



Attitudes and Beliefs Regarding Pregnancy Physical Activity in a Non-pregnant Population

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ABSTRACT

International Journal of Exercise Science 12(3): 636-645, 2019. The purpose of this study was to examine the attitudes and beliefs about pregnancy physical activity (PA) in non-pregnant individuals. We hypothesized that younger, more educated, females, those who had ever been pregnant (or partner had been pregnant, for males) and physically active individuals would view pregnancy PA more positively than older individuals, those with less education, males, those who had not ever been pregnant (partner had not been pregnant, for males), and those who are inactive, respectively. Participants were non-pregnant adults ages 20+ years who were recruited by word-of-mouth, social media, and from physician offices. A total of n=698 completed a survey consisting of 27 items in five sections: demographics, PA over prior six months, questions regarding efficacy of PA during pregnancy, importance of exercise for pregnant women, and safety of moderate or vigorous intensity PA. Participants were dichotomized by sex (male; female), PA (meets or does not meet PA Guidelines), education (Bachelor's degree; no Bachelor's degree), and prior experience with pregnancy (self/partner had ever been pregnant; self/partner had never been pregnant). Overall, physically active individuals, those with college degrees, and those age 40+ years viewed pregnancy PA more favorably, and non-pregnant females and more educated people believed moderate activity is safe ($p < 0.05$ for all comparisons) compared to males and less educated, respectively. Beliefs and attitudes about pregnancy PA vary by age, sex, education, and PA level. High levels of agreement with statements about benefits from and safety of light and moderate intensity PA were reported. Targeting education and PA promotion related to pregnancy to less educated, inactive, and younger age groups should be encouraged, as well as increasing education in all groups regarding safety of vigorous intensity PA during pregnancy.

KEY WORDS: Maternal, opinions, exercise

INTRODUCTION

There are many well described health benefits for women who are physically active during pregnancy; these include decreased risk of gestational diabetes (10, 24), preeclampsia (26, 27), less gestational weight gain (28), and decreased length of labor (5). The offspring of physically active women are less likely to be delivered preterm (20) or to be born via operative delivery (29). However, only 13.8 to 22.9 percent of pregnant women in the US meet physical activity

(PA) recommendations (17), and the average minutes per day of moderate activity for pregnant women as recorded by accelerometer is 12 minutes (18). Pregnant women report many barriers to PA during pregnancy including lack of time, lack of energy or fatigue, feeling unwell, and lack of childcare (3, 12, 15); some also report fear of harm to their unborn child (6, 11, 13, 15). Pregnant women who report high levels of self-efficacy for exercising safely were significantly more likely to accumulate high amounts of PA (8, 25). These studies suggest an important role of belief about PA self-efficacy in prediction of PA behavior in this population.

In addition, exercise or PA advice received by pregnant women from others may be incorrect or inadequate. In 2007, Entin & Munhall reported that 52% of US obstetricians in their surveyed sample reported discussing exercise with 81-100% of their patients but 62% of obstetricians reported regularly specifying a maximum heart rate for exercise (14), which is inconsistent with US PA recommendations (7) and American College of Obstetricians and Gynecologists (ACOG) advice (1). Another study found that while 99% of prenatal healthcare providers believed pregnancy exercise to be beneficial, 64% of those providers still believed an outdated guideline published in 1985 (2). This may translate to inappropriate, outdated, or no advice related to pregnancy exercise being provided to patients from their healthcare providers.

Several studies have reported on pregnant women's beliefs about the safety of PA and exercise during pregnancy, both for the mother and the unborn child (6, 11, 16, 23). Other data have shown that partners and family members have considerable influence over a pregnant woman in terms of lifestyle behaviors (19, 21). In the second and third trimesters, pregnant women report advice from friends and family as the greatest source of PA information and advice; they relied more on advice from friends and family than from books and magazines, health professionals, or other sources (6). In another study, pregnant women reported that spouses and friends or individuals who were personally close to them were most likely to encourage leisure-time PA (22). Despite the important role support providers have in influencing pregnant women toward positive behaviors such as PA, we know of no studies that have examined the beliefs and attitudes about the safety of PA in individuals other than pregnant women themselves or their healthcare providers (4). Therefore, the purpose of this study was to examine the attitudes and beliefs about pregnancy PA in non-pregnant individuals, as well as to investigate differences in beliefs and attitudes about pregnancy PA by age, sex, education, and PA level. We hypothesized that younger, more educated, females who are physically active would view pregnancy PA more favorably than older individuals, those who are less educated, males, and those who are not active, respectively.

METHODS

Participants

Participants were recruited via word of mouth, email, and social media and asked to participate in an anonymous online survey, or they were recruited at various physician offices in the Southeastern region of the United States and asked to complete the same survey but in paper form. To participate, participants were required to be at least 20 years old and not be pregnant

at time of survey completion. A total of 545 non-pregnant females and 184 males were enrolled in this study, but 31 individuals did not complete the attitudes and beliefs portion of the survey, which rendered their responses unuseable. Therefore, total analyzed sample size was n=698. A total of 401 respondents completed the survey online (via the Qualtrics platform) while 297 completed paper copies of an identical survey. This study was approved by the university's Institutional Review Board as an exempt study; informed consent was not required. Survey completion implied consent.

Protocol

All participants completed a survey detailing their age, education, current PA levels, and reproductive history (males were asked about the reproductive history of their spouse/partner, if applicable). Moderate activity was defined as: walking briskly (3 miles per hour or faster, but not race-walking), water aerobics, bicycling slower than 10 miles per hour, tennis (doubles), ballroom dancing, general gardening while vigorous activity was defined as: race walking, jogging, or running, swimming laps, tennis (singles), aerobic dancing, bicycling 10 miles per hour or faster, jumping rope, heavy gardening (continuous digging or hoeing), hiking uphill or with a heavy backpack (7). Current PA was assessed via a single question that asked about PA levels over the prior 6 months. Respondents either answered that they accumulate less than or equal to 150 minutes per week of moderate and/or vigorous PA, or that they accumulate more than 150 minutes per week of moderate and/or vigorous PA. Examples of moderate and vigorous activities were provided as per the definition of moderate and vigorous provided by the International Physical Activity Questionnaire (IPAQ) (9). The question did not define PA as specifically aerobic or anaerobic, so interpretation of the question was left to respondents.

Respondents then answered three sections of questions related to pregnancy PA beliefs and attitudes. First, participants responded to survey questions assessing their agreement or disagreement with eleven statements related to their beliefs about safety and efficacy of pregnancy PA (see table 2). These statements were developed and utilized by Evenson & Bradley previously (16); the current study used the Exercise during Pregnancy and Benefits of Exercise and Physical Activity During Pregnancy portions of their reported survey questions. The next section required participants to rank, on a Likert scale from 1 to 5 (1 indicating extremely unimportant and 5 indicating extremely important) their beliefs in the importance of PA as well as rest and relaxation during pregnancy; these were developed by Clarke & Gross (6). In the third section, survey respondents ranked (on a Likert scale from 1 to 5, indicating very unsafe to very safe and 3 indicating unsure) their beliefs about the safety of both moderate and vigorous PA for mother and offspring; these questions were adapted from those previously published by Mudd and colleagues (23).

Statistical Analysis

All demographic variables were converted to dichotomous categorical variables. Participants were categorized by sex (male, female), self-reported PA (inactive, active), education (less than Bachelor's degree, Bachelor's degree or more), age (≤ 40 years, > 40 years), and prior pregnancy (≤ 40 years with no prior pregnancy (self or partner), > 40 years with no prior pregnancy). In

addition, PA and exercise beliefs and attitude variables were also converted to dichotomous variables. The Likert scale questions related to beliefs about importance of certain behaviors were dichotomized as either “important” (includes very important and somewhat important) or “not important/unsure” (includes unsure, somewhat unimportant, very important). Similarly, questions requiring ranking of safety beliefs were categorized as either “safe” (includes very safe and somewhat safe) or “unsafe/unsure” (includes unsure, somewhat unsafe, very unsafe).

Frequencies, in percentages of total sample, were calculated for agreement with statements or beliefs related to pregnancy PA importance and safety. Chi-square analyses were used to assess differences in agreement frequency by demographic category. Biserial point correlation was calculated to assess the relationship between age as a continuous variable and the dichotomous categorical variable of experiencing prior pregnancy (self for females or partner for males). For all analyses, $\alpha = 0.05$ was used to determine statistical significance and SPSS 25 software was utilized.

RESULTS

Demographic data describing the surveyed sample are shown in Table 1. The average age of those surveyed was 36.82 ± 13.69 years, and more than half of those had completed a Bachelor’s degree or more. More than half of the males (54.3%) in the sample met the ACSM Physical Activity Guidelines of 150 minutes per week of moderate or vigorous PA, while only 38.9% of females reported meeting the Guidelines. One responded did not answer the education question but answered all others and was thus excluded from the education analysis only; similarly, two respondents did not report their PA and were thus excluded from the PA analysis only.

Table 1: Demographic data for the sample is shown by sex, physical activity (PA), education, age, and prior pregnancy. Each variable was dichotomized and the overall number of respondents and percentage of the sample represented are shown.

		Number, (% of sample)
Sex	Male	184, (26.4)
	Female	514, (73.6)
PA	Inactive	397 (57.0)
	Active	299 (43.0)
Education	No Bachelor's degree	299 (42.9)
	Bachelor's degree or more	398 (57.1)
Age	≤40 years	390 (55.9)
	>40 years	308 (44.1)
Prior Pregnancy	≤40 years, never pregnant	330 (90.9)
	>40 years, never pregnant	33 (9.1)

Table 2 shows the percentage of respondents who agreed with eleven statements related to both the safety and benefit pregnant women and/or their babies receive from a mother’s pregnancy

PA or exercise. All significant differences were in the same direction for each category; that is, females, active, more educated, older, and those with pregnancy experience were more likely to agree with the statements regarding the benefits of PA and exercise. Only two questions of the eleven asked had no statistically significant variation in percent agreement in any category; these were ‘pregnant women will benefit from mild exercise’, in which no less than 97% of the sample agreed in any category, and ‘pregnant women will experience lower birth weight due to exercise’ in which no more than 15% of the sample agreed.

Table 2: Percentage of sample by category that agreed with each of eleven statements related to efficacy and safety of pregnancy PA/exercise.

% Agree that pregnant women...	Male	Female	Inactive	Active	No Degree	Degree	Age≤40	Age >40	Age ≤ 40, Age > 40,	
									Never pregnant	Never pregnant
Can continue regular exercise	84.8	89.9	86.6	91.0	86.3	90.2	83.6	94.8†	82.9	96.7*
Can begin exercising if never exercised before	66.3	63.6	64.7	63.9	56.9	69.8†	60.8	68.8*	60.5	66.7
Are Ok to continue to exercise even if tired/exhausted	25.1	21.0	18.9	26.5*	16.1	26.6†	22.1	22.1	24.0	23.3
Benefit more from regular exercise than irregular	94.0	91.6	90.9	94.0	90.6	93.5	90.3	94.8*	91.6	96.6
Benefit from mild exercise	97.8	99.2	99.0	98.7	98.0	99.5	98.7	99.0	98.5	100.0
Benefit from moderate exercise	82.1	80.5	78.0	84.9*	73.5	86.4†	82.5	78.9	82.9	76.7
Benefit from vigorous exercise	33.2	25.7	24.7	31.5*	23.5	30.7*	25.9	30.0	27.4	20.0
Feel more energetic if they exercise	88.0	94.4†	93.2	92.0	89.3	95.2†	89.7	96.4†	91.6	96.7
Experience improved labor and delivery if active	90.7	93.4	91.7	94.3	89.6	95.0†	91.8	93.8	91.6	96.6
Experience improved infant health due to exercise	84.6	86.5	86.4	85.5	82.4	88.7*	85.9	86.3	87.8	89.7
Experience lower birth weight due to exercise	11.5	11.5	10.6	12.5	11.1	11.8	12.9	9.8	14.8	6.9

Notes: Never pregnant refers to females who have never been pregnant and males whose spouse/partner have never been pregnant. *indicates statistically significantly different from alternate category (e.g. male different from female, inactive different from active), p<0.05. †indicates statistically significantly different from alternate category, p<0.01.

Because of the increasing likelihood of experiencing pregnancy as people age (point biserial Pearson correlation of r=0.725, p=0.00 for age and self/partner having ever been pregnant), a column labeled ‘never pregnant,’ analyzing percent agreement by age for only those who have never experienced pregnancy (themselves for females, their partner for males) is included in all analyses. In Table 2, the older group responded more favorably to four of the eleven statements. When those with prior experience with pregnancy were excluded (see right-most column in Table 2), the older group responded more favorably to only one statement. Table 3 shows females and younger adults were more likely to agree that pregnant women should rest and relax while active people were more likely to agree that pregnant women should be regularly active and maintain an active lifestyle during pregnancy.

Table 3: Percentage of sample by category that agreed it was either important or extremely important for pregnant women to engage in three different activity-related behaviors.

% believe important or extremely important for pregnant women to...	Male	Female	Inactive	Active	No Degree	Degree	Age≤40	Age >40	Age ≤ 40, Age > 40,	
									Never pregnant	Never pregnant
Rest and relax	67.8	78.2†	77.6	72.5	78.5	73.4	78.5	71.7*	80.6	73.3
Regularly exercise during pregnancy	67.4	71.8	67.0	74.5*	64.8	74.4†	71.2	69.2	72.9	70.0
Have active lifestyle during pregnancy	66.1	74.1	68.3	77.6†	70.9	73.4	74.9	69.2	77.6	66.7

Notes: Never pregnant refers to females who have never been pregnant and males whose spouse/partner have never been pregnant. *indicates statistically significantly different from alternate category (e.g. male different from female, inactive different from active), $p < 0.05$.

Similarly the percentage of respondents who agreed or strongly agreed that moderate or vigorous exercise during pregnancy was safe for the mother or the offspring is shown in Table 4. Females viewed moderate activity as safer when compared to males. Active people were more likely to believe moderate activity is safe for offspring and that vigorous activity is safe for both mother and offspring. Those with a college degree were more likely to believe pregnancy exercise is safe for all four intensity/group combinations, and the older group was more likely to agree that vigorous activity is safe for both mother and baby. However, there were no difference for age once those with prior pregnancy experience (themselves or partner) were excluded, as shown in the far right columns of Table 4.

Table 4: Percentage of sample by category who believed each statement was very or somewhat safe (e.g. ranked a 4 or 5 on Likert scale ranging 1 to 5).

% believe very or somewhat safe	Male	Female	Inactive	Active	No Degree	Degree	Age≤40	Age >40	Age ≤ 40, Age > 40,	
									Never pregnant	Never pregnant
Moderate activity safe for mother	78.8	89.9†	85.6	89.0	79.3	92.7†	86.4	87.7	88.2	80.0
Moderate activity safe for baby	76.1	84.0*	79.4	85.3*	73.1	88.4†	79.4	85.0	82.1	83.3
Vigorous activity safe for mother	42.9	39.1	33.2	49.2†	30.8	47.2†	35.6	45.8†	33.8	40.0
Vigorous activity safe for baby	35.9	34.1	29.2	41.6†	23.1	43.3†	31.0	39.1*	30.4	43.3

Notes: Never pregnant refers to females who have never been pregnant and males whose spouse/partner have never been pregnant. *indicates statistically significantly different from alternate category (e.g. male different from female, inactive different from active), $p < 0.05$. †indicates statistically significantly different from alternate category, $p < 0.01$.

DISCUSSION

Overall, we found some differences in attitudes and beliefs of non-pregnant individuals about pregnancy PA by sex, PA, education, and age. The greatest number of differences between categories was found with education, where non-pregnant individuals with college degrees more favorably viewed pregnancy PA in 12 of the 18 survey questions. Non-pregnant individuals who were physically active were also more likely to positively view pregnancy PA, as there was a significant difference by PA in 8 of the 18 questions. This suggests that promotion of PA during pregnancy may be more needed amongst individuals and communities with lower levels of education and self-reported . We hypothesized that males would view pregnancy PA less favorably than females simply because they do not and cannot experience pregnancy first hand, but we know of no data upon which to base this or any similar hypothesis. Overall, however, males did not view pregnancy PA differently than females. Non-pregnant females viewed moderate activity as more safe than males did, and were more likely to believe that pregnant women should rest and relax and that they would feel more energetic if they exercise. Older people were more likely to agree that vigorous activity was safe for mother and baby than younger people, though when experience with pregnancy was accounted for, those differences

did not persist. Finally, overall, non-pregnant individuals viewed moderate intensity PA more favorably than vigorous.

Per other research, pregnant women are much less likely to agree that vigorous exercise is safe compared to moderate (15, 23) and we found that same trend in our sample of non-pregnant men and women. Our data confirm the findings of others (16, 23) suggesting that those who are physically active themselves are more likely to have positive beliefs regarding pregnancy PA. Specifically, non-pregnant individuals who meet PA guidelines are more likely to positively view vigorous activity; they were more likely to believe that women gain some benefit from vigorous exercise (Table 2), believe vigorous intensity is safe for the mother, and believe vigorous intensity is safe for the offspring (Table 3).

Another important finding worth noting is that in general, non-pregnant individuals view pregnancy PA quite favorably. Very high percentages (in the 90% or greater) of respondents agreed that women can continue regular exercise, benefit from mild exercise, feel more energetic, and have improved labor and delivery if they are active during pregnancy, regardless of category examined (Table 2). Evenson & Bradley (16) previously used these statements to examine the beliefs and attitudes of pregnant women themselves. Similarly high numbers of pregnant women agreed with the statements; for instance, 94.3% of their sample agreed that PA and exercise during pregnancy might make a woman feel more energetic, while 97.9% believed pregnant women gain some benefit from mild exercise. These high levels of agreement with these statements indicate that public health messaging about pregnancy PA is, to at least some degree, changing attitudes and beliefs, at least as it relates to lighter intensity activity. In our sample, there was also a large discrepancy in the percentages of those who believed moderate versus vigorous activity was safe, which indicates a need for further education about safety of vigorous intensity activity during pregnancy in particular.

Though we hypothesized differently, the older group (those age ≥ 40 years) were more likely to agree that regular exercise is important and especially that vigorous exercise is safe, both for mother and offspring, during pregnancy. Once experience with pregnancy (i.e. females who had ever been pregnant or males whose spouse/partner had ever been pregnant) was accounted for, however, those age effects did not persist. Older versions of the PA Guidelines advised pregnant women to keep heart rates below 140 beats per minute, but that recommendation has since been changed (7). Women are no longer restricted by exercise heart rates but are instead encouraged to either begin or continue participating in moderate intensity exercise. Additionally, those who are vigorously active prior to pregnancy may continue. Thus we expected younger participants, who likely were never aware of the guideline to keep HR below 140 bpm because they were born after the guideline was changed, would be more likely to believe vigorous exercise is safe, but that was not the case. Data show that many healthcare providers do not discuss PA or exercise during pregnancy with their patients, and/or provide out-of-date information (4), so regardless of age, people may not be aware of appropriate guidelines regarding pregnancy PA.

This study does have some limitations, which include survey-based data collection technique, convenience sampling, and using only one question to assess whether participants met or did not meet PA guidelines. We relied on self-report for all data, which is open to bias and should be acknowledged. Further, the single question relating to self-reported PA did not differentiate between resistance exercise and aerobic exercise.

Overall, we found that education level, self-reported PA level, age, sex, and prior experience with pregnancy all impacted individual beliefs and attitudes about pregnancy PA. Further, promotion of vigorous intensity PA in particular should be emphasized. Our sample generally favorably viewed light and moderate activity or statements that were general in nature. The data suggest that education regarding safety (and efficacy) of pregnancy PA should be provided not only to pregnant women themselves but to their partners, friends, and family members who support them throughout their pregnancies, especially as it relates to higher intensity activity.

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