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FAMILY PROCESS

ORIGINAL ARTICLE

Relationship education for women during pregnancy: The impact of MotherWise on birth outcomes

Galena K. Rhoades[1] | **Maggie O. T. Allen**[1] | **Rachel Peña**[2] | **Jennifer Hyer**[2] | **Sara E. Mazzoni**[3]

[1]University of Denver, Denver, Colorado, USA

[2]Denver Health Hospital, Denver, Colorado, USA

[3]University of Washington, Seattle, Washington, USA

Correspondence
Galena K. Rhoades, University of Denver, Denver, CO, USA.
Email: grhoades@du.edu

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Abstract

The field of relationship science has called for more research on the impact of relationship education on child outcomes, yet studies in this area remain sparse, particularly regarding maternal and infant health at birth. Research on group prenatal care demonstrates that individual-oriented group interventions have a positive impact on infant birth outcomes, suggesting the need to consider the impacts of other forms of group programming for women. The current study examined the impact of MotherWise, an individual-oriented relationship education and brief case management/coaching program for minority and low-income pregnant women, on birth outcomes. The study sample included 136 women who enrolled in a larger randomized controlled trial of MotherWise during early pregnancy. Although statistical power was limited due to the sample size and the effects were not outright significant at $p < 0.05$, results indicated that the effects of MotherWise on birth outcomes were small to moderate in size (0.23 for birthweight, 0.46 for preterm birth) and suggest important avenues for future tests of relationship education programs and their impacts on maternal and infant health. The current study suggests that relationship education during pregnancy could directly impact women's and infant's health.

KEYWORDS
birth outcomes, child outcomes, couples, preterm birth, randomized controlled trial, relationship education

INTRODUCTION

Relationship education is typically a group intervention that covers relationship and communication skills. It has historically been delivered to committed couples and measured by couple outcomes. Reviews and meta-analyses of such couple-based programs show that they are often effective at improving relationship skills and communication (Hawkins et al., 2008; Hawkins & Erickson, 2015; Stanley et al., 2020), and when long-term data are collected, some show the prevention of divorce (Stanley et al., 2014).

Many calls have been made to directly test the impact of relationship education for parents on their children (e.g. Cowan & Cowan, 2014; Markman & Rhoades, 2012), but, compared to the large literature on couple outcomes, few studies have done so (for a review, see Cowan & Cowan, 2014). One of the most direct tests of impacts on child outcomes was for the Family Foundations program for parents during pregnancy and postpartum. The program demonstrated positive impacts on indicators of infant regulation and children' later emotional adjustment (Feinberg et al., 2010; Feinberg & Kan, 2008). Furthermore, a recent meta-analysis suggests that couple-oriented relationship education has significant but small average effects on child well-being and behavior (Hawkins, 2022).

With sustained low rates of marriage and high numbers of children born to unmarried parents, it has become increasingly important to offer relationship education not only to married or premarital couples, but earlier in relationship stages, when some of the most significant events and decisions now happen (Rhoades & Stanley, 2009). Many fewer programs and much less research exist regarding this individual-oriented type of relationship education (Stanley et al., 2020).

This study examined the impact of MotherWise, an individual-oriented relationship education and brief case management/coaching program for minority and low-income pregnant women. Given that all women were pregnant, we chose to examine the program's impact on the earliest indicators of children's well-being – birth outcomes. We used hospital medical chart data to measure preterm birth, the baby's birthweight, and neonatal intensive care unit admission.

The literature on group prenatal (obstetrical) care suggests that birth outcomes could be impacted by this kind of intervention, particularly among highly disadvantaged groups. Group prenatal care is typically offered in hospitals and is a structured group facilitated by a medical provider in which pregnant women meet to learn about pregnancy and infant care. They also receive an individual medical exam during the meeting. Reviews of the literature on group prenatal care indicate that some studies show reductions in preterm birth and decreases in low birthweight for those assigned to group prenatal care versus individual care (Carter et al., 2016), and that these effects may be most pronounced among minority women (Mazzoni & Carter, 2017). Some have hypothesized that the social support component, not only the prenatal medical care received, influences the positive outcomes, particularly for those who are most socially disadvantaged (Chae et al., 2017; Mazzoni et al., 2020). Similarly, prenatal home visiting programs have been shown to have an impact on preterm birth and baby's birthweight, particularly among Black women (Anthony et al., 2021), further suggesting that social programs like relationship education could impact birth outcomes. Additionally, evidence from the Family Foundations couple-based relationship education program shows that it reduces the risk of Cesarean births, although there were no direct impacts on other birth outcomes (Feinberg et al., 2015).

MotherWise is an ongoing community-based program. It includes a 6-week, group-based workshop series on healthy, safe relationships and positive parenting as well as one-on-one coaching/case management. The goal of the program is to equip women with the tools, skills, and resources to make wise decisions for themselves and their children. Using the Within My Reach curriculum (Pearson et al., 2005), mothers meet weekly to consider what strong, healthy families look like to them, ways to communicate effectively, the prevention of domestic violence and maltreatment, and successful co-parenting after a breakup. It also includes

research-based content on partner selection, the impact of relationships on children, strategies for making wise decisions in relationships, co-parenting, aggression, and violence, and communication skills (Rhoades & Stanley, 2009, 2011). Each workshop session also includes information on caring for and connecting with a newborn that was developed for this project.

A recently released report described the positive impact of MotherWise on relationship outcomes. This study was a randomized controlled trial conducted with 953 women. At 1-year after study enrollment, those assigned to the MotherWise program reported better relationship and conflict management skills, less approval of couple violence, greater relationship happiness, and more use of constructive conflict behaviors than those assigned to the no-treatment control group. In addition, those assigned to the MotherWise program had fewer unintended pregnancies in the year following enrollment than those in the control group (Patnaik & Wood, 2021). (For the current study, we used a subset of this sample and medical chart data collected independently.)

In addition, the relationship education curriculum used in the MotherWise program, Within My Reach, has been shown to be effective in improving psychological distress, knowledge of healthy relationships, relationship confidence, communication skills, conflict resolution, commitment, and relationship quality, as well as in reducing domestic violence (Antle et al., 2011, 2013; Carlson et al., 2017, 2018; Cottle et al., 2014; Visvanathan et al., 2015). Improvements in relationship dynamics related to participating in Within My Reach have also been linked with children's mental health (Sterrett-Hong et al., 2018), but impacts on offspring have not been tested directly.

We expected that MotherWise could decrease risk for poor birth outcomes by way of increasing social and community support and decreasing relationship distress, thus reducing maternal stress. Maternal stress has demonstrated clear links to birth outcomes in the obstetrical literature, as stress impacts the vascular system and hormones that can cause preterm birth (Latendresse, 2009). This sample was particularly high risk for poor birth outcomes based on a number of factors, including that most participants were unmarried (Shah et al., 2011) and identified as minorities (Hoyert & Miniño, 2020). Some have argued that the links between maternal stress and poor birth outcomes may be even stronger among groups like those served in MotherWise (Wadhwa et al., 2011).

Current study

The current study was a randomized controlled trial comparing participants assigned to the MotherWise program to participants assigned to a no treatment control group. We hypothesized that those assigned to the MotherWise program would demonstrate healthier birth outcomes than those assigned to a no-treatment control group as measured by (1) fewer instances of preterm birth, (2) higher birthweight, and (3) fewer admissions to the neonatal intensive care unit. These outcomes were chosen as they are the most investigated and associated with group prenatal care (Mazzoni & Carter, 2017). Hoffman et al. (2016) demonstrated that increased stress during the second trimester, but not at any other time, was associated with an increased risk of preterm birth, so we elected only to include participants enrolled in the study early in pregnancy, who would have been able to receive the intervention by mid-pregnancy.

METHOD

Participants

Participants were 136 pregnant women from a larger randomized-controlled trial (see CONSORT diagram in Figure 1). All were receiving prenatal care and delivering at a safety-net hospital in a metro area in the Western U.S. They ranged from 19 to 40 (M = 28.68, SD = 6.35).

When asked (yes or no) whether they were Hispanic/Latina, 61.8% indicated they were. When asked to check all that apply regarding race, 37.1% checked "other," 34.1% checked White, 16.7% checked Black or African American, 5.3% checked multiracial, 5.3% checked American Indian or Alaska Native, and 1.5% checked Asian. The majority of participants were unemployed at enrollment (57.8%) and received some form of government benefits (71.9%). Regarding education, 73.8% received a high school diploma or equivalent and 9% graduated from college. In terms of language spoken, 19.6% were monolingual Spanish speaking and the rest spoke English. The vast majority of participants were in a relationship, with 34.6% married, 44.1% engaged or "romantically involved with someone on steady basis," 9.5% "involved in an on-again off-again relationship," and 11.8% not partnered.

Procedures

As mentioned earlier, the current study used a subsample from a larger randomized controlled trial on the effectiveness of MotherWise for relationship outcomes conducted by Mathematica Policy Research. For the larger study, pregnant and newly parenting women (N = 953) were recruited from prenatal care visits at a safety-net hospital, as well as from the community via social media, radio, and social services referrals. Women did not have to be in a romantic relationship to participate; the only criteria were that they were pregnant or less than 4 months postpartum, 18 years or older, and fluent in English or Spanish. They were either scheduled during their prenatal visits for a study intake or they called or texted the program offices and were scheduled via the phone.

Multiple program staff members performed intakes for the larger study. This intake took place in person and included a description of the study and the MotherWise program, consent procedures (for both the larger study's surveys and the medical chart abstraction used in the current study), as well as a phone survey conducted by Mathematica's calling center. At the completion of the phone survey, computer-generated random assignment was provided and the staff member informed participants of their assigned condition. If they were assigned to the MotherWise group, the staff member scheduled them for a workshop series. If they were assigned to the no treatment control group, they received no services or referrals. All participants were paid $30 for this intake appointment. Randomization was initially 3:2 to create groups of adequate numbers for workshop groups, then changed to 1:1 when recruitment was deemed sufficient (after 7 months).

For data analyses in the current study, we selected a subsample (n = 136) of women who were randomized at <18 weeks gestational age, carrying a singleton, had a non-anomalous gestation, and received prenatal care and delivered at the hospital for which we had direct access to medical records. All study procedures were approved by two university Institutional Review Boards.

Intervention

As described earlier, MotherWise includes the Within My Reach curriculum (Pearson et al., 2005) augmented with brief (10 min per workshop session) information about self-care and caring for and connecting with a newborn as well as one-on-one coaching/case management. Within My Reach was developed as a relationship education program for those attending without partners. It is based, in part, on the Prevention and Relationship Education Program (PREP, see Markman et al., 2010) as well as Pearson's Love Notes program for teens (Barbee et al., 2016). A central goal of Within My Reach is to provide individuals with resources and skills to make wise choices for themselves and their children. It is based on a cognitive-behavioral model and assumes that it is important to change both behaviors (e.g., conflict management, stay/leave behavior) and cognitions (e.g., self-esteem, expectations for healthy

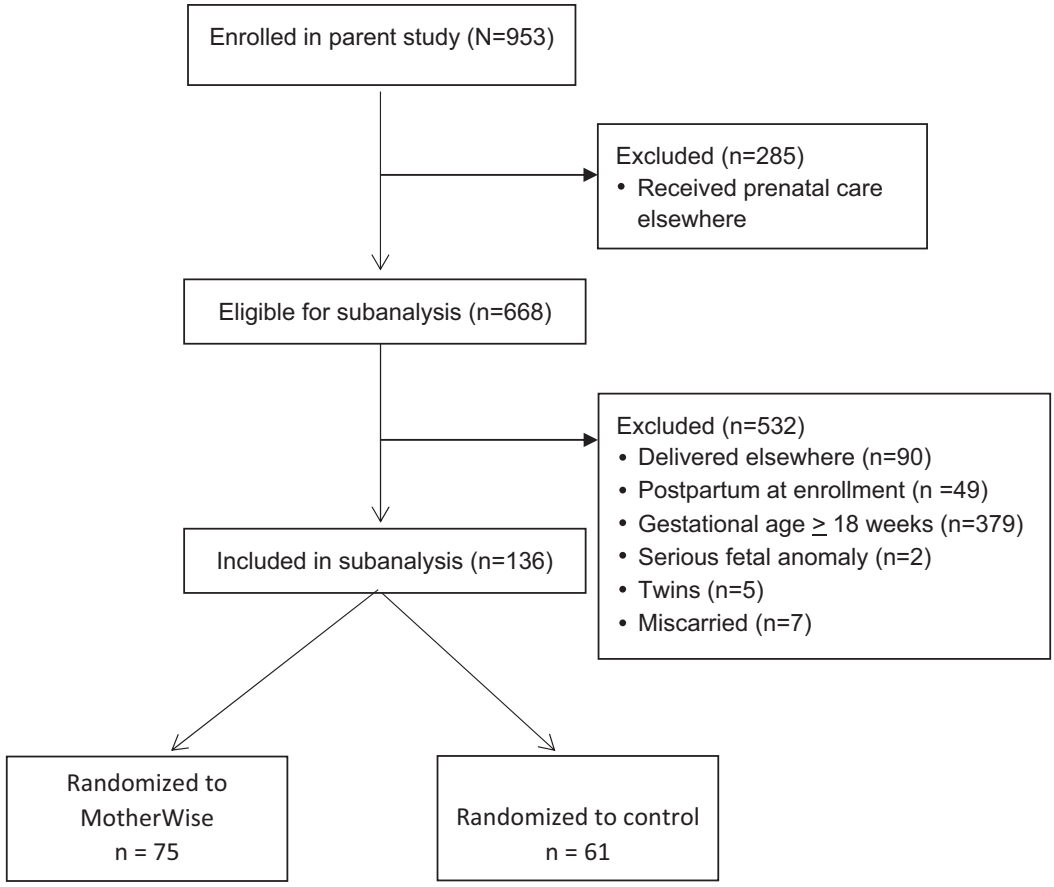

FIGURE 1 CONSORT diagram

relationships) to improve relationship experiences. It includes research-based content on partner selection, the impact of relationships on children, strategies for making wise decisions in relationships, co-parenting, aggression and violence, and communication skills (Rhoades & Stanley, 2011). The infant care and parenting content was developed by the program team and covered safe sleep practices, identification of safe caregivers, feeding, self-care, postpartum depression, and connecting with and responding to newborns.

The MotherWise program was offered over 6 weeks in weekly 4-hour workshop sessions. The sessions were a mix of lectures, discussion, videos, group activities, and individual workbook activities. (The workbook they received was kept at the program offices until the end of the program when participants could choose whether to take them home.) For coaching/case management, each MotherWise participant had a dedicated family support coordinator who worked one-on-one with her to apply new skills in her own life and to connect her with other community resources such as mental health, food assistance, housing, and employment services. All program services were available in English and Spanish.

Staff at MotherWise worked as both family support coordinators and workshop facilitators. All workshop sessions were co-facilitated. In some cases, one of the co-facilitators also served as the participant's family support coordinator; in other cases, it was a different person on the family support/facilitation team. These family support coordinators/facilitators ranged in experience and education, with some having a Master's in social work or psychology, others have college degrees, and some having some college education, but no

degree. They were selected based on their experience with the population served, commitment to serving this population, and ability to facilitate classes well. Often, they had lived experience and cultural backgrounds similar to the participants. They were trained in Within My Reach by the developers and met as a team with one of the developers biweekly for supervision.

The program also provided onsite childcare, a meal during workshops for her and her children, and transportation (setup via a rideshare app) to all workshops and family support meetings. Participants in this study also received direct assistance via Visa or Walmart gift certificates for attending program services, including $30 for their initial visit (mentioned above), $10 for each workshop session or coaching/case management meeting attended, and $100 for attending five of six workshop sessions.

In the current study's subsample and of those randomized to MotherWise (n = 75), 87% attended at least one class and 30% attended all six classes (M = 2.39 classes, SD = 2.83). There were, on average, six women in attendance per class. Participants received an average of three visits with a family support coordinator.

Measures

Medical chart data abstraction

Clinical outcomes were abstracted from the participant's electronic medical record and stored in Research Electronic Data Capture (REDCap) by trained data abstractors who were blinded to random assignment. The clinically determined estimated due date was used to ascertain gestational age. Tobacco, illicit drug, and alcohol use were collected by self-report and dichotomized as yes or no as any use at any time during pregnancy. Medical and mental health co-morbidities were defined as any medical illness or psychiatric illness documented in the obstetrical problem list by the caring providers. The primary outcomes of interest were also abstracted from participants' medical records: *preterm birth* (yes/no delivery prior to 37 weeks gestational age), *birthweight* (grams), and admission to the neonatal intensive care unit (*NICU*) for >1 day (yes/no; excludes infants admitted only for transition). The second author, an obstetrician, reviewed all abstracted clinical data.

Data analytic plan

All analyses were based on intention to treat. To assess for baseline inequivalence and in order to determine if control variables were necessary to include in the primary analyses, we performed a series of t-tests for continuous variables and chi-square tests for categorical variables. Several variables from medical charts and the phone surveys Mathematica conducted were tested: age at enrollment, Medicaid insured, race and ethnicity, Spanish speaking, parity (the number of times she has given birth to a fetus with a gestational age of 24 weeks or more), history of spontaneous (not planned or indicated) preterm birth, gestational age at enrollment, medical comorbidity, mental health comorbidity, tobacco use during pregnancy, drug use during pregnancy, and STI during pregnancy. These tests yielded significant differences between participants randomized to MotherWise and participants randomized to the control group on two variables: history of spontaneous preterm birth (p = 0.027, two tailed) and tobacco use during pregnancy (p = 0.006, two tailed).

For the primary analyses, binary logistic regressions were used for dichotomous outcomes (NICU admission, preterm birth) and one-way analysis of covariance (ANCOVA) was used for continuous outcomes (birthweight). Given the small sample size and low base rate of the

variables of interest, this report focuses on effect sizes, however, to be consistent with other literature, we present *p*-values, as well. Given that the effects were hypothesized, we used one-tailed tests for all primary tests of hypotheses. All analyses controlled for history of spontaneous preterm birth. Given that tobacco use was measured at any point during pregnancy, it is possible that MotherWise could have also affected participants' tobacco use and its subsequent impact on birth outcomes. However, medical chart data abstraction did not capture when tobacco use started or ended relative to program enrollment. Therefore, sensitivity analyses were conducted controlling for tobacco use during pregnancy in order to evaluate the extent to which this variable affected the primary results.

RESULTS

Preliminary analyses showed that the three outcome variables were minimally to moderately correlated with one another, suggesting they are measuring distinct indicators. Preterm birth was correlated 0.57 with NICU admission and −0.34 with baby's birthweight; baby's birthweight was correlated −0.06 with NICU admissions.

Controlling for history of spontaneous preterm birth, there was a trend for participants randomized to MotherWise to be less likely to experience a preterm birth (spontaneous or indicated; 7 [9.3%]) compared to participants randomized to the control group (12 [19.7%]), $b = -0.76$, OR = 0.47, $p = 0.072$, one tailed, ES = 0.46). Furthermore, there was a trend for participants randomized to MotherWise to give birth to babies with higher birthweights ($M = 3254.91$ g, SD = 489.77) compared to participants randomized to the control group ($M = 3136.15$ g, SD = 485.79; $F(1, 132) = 1.687$, $p = 0.098$, one tailed, ES = 0.23). MotherWise participants were not significantly less likely to have a baby admitted to the NICU (11 [14.9%]) compared to participants randomized to the control group (11 [18.0%]), $p = 0.187$, one tailed.

Sensitivity analyses with the addition of tobacco use during pregnancy as a covariate yielded similar findings for preterm birth, birthweight, and NICU admission.

DISCUSSION

This study is the first to indicate that relationship education programs could impact birth outcomes, which has important implications for public health and related policies. This RCT showed that the MotherWise program, compared to a no-treatment control group, was associated with lower preterm birth rates (a 55% reduction) and higher infant birthweight. These effects were small to medium in size, but, given the small sample, they were not statistically significant by typical standards. Post-hoc power analyses indicated that only effect sizes of 0.43 could be detected as significant two tailed with $p < 0.05$. Nevertheless, we believe these findings are important for the development of future, larger studies of relationship education programs and the reach they could have on a wider range of outcomes than are usually assessed.

Although there are indications that relationship education for couples or individuals improves mental health (Carlson et al., 2014, 2017; Roddy et al., 2020), that a relationship education program could have impacts on physical health is new to this field. This type of impact has rarely been examined. Two exceptions are that an online relationship education/therapy program for couples significantly improved perceived general health and insomnia (Roddy et al., 2020) and that there were no main effects of the Family Foundations program on birth outcomes, but there was an impact on the risk of birth by Cesarean section (Feinberg et al., 2015).

These preliminary findings also fit with research showing that group prenatal care impacts birth outcomes, at least in some studies (see Mazzoni & Carter, 2017). Group prenatal care

is similar to the MotherWise program in that it is offered during pregnancy, is group based, and includes some psychoeducation about self-care and postpartum depression, but different in that it also includes clinical care such as blood pressure and fetal heartbeat checks. Some have theorized that it may be these shared components, being with other women with similar experiences, and increased social support that make group prenatal care effective (Chae et al., 2017; Mazzoni et al., 2020).

Our study's findings, while limited by sample size, indicate important avenues for future programming, research, and policy. Most importantly, they suggest that relationship education during pregnancy could impact women's and infant's health directly. Future research should replicate these findings with larger samples to better test the impact of the MotherWise program or relationship education more generally during this critical phase in family development. Additionally, this study suggests that research in both the relationship education and group prenatal care fields should consider a wider range of impacts than are typically assessed.

Mechanisms of effect should also be examined. Is the impact of MotherWise due to increased social support (i.e., being with other pregnant women), connections to community resources (e.g., housing, food assistance), improvements in their romantic relationships, or something else as-yet unstudied? Furthermore, the impacts of maternal stress and cortisol on birth outcomes were buffered by being assigned to the Family Foundations program (Feinberg et al., 2015, 2016), suggesting that moderators may be important to assess in future research in this area. Lastly, given that disparities in maternal health have been well documented in the U.S. for decades, particularly for Black women (Flanders-Stepans, 2000; Hoyert & Miniño, 2020), programs like MotherWise should be examined in the context of race and ethnicity to understand whether these kinds of social programs can reduce health disparities and ultimately improve maternal and infant outcomes for all.

Many have called for greater attention and improved policy regarding maternal health in the U.S. (Gingrey, 2020). The U.S. continues to demonstrate abysmal maternal mortality rates, lagging behind other developed nations (Walani, 2020). Preterm birth is a key indicator of maternal health and rates by state are tracked by the March of Dimes. They grade states from F (among six states) to A (only Vermont), with the U.S. overall last receiving a C- (2021 March of Dimes Report Card, 2021). The cost of a single preterm birth, only in terms of medical care within the 6 months after birth, is estimated to be $76,153 (Beam et al., 2020). A full cost study of the MotherWise program would need to be conducted to fully sort out the financial, tax-payer savings related to the program, but we estimate, based on the first 5 years of running the program, that the cost per person of the MotherWise program is roughly $2000. MotherWise is cost effective in part because implementing the program does not require medical/other advanced degrees or medical or mental healthcare, as traditionally defined. Due to the coronavirus/Covid-19 pandemic, it has also now been implemented virtually, via video conferencing, which could lead to further cost savings. Future research could compare these models. More broadly, if the effects of this study are replicated and a relatively inexpensive psychosocial program like this can reliably impact maternal and infant health, these kinds of programs should be used widely as a way to address the maternal health crisis in the U.S.

DISCLOSURES

With Scott Stanley and Marline Pearson, Galena Rhoades co-developed "Within My Reach" and receives royalties and payment for trainings in the curriculum.

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