EXERCISE AND STRESS IN AT-RISK WOMEN DURING PREGNANCY AND POSTPARTUM

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Abstract

Purpose: We aimed to understand the relationship between exercise and stress among socioeconomically at-risk women who participated in a home visitation service during pregnancy and postpartum.

Methods: A mixed-methods design was used to support and supplement quantitative data using qualitative data. Convenience sampling was used to collect data from at-risk women via questionnaires and follow-up interviews. The Perceived Stress Scale was used to assess stress. Frequency and duration of exercise were assessed based on the American College of Obstetricians and Gynecologists exercise guidelines. Regression analyses examined the association between stress and exercise controlling for covariates. Content analysis was used to understand women's stress management experiences.

Results: $N = 114$ women completed the questionnaire and a subgroup of 11 received follow-up interviews. Greater frequency of exercise was significantly associated with lower levels of stress. Approximately one-third of women reported experiencing significant stress. Talking to their husband or partner was the most used and exercise was the least used coping strategy. Many women recognized the importance of managing stress and benefits of exercise, but were hindered by barriers such as feeling tired, preventing them from exercising.

Clinical Implications: A personalized and safe exercise program has the potential to be a low-cost stress management strategy for women during pregnancy and postpartum.

Key words: At-risk; Exercise; Mixed methods; Pregnancy; Postpartum; Stress.

Stress among Women during Pregnancy and Postpartum

High levels of pregnancy stress are associated with adverse maternal and birth outcomes such as preeclampsia and preterm births (Rabiepour et al., 2019). Postpartum stress impairs mother–infant bonding (Rossen et al., 2019). Stress levels are particularly high among women during pregnancy and postpartum in low socioeconomic groups in the United States. Key factors such as low educational attainment, maternal age 35 or older, unemployment, and history of medical and psychiatric complications put pregnant and postpartum women at risk (Chang et al., 2019). Exercise promotes emotional resilience to cope with stress (Edenfield & Blumenthal, 2011) and is recommended as an important approach to enhancing physical and emotional wellbeing for women during pregnancy and postpartum (American College of Obstetricians and Gynecologists [ACOG], 2020).


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Facilitators to exercise included an expectation of having an easy birth, healthy baby, and better management of weight gain and blood sugar, whereas barriers to exercise were being too tired, not having enough time, not sure what are safe exercises, and lack of family support.

Exercise during Pregnancy and Postpartum

During pregnancy, exercise promotes mental health, prevents excessive weight gain, and reduces the risk of medical complications; after birth, exercise speeds recovery time and enhances cardiovascular health (ACOG, 2020). ACOG (2020) recommends that healthy women during pregnancy and postpartum engage in at least 150 minutes of moderate-intensity exercise per week, that is, 30 minutes a day on most days. Despite substantial benefits, most women do not exercise for the recommended amount of time. For example, several past studies have shown that in the United States only 14% to 23% of all pregnant women met the ACOG exercise guidelines. This activity is much lower (7%) among Hispanic women (Evenson & Wen, 2011; Lynch et al., 2012). During postpartum, almost half of the women did not engage in any exercise (Demissie et al., 2011).

Many studies demonstrate positive effects of exercise on prevention of depression for women during pregnancy and postpartum. Perinatal stress increases the risk for depression and anxiety (Scheyer & Urizar Jr., 2016). However, there are mixed results on how exercise influences women's responses to stress (Crone et al., 2019; Riley & Park, 2015). In one study with 122 healthy pregnant women, the effect of 1-hour yoga per day for 16 weeks significantly decreased perceived stress by 31.6% compared with increased stress by 6.6% in the control group (Satyapriya et al., 2009). Norman et al. (2010) reported women during postpartum who received an 8-week physical activity program had higher positive emotions compared with counterparts in the control group. In contrast, Eichler et al. (2019) found that physical activity did not predict stress level in pregnant women. There is limited evidence about the connection between exercise and stress for women during pregnancy and postpartum. The purpose of our study is to examine the association between exercise and stress with at-risk women in the United States during pregnancy and postpartum.

Methods

Design

We used a mixed-method design that collects both quantitative and qualitative data. Quantitative analyses of survey data were enhanced by exploring women's experiences in their social context and cultural values (Pluye & Hong, 2014). The study was conducted at MOMS Orange County (OC), a community organization that provides prenatal and postpartum home visitations to approximately 3,400 women annually, with the majority being Hispanic and socioeconomically at-risk women in Orange County, California.

Sample and Procedure

Convenience sampling included women during pregnancy and postpartum because ACOG (2020) emphasizes

physical activity as an important component of perinatal care. Inclusion criteria were pregnant or postpartum women who received home visitation service from MOMS OC and spoke English or Spanish. Paraprofessional home visitors from MOMS OC passed out flyers and English or Spanish hardcopy surveys to women who voluntarily participated during home visits. One-hundred and twenty women completed the questionnaire. Each received a $5 gift card as appreciation. Six cases were removed because of missing data, and 114 participants (66 in English and 48 in Spanish) used for analyses. A subgroup of 11 women agreed (8 in English and 3 in Spanish; 9 prenatal and 2 postpartum) to participate in an individual interview. They received another $20 gift card. Interviews were conducted at MOMS OC by a bilingual research assistant. Each interview lasted between 45 minutes to 1 hour and was audio recorded.

Measures

The questionnaire included demographic information, stress, exercise, and stress coping. Perceived stress was assessed using two questions from Perceived Stress Scale (PSS: Cohen, 1983) with each item rated on a 5-point Likert Scale from "never" to "almost always." Good construct validity and adequate reliability were reported with similar populations in both English and Spanish for either the full questionnaire or selected questions (Karam et al., 2012; Silveira et al., 2013). The two questions include "In the past month, how often have you felt nervous and stressed?" and "In the past month, how often have you felt that you were unable to control the important things in your life?" Higher scores indicate greater self-reported stress. Cronbach's Alpha for stress was 0.64 for this sample. Two exercise questions were based on the ACOG (2020) exercise guidelines. Subjects reported "in the past month how often have you exercised each week (from "not at all" to "6-7 days") and how many minutes you have exercised each day" (from "not at all" to "1 or more hours"). Cronbach's Alpha for exercise was 0.78 for this sample. We developed one stress coping item to understand how those women managed their stress such as talking to your partner, exercise, prayer, or meditation that are based on previous studies (Guardino & Schetter, 2014). The semistructured interview guide (i.e., composed of five questions) was created in the same way for the qualitative portion of the study (Connelly et al., 2015). An example question was "How important do you think it is to get exercise or stay active during pregnancy?"

Data Analysis

We conducted three types of quantitative analyses with SPSS v. 25: descriptive analyses to report demographic characteristics, stress, exercise, and stress coping; analysis of variances to compare perceived stress scores by groups with different demographic factors; and regression analyses to examine associations between exercise and stress controlling for maternal age, education, and prenatal versus postnatal period.

The interviews were transcribed and compared with audio files for accuracy. Three steps were taken to conduct content analysis (Shenton, 2004). First, the first author educated six nursing students on to review and code transcriptions independently. Second, they collapsed codes into categories and developed themes. Third, the first author facilitated discussion to solve disagreements and reach a consensus on 26 codes, nine categories, and four themes including exercise experience, factors that influence exercise, self-perception of stress, and coping strategies. Trustworthiness and reliability were addressed through having research team members with varied clinical and research backgrounds conduct interview analysis using the same analysis guideline (Shenton, 2004).

Results

Characteristics of Participants

Average age of the participants was 28.18 (SD = 6.64). Of the 114 women, 95 (84%) self-identified as Hispanic. Forty-eight (42%) had a high school diploma and 38 (33%) had some college experience or degree. Fifty-seven (50%) had family annual income less than $29,999. Fifty-four (48%) were married and lived with the father of their baby. Thirty-four (30%) women were pregnant for the first time. Additionally, 56 (49%) pregnant and 58 (51%) postpartum women participated in this study. There was no significant difference in demographic characteristics between pregnant and postpartum women.

Surveys

Exercise and Stress

Regression analyses showed greater frequency of exercise was significantly associated with a lower level of stress when controlling for maternal age and education as well as the prenatal versus postnatal period (β = -0.23, p = 0.01). There was no significant difference in the relationship between the duration of exercise and stress (β = -0.14, p = 0.13).

Exercise

Twenty-five women (23%) met the ACOG (2020) guidelines (i.e., exercise for 30 minutes on most days every week). Almost half (48%) did some exercise (i.e., frequency: fewer than 3-4 days; duration: shorter than 30 minutes per week), but less than the ACOG recommendations, and about one-third (29%) did not exercise at all.

Stress

Most women (85%) reported feeling stressed or out of control in the past month during pregnancy or postpartum (mean = 2.79, SD = 1.82). One-third (36%) reported moderate or high stress. Analysis of variance showed women who were aged 30 or greater experienced significantly higher perceived stress compared with those who were aged 29 or less (F (1,112) = 3.96, p = 0.049). There were no significant differences in perceived stress by ethnicity, prenatal versus postnatal period, maternal education, marital status, income, gravida, and medical history

of previous or current pregnancy. Talking to their husband or partner (48%) was the most common stress coping strategy, followed by talking to friends or family members (35%), taking deep breaths (31%), praying or meditating (27%), and exercise (20%).

Interviews

Exercise Experience

Walking was the common exercise with the duration from 15 to 45 minutes. Eight women had a brief conversation about exercise with their health care providers during pregnancy and postpartum care. One who had gestational diabetes said that her doctor provided general instruction, *30-minutes exercise … something that raises my heart rate.* Women revealed they desired specific exercise guidelines on frequency, intensity, duration, and type of exercise.

Factors that Influence Exercise

Ten women had favorable attitudes toward exercise, acknowledging its importance. Four facilitators to exercise included easy birth, healthy baby, better management of weight gain, and blood sugar. A woman who had gestational diabetes in her previous and current pregnancy shared her motivation to exercise, *To keep my sugar levels … at the level that they need to be at. To avoid [baby] becoming too overweight that I won't be able to have it [baby] naturally…* Another woman described her experience, *I feel like sometimes I get lazy, but then I'm like just think of the baby and not about myself … I don't want to gain a bunch of weight. And so I'm like — Okay like get your steps in.*

Fatigue was the main barrier to exercise. A pregnant woman said, *Like walking … because it's a job [cleaning offices], it's something daily that I do. And I need to like add 20 minutes to exercise…and the truth is that I don't do it … because I'm tired.* Another woman who regularly exercised prior to pregnancy pointed out that her partner could be a barrier to exercise, *My husband's like, 'Oh, I don't think you should be doing that [lifting weights]'... That's what I like to do. But he was like, 'No, no more.'*

Self-Perception of Stress

Four women noted that stress would have a significant impact on their pregnancy and fetus. One interviewee shared, *It [stress] is really bad for the baby, the baby can feel the stress.* Another woman elaborated, *If I'm stressed out … I don't feel connected to the baby. I just feel like he's going to come out like feeling unloved or anxious … I feel like he [baby] feels what I feel and I just don't want him to come out like emotional.*

Coping Strategies

Six women received health information on how to manage their stress during pregnancy and postpartum care; three from health care providers and three from community organizations. They were advised to practice deep breathing, talk to family members especially partner, get rid of stressors if possible, or take medications if having an anxiety attack. One woman shared, *They [my doctors] wanted to put me on medications and I rather try to figure it out on my own … I just started that [talk therapy] so it's new. I've never done that before … when I get like anxiety attacks, I have to stop and focus on my breathing sometimes … I'll lay on the floor, like the cold floor … that'll calm me.*

Discussion

Our results provide preliminary evidence showing that the greater the frequency of exercise, the lower the stress level. Based on women's preference for concrete health information and guidance, a future stress reduction intervention should include specific guidance on exercising and ongoing coaching.

Relationship between Exercise and Stress

Findings from the survey indicated a negative association between exercise and stress. Women who engaged in a greater frequency of exercise experienced a lower level of stress. These results are consistent with a study in Canada where healthy pregnant women who experienced high levels of stress had low levels of physical activity in early- to midpregnancy even though this population had a higher socioeconomic status compared with our participants (Sinclair et al., 2019).

Further understanding of the relationship between perinatal stress and exercise via frequency and duration offers knowledge toward the development of appropriate interventions. We found a significant association between greater frequency of exercise and stress reduction. However, the relationship between the duration of exercise and stress was not signficant. Self-reported physical activity can have substantial measurement error compared with objective data using accelerometer devices (Lim et

Clinicians should partner with at-risk women during pregnancy and postpartum to develop a personalized and safe exercise plan that has the potential to be a low-cost stress management strategy by tailoring individual conditions, maximizing facilitators, minimizing barriers, and leveraging technology.

SUGGESTED CLINICAL IMPLICATIONS

- The negative association between exercise and stress among at-risk women during pregnancy and postpartum showed the greater frequency of exercise was related to lower levels of stress.
- Most women reported feeling stressed or out of control in the past month.
- ACOG (2020) recommends that women during pregnancy and postpartum engage in at least 150 minutes of moderate-intensity exercise per week.
- Although many women were aware of the benefits of exercise, only one-fifth met the ACOG (2020) exercise guidelines.
- It is critical for clinicians to help women to develop a personalized and safe exercise plan as a proactive stress management strategy.

al., 2015). A possible explanation may be frequency of action carries less recall error than the duration of action. Data from our survey showed exercise was the least used coping strategy, whereas communication with partner was the most frequently used. Our results suggest exercise can be a potential stress reduction intervention for at-risk women during pregnancy and postpartum.

Facilitators and Barriers to Exercise

Data from interviews demonstrated that most women understood the importance of exercise for their physical health, consistent with prior studies reporting a majority of women had a positive attitude toward the importance of exercise across ethnicity and medical conditions (Halse et al., 2015). Although women were aware of the benefits of exercise, our survey found that only one-fifth met the ACOG (2020) exercise guidelines.

Barriers and facilitators may help us understand the discrepancy between attitudes toward exercise and actual performance. Our results support prior studies showing that intrapersonal factors are the predominant barriers and facilitators to exercise for pregnant women (Harrison et al., 2018). Feeling tired was the most common factor. Other factors included lacking specific exercise guidance, not having adequate time, and concerns about safety. Facilitators for exercising included beliefs that an easy birth, healthy baby, and better management of weight gain and blood sugar would be the benefits. Similar to other results, interpersonal factors such as social support from partner or family members were an important barrier or facilitator (Harrison et al., 2018).

Limitations

This study has several limitations: convenience sampling of low-income families from a community organization that provides home visitations, the majority of whom were Hispanic; and self-reported measures may underestimate stress, but overestimate exercise (Brett et al., 2015; DiPietro et al., 2004). Generalization of results is limited.

Clinical Implications for Stress Reduction Intervention

Our findings suggest that an exercise program has the potential to be a low-cost stress management strategy by incorporating several factors. Tailoring an individual's socioeconomic and cultural background into a feasible exercise plan may be of benefit (Harrison et al., 2018). Prior studies suggest exercise or leisure type of physical activity has a positive effect on depression, whereas household or caregiving physical activity either increases risk for depression or has no effect on depression (Demissie et al., 2011; Szegda et al., 2018). Clinicians could promote walking (reported as the most common exercise in our study) as a self-care activity and a stress reduction strategy in a safe neighborhood or indoor malls with their significant partner, family members, and friends. Clinicians could also use facilitators to motivate women so their positive intention about exercise will be translated into healthy behaviors (Harrison et al., 2018). It is critical to enhance social support for women through engaging partner and family members. The entire family should fully understand the positive role of exercise in maternal and infant health as well as being supportive of women to exercise as recommended. Clinicians can leverage technology to objectively monitor stress and exercise to increase women's awareness of their health behaviors. One study found pregnant women were willing to wear a smartwatch for continuous monitoring of their physical activity and heart rate during pregnancy and postpartum (Grym et al., 2019).

There is a relationship between the greater frequency of exercise and a lower level of stress. Our results suggest the need to develop in partnership with women a personalized exercise intervention as a proactive stress management strategy. To succeed, exercise interventions should be designed to maximize facilitators, minimize barriers, and use technology. ✣

Acknowledgment

This work was supported by the *National Science Foundation* under *Smart and Connected Communities (S&CC)* grant CNS-1831918.

The authors thank the administrators and staff of MOMS Orange County for their support; Margaret Schneider, PhD, and Stephanie Reich, PhD, for their feedback on interview guideline; Sirena Reyes for facilitating data collection; and their research assistants for data analyses, especially Holly Borg, Michelle Heredia, Hannah Vasquez, Melissa Navarrete, and Nour Hamade.

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The authors declare no conflicts of interest.

DOI:10.1097/NMC.0000000000000722

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