stomach, not colic as English-speakers think of it in an infant. Listing two things each for stomach cramps became a difficult question. She meant to ask people to each list two things to do with a crying baby. About half-way around the circle, [the midwife] seemed to realize her mistake" (P21; 699-722).

The midwife later confirmed that she had meant to ask what to do with a crying, inconsolable baby, but was having what she described as a "bad-Spanish" day.

The setting also permitted women to have more control in their care. A table was consistently set up to allow women to perform their own data collection with a digital scale sitting out, and a table set with a self-blood pressure cuff and area for urinalysis which women are taught to perform themselves, and women have free access to their charts to record data and to review them if they wish.

The midwives' approach consistently showed respect to their clients. This was often apparent by things such as body language and tone of voice utilized in interactions

as it was interpreted by the observers. It was apparent by the trust midwives placed in clients to accurately take and record their own blood pressures, urinalysis, weights, collect their own group beta streptococcus vaginal/rectal cultures, and even to hold and have the freedom to read their own medical charts. Respect was seen in the group dynamics as women shared their stories and learned from one another. Midwives were observed attentively listening as women described issues or concerns or told stories, "*[The woman] also complained of back pain. [The student midwife] asked her what had helped. [The student midwife] again showed very active listening, looking her in the eyes, nodding as she explained*" (P19; 128-132).

Respect was also demonstrated through validation of women's experience. One woman described an episode of uterine contractions that occurred during the week. "*[The midwife] asked what she did and she replied that she drank water and then laid down again. (The midwife) replied that was perfect - that sometimes contractions happen when you don't drink enough water*" (P21; 230-235).

Data collection was a focused part of prenatal care observed in the *CenteringPregnancy*™ sessions. Data collection was performed by both the clients and the midwife. Women take their own blood pressures, dip their own urines for protein and glucose, they weigh themselves and results are recorded by women in their own charts.

> "*Women take urine cups and walk down the hall to the bathroom. Women help each other read urine dip sticks and with placing the blood pressure cuff. They do not need any assistance from the registered nurse, student or certified nurse-midwife*" (P14; 50-55).

One on one time between the midwife and woman was kept to a minimum, really to focus only on individual physical assessments. The midwife collects data by asking basic questions, checking position of the baby with her hands, measuring fundal height, and listening to the fetal heartbeats. Questions that are raised with the midwife individually are often redirected to the group setting.

> *"Woman: Is my weight OK, because I am 120-something, 127, 128, and*
>
> *Midwife: (turns away from camera, looking down at chart that is sitting on the floor to her right, next to her) You have gained weight, 19 pounds from the beginning.*
>
> *Woman: Is that OK?*
>
> *Midwife: mm-mhh (nods) we want you to gain more or less 20 or 25 pounds in the pregnancy, so it is fine. That is a good question and we are going to talk about this, I think many people are asking this"* (P16; 216-229).

Other problems or issues that come up in discussion on the mats were also assessed either right away during the mat time, or the woman returns with the midwife to the clinic after the group session for further data collection and assessment.

Data collection included not only physical symptoms, but also psychosocial issues, and health prevention measures such as family planning methods after the baby is born,

> *"One researcher asked about literacy evaluations, especially in regards to the literature given out and our consenting. The midwife knew exactly which woman had triggered that question. An evaluation is done during the intake and she says they try to accommodate by explaining things more carefully"* (P5; 291-298).

After data collection there was an assessment by the midwife, which was often conveyed to the woman with reassurance and often an attempt at normalization of the situation. At times the assessment was not verbalized, but reflected back, helping the woman to evaluate her own symptoms,

"Midwife: Cramps more than the ligament pain?

Woman: Well, my stomach has hurt a lot.

Midwife: How?

Woman: My stomach hurts a lot, at times it is the baby kicking and at times I think I am having contractions (laughs), but, no

Midwife: All of the stomach here gets hard (motions to central abdominal area) or only here (motions LUQ)

Woman: More here (motions Lower abdomen)

Midwife: Does it get tight, like a belt?

Woman: Sometimes, yes, it tightens

Midwife: OK, do you remember the two groups when we talked about signs of preterm labor? Do you remember how many times when it is tightening, do you remember how many times per hour is a sign of preterm labor?

[NOTE: Appears to be trying to draw her into her own care by assessing her own symptoms based on past group topics]

Woman: No, I don't remember

Midwife: It is like five to six in an hour and regular for many hours also. Do you have this frequency?

*Woman: No" (*P1; 208-236).

Plans were made for any abnormal assessments:

> *"[Midwife]: So, so if your baby is breech when you are 34 weeks of pregnancy, we are going to begin some exercises to turn the baby, OK, and other natural interventions that we can do, but until this week, if the baby turns around a lot, a lot it is OK. We anticipate that it is going to change its position many times until 34 weeks"* (P2; 246-254).

The theme of providing care describes observations of midwives providing prenatal health care in the group setting. The setting was arranged and prenatal care was provided in individual segments with each woman within the group space.

Participatory Care.

The theme cluster of participatory care includes codes that described women's active participation in prenatal care, including "Data Collection", "Group Centered", "Woman Powered", "Family Involvement". This theme describes prenatal care in *CenteringPregnancy*™ as bidirectional and interactional; the midwife and the woman are participating in care together. Although it has some overlap with the theme of "providing care" it was robust enough with observational data to merit description. Women were observed in collecting and being responsible for collecting clinical information, *"The women come in and begin a process of collecting their own data (weight, blood pressure, urines) and charting it in their record, which they hold on to"* (P4; 158-162). It also refers to the particular arrangement of chairs into a circle for discussion, seen in every *CenteringPregnancy*™ group observed, *"As the initial assessments were completed the group began to assemble into the chairs placed in a circle – this configuration is purposeful, according to the Centering principles, to prevent domination by the*

provider" (P4; 203-209). It seemed to communicate that what everyone has to say is of equal importance.

Family members were welcome to come to the *CenteringPregnancy*™ sessions and were at times encouraged to be involved in care. The following dialogue is between the midwife, the woman, her husband and her son regarding listening for fetal heart tones.

> *"Midwife: (To boy) you are not going to hurt anyone. (To patient's husband) Do you want to do it? (offers Doppler) yes, (hands him Doppler), look.*
>
> *(patient's husband searches for heartbeats with the midwife's assistance)*
>
> *Midwife: That's it, that's all it is. (to boy) You can do it next time if you want"* (P1; 408-416).

The final category in the participatory care theme was titled "Woman Powered." This theme describes incidences where the woman was in charge of her health care. The power differential was shifted and power moved from the provider to the woman. This is evident through the process of data collection performed by the woman, as previously discussed, as well as the group format with education through facilitation. The simple act of allowing women to hold, review their chart, and write their own data in their chart placed power into the hands of the individual, as did understanding the basics of her health assessments well enough to describe them to others. For example, *"The woman with a male partner sat next to him and explained the different parts of the flow sheet"* (4; 198-201).

Participatory care was consistently observed throughout the *CenteringPregnancy*™ sessions. Women performed much of their own data collection

and had control of their health charts. Their contributions were encouraged through the group facilitation process for health education topics and time was provided for their specific questions and concerns to be voiced and discussed.

Comparison to the Essential Elements of Centering Pregnancy

The second objective was to compare the study findings with the essential elements of the *CenteringPregnancy*™ model as presented by Rising (1998). While the complete list of the essential elements of *CenteringPregnancy*™ are listed in Table 1, the core concepts can be summarized to include 1) activities occur in a group with stable participants, leadership and core content; 2) facilitative leadership where the contribution of each member is honored; 3) the woman participates in self-care activities; and 4) opportunity is provided for socialization.

As discussed in the results, *CenteringPregnancy*™ sessions were group sessions with continuity observed with both participants and leadership. There was a set agenda of core content with some flexibility in presentation based on the groups needs. All of the assessment activities occurred in the group space and women sat in circles for all group discussions. A facilitative leadership style was used, although the actual application of such varied by provider skill and personality. The contributions of each member were generally honored. At times it appeared providers felt the constraints of time and limited discussion or contributions of women in order to cover the agenda appropriately. Women were observed participating in self-care activities through the collection of their own blood pressures, urinalysis, weights and group beta strep vaginal/rectal cultures. There was ample opportunity and an environment for socialization as women socialized for the first 15 to 30 minutes as people were arriving as

well as during a short break as the midwives conducted individualized assessments in a corner of the room with each woman. It can be concluded that *CenteringPregnancy*™ group prenatal care observed in this setting, does follow the essential elements of the model of care presented by Rising (1998).

Comparison to Kennedy and Colleagues Midwifery Model of Care

Midwifery care, regardless the mode of care being observed, is a dynamic process. Many themes of care identified in *CenteringPregnancy*™ overlap and work together to make the overall process stronger than the individual parts. The three processes of midwifery care identified by Kennedy and colleagues (2004) will be addressed in the context of *CenteringPregnancy*™.

The Midwife in Relationship with the Woman

According to Kennedy and colleagues' (2004) framework, the first theme of midwifery care is the structure of the relationship between the midwife and the woman. They noted that the concept of mutuality is foundational to the relationship. Mutuality is described as the midwife regarding herself on an equal level with the woman and recognizing what the woman brings to the relationship. They noted that participatory and individualized care are both factors in mutuality, as well as validation to acknowledge the woman's feelings and concerns. A professional, yet personal connection and partnership is forged which provides a foundation for the midwife to orchestrate an environment of care to meet the woman's needs.

While mutuality was not a specific code that independently emerged in this dataset, it was recognized indirectly through some of the observations of *CenteringPregnancy*™ group prenatal care. "Participatory Care", "Personalized Care",

"Respect", "Asking Permission", "Validation", "Attentive Listening", and "Confianza" were all strong themes that emerged from the data that described the midwife in relationship with women, and describe a foundation of mutuality.

Orchestration of an Environment of Care

Kennedy and colleagues (2004) identified orchestration of an environment of care as the midwife's "art" in creating a space in which the woman's desires are met, while preserving safety and normalcy. The foundational concepts of orchestrating an environment of care were advocacy and acting as a conduit. Advocacy was described as supporting what a woman would like to have happen balanced with what the midwife believes is safe to happen. Working as a conduit entails the midwife working to meet the woman's needs, but with a power differential that shifts the control from the provider to the woman resulting in an experience where the woman is credited for the work she has done.

Advocacy was observed in this study in which women were encouraged to lead discussions and education times according to their questions and concerns, while the midwife balanced the core content on a particular topic that needed to be communicated in the session. It was seen as advocacy for the woman assuming control. Another key element of the environment of care was the shift in power structure from the provider to the participants in the *Centering* group. Kennedy and colleagues (2004) describe the midwife as a conduit as she works to meet the woman's needs, but in a way that entails a shift of control from the provider to the woman. This was particularly notable in the observations with codes such as "Woman Powered", "Participatory Care" and "Learning from One Another." Women in the Centering groups had open access to their charts,

they consistently performed their own basic data collection, and at times had power and influence in the progression of the group session regarding where the health education discussion led.

The physical environment was orchestrated by the midwives with the movement of prenatal care from the exam room into a conference room. Music, food, opportunity for social interactions and group discussion all contributed to a physical and emotional environment where people felt safe and that supported women's needs. The midwifery management process of data collection, assessment, implementation and evaluation were observed as well as referrals as appropriate. Families were involved and there was a support of normalcy throughout. Overall the implementation of *CenteringPregnancy*™ projected a trust in women and a belief in their strength.

The Life Journeys of the Midwife and the Woman

Kennedy and colleagues (2004) describe "Life Journeys" as the both the short- and long-term outcomes of midwifery care. Life journeys describe the sense of accomplishment, emotion, victory, and strength experienced by women as well as growth, learning and humility experienced by midwives. Because of the method employed in this study, there was limited ability to measure the actual outcomes or life journeys from *CenteringPregnancy*™. Some outcomes, such as long term community (woman-to woman relationships), were encouraged by the midwives and there were suggestions that these might be occurring in the field observations of participants. However, interviews with participants would be necessary to confirm if they were actualized. Such interviews were beyond the scope of this study. Two possible outcomes included "Women Powered" and "Women in Relationship with Women": establishing a

social support network. Although the codes were not consistently observed enough to be clustered into separate themes, they added strength to the themes that were developed, and provided evidence to support some of Kennedy and colleagues' (2004) findings.

"Woman Powered" was one outcome observed in *CenteringPregnancy*™. Women become empowered in their own prenatal health care. They quickly were able to perform basic data collection and became familiar with their normal values. They had their charts and medical information in their hands, lending towards a greater understanding and ownership. They were able to not only perform and take ownership of their prenatal care, but explain it to others. Through these simple measures, the power differential in a woman's prenatal care was shifted a bit from the provider, to the client.

A second outcome was the establishment of a social support network. While this was not viewed with every participant in the group sessions, some connections were apparent. Relationships were forged through continuity of women in the same groups throughout pregnancy, opportunity for social interactions, and some freedom and flexibility in discussions for women to disclose their lives and experiences and learn from one another.

The observations of care provided through *CenteringPregnancy*™ sessions demonstrated the three dimensions of midwifery care as described by Kennedy and colleagues (2004): the midwife in relationship with the woman; orchestration of an environment of care; and life journeys of the woman and the midwife. A fourth dimension of care titled, "Women in relationship with women" could be added when viewing care provided in the *CenteringPregnancy*™ model. The social interactions and

connections women establish with one another add additional support to enhance the woman's experience and resources.

Discussion

Four themes emerged as foundational to *CenteringPregnancy*™ group prenatal care as observed in this focused ethnographic study: 1) Social Connections; 2) Educational Focus; 3) Providing Care; and 4) Participatory Care.

Social connections described the relationships forged between women and other women in the group as well as with the midwife. This adds an important element to prenatal care if, as Lu & Halfon (2003) suggest, chronic stress is related to birth outcomes. Adding additional social support systems could possibly enhance a woman's resources and therefore to some extent decrease the impact of longitudinal stress. Social support may be an essential element missing from traditional prenatal care.

The education provided in *CenteringPregnancy*™ was in quantity incomparable to the amount of health education able to be provided in traditional prenatal care. Much of the group time is dedicated to health education, spanning topics of pregnancy, labor and birth, baby care, family planning and psychosocial issues through multiple formats. Women learned from the provider as well as from each other. Normalization and validation were consistently observed throughout the sessions. The extent that the health education information is retained, utilized, or changes the outcomes for mother or baby, remains to be tested.

Although not a major concern in the observations included in this study, language ability of the providers could potentially be an issue. One objective of *CenteringPregnancy*™ is to allow women to set the tone and dominate the teaching so

that they learn from one another. In a way it may be that imperfect language ability could be helpful in that it forces the care provider to take a step back in discussion and allow clients to lead more. On the other hand, if the midwife does not understand everything that is being discussed, incorrect or dangerous information could theoretically be disseminated, which would impact the quality of care. Additionally, as some very important topics are discussed in the group such as domestic violence, substance abuse, baby safety, and depression, among others, it seems essential that the midwife's language ability be strong enough to understand a group discussion and any disclosures that may occur that could impact safety of the woman or child.

The prenatal health care offered through *CenteringPregnancy*™ provided the same ongoing assessments and management, despite the different context of care. Midwives engaged in data collection, assessment, plan, implementation, evaluation. They followed up their care and referred women appropriately in the observations in this study. Physical health care provision did not appear significantly different from care in a traditional format. As the group membership was constant, continuity was achieved and midwives knew their patients well. Personalized care was easily able to be offered within the group setting. If additional assessment or management measures were needed that could not be provided in the group setting, such as a wet mount or cervical check, woman could return to the clinic with the midwife after the group.

Midwives orchestrated an environment of care through the physical setting. If there had been freedom to conduct the *CenteringPregnancy*™ sessions in a woman's home, or other even more neutral environment rather than a conference room, the culture of the group would most likely be impacted even more intensely. Yet the move out of the

clinic exam room appeared to shift the feel of the care. The exam room connotes medicine and within the culture of medicine, it can be hard for a woman/the client to feel on the same level and of equal power with the practitioner. It is a naturally uncomfortable environment for clients as it is where their physical and very personal space is invaded by essentially strangers, with permission, and for a good reason: i.e. physical exam or medical procedure. But the emotional association is one that seems to prevent a feeling of power or equality. By bringing care into a more neutral environment, there seems to be a corresponding shift in comfort of clients and therefore in participation in care.

Participatory care was evident throughout *CenteringPregnancy*™ sessions. Women became actively involved in their care. Empowerment seemed to be the goal, the extent to which empowerment actually occurs remains to be studied. If women do become empowered in their health care management, the hope is that it will spread to other aspects of their lives. If a woman gains an understanding of her personal power, she may have the strength to leave an abusive relationship, or become an activist in her community. This has the potential to effect change in communities, which according to Lu and colleagues (2003) could fight some of the root causes of poor birth outcomes. It could ultimately change the impact of prenatal care. Actual empowerment through a *CenteringPregnancy*™ model of prenatal care requires further study, as does the impact it may or may not have on birth outcomes.

One major limitation of this study was that it was a focused ethnography and as such, only field observations and video-taped transcripts of *CenteringPregnancy*™ groups were included for analysis. Participant interviews would have strengthened

conclusions drawn, but were beyond the scope of the study. The result was a pilot study examining the culture of the practical application of *CenteringPregnancy*™ with an urban, mono-lingual Spanish-speaking, Medicaid-eligible population in a public institution midwifery practice. Other limitations include that the data included in this study was a subset of data from a larger, ongoing study examining midwifery care in an urban hospital environment. Full baseline data were not available on all of the *CenteringPregnancy*™ group participants. All of the *CenteringPregnancy*™ sessions observed were conducted in Spanish. Although the author has strong Spanish-speaking skills, it is not her first language and as such nuances of the language and culture may be missed. Finally, maintaining a dual role as student nurse-midwife as well as researcher in seven of the observed *CenteringPregnancy*™ sessions may have introduced additional limitations to the study. While it enhanced my role as a cultural member, at times the reflexivity also proved challenging as my attention was hampered by the dual role as midwife.

This study provided a useful description of the practical application of the *CenteringPregnancy*™ model of prenatal care implemented in an inner-city setting. It demonstrated a group-centered approach that was consistent with the principles of midwifery care as described by Kennedy and colleagues (2004). *CenteringPregnancy*™ is a novel approach to care that encourages establishing social support networks within a woman's community, and personal empowerment. Should these outcomes be achieved, they could potentially impact a woman's life-course as well as promote grassroots community change.

Further qualitative study is needed to explore the model of *CenteringPregnancy*™, including interviews with both midwives providing care, and participants in order to achieve a more complete understanding of the culture and impact of this group model of care. The impact of social connections, increased education, the group-centered approach, participatory care and empowerment need to be examined qualitatively to gain a better understanding of the care being provided, the reality perceived by the woman, and the outcomes. Quantitative studies are also indicated to explore differences in outcomes of women receiving traditional and *CenteringPregnancy*™ group prenatal care.

Conclusion

CenteringPregnancy™ provides prenatal care within a midwifery model of care (Kennedy et. al., 2004). While *CenteringPregnancy*™ in no means is the single answer to the problem of poor birth outcomes, it does creates a setting in which women develop community with other women, enhance their knowledge, and appear to gain power in the process. It is a form of prenatal care that may impact root causes at the community level of poor birth outcomes and as such deserves further attention and study. This study supported that the elements of *CenteringPregnancy*™ and a midwifery model of care (Kennedy et al 2004) can be combined and supported in an inner city setting.

References

Arias, E., MacDormand, M. F., Strobino, P. M. & Guyer, B. (2003). Annual summary of vital statistics -- 2002. *Pediatrics, 112* (6), 1215-30.

Centers for Disease Control and Prevention (2004). *Health, United States, 2004.* Retrieved May 3, 2005 from http://www.cdc.gov/nchs/data/hus/hus04.pdf

Cragin, L. (2002) Outcomes in moderate risk women: comparison of midwifery and obstetrical care. Unpublished doctoral dissertation, University of California, San Francisco.

Collins, N., Dunkel-Schetter, C., Lobel, M., Scrimshaw, S. (1993). Relation of the content of prenatal care to the risk of low birth weight. *Journal of Personality and Social Psychology, 65*. 1243-1258.

Fiscella, K. (1995) Does prenatal care improve birth outcomes? A critical review. *Obstetrics and Gynecology,* 85, (3), 468-479.

Freeman, R., Poland, R., editors (1992). Guidelines for prenatal care. American Academy of Pediatricians, American College of Obstetricians and Gynecologists, 50.

Grady, M. A. & Bloom, K. C. (2004). Pregnancy outcomes of adolescents enrolled in a CenteringPregnancy program. *Journal of Nurse Midwifery & Women's Health,* 49, 412-420.

Ickovics, J. R., Kershaw, T. S., Westdahl, C., Rising, S. S., Klima, C., & Reynolds, H., et. al. (2003). Group prenatal care and preterm birth weight: Results from a matched cohort study at public clinics. *Obstetrics & Gynecology*, 102, 1061-7.

Institute of Medicine, Committee to Study the Prevention of Low Birth Weight. (1985). Preventing low birth weight. Washington, DC: National Academy Press.

Kennedy, H. P. (2000). A model of exemplary midwifery practice: Results of a Delphi study. *Journal of Nurse Midwifery & Women's Health,* 45, 4-19.

Kennedy, H.P., Shannon, M.T., Chuahorm, U., & Kravetz, M.K. (2004). The landscape of caring for women: A narrative study of midwifery practice. *Journal of Nurse Midwifery & Women's Health*, 49, 14-23.

Kogan, M., Alexander, G., Kotelchuck, M. Nagey, D. (1994). Relation of the content of prenatal care to the risk of low birth weight. 1340-1345.

Lu, M. C. & Halfon, N. (2003). Racial & ethnic disparities in birth outcome: a life course perspective. *Maternal Child Health Journal*, 7, (1), 13-30.

Lu, M. C., Tache, V., Alexander, G. R., Kotelchuck, M. & Halfon, N. (2003). Preventing low birth weight: is prenatal care the answer? *Journal of Maternal-Fetal and Neonatal Medicine*, 13, 362-380.

MacDorman, M. F. & Singh, G. K., (1998). Midwifery care, social and medical risk factors, and birth outcomes in the USA. *Journal of Epidemiology and Community Health*, 52, 310-317.

Martin, J. A., Hamilton, B. E., Ventura, S. J., Menacker, F, Park, M. M, Sutton, P. D. (2002). Births: final data for 2001. *National Vital Statistics Report*, 51 (2). Huntsville, MD: National center for Health Statistics.

Rising, S. (1998). CenteringPregnancy: An interdisciplinary model of empowerment. *Journal of Nurse Midwifery,* 43, 46-54.

Rising, S., Kennedy, H. P., & Klima, C. S. (2004). Redesigning prenatal care through CenteringPregnancy. *Journal of Nurse Midwifery,* 49, 398-404.

Scott, J. C., Conner, D. A., Venohr, I., Gade, G., McKenzie, M., Kramer, A. M., Bryant, L., & Beck, A. (2004). Effectiveness of a group outpatient visit model for chronically ill older health maintenance organization members: a 2-year randomized trial of the cooperative health care clinic. *Journal of the American Geriatric Society*, 52. 1463-1470.

Speziale, H. J. S. & Carpenter, D. R. (2003). Ethnography as method. In *Qualitative research in nursing advancing the humanistic imperative, third ed.* (pp. 153-180). Philadelpha: Lippincott Williams & Wilkins.

U. S. Public Health Service Expert Panel on the Content of Prenatal Care. (1989). Caring for our future, the content of prenatal care. Washington, DC: U. S. Department of Health and Human Services.

Wagner, E. H., Grothaus, L. C., Sandhu N., Galvin, M. S., McGregor, M., Artz, K., & Coleman, E. A. (2001) Chronic care clinics for diabetes in primary care: a system-wide randomized trial. *Diabetes Care*, *24*. 695-700.

Table 1

Essential Elements of CenteringPregnancy

Health assessment occurs within the group space.

Women are involved in self-care activities.

A facilitative leadership style is used.

Each session has an overall plan.

Attention is given to the core content; emphasis may vary.

There is stability of group leadership.

Group conduct honors the contribution of each member.

The group is conducted in a circle.

Group composition is stable, but not rigid.

Group size is optimal to promote the process.

Involvement of family support people is optional.

Opportunity for socialization within the group is provided.

There is ongoing evaluation of outcomes.

(Rising, Kennedy, & Klima, 2004)

Table 2

Centering Pregnancy and the Midwifery Process of Care

Orchestration of an Environment of Care

Advocacy

- Education (170)
- Incomplete Information (5)
- Group Centered (77)

Conduit

- Learning from one another (13)

Midwifery Management Process

- Data Collection (136)
- Attentive Listening (10)
- Participatory Care (74)
- Assessment (43)
- Plan (16)
- Normalization (22)
- Low Technology (14)
- Hands (30)
- Personalized Care (23)
- Follow-up (22)

Physical Environment

- Setting (54)
- Comfortable Environment (24)
- Uncomfortable in Environment (2)
- Culturally Appropriate (27)
- Culturally Inappropriate/Differences (2)
- Family-centered

Emotional Environment

- Social Interaction (51)
- Learning from one another (13)
- Respect (9)
- Confianza (5)

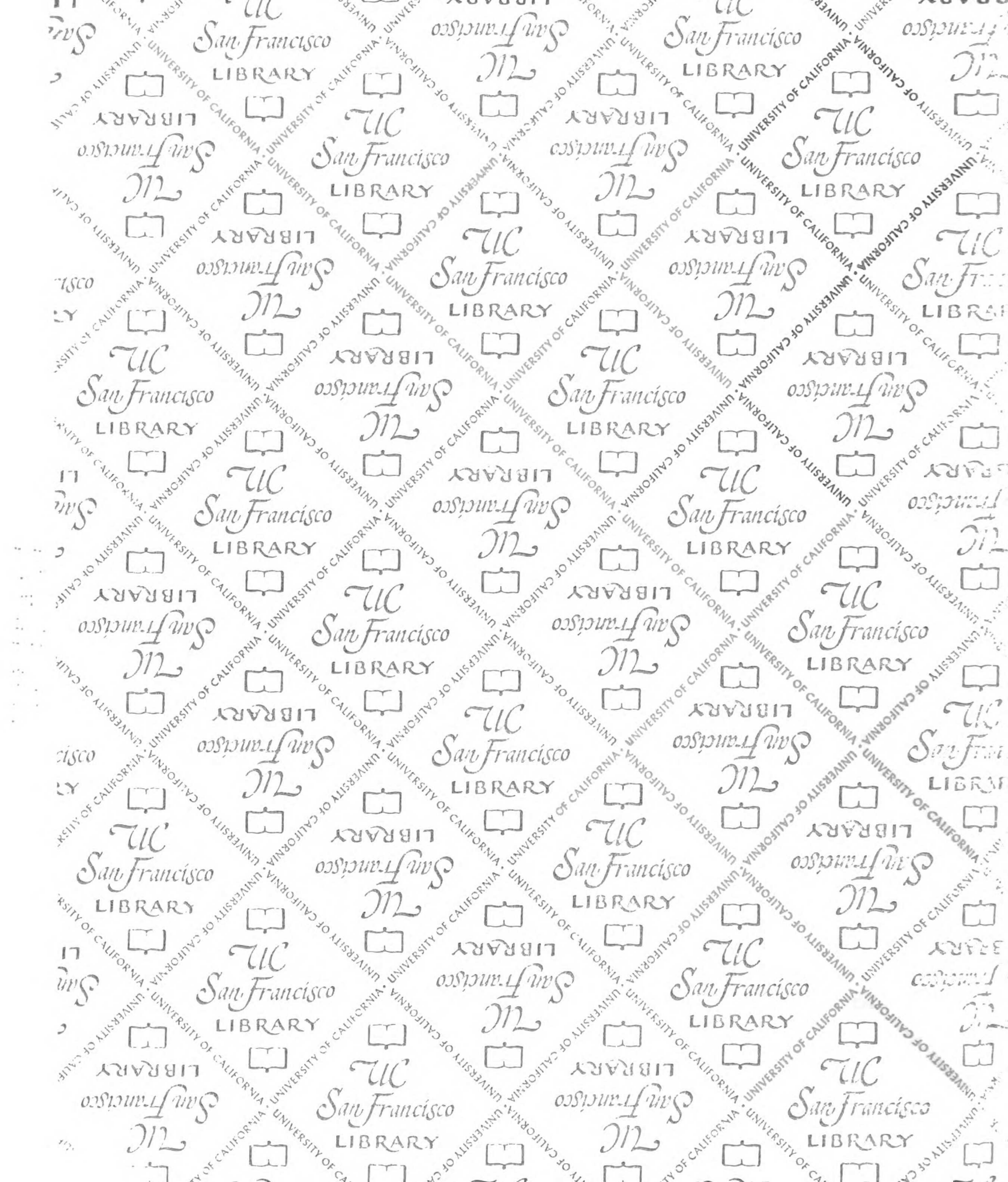
The Midwife in Relationship with the Woman

Mutuality

- Participatory Care (74)
- Personalized Care (23)
- Asking Permission (4)
- Validation (9)
- Commitment of Providers (11)
- Concern for Women (8)
- Confianza (5)

The Life Journeys of the Midwife and the Woman

- Social Support (24)
- Community-based (12)
- Enjoys Group (21)
- Enjoys work (5)
- Woman Powered (42)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