

Examining the energy cost and intensity level of prenatal yoga

Nathan Anthony Peters, Rebecca A Schlaff

Department of Kinesiology, Saginaw Valley State University, University Center, MI, USA

Address for correspondence: Mr. Nathan Anthony Peters,
5260 N Banner Rd, Deckerville, MI 48427, USA.
E-mail: napeters@svsu.edu

ABSTRACT

Context: A popular form of pregnancy physical activity (PA) is prenatal yoga. However, little is known about the intensity and energy cost of this practice.

Aims: To examine the energy cost and intensity level of prenatal yoga.

Methods: Pregnant women in a prenatal yoga class ($n = 19$) wore a Sense Wear Armband during eleven 60 min classes each, and self-reported demographic variables, height and weight, prepregnancy weight, and PA behaviors and beliefs. Sense Wear Armband data included kilocalories, metabolic equivalent (MET) values, and time spent in various intensities. Descriptive statistics and frequencies were utilized to describe energy expenditure and intensity.

Results: Energy expenditure averaged 109 ± 8 kcals, and the average MET value was 1.5 ± 0.02 . On average, 93% and 7% of classes were sedentary and moderate intensity PA, respectively.

Conclusions: Time spent in a prenatal yoga class was considered to be primarily a sedentary activity. Future research should utilize larger samples, practice type, and skill level to increase generalizability.

Key words: Energy cost; intensity; prenatal yoga; yoga.

INTRODUCTION

As indicated by the American College of Sports Medicine (ACSM), over the past several years, exercise during pregnancy has dramatically gained popularity among women.^[1] Healthy pregnant women should get at least 150 min of moderate intensity aerobic activity per week, according to the Centers for Disease Control and Prevention. When working to meet these recommendations, the importance of understanding the intensity level of various forms of physical activity (PA) among this population cannot be understated.

Research indicates that participating in exercise during pregnancy is associated with decreased risk of several birth complications.^[2-5] Unfortunately, due to the many physiological changes occurring in the body during

pregnancy (such as nausea, fatigue, and weight gain), many women tend to adopt sedentary habits,^[6] which has been linked to several adverse pregnancy outcomes, including pregnancy-induced hypertension, gestational diabetes, and several others.^[7] Therefore, enjoyable forms of PA must be identified to help women engage in recommended amounts of PA. Recently, prenatal yoga has increased in popularity as a form of recommended PA and the mind-body-based techniques associated with it have been indicated in birth preparation, including the use of breathing patterns and postures.

When quantifying the relative intensity of PA, ACSM utilizes several methods; one being metabolic equivalents (METs). Recording METs is a standardized way to describe the intensity at which someone is performing work. Light intensity PA is defined as requiring <3 METs, moderate as $3-6$ METs, and vigorous as ≥ 6 METs. Although

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data regarding the energy intensity of prenatal yoga are limited, data for energy intensity of traditional and nonprenatal yoga are abundant. Research suggests that hatha yoga, a commonly used form of yoga emphasizing a system of physical postures for balancing, stretching, and strengthening the body,^[8] reaches a low level of PA with a mean value of 1–2 METs.^[9–11] Additional studies suggest that hatha yoga does not meet the intensity level necessary to count toward recommendations for “levels of PA for improving or maintaining health or cardiovascular fitness,” but may contribute some benefit to sedentary individuals.^[9]

As a result of the physiological changes that occur during pregnancy, it is possible that the metabolic cost of yoga may differ from the nonpregnant state. However, despite the increasing popularity of prenatal yoga and its potential role in improving birth outcomes,^[12] little is known about its energy costs, potentially deeming it unfit to be recommended as a form of PA that contributes toward meeting PA recommendations. Therefore, the central focus of this study was to understand the energy cost and intensity level of prenatal yoga.

METHODS

Methodological overview

Participants were recruited from a local yoga studio, which offered one class per week specifically for pregnant women. Women were required to register for and commit to 11 weeks of classes (11 classes total); therefore, the study participants did not vary from class to class. All women enrolled in the class were eligible to participate ($n = 19$). All methodological aspects of the study were reviewed and approved by the university’s Institutional Review Board.

Survey administration

Women consented to participate and completed a brief questionnaire at enrollment and self-reported demographic variables (age, race, marital status, and annual household income), current height and weight, gestational age, number of previous pregnancies (parity), prepregnancy weight, and answered several questions related to their PA behaviors and beliefs. Specifically, with regard to PA behaviors, women were asked to self-report prepregnancy and current levels (at enrollment).

Class description

Each 60 min class varied according to the specific asanas utilized; however, commonalities were present with regard to their structure. Each class began and ended with 5 min of relaxation (savasana). After relaxation, the class included 50 min of various asanas, focused on fostering the

mind-body connection, as well as the connection between mother and baby.

Measurement of energy expenditure

To objectively assess energy expenditure, participants were asked to wear a Sense Wear Armband (Mini Model; Body Media, Inc., Pittsburgh, PA) during each 60 min class, worn over the left triceps. A trained research assistant was present to ensure proper wear and supervised each class. Output utilized for this study included minute data of kilocalories and MET values. The device derives its output by a combination of parameters including accelerometry, heat flux, galvanic skin response, and body temperature. Subject characteristics of gender, age, height, and weight were also included in deriving the energy expenditure output. The use of the Sense Wear Armband was recently validated among a sample of pregnant women.^[13] Results indicated that it correlated well ($r = 0.87$) with the criterion measure (indirect calorimetry).

Data analysis

Descriptive statistics (mean \pm standard deviation [SD] and frequencies) were utilized for all demographic data. Minutes per week of current and prepregnancy moderate and vigorous PA were calculated for each participant and compared to PA recommendations.

Minute data were obtained via the Sense Wear Professional Software v7.0 (Body Media, Inc., Pittsburgh, PA), which included kilocalories and MET value. Participants’ minute data for each of the 11 sessions were summed to obtain total kilocalories expended within each 60 min session and averaged among all 11 sessions to obtain an average value for total kilocalories expended. These same procedures were applied to obtain the average MET value for each participant. Finally, the number of minutes within each class spent in light, moderate, and vigorous intensity PA was calculated for each participant. Descriptive statistics (mean \pm SD and frequencies) were utilized to describe the energy expenditure and intensity across all participants.

RESULTS

With an adherence rate of 100%, a total of 19 women participated in the study. Upon enrollment, study participants’ average gestational age, maternal age, and prepregnancy body mass index were 22 ± 6.9 weeks, 30.3 ± 5.4 years, and 24.1 ± 8.2 kg/m², respectively. All other demographic characteristics of the study sample are shown in Table 1.

On an average, women met PA guidelines before becoming pregnant, but not during pregnancy [Table 2]. The energy

Table 1: Descriptive characteristics of the study sample (n=19)

Characteristic	Frequency n (%)
Race	
White	18 (95)
Other	1 (5)
Marital status	
Married	14 (74)
Not married	5 (26)
Parity	
0	11 (58)
1	3 (16)
2	5 (26)
Annual household income	
<\$25,000	1 (5)
\$25,000-\$49,999	2 (11)
\$50,000-\$74,999	4 (21)
>\$75,000	12 (64)

Table 2: Self-reported physical activity at study enrollment (n=19)

Self-reported PA	Average (range; minutes/week)
Prepregnancy: Moderate	97 (0-400)
Prepregnancy: Vigorous	169 (0-540)
Pregnancy: Moderate	61 (0-220)
Pregnancy: Vigorous	12 (0-70)

PA = Physical activity

expenditure during each 60 min class averaged 109 ± 8 kilocalories, and the average MET value was 1.5 ± 0.2 , indicating that the intensity level of the prenatal yoga classes was, on average, not high enough to count toward the recommended 150 min of moderate to vigorous intensity PA per week. Furthermore, when evaluating the number of class time minutes spent in light, moderate, and vigorous intensity activity, it was found that participants contributed 93% and 7% of classes in light and moderate-intensity PA, respectively (equivalent to 56 sedentary and 4 moderate minutes).

DISCUSSION

The purpose of this study was to investigate the average intensity level and the energy expenditure during an 11-week prenatal yoga class. Our findings indicated that the intensity level and the energy expenditure achieved during a 60 min prenatal yoga class were, on average, considered very low (comparable to intensities of preparing food, washing dishes, or walking slowly around the house). Therefore, the prenatal yoga practice assessed within this study did not contribute significantly toward the achievement of aerobic PA recommendations during pregnancy.

Our results suggest that prenatal yoga may not be appropriate for healthcare providers to recommend as a means to achieve aerobic PA recommendations during pregnancy. Although prenatal yoga may not be

an appropriate form of moderate or vigorous aerobic PA, there are other documented benefits, including reduction in symptoms of prenatal depression^[14] and maternal discomfort during delivery^[15] that may favorably impact health, albeit not through PA. Since we are among the first to investigate the energy cost of prenatal yoga, these results should be interpreted with caution.

There are several strengths and limitations of the current investigation that are worth noting. First, as the asana practice and specific postures varied among classes, we were unable to describe the practice in detail. However, upon further exploration of our data, we found the variation in total kilocalories expenditure among classes (within each participant) to be relatively small (average \pm SD: 6.5 ± 5.3 kcals). Furthermore, we were unable to assess energy expenditure via direct or indirect calorimetry (criterion methods), and our prepregnancy and pregnancy PA measures were obtained via self-report. In addition, our study utilized a relatively small sample size with a majority of participants being Caucasian, married, of high socioeconomic status, and relatively physically active prior to becoming pregnant. These aforementioned qualities may potentially limit the generalizability of our findings. Although our sample size was relatively small, the self-reported PA levels (during pregnancy) were quite variable among our participants, thereby strengthening the generalizability of findings.

CONCLUSION

Our findings suggest that prenatal yoga may be unfit to be endorsed as a form of moderate or vigorous aerobic PA for this population. However, these findings should be interpreted with caution, considering the aforementioned study limitations, and this being among the first investigation on this topic. It is important that future research continues to investigate the energy cost and intensity level of yoga practice within this population, and also explore alternative physiological mechanisms for which prenatal yoga exerts its positive effects. Specifically, future research should investigate these parameters within larger samples varying in location (with variety in demographic characteristics of participants), practice type, and skill level to produce more generalizable findings. Furthermore, future investigations should consider utilizing other objective PA measurement devices.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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