# How is Pregnancy Physical Activity and Related Factors Among Pregnant Women?

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**Abstract:** ***Background:*** The purpose of this study was to determine the modality, frequency, duration, and intensity of physical activity, as well as other characteristics associated to physical activity during pregnancy. ***Methods:*** A descriptive-analytic cross-sectional design was used. A total of 384 women from Turkey/ Istanbul who routinely frequented hospitals for prenatal care were chosen using convenience sampling. The demographic questionnaire and the Pregnancy Physical Activity Questionnaire (PPAQ-II) 2nd edition were used to collect data. The descriptive statistics, t test, ANOVA, Kruskal Wallis, and Post Hoc test were used to examine the data. P values 0.05 were considered significant. ***Results:*** The mean age of pregnant women was 27.92 ± 4.55 years. 243 (63.2%) of the participants were primigravidas. The mean age of gestational was 20.86 ± 10.78 weeks. The mean score of PPAQ (MET-hours/week) was 283.19 ± 167.85. Moderate activity had highest score (134.45±65.77), while vigorous activity had lowest score (7.07±22.83). The results showed, there was statistically significant differences between the score of PPAQ and number of child (p= 0.00). In fact there were significant mean differences among the each category of questionnaire; activity intensity and type (p= 0.00). ***Conclusions:*** The results of this study can be used in prenatal care routines, midwifery care education, and maternal health policies.

**Keywords:** Pregnancy Physical Activity, PPAQ, Turkey, Pregnant Women.

# INTRODUCTION

Physical activity (PA) is one of the most important determinants of quality of life. The appearance of a healthy pregnancy; it is influenced by the healthy lifestyle of the mothers and the phase before pregnancy (preconceptional).[1] Improper circumstances before pregnancy, inactivity during pregnancy, inappropriate metabolic conditions to maintain cholesterol levels ,[2] insufficient cardiovascular capacity,[3] put a strain on maternal and fetus health, leading to gestational diabetes, preeclampsia, and perinatal difficulties during pregnancy.[4,5] Studies have shown that regular PA has significant maternal and fetal health benefits.[6] Improved cardiovascular function, regulated weight gain during pregnancy, musculoskeletal pain, muscle cramps and edema of the lower extremities, mental stability, and reduced gestational diabetes and gestational hypertension are some of the maternal benefits. Reduced fetal fat, higher stress tolerance, and faster neurological development are among the fetal benefits. In addition, some studies explicitly addressing the effects of PA on labor and delivery show that PA reduces the incidence of surgical births and shortens the time of delivery in women with normal pregnancies.[4,7-13]

Like non-pregnant women, pregnant women can benefit from regular exercise to meet the increased metabolic needs of mother and baby during pregnancy, regardless of the physiological changes caused by pregnancy.[9]

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Therefore, all healthy women should be encouraged to have moderate-intensity PA regularly during their pre-pregnancy period.14 In addition, it was hypothesized that behaviors formed during pregnancy can have long-term positive effects on a woman's health.[15] The guidelines of the American College of Obstetricians and Gynecologists (Association) (ACOG) and the Centers for Disease Control and Prevention / American College of Sports Medicine (CDC / ACSM) both recommend 30 minutes or more of moderate activity, 3-5 days per week, but only ACOG and CDC / ACSM recommend any type of PA during exercise.[16-18]

The purpose of this study is to help pregnant women understand PA examples, their current status with chores and activities, and to help pregnant women construct realistic activity requirements. Despite the known benefits of physical activity, let's see how pregnant women are doing. If the results show that PA is safe for pregnant women, we want to develop an exercise program for Turkish pregnant women during pregnancy.

The aim of this study was to determine the level of physical activity during pregnancy. The relationship between demographic and obstetric factors and physical activity should also be explored.

# MATERIALS AND METHODS

## *Study Design*

**Selection and Description of Participants:** We used a cross-sectional descriptive-analytical strategy. To study physical activity and related traits in Turkish pregnant women, an appropriate sample of 384 pregnant women who made routine prenatal visits to hospitals was selected.

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For the sampling, a sample was drawn from each of the hospitals at random and in proportion to the population of the center using an acceptable sampling method. People who met the eligibility criteria completed the demographics / pregnancy and physical activity questionnaires. Exclusion criteria were a history of premature rupture of the skin, a history of premature birth (premature birth), a history of abortions, bleeding (repeated in the second quarter), placenta previa, intrauterine growth retardation, high blood pressure during pregnancy, cardiovascular / lung / and epilepsy, type -I diabetes, twin and multiple pregnancies, insufficient weight gain during pregnancy, and a history of medical conditions.

Study inclusion criteria included study participation, informed consent, residency in Istanbul, and pregnant women in all trimesters of pregnancy. Participants were assessed during all three trimesters.

## *Demographic Characteristics Questionnaire*

The data was collected using a questionnaire created by researchers that asked about demographic and obstetric characteristics of the pregnant woman, such as mother's age, educational level, professional status, number of pregnancies and pregnancy trimesters.

## *Pregnancy Physical Activity Questionnaire*

The Physical Activity Pregnancy Questionnaire (PPAQ), a self-reported questionnaire that assesses the type, duration, and frequency of PA in pregnant women. The questionnaire consists of 36 questions, which are divided into six values and seven dimensions. Sedentary activities (activities) (5 questions), low-intensity (9 questions), medium-intensity (13 questions), high-intensity (2 questions), household activities (12 questions), work-related activities (5 questions), and sport-related activities (5 Questions) belong to the dimensions of the questionnaire (9 questions). Each activity is divided into three categories: inactive (immobile) (1.5 MET), light (1.5-3.0 MET), moderate (3.1-6.0 MET) and vigorous (> 6.0 MET ) as well as type, d divided into three categories: home / care, work and sport / sport. To calculate the average weekly energy expenditure, the time spent on each reported activity was multiplied by the intensity of the activity (MET h. Week 1). Chasan-Taber *et al*. validates the PPAQ.[19]

Cirak *et al*. (2015) discovered Cronbach alpha (0.961) and acquired formal approval to use the scale in PPAQ validity and reliability assessments of the Turkish version. The correlation coefficients between the classes have a reliability value.[20] Cronbach alpha was found to be 0.772 in our research.

**Statistics:** The data were evaluated using the Statistical Package for the Social Sciences (SPSS, SPSS Inc., Chicago, IL, USA), Version 22.0. Demographic / obstetric variables and PPAQ variables were given descriptive statistics (means, standard deviations, and frequency distributions). To assess the differences between physical activity and demographic variables such as gestational age and education, a one-way ANOVA and a t-test were used. The post hoc Least Significant Difference LSD test was used to identify whether the subgroup was significant after assessing fit to normal in comparisons of more than two subgroups using one way analysis of variance of ANOVA. A two-way anova was used to find differences between trimesters and activities. A post hoc LSD test was performed again based on the significance factor. A Student's t-test was used to compare two sets of categories. P values of 5% were considered significant.

**Ethical Considerations:** This study concept was approved by the Istinye university ethics committee before the data was collected (with No. 20-01). All participants signed a declaration of consent.

# RESULTS

This study included 384 pregnant women. The age range of the participants ranged from 18 to 43 years with a mean standard deviation (SD) of 27.92±4.55 years. 53 percent of the participants had a university education. Majority of the women were housewives. In terms of obstetric history, 243 (63.2%) of the subjects were Primigravidas. The majority of women (n = 147, 38.2%) were in the first trimester. The mean gestational age was 20.86±10.78 weeks. In addition, all women had uncomplicated pregnancies. The results of the one-way ANOVA and the t-test, as well as the physical activity score, showed statistically significant differences between the PPAQ score and the number of children (p= 0.00) (**Table 1**).

The mean total PPAQ score (MET hours / week) was 283.19±167.85. (min: 49.70, max: 1093.46). Moderate exercise had the highest score on the activity intensity dimensions (134.45±65.77), while strenuous activity was the lowest (7.07±22.83). There were statistically significant variations in the dimensions of activity intensity (p = 0.001). The household had the highest score for activity dimensions (153.08±110.02) while it had the lowest score (22.88±41.69). There were significant differences between the different types of activity dimensions (p = 0.05) (**Table 2**).

In addition, there were no statistically significant changes between the total amount of physical activity during pregnancy and the pregnancy trimesters (**Table 3**) and between the activity intensity / type of activity and the pregnancy trimesters (p = 0.16 and p = 0.42, respectively). However, there were considerable differences in mean values between the individual questionnaire categories; Exercise intensity and type (p= 0.00).

**Table1:** Differences among demographic and obstetric characteristics and PPAQ (MET-h/week) scores (n = 384).

| Personal characteristics | n | Mean ± SD | P-Value |
|---|---|---|---|
| **Age** | | | **0.21**** |
| < 30 | 270 | 273.78±170.46 | |
| ≥ 30 | 114 | 313.55±157.58 | |
| **Educational level** | | | **0.22*** |
| No formal education/ primary school | 24 | 240.49±68.67 | |
| Secondary school | 63 | 353.53±115.38 | |
| High school | 95 | 319.50±232.69 | |
| University | 202 | 270.78±161.28 | |
| **Gravidity** | | | **0.08*** |
| First pregnancy | 243 | 260.96±173.65 | |
| Second pregnancy | 72 | 337.19±175.09 | |
| Third pregnancy or more | 69 | 296.03±126.73 | |
| **Number of child** | | | **0.00*** |
| No child | 185 | 222.13±140.04[a] | 0.00[a-b] |
| < 2 | 184 | 336.88±175.37[b] | 0.02[a-c] |
| ≥ 2 | 15 | 367.91±146.28[c] | 0.62[b-c] |
| **Employment** | | | **0.40**** |
| Housewife | 219 | 273.32±163.38 | |
| Employed | 165 | 296.42±174.05 | |
| **Gestational age** | | | **0.46*** |
| First trimester (14>) | 147 | 260.79±129.05 | |
| Second trimester (14-28) | 142 | 298.02±199.85 | |
| Third trimester (28<) | 95 | 293.45±170.16 | |

**PPAQ: Pregnancy Physical Activity Questionnaire** *** One way Anova** **** T-test** **a-b,a-c,b-c Post-hoc test**

**Table 2:** Descriptive statistics for pregnancy physical activity questionnaire (n = 384).

| PPAQ** dimentions | Mean ± SD | P-value |
|---|---|---|
| **Activity intensity** | | **< 0.001*** |
| Sedentary | 41.13±23.81 | |
| Light | 134.45±65.77 | |
| Moderate | 100.54±96.87 | |
| Vigorous | 7.07±22.83 | |
| **Type of activity** | | **<0.001*** |
| Household/caregiving | 153.08±110.02 | |
| Occupational | 46.88±59.07 | |
| Sports/exercise | 22.88±41.69 | |

**Table 3:** Description of PPAQ according to intensity and type of activity by pregnancy trimester among women (n=384).

| Total energy expenditure | First Trimester | Second Trimester | Third Trimester | P-value |
|---|---|---|---|---|
| Activity intensity | | | | 0.16* |
| Sedentary | 42.57±23.19 | 42.63±28.08 | 37.63±18.80 | |
| Light | 123.18±59.40 | 140.27±73.55 | 141.48±63.19 | |
| Moderate | 92.12±78.76 | 103.00±107.69 | 108.00±104.85 | |
| Vigorous | 2.91±8.18 | 12.12±35.01 | 6.33±15.29 | |
| Type of activity | | | | 0.42* |
| Household/caregiving | 139.52±107.44 | 152.66±107.86 | 170.16±115.57 | |
| Occupational | 51.45±58.29 | 50.88±68.26 | 36.68±47.46 | |
| Sports/exercise | 13.25±22.78 | 30.31±53.53 | 26.05±42.62 | |
| **Total** | 260.79±12.90 | 298.02±199.85 | 293.45±170.16 | 0.46* |

* kruskal wallis

# DISCUSSION

## *Key Results*

Regular PA has been shown to have considerable benefits for maternal and fetal health in studies.[6] The findings of this study revealed the optimal length of physical activity for pregnant women. But it could be due to the small sample size and not among all of Turkish pregnant women.

## *Physical Activity Status Among Pregnant Women*

According to the results of this study, the PPAQ score in Turkish pregnant women was 283.20±167.85 (min: 49.70, max: 1093.46) MET-hours / week. Compared to previous studies, pregnant Taiwanese people achieved 34.8-36.4 (MET-hours / day),21 pregnant American women 32.6-33.8 (MET-hours / day),22 and pregnant Portuguese 270, 91, 220.54, 210.35 (MET hours / week) from the first to the second trimester of pregnancy.23 Compared to other research, our results showed the greatest physical activity in pregnant women. According to ACOG / CDC guidelines, 30 minutes or more of moderate exercise, 3-5 days per week, is recommended. The results of this study indicated the optimal length of exercise for pregnant women.

In addition, we found that pregnant women devote the most energy to activities that were classified as mild by the level of physical activity and that were performed most frequently, while intense activities were observed relatively infrequently. Compared to previous studies, it was shown that the most common physical activity in pregnant women in terms of intensity was light and heavy physical activity was rare.[24] Cultural considerations can explain why pregnant Turkish women, overall, have slightly more physical activity than the rest of their community.

In our study, household / caregiving activities accounted for most of the time and exercise / sport accounted for the least when it came to type of activity during pregnancy. Nascimento *et al*.[24] found the same results, with activities at home being the most active and sports / exercise the least. In the current study, there were no significant differences between the types of activity and the pregnant trimester. Santos at el. Found significant differences in household / caregiving, occupational/transportation and PPAQ, which decreased from the first to the second trimester.[23] This might could be due to demographic considerations. For example, the vast majority of our participants were housewives.

## *Factors Affecting Physical Activity*

We discovered a significant association between the characteristics / obstetric factors; having a child and mean PPAQ ($p = 0.00$) in the current study. This association showed that women without children spent less time on PPAQ than women with one or more children. However, several other studies found the opposite. For example, the results of a study in southern Brazil showed a significant relationship between education, employment during pregnancy, primary care and PPAQ in women.24 Again, cultural considerations can explain why pregnant Turkish women, in any scenario, have the majority of normal daily activities that must also be performed during pregnancy.

## *Physical Activity Status Among Pregnancy Trimesters*

In the current study, there were no significant differences between the trimester of pregnancy and the total PPAQ and the intensity / type of physical activity. It has also been documented in other studies. Lee *et al*. found no variations in total energy expenditure or energy expenditure with activity intensity, suggesting that these expenditures were comparable for individuals in the first,

second, and third trimesters.21 According to several studies, the average total activity rates in the household did not fluctuate significantly during pregnancy.25,26 Lee *et al*. found significant changes in household / caregiving and professional time women spend in different trimesters.[21] Santos *et al*. however, discovered a significant drop in total PA levels, especially from the first to the second trimester of pregnancy.[23] According to Borodulin *et al*. total physical activity decreased between the second and third trimester ($p<0.001$).[16]

# CONCLUSION

Pregnancy can have a significant impact on physical activity. Therefore, health care professionals should encourage healthy pregnant women to become more active during pregnancy and efforts should be made to provide opportunities for prenatal classes to maintain or improve physical activity.

## *Study Limitations*

The lack of relevant research and the use of different types of physical activity questionnaires in pregnant women to compare with the results obtained was a major drawback of the current study.

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