

Changes in Leisure-Time Physical Activity From the Prepregnancy to the Postpartum Period: 2004 Pelotas (Brazil) Birth Cohort Study

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Background: The aim of this study was to evaluate changes in leisure-time physical activity (LTPA) and its correlates from prepregnancy to the postpartum period in mothers enrolled in a Brazilian birth cohort study. Our hypothesis was that LTPA would decline considerably during pregnancy. **Methods:** Maternal LTPA in the 3 months before pregnancy and during each trimester of pregnancy was assessed soon after delivery. A follow-up visit was conducted 3 months later. Weekly frequency and duration of each session of LTPA in a typical week were assessed for each period and a cut-off point of 150 minutes per week was used to classify women as active or not. **Results:** The proportion of women active in leisure time declined from 11.3% in the prepregnancy to 2.3% in pregnancy and 0.1% in the postpartum period (P for trend <0.001). When considering any LTPA practice, the decline ranged from 15.4% to 4.4% and 7.5% (p for trend <0.001), respectively. Higher income, higher education and lower parity were the main predictors of LTPA practice. **Conclusions:** LTPA declined considerably during pregnancy and did not return to prepregnancy levels at 3 months postpartum. Mothers must be advised on the benefits of LTPA prepregnancy, during, and postpregnancy.

Keywords: motor activity, exercise, follow-up studies, women's health

Evidence suggests that physical inactivity during pregnancy and the postpartum period has long-term deleterious consequences for maternal health, leading to increased weight gain and increased risk of chronic diseases.¹⁻⁵ Therefore, the need to achieve and maintain the recommended levels of physical activity is particularly relevant to women in the childbearing years.⁶⁻⁹

The American College of Obstetricians and Gynecologists guidelines for exercise during pregnancy and the postpartum period indicate that, in the absence of medical complications, women should engage in moderate-intensity physical activities for at least 30 minutes every day or almost every day during pregnancy. Guidelines also state that after delivery, prepregnancy physical activity may be resumed gradually as soon as it is physically and medically safe.⁶

However, pregnancy is a period associated with several psychological, behavioral and biological changes that may contribute to the adoption of more sedentary behaviors, leading to a decrease in overall physical activity among women.¹⁰⁻¹² Accordingly, results of previous studies have reported that pregnant women are less active than nonpregnant women, and that as pregnancy progresses, leisure-time physical activity (LTPA) levels decrease.¹²⁻¹⁷

Studies from high-income countries also indicate that few women resume or start a regular physical activity program in the postpartum period.^{18,19} Even after the immediate postpartum period has passed, over, half of the women report less physical activity in the postpartum period compared with their prepregnancy levels.²⁰ Low-income and low education women, those with more kids, and those who were inactive before pregnancy are at high risk for inactivity.¹²⁻²⁰

In low and middle income countries studies that evaluated changes in LTPA levels and its correlates from prepregnancy to the postpartum period were not found. This study was aimed at assessing the change in LTPA and its correlates from the prepregnancy to the postpartum period among mothers enrolled in the 2004 Pelotas (Brazil) Birth Cohort Study. Our hypothesis was that LTPA would decline considerably during pregnancy.

Methods

In 2004, all maternity hospitals located in Pelotas, southern Brazil, were visited daily and the births identified. Those live births whose family lived in the urban area of the city were examined and their mothers interviewed soon after delivery ($n = 4189$). The refusal rate was 0.75%. At that occasion, women's LTPA practice was evaluated in the 3 months before pregnancy and during each trimester of pregnancy. When children were 3 months old, the mother/guardian was interviewed again²¹ and women were asked about their usual behavior during leisure time with respect to physical activity since the child was born. The follow-up rate at this visit was 94.2%, totaling 3946 women. For the purpose of this study, only data from mothers of singletons were analyzed ($n = 3906$).

LTPA was assessed using a structured questionnaire that evaluated the type, frequency and mean duration of each session of physical activity in a typical week in each period. Women were asked not to report commuting, household or occupational activities. The total LTPA score was generated by the sum of minutes per week spent on each physical activity. A cut-off point of 150 minutes per week was used to classify women as active or not in each period.⁶ The study instrument was tested in a pilot-study but not validated by the authors.

Two outcomes were used in the present analysis: (a) a dichotomous variable that considered the weekly amount of LTPA to categorize women as active or not according to current guidelines of 150 minutes per week; (b) a dichotomous variable for 'any LTPA'

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regardless of weekly amount. The independent variables studied were maternal age, family income (categorized into quintiles, where the first quintile corresponds to the poorest families), schooling (number of years of formal education), and parity.

The prevalence of LTPA was calculated for each period and its temporal trends were evaluated. Chi-square test for linear trend was used to compare the proportions. To identify correlates of physical activity in each period, the proportion of active women was described according to the subgroups of the independent variables and confidence intervals were calculated. Finally, the prevalence of LTPA according to the independent variables and its equivalent percent changes were also estimated for each transitional period (prepregnancy to pregnancy, pregnancy to postpartum, and prepregnancy to postpartum). A chi-square test for difference in proportions across periods was used to verify significant changes. All analyses were performed in Stata version 12.0 and statistical significance was set at $P < .05$.

The study was approved by the Medical Research Ethics Committee of the Federal University of Pelotas under the protocol number 4.06.01.116. The interviews were conducted only after informing mothers of the study objectives and a signed informed consent was obtained. A special consent form, to be signed by parents or guardians, was prepared for mothers aged < 18 years, in accordance with recommendations from the Ethical Committee.

Results

A total of 3906 mothers were included in the present analysis, of which 67.6% were aged between 20 and 34 years, 43.7% had 9 or more completed years of schooling and 39.4% were primiparous. Figure 1 shows that the proportion of women considered physically active in leisure time steadily declined from 11.3% in prepregnancy to 0.1% in the postpartum period (P for trend < 0.001). When considering the prevalence of any LTPA, we observed a decreased from 15.2% in the prepregnancy period to 7.4% in the postpartum period (P for trend < 0.001).

Figure 2 presents the prevalence of LTPA (≥ 150 minutes/week) according to the independent variables. Older women were

more likely to be active in the prepregnancy period, but the same was not observed in the pregnancy period, in which all groups had very low numbers. High-schooling and high-income were related to higher LTPA levels in the prepregnancy period. Parity was inversely related to LTPA levels in the prepregnancy and pregnancy periods. Declines in LTPA were statistically significant in all subgroups of the independent variables (age, income, schooling and parity). In the postpartum period, virtually all women were inactive (0.1%), and therefore, we opted not to present these numbers in the figure.

The same analysis was conducted for 'any LTPA' and findings are shown in Figure 3. The prevalence of any LTPA in the total sample declined approximately 51.9% from the prepregnancy to the postpartum period. Declines were statistically significant in all subgroups analyzed, except for those belonging to the poorest income quintile. Before pregnancy, the same pattern of association was observed for any LTPA. However, in the pregnancy and postpartum periods, a positive association of any LTPA with family income and schooling, and an inverse relation with parity, were observed.

Adjusted analyses were also conducted, but because the findings were similar to the unadjusted ones, we opted not to display them here (data available upon request). Regarding the association between LTPA and parity, an inverse association was observed in all the 3 periods in the unadjusted analysis, but after the adjustment for the effect of the other variables (age, family income and schooling) it remained only significant in the prepregnancy and pregnancy periods.

Discussion

We evaluated changes in LTPA patterns from the prepregnancy to the postpartum period, among approximately 4000 mothers enrolled in a birth cohort study in southern Brazil. LTPA declined from prepregnancy to pregnancy, and did not return to prepregnancy levels in the postpartum period. Only 5 women (0.1%) were considered physically active in leisure time in the postpartum period. Even when considering the prevalence of any LTPA, the proportion of active women declined over 50% from the prepregnancy to the postpartum period.

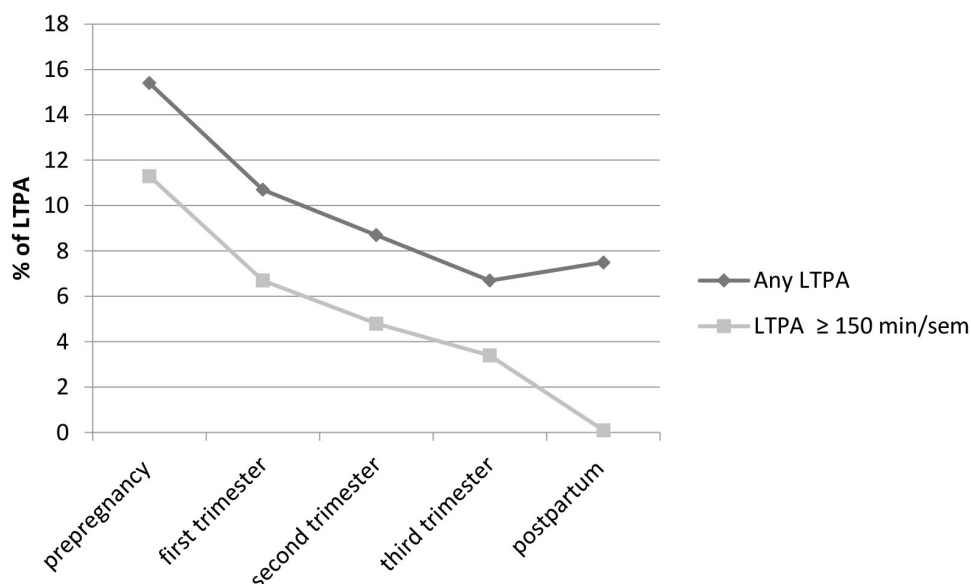


Figure 1 — Time trends in leisure-time physical activity from prepregnancy to the postpartum period; Pelotas, Brazil.

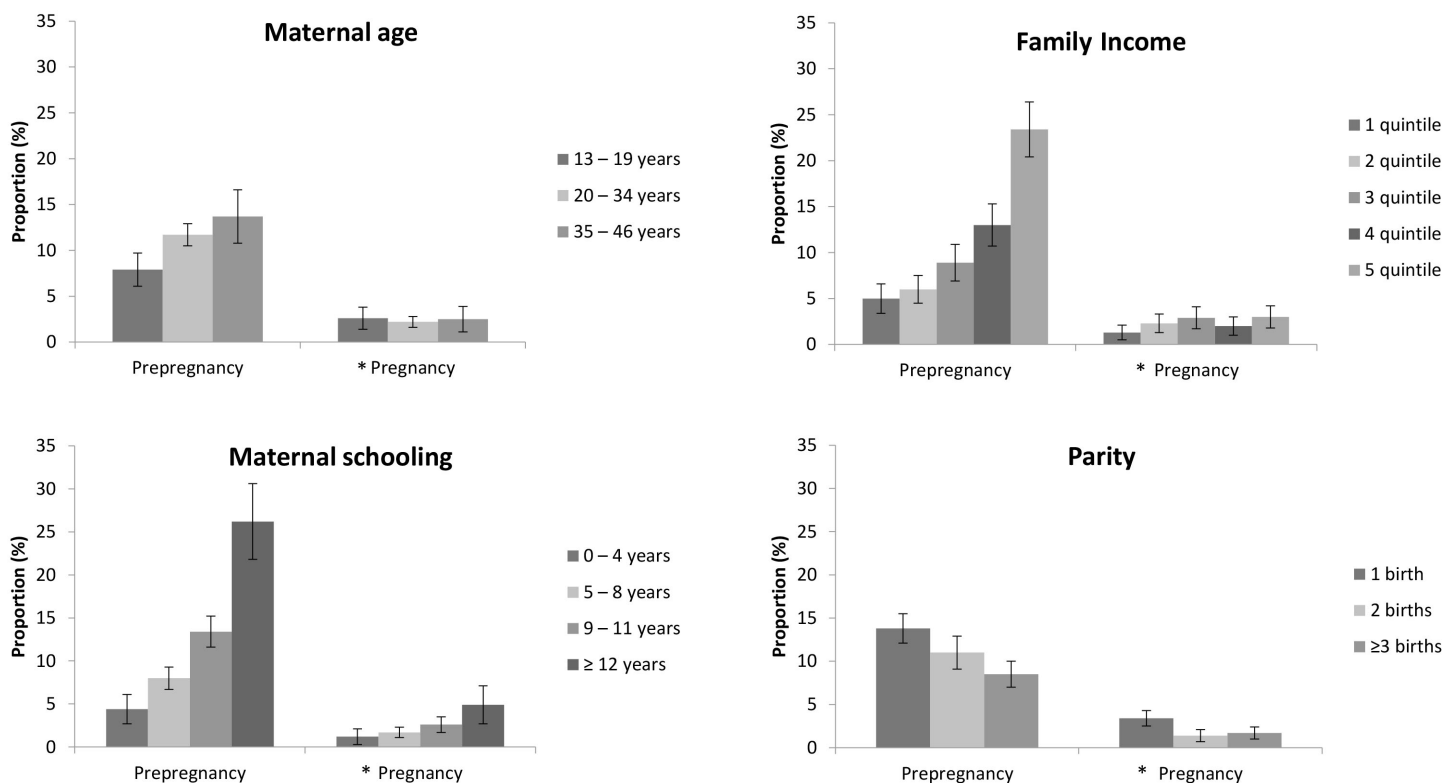


Figure 2 — Prevalence of physical activity (≥ 150 min/week) according to independent variables; Pelotas, Brazil. * LTPA (≥ 150 min/week) in all pregnancy trimesters.

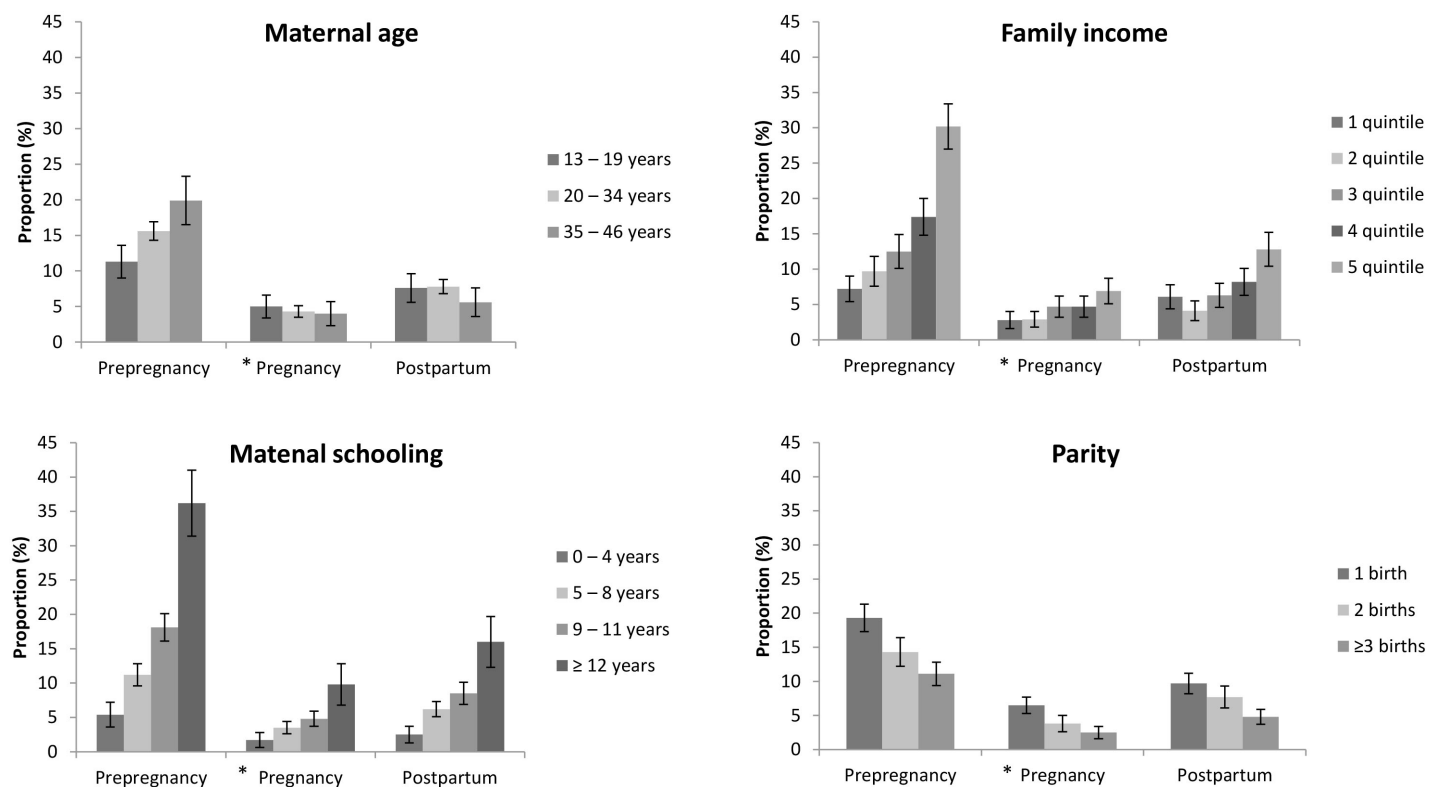


Figure 3 — Prevalence of any physical activity according to independent variables; Pelotas, Brazil. * Any LTPA in all pregnancy trimesters.

Other studies have also observed a decline in LTPA levels from prepregnancy to pregnancy, and from prepregnancy to the postpartum period.^{11,13,20} In Canada, Fell et al observed a large decline in sports and exercise participation during the first 20 weeks of pregnancy compared with the year before pregnancy in 1737 women enrolled in a prospective cohort study.¹¹ Similarly, in a cross-sectional study conducted in Spain, recommended levels of LTPA decreased from 27.5% in the year before pregnancy to 19.4% in the first half of pregnancy among 1175 healthy pregnant women.¹³ The authors found a general reduction in the frequency, intensity and duration of all leisure time physical activities during pregnancy.

Regarding changes from prepregnancy to the postpartum period, Pereira et al found that leisure time physical inactivity increased from 12.6% before pregnancy to 21.7% at 6 months after delivery in a cohort study of 1442 pregnant women and their offspring conducted in the United States.²⁰ Therefore, our results are consistent with those of others studies conducted in different countries, indicating that LTPA levels decline during pregnancy and few women return to their prepregnancy exercise routines after delivery.

These findings are even more concerning if we consider that such declines may persist beyond the postpartum period. Because physical activity in the postpartum period is recommended, and is an essential contributor to maternal health, the decline observed here is particularly relevant and may have long-term consequences on the risk of chronic diseases.^{1–5,22–25}

In the current study, the main correlates of LTPA practice were higher income and education and lower parity. These findings are in accordance with previous studies from high-income countries.^{12,26,27} In a review paper on the correlates of exercise participation during pregnancy, Gaston & Cramp observed that higher educational and income and not having other children at home were consistent predictors of higher exercise participation during pregnancy.¹² In the postpartum period, Vladutiu et al found that a lower chance of participation in leisure-time moderate-to-vigorous physical activities was associated with lower education and income.²⁷ An interesting finding was that older mothers were more active in the prepregnancy period, but younger mothers tended to be more active in the postpartum period, suggesting their recovery time might be shorter than that of older women.

Among the limitations of the current study we must highlight the following issues: (1) the retrospective assessment of LTPA could result in recall bias. However, we understand the retrospective component of our study is acceptable, because in the worst case scenario mothers had to report their activity levels 12 months before the interview date (pregnancy LTPA); (2) the instrument used to measure LTPA was not validated against a reference method, and therefore, it does not allow direct comparisons to other studies; (3) we did not collect data on occupational, commuting or household physical activities, and therefore our prevalence of active mothers could be underestimated. However, previous studies on this topic also focused on LTPA only.¹¹

In addition to these limitations it should be noted that the lack of information about the intensity of LTPA was a decision of the researchers based on 2 main factors: (a) standard intensity parameters, such as heart rate or maximum oxygen consumption (VO_2max) are not suitable for pregnant women; (b) the use of intensity prompts (amount of moderate-intensity or vigorous-intensity activities) would not be ideal in a retrospective analysis—women might know how much they exercised some months ago, but probably not the intensity in which these activities were carried out. The list of activities we used would allow taking the mean MET value of each activity according to the Compendium of Physical

Activities.²⁸ However, we opted not to use this intensity indicator because in trend analysis, a single activity practiced at 2 different intensities would have the same MET value. For example, a woman could run at 6 miles per hour in the prepregnancy period and at 4 miles per hour at the postpartum period. Because our questionnaire only asked about running, and not about the speed, we would not be able to differentiate the intensity of these 2 activities.

Another issue to be considered is that women do have different recovering periods after delivery, which is a little longer for those delivering through caesarean section. However, it is important to highlight that the postpartum interviews took place at least 13 weeks after delivery, therefore minimizing the effect of the recovery period on our estimates.

Among the strengths of this study, stands out the fact that we use data from a large population-based prospective cohort study with a high response rate. A longitudinal study allows us to understand behaviors using a life course perspective, showing how each period (pregnancy, pregnancy and postpartum) may influence changes in LTPA. Describing data from a middle-income country is also a fortress of our study, because most previous articles on the topic were derived from high-income settings.

Conclusions

In summary, our results showed that pregnancy leads to significant declines in LTPA that persisted in the postpartum period, as well as highlighted some characteristics that should be taken into account when designing physical activity interventions for women. Antenatal care providers should advise the mothers on the importance of LTPA engagement during pregnancy and the postpartum period. Further studies are needed to help understand the reasons for such dramatic declines in LTPA, particularly in light of all the evidence about the benefits of physical activity for the mother and the newborn.

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