



Associated factors to physical activity practice in leisure in postpartum women

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ABSTRACT

Introduction: Brazilian studies on physical activity practice are scarce, especially in postpartum women. **Objective:** To investigate factors associated with the alterations in the physical activity practice in leisure (LPA) in postpartum women. **Methods:** Four hundred and seventy-eight women, age range of 15-45 were recruited and followed for nine months postpartum in a prospective study with four follow ups (15 days; 2; 6 and 9 months). The LPA was defined as a dependent variable and measured through a score. The designing of scores was based on the application of a validated questionnaire, which includes five questions concerning physical activity at work and six concerning LPA. The main co-variables investigated were skin color; age; total family income; parity and type. The data were analyzed using models of longitudinal linear regression with mixed effects. **Results:** It was observed that 82.4% of the women practiced some degree of physical activity in postpartum leisure. The highest means of score for LPA at the nine months postpartum were observed among mixed color (2.41), older than 30 years (2.44) and with three children or more (2.44) women. The factors which remained associated with the most practice of LPA in the multivariate model were black and mixed skin color [(white/black $\beta = 0.0925$; white/mixed $\beta = 0.1114$)]; the oldest age ($\beta = 0.0157$); the lowest total family income ($\beta = 0.0001$); the highest parity ($\beta = 0.1708$) and the kind of birth c-section ($\beta = -0.1058$). **Conclusions:** Black and mixed, older and with higher parity women present the highest score of LPA in the postpartum period in the studied sample.

INTRODUCTION

Sedentarism is an undesirable condition and represents a health risk. Several studies have already pointed out an inverse association between more active life style and lower death probability, as well as better life quality⁽¹⁻³⁾.

Conversely, countless investigations have already confirmed the importance of physical activity practice in health promotion, life quality and prevention and/or control of many diseases, besides contributing for the reduction of morbid mortality⁽¹⁻⁴⁾. Studies as

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the one by Sternfeld *et al.* (1995)⁽⁵⁾ also showed that the maintenance of regular practice of physical exercises or sport consists in a protecting factor over women's mental and emotional health during pregnancy and postpartum. According to Carvalho *et al.* (1997)⁽⁶⁾, individuals physically capable and/or trained tend to present lower incidence of chronic-degenerative diseases, which may partially be explained by the many physiological and psychological benefits derived from regular practice of physical activity.

In past decades, pregnant women were advised to reduce their activities, especially during the final stages of pregnancy, due to the belief that exercising would increase the risk of premature labor through stimulation of uterine activity. However, in the middle of the 90's, the American College of Obstetricians and Gynecologists (ACOG)⁽⁴⁾ acknowledged that regular physical activity practice during pregnancy should be developed as long as the pregnant woman presented suitable physical fitness, after specialized medical evaluation.

In pregnant women, the aims of physical activity practice include maintenance of physical fitness and health, decrease of pregnancy symptoms, prevention, reduction of premature and surgical deliveries, better ponderal control and faster recovery in immediate postpartum⁽⁷⁻⁹⁾. The recommendations for women at postpartum are based on some randomized essays which tested the effect of postpartum weight control programs and suggest to avoid the beginning of more intense physical activities before the end of the first month⁽¹⁰⁻¹¹⁾. Weight retention is one of the most serious epidemiological problems in this group of women. Besides being associated with gestational weight gain, parity, age, marital status and skin color, it has also been related with lifestyle, including practice of physical activity⁽¹²⁻¹³⁾.

Studies which investigated factors associated with postpartum physical activity are still scarce. Within this context, the present investigation had the aim to identify factors associated with leisure physical activity practice in women followed during nine postpartum months.

METHODS

Recruiting and selection of participants, eligibility criteria and losses pattern

Four hundred and seventy-eight women were recruited and followed for nine postpartum months, in a follow-up study performed in Rio de Janeiro county, between May, 1999 and April, 2001.

The study's design involved four follow ups: at the 15th day; 2, 6 and 9 months approximately, moments in which all data were collected. The women were recruited in two distinct places, namely: in the local central maternity during the pre-natal routine, and during the BCG immunization routine at the County Health Center itself.

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The eligibility criteria established for the cohort entrance were: to be between 15 and 45 years of age; to have less than 30 postpartum days at the first interview day; to be free of chronic diseases; to have gestational age ≥ 35 weeks at birth; not to present gemelar pregnancy and to live in the study's programmatic area.

The losses pattern was evaluated considering the final follow-up rate distribution (number of women with complete segment/number of women who entered the cohort), according to several important co-variables (age group and income in reais). Differences in the final rates of follow-up were evaluated according to the qui-square test for proportions.

The project was submitted and approved by the Ethics Committee of the Nucleus of Collective Health Studies (NESC), of the Rio de Janeiro Federal University (UFRJ), and is according to the ethical principals of non-maleficence, beneficence, justice and autonomy, found in the Resolution 196/96, of the National Health Committee⁽¹⁴⁾. All participants signed a consent form which was free and spontaneously obtained after necessary explanations were given.

Dependent and independent variables

The dependent variable established in this study was the leisure physical activity, being verified through a score. The score was based on the application of a validated questionnaire⁽¹⁵⁾, which included five questions concerning labor physical activity and six questions concerning leisure physical activity. Each answer option is equivalent to specific points and the scores are calculated through the point's addition. Thus, the higher the score, the greater the energetic cost.

Socio-demographic and reproductive independent variables were included in the analysis, namely: maternal age (15-19, 20-28, ≥ 30 years); total family income in quartics (< 281.0; 281.0-478.5; 478.6-842.9; ≥ 843.0 reais); marital status (married, in a stable relationship, single); skin color (white, brown, black); ability to read a letter (yes, no); smoking habit (yes, no); work during pregnancy (yes, no); parity (1, 2, ≥ 3 children); age at the first delivery (in years); type of delivery (vaginal, cesarean section) and gestational age at birth (< 37, ≥ 37 weeks).

Statistical analysis

The statistical analysis was done in steps. Initially, the means and standard deviation for continuous variables as well as frequency and trustworthiness interval of 95% (CI 95%) for the category variables were calculated. The second step involved the calculation of the means and CI 95% for the leisure physical activity score throughout the time according to categories of selected variables.

Finally, the data were analyzed using mixed-effects longitudinal linear regression models in order to investigate the effect of potential predictors of leisure physical activities practice during nine postpartum months. The longitudinal nature of the study allowed us to describe the leisure physical activity pattern along the time.

The variable score of leisure physical activity practice was analyzed as dependent variable through the *lme* routine of the SPLUS 2000® program. The postpartum time and a quadratic term of the postpartum time were included in all models.

Initially, a bi-varied model which includes the postpartum time and the quadratic postpartum time, as well as each one of the variables potentially associated with the leisure physical activity was adjusted. The variables which presented p valor < 0.20 in this step were selected in order to compose the multivariate model.

The multivariate model was obtained through the *backward* procedure with elimination of the variables with p valor > 0.05. The choice of the best model was based on the global criteria as the *Akaike Information Criterion* (AIC) and the *log Likelihood* (logLik).

RESULTS

Selective loss was not observed when the 478 women who entered the cohort and the 313 who reached the fourth and last

follow-up were compared, concerning several variables such as maternal age, weight, parity and gestational age (results not presented).

Table 1 shows the means and the frequency distribution according to selected variables. The majority of women participating in the study was mixed (45.2%) and was in a stable relationship (57.9%). The mean of income was R\$ 652.80 and educational background was 6.8 years.

TABLE 1
Mean and distribution of the frequency of variables selected in postpartum women. Rio de Janeiro, 1999-2001

Variables	n	Mean	Standard Deviation
Age (years)	478	25.0	6.4
Maternal weight (kg)	478	62.0	12.6
Total family income (reais)	478	652.8	671.5
Parity (number of children)	352	2.0	1.5
Gestational age (weeks)	422	38.6	1.93
Educational background (years)	422	6.8	3.3
	n	%	CI 95%
Marital status			
Single	121	25.3	21.5-29.5
Married	80	16.8	13.5-20.4
In stable relationship	277	57.9	53.4-62.4
Skin color			
White	171	35.8	31.5-40.3
Black	91	19.0	15.6-22.8
Brown	216	45.2	40.7-49.8
Ability to read a letter			
With easiness	358	84.8	81.1-88.1
Cannot read	64	15.2	11.9-18.9
Smoking			
Yes	74	15.5	12.4-19.0
No	404	85.5	81.0-87.6
Type of Delivery			
Natural	219	63.6	57.8-68.2
Cesarean	128	36.3	31.8-42.2
Abortion			
Yes	120	34.0	29.1-39.3
No	232	66.0	60.7-70.9

Table 2 presents the means and the trustworthiness interval 95% for the leisure physical activity score according to the selected variables. All means tend to increase during the postpartum period, showing hence that the leisure physical activity increases based on postpartum time. Black and mixed women presented the highest means of score for leisure physical activity at nine postpartum months (2.41 and 2.36, respectively) in group with women at 30 to 45 years (2.44; IC 95%: 2.20-2.67) and women with 3 or more children (2.44; IC 95%: 2.24-2.65).

Table 3 shows the bi-varied coefficients of longitudinal regression between the leisure physical activity score and the several potentially associated variables. The variables eligible to the final model included: skin color [(white/brown $\beta = 0.1535$; p value = 0.0004); (white/black $\beta = 0.0802$; p value = 0.0170)]; total family income (reais, $\beta = -0.0002$; p value < 0.0001); ability to read a letter (yes/no, $\beta = 0.1089$; p value = 0.0706); type of delivery (normal/cesarean section $\beta = -0.1495$; p value = 0.0006); parity ($\beta = 0.2547$; < 0.0001); smoking during pregnancy (yes/no $\beta = -0.0966$; p value = 0.1512) and maternal age ($\beta = 0.0219$; p value = 0.0004).

The following variables remained associated with the highest score of leisure physical activity in the multivariate model: black and brown skin color (white/brown, $\beta = 0.1114$; p value = 0.0126); (white/black $\beta = 0.0925$; p value = 0.0065); lowest total family income ($\beta = -0.0001$; p value = 0.0304); cesarean section type of delivery ($\beta = -0.1058$; p value = 0.0117); highest parity ($\beta = 0.1708$; p value = 0.0022) and highest maternal age ($\beta = 0.0157$; p value = 0.0260) (table 4).

TABLE 2
Means and CI 95% for score of leisure physical activity in postpartum women. Rio de Janeiro, 1999-2001¹

Variables	Postpartum time (months)			
	0.5	2	6	9
	Score of leisure physical activity			
Maternal age (years)				
15-19	0.96 (0.76-1.17) [107]	1.96 (1.73-2.20) [91]	2.14 (1.88-2.42) [75]	2.08 (1.85-2.32) [61]
20-29	1.32 (1.16-1.47) [265]	2.16 (2.00-2.31) [231]	2.21 (2.05-2.39) [191]	2.17 (2.02-2.34) [179]
30-45	1.39 (1.15-1.64) [106]	2.25 (2.01-2.49) [100]	2.33 (2.15-2.52) [80]	2.44 (2.20-2.67) [73]
Skin color				
White	1.09 (0.92-1.27) [171]	1.93 (1.75-2.11) [158]	2.01 (1.83-2.19) [131]	1.93 (1.75-2.12) [118]
Black	1.36 (1.10-1.62) [91]	2.37 (2.01-2.72) [76]	2.63 (2.28-2.97) [62]	2.36 (2.02-2.69) [56]
Brown	1.33 (1.17-1.51) [216]	2.22 (2.08-2.37) [188]	2.26 (2.10-2.42) [153]	2.41 (2.26-2.56) [139]
Parity (number of children)				
1	0.88 (0.71-1.06) [159]	1.84 (1.65-2.03) [159]	2.06(1.87-2.25) [155]	2.06 (1.88-2.25) [139]
2	1.24 (1.01-1.48) [105]	2.28 (2.09-2.48) [105]	2.26 (2.07-2.45) [104]	2.26 (2.05-2.47) [92]
≥ 3	1.69 (1.45-1.94) [88]	2.23 (2.02-2.43) [88]	2.49(2.27-2.72) [87]	2.44 (2.24-2.65) [81]
Type of delivery ²				
Natural	1.35 (1.19-1.51) [219]	2.17 (2.02-2.32) [219]	2.36 (2.21-2.51) [215]	2.28 (2.13-2.42) [194]
Cesarean	0.91 (0.71-1.12) [128]	1.92 (1.74-2.12) [128]	2.02 (1.83-2.21) [127]	2.10 (1.90-2.31) [113]
Total family income (reais)				
< 460	1.39 (1.23-1.55) [238]	2.27 (2.11-2.44) [206]	2.27 (2.12-2.44) [166]	2.31 (2.16-2.46) [147]
≥ 460	1.12 (0.97-1.27) [240]	2.01 (1.86-2.17) [216]	2.18 (2.02-2.36) [180]	2.14 (1.96-2.31) [166]

¹ mean; CI 95% between parentheses; between brackets, ² five women presented type of birth different from cesarean or natural.

TABLE 3
Bi-varied model of longitudinal regression of mixed effects for leisure physical activity score in postpartum women. Rio de Janeiro, 1999-2001

Variables ¹	Regression coefficient	PE	P value
Marital status (married ² /single)	-0.0207	0.0541	0.7016
Marital status (married ² /in stable relationship)	-0.0344	0.0324	0.2883
Skin color (white ² /brown)	0.1535	0.0434	0.0004
Skin color (white ² /black)	0.0802	0.0335	0.0170
Total family income (reais)	-0.0002	0.0001	< 0.0001
Ability to read a letter (yes ² /no)	0.1089	0.0601	0.0706
Type of delivery (natural ² /cesarean)	-0.1495	0.0428	0.0006
Gestational age (weeks)	-0.0016	0.0218	0.9389
Smoking during pregnancy (yes/no ²)	-0.0966	0.0669	0.1512
Parity (number of children)	0.2547	0.0493	< 0.0001
Maternal age (years)	0.0219	0.0061	0.0004
Age at first delivery (years)	-0.0058	0.0087	0.4999
Work during pregnancy (yes ² /no)	0.0221	0.0398	0.5781

¹ All the bi-varied models were adjusted for time and square time (in days); ² Reference category [(married = 0, single = 1, in stable relationship = 1), (white = 0, brown = 1, black = 1), (yes = 0, no = 1), (natural = 0, cesarean = 1)].

DISCUSSION

In Brazil studies on physical activity pattern in women are scarce and studies about postpartum women have not been identified yet. The present study analyzed the factors associated with leisure physical activity in postpartum women who were followed during nine months in a Health County Center in the Rio de Janeiro County. It was observed in the present investigation that the women who practiced leisure physical activity were: black and mixed; the ones with the lowest income; the ones who had natural delivery; the ones with three or more children or between 30 and 45 years. These results are different from the ones normally observed by the literature for women. This difference may be partially explained due to specificities of the population group in question, namely, postpartum women; however, the lack of similar studies makes comparisons and discussions about the results difficult.

In one of the few studies on leisure physical activity in the Brazilian population, Masson *et al.* (2005)⁽¹⁶⁾ demonstrated that 37% of the women in the São Leopoldo city were sedentary, 59.4% insufficiently active and only 3.6% practiced physical activity. In

TABLE 4
Final model of longitudinal regression of mixed effects for leisure physical activity score in postpartum women. Rio de Janeiro, 1999-2001

Variables	Regression coefficient	PE	P value
Postpartum time ¹ (days)	0.0134	0.0010	< 0.0001
Postpartum time ¹ (days)	-0.00003	0.0000	< 0.0001
Skin color (white ² /brown)	0.1114	0.0444	0.0126
Skin color (white ² /black)	0.0925	0.0338	0.0065
Total family income (reais)	-0.0001	0.0001	0.0304
Type of delivery (natural ² /cesarean)	-0.1058	0.0417	0.0117
Parity (number of children)	0.1708	0.0554	0.0022
Maternal age (years)	0.0157	0.0070	0.0260

¹ Model adjusted for time and square time (in days); ² Reference category [(married = 0, single = 1, in stable relationship = 1), (white = 0, brown = 1, black = 1), (yes = 0, no = 1), (natural = 0, cesarean = 1)].

postpartum women, Boardley *et al.* (1995)⁽¹³⁾ demonstrated that black women practiced less physical activity when compared with white ones, even after control for confusion factors. Mensink *et al.* (1997)⁽¹⁷⁾ observed that women with higher socio-economical status were 3 to 4 times more engaged in leisure activities, regardless other factors related to life style. Ford *et al.* (1991)⁽¹⁸⁾ also found association between socio-economical status and leisure physical activity, where women with lower socio-economical status were less physically active, as well as in other studies⁽¹⁹⁻²⁰⁾.

It is important to mention that although the results for income are contradictory, the magnitude of association is fairly small as demonstrated by the extremely low beta coefficient value (-0.0001). A recent investigation based on a transversal study nested in a cohort of population basis, revealed that high income adolescents between 10 and 12 years old presented 27% more chances to be sedentary in comparison to lower income adolescents when all dominium of physical practice were considered, that is, leisure and dislocations⁽²¹⁾. The explanatory hypothesis lays on the fact that among low income individuals, the cost with dislocation activities is higher, which is usually not considered by the majority of scales. Another study by the same authors⁽²²⁾ also observed greater chance of sedentarism among adult women with higher socio-economical status. It is visible that low individuals with low socio-economical

status tend to present higher degree of occupational activity and lower participation in leisure activities⁽²³⁾. Within this context, one may speculate that the results here observed may be a reflex of higher importance of labor activities over leisure activities. It is possible that in the case of postpartum women there is an additional issue, that is, the fact that the measurement instrument of physical activity was not able to suitably pick up the two dimensions, namely labor and leisure physical activities. Therefore, it is possible that higher leisure physical activity observed in lower income women is in fact a limitation of the instrument in discriminating the two dominium of the physical activity.

The practice of surgical delivery was the only factor associated with lower physical activity practice which finds grounding in the literature. Weiderpass *et al.* (1998)⁽²⁴⁾ when studied nulliparas, observed that sedentary women presented risk 4.5 times higher of cesarean section deliveries than physically active pregnant women, even after control for confusion variables such as age, type of analgesia, BMI alterations prior to pregnancy, induced labor and type of delivery hospital. The results demonstrated that the performance of physical exercises, especially in the two first trimesters, was associated to lower risk of cesarean deliveries.

According to the American College of Obstetricians and Gynecologist (2002)⁽⁴⁾, the return to physical activity after delivery is associated with countless advantages, such as reduction of depression occurrence, differences in the hormonal profile, reduction of blood pressure, among others. In the lack of complications, it is recommended that the postpartum exercise practice is resumed in 30 days after natural delivery and 45 days after surgical delivery, applying the same principles used for exercise prescription in the general population. The return to pre-gestational conditions, especially in athletes, will depend on the degree of physical fitness the woman keeps during pregnancy⁽⁷⁾.

Some of the study's limitations should be highlighted. The first one is related to the data collection concerning exclusively leisure and labor physical activity practice, where dislocations and house

chores were not measured. A second limitation is related to a potential concentration of the studied population in mixed and black women. Concerning the first limitation, it is necessary to mention that validated scales which measured dislocations or even house chores were not identified at the time of the study. Concerning the second limitation, it is believed that the distribution of skin color observed in the sample reflects, in a certain extent, in the higher use of health public services by such population, which does not avoid that the results are extrapolated for populations with similar skin color distributions. On the other hand, it is necessary to mention the lack of studies which focus on alterations in the postpartum leisure physical activity pattern and its determinants, especially studies which have used sophisticated analytical strategies as the longitudinal linear regression models.

It is concluded that studies which have investigated the leisure physical activity pattern during the nine postpartum first months are scarce. In the investigated sample, older black and mixed women with greater parity presented the highest leisure physical activity.

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