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Original Article

ASSOCIATION BETWEEN EARLY LIFE FACTORS AND ACCELEROMETRY-BASED PHYSICAL ACTIVITY MEASURES IN CHILDREN AGED 5-7 YEARS OLD

ASSOCIAÇÃO ENTRE FATORES PRECOCES E MEDIDAS DA ATIVIDADE FÍSICA POR ACELEROMETRIA EM CRIANÇAS DE 5 A 7 ANOS DE IDADE

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RESUMO
O presente estudo tem como objetivo verificar se existe associação entre fatores precoces (peso ao nascer, amamentação exclusiva ao seio, ordem de nascimento e nascimento pré-termo) e as medidas da atividade física por acelerometria em crianças de 5 a 7 anos. Trata-se de umestudo transversal realizado com crianças de escolas públicas e privadas do Recife. Utilizou-se um questionário com os pais/mães das crianças.Das 784 crianças participantes do estudo, 491 tiveram, pelo menos, três dias de monitoramento válido. Identificou-se que as crianças que eram classificadas como o quarto filho ou superior apresentaram 83% menos chance de ter baixo percentual de tempo diário despendido em atividades físicasem intensidade moderada quando comparadas as que eram o filho primogênito (OR= 0,17; 0,03-0,80). Verificou-se que somente a ordem de nascimento foi negativamente associada ao baixo percentual de tempo diário despendido em atividades físicasem intensidade moderada, mesmo após ajustamente para os fatores de confusão.
Palavras-chave: Atividade motora. Acelerometria. Saúdematerno-infantil. Criança.

ABSTRACT
The present study aims to verify if there is an association between early life factors (birth weight, exclusive breastfeeding, birth order and preterm birth) and accelerometry-based physical activity measures in children aged 5 to 7 years old. It is a cross-sectional study carried out with children from public and private schools in Recife, Brazil. A questionnaire was applied to the children's parents. Of the 784 children participating in the study, 491 had at least three days of valid monitoring. It was possible to identify that the children classified as the fourth ones, as to birth order, or over, were 83% less likely to have a low percentage of daily time spent on moderate-intensity physical activities compared to firstborns (OR = 0.17; 0.03-0.80). Only birth order was negatively associated with low percentage of daily time spent on moderate physical activities, even after adjustment for confounding factors.
Keywords: Motor activity. Accelerometry. Maternal and child health. Child.

Introduction

Biological and environmental exposures during the prenatal and perinatal periods can negatively or positively influence behavior related to physical activity and prevent or cause late risk of chronic non-communicable diseases, as a consequence of morphofunctional changes and/or biochemical lesions in the central nervous system[1-3]. These changes may include pulmonary and cardiovascular disorders[4], as well as changes in the structure and functions of the skeletal muscle[5] in the short and long terms, which can reduce physical fitness and, consequently, decrease physical activity levels and increase sedentary behavior in subsequent stages of life[6-9].

Despite the relevance of biological factors, the contemporary literature points out that environmental factors (for instance, unfavorable socioeconomic conditions and lack of social and affective relationship between mother and fetus)[10] have correlated with restricted intrauterine growth and inadequate motor development in children[11]. International[2,6] and national[1] scientific investigations have shown that physical activity level was associated with some early life factors, such as preterm birth, birth weight and birth order, in adolescents and adults.

These findings can be explained by the hypothesis of the developmental origin of health and disease[12], which has postulated that the intrauterine environment can induce adaptive responses from phenotype changes that occur due to the signals that the intrauterine environment sends to the fetus, as a strategy to prepare it to expected future conditions[13]. In this sense, the adaptive response is adequate when the postnatal environment is equal to that expected by the organism and allows the individual to grow and develop normally. On the other hand, the adaptive response is not adequate when the expected environment differs from the real environment, as it makes the individual more prone to presenting chronic non-communicable diseases[14].

From this perspective of the developmental origin, Kajantie et al.[15] found that adults born with low weight (<1500g) reported spending less time on leisure physical activities than those born at term (≥ 37 full weeks of gestation), by survey-reported measures. However, in cohort studies conducted by Mattocks et al.[16] and Pearce et al.[17], no association was found between birth weight and physical activity level, both measured by accelerometry.

Some international investigations[6,15,17] have indicated that the results of early life factors associated with engagement in physical activity in children showed changes in the sense and magnitude of the associations. In light of the foregoing, it is worth noting that the sense of these associations is inconsistent as to the type of physical activity measure used, raising questions about the applicability of studies in the context of the developmental origin of health and disease as a strategy for analyzing factors associated with physical activity level at different stages of life.

In this context, researchers suggest that these variations depend on the type of measure used for analyzing physical activity, since early life factors can express different biological or psychosocial phenomena and, consequently, manifest themselves differently according to each type or intensity of physical activity[2,16]. However, the interpretations of these results need caution and an accurate assessment by the reader, as these divergences may derive from the different strategies and/or instruments employed, as well as from the various cutoff points used for measuring physical activity[18].

Despite evidence on the health benefits of physical activity[19], as far as it is known, few investigations have assessed whether early life factors are associated with physical activity level at different intensities measured by accelerometers[1,17], mainly when it comes to children. Recognizing early life factors associated with physical activity level favors the planning of more effective interventions to promote physical activity for this population subgroup affected by biological and environmental problems[20-22], considering that this period is a critical moment for the establishment of health conducts, including those related to physical activity engagement.

Given this scenario, the objective of the present study was to verify whether there is an association between early life factors (birth weight, preterm birth, breastfeeding and birth order) and accelerometry-based physical activity measures in children aged 5 to 7 years old.

Methods

Study Characterization and Ethical Aspects

This is a school-based, cross-sectional and epidemiological study conducted through the analysis of data from the "Longitudinal Study on Health and Wellbeing of Pre-school Children" [*Estudo Longitudinal de Saúde e Bem-estar de Crianças em Idade Pré-escolar*] (ELOS-Pré). The aforementioned project was approved by the Pernambuco University's Ethics Committee on Research Involving Human Beings (CAAE: 0096.0.097.000-10). The Informed Consent Form was signed by the parents or legal guardians of all participating children.

Target Population and Sample Planning

The target population of the study was composed of children, of both sexes, enrolled in public and private early childhood schools, located in the areas covered by the Northern and Southern Regional Education Departments of the city of Recife, Pernambuco, Brazil. The sample size calculation for the ELOS-Pré project adopted the following parameters: estimated population of 49,338 children; estimated prevalence of variables of interest in the investigated population set at 50%; 95% confidence interval; maximum tolerable error of four percentage points; and effect of the sample design set at 1.5. The sample size was initially estimated at 890 participants, with an additional 20% for handling possible losses and declines. Afterwards, considering the analytical component of the several subprojects that compose the ELOS-Pré, a sample size calculation was performed to estimate the statistical power for analysis of the association between variables.

From the data provided by Recife's Education Department, in 2009, the number of enrolled preschoolers in the age group from three to five years old was estimated at 49,038, distributed into 782 schools. In 2010, 1,155 children aged 3-5 years old were selected, considering 28 schools and the minimum sample size of 1,068 children, calculated as mentioned earlier. For sample selection, the single-stage cluster sampling procedure was used, with the sample unit being the school. All schools in Recife with classes of preschoolers were deemed eligible to be included in the study. In order to guarantee the representativeness of the sample, the following stratification criteria were taken into account: school type (public and private), size (small: <50 enrolled children; medium: 50 to 199 children; and large: ≥200 children) and the distribution of the schools according to the city's six political-administrative regions (PAR), (1st PAR - 6th PAR).

Procedures

The present study was conducted with data collected in the second evaluation of the Elos-pré project, in 2012, when the children were 5 to 7 years old (n = 784). Data were collected from August to November 2012 by a duly trained team composed of graduate and undergraduate students. A questionnaire (http://www.gpesupe.org/downloads.php) applied in the form of a face-to-face interview with parents was used for sourcing sociodemographic and behavioral data from children and their parents, as well as information on early life factors. This questionnaire was tested with 65 school parents and presented moderate to high reproducibility indicators (consistency of test-retest measures) for the sociodemographic and physical activity variables.

Variables Description

Information relating to the independent variables was also collected through the questionnaire. The early life factors were: preterm birth (no, yes), exclusive breastfeeding (≤ 6 months, and > 6 months), birth order (1, 2 or 3, >4 children) and birth weight (low weight <2,500, normal weight between 2,500 and 3,999, and high weight > 3,999). Excessive weight (overweight and obesity) was categorized according to the cutoff points proposed by the International Obesity Task Force - IOTF23, adjusted for sex and age.

Measures regarding physical activity, time and percentage of daily time spent on physical activities of moderate, vigorous, and moderate to vigorous intensity were taken using an Actigraph accelerometer (model GT1M, ActiGraph, Pensacola, USA). Concerning the procedures for using the device, the accelerometers were attached to an elastic band and placed on the child's waist, to the right side of the hip, close to the upper iliac crest. The accelerometers were mounted in the early morning and removed before the child slept, showered or participated in water activities. The monitoring time comprised seven consecutive days.

During the monitoring period, in addition to the children's parents receiving a pamphlet with illustrative instructions on how to use the accelerometers, they were also instructed to complete a diary in order to record the time at which the accelerometer was mounted and removed. Besides, the parents were asked about possible doubts on using the device, as well as difficulties and reasons for not using it, in order to ensure that the instructions for use were being followed properly.

Data resulting from the accelerometry-based monitoring were reduced on Actilife, version 6.10, adopting a minimum of 10 hours of valid monitoring as a criterion to define a day as being valid. The monitor non-use periods were defined considering an interval of 30 consecutive minutes without accelerations being recorded.

To determine the percentage of daily time spent on physical activities of moderate to vigorous intensity, data on acceleration of body mass were recorded at an interval of 15 seconds. The valid data taken into account were those referring to children who had information comprising three or more days of monitoring, including a weekend day. Accelerometer non-use periods were those in which no acceleration was recorded over 30 consecutive minutes, which were later excluded from the analysis and not counted as time spent on sedentary activities.

These variables were categorized as follows: children classified in the lower quartile were considered as having a low daily percentage in physical activities of moderate, vigorous, and moderate to vigorous intensity, while the other kids classified above the lower quartile were deemed physically active. To determine the time and intensity of physical activities, the cutoff points suggested by Pate et al.[24] were adopted for activities of moderate intensity (≥420 counts/15 seconds) and vigorous intensity (≥842 counts/15 seconds).

Statistical Analysis

For the analysis to be run, Data Analysis and Statistical Software (STATA), version 10.0, was used, with the employment of procedures involving descriptive statistics (median, interquartile interval, frequency distribution, and 95% confidence interval) and inferential statistics (Mann-Whitney U test, and binary logistic regression).

The means between daily time spent on physical activities of different intensities and the children's sex were compared by the Mann-Whitney U test. The level of significance was set at $p<0.05$. The chi-squared test was also used for verifying the prevalence of sociodemographic factors by the child's sex.

Binary logistic regression was employed to verify whether early life factors were associated with different intensities of physical activity. The values for Odds Ratio (OR) and confidence intervals (95% CI) were presented in the results of this study. For data analysis, the model described in Figure 1 was used. The method used for sealing the variables was the backward, with two criteria being considered: the first one was statistical, $p<0.20$, and the second one was the contribution to the quality of the fit of the model to keep the variables in the model.

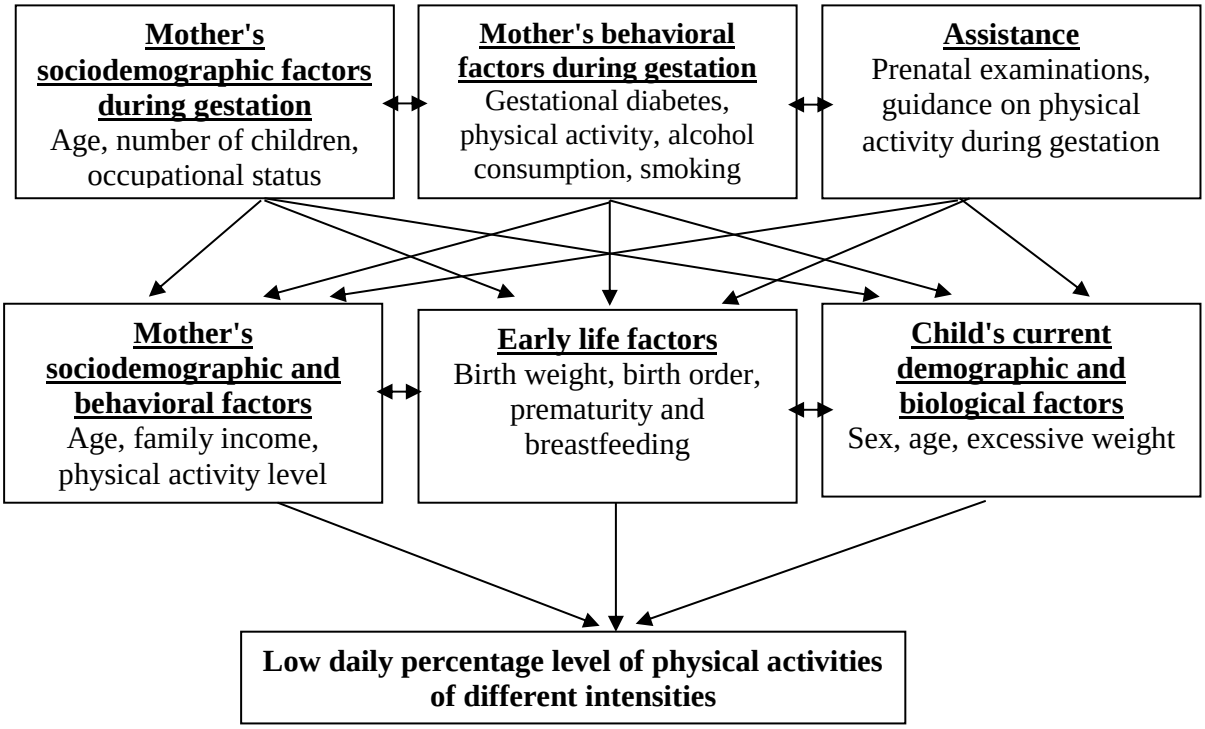

Figure 1. Theoretical model for determining low daily percentage levels of physical activity of different intensities in children
Source: The authors

Concurrent models were assessed through the following parameters: Bayesian Information Criterion (BIC), Aike Information Criterion (AIC), and Prob>LR = <0.001, which means that model 1 has a better fit (values <0.05, significant) for presenting lower values for "D" (Deviance) and "BIC" compared to model 2, which indicates the best adequate fit of the model. The final adjustment of the model was carried out using the Hosmer-Lemeshow test and Cox and Snell's pseudo-R^2.

VIF (variance inflation factor) values were used as a criterion for collinearity analysis; however, the variables that remained in the final model did not show collinearity because the VIF values are within the recommended range (between 1 and 5). Inferential analyses were preceded by an assessment on the interaction of early life factors with the child's sex, age and excessive weight, and the mother's socioeconomic conditions (occupational situation, education and family income). No interaction was observed though. The p value considered for interaction was <0.05.

Results

Of the total of 784 study participants, all children accepted to wear the accelerometer. Among them, only 491 presented valid data from three or more monitoring days, including a weekend day. This sample size allowed detecting as significant all odds ratios (OR) equal to or greater than 2.50, considering a 95% confidence interval, an 80% statistical power, and an 85% outcome prevalence among those exposed, and 93.4% among those not exposed. The sociodemographic, socioeconomic and behavioral characteristics of mothers and/or children according to the children's sex are displayed in Table 1.

Table 1. Sociodemographic, socioeconomic and behavioral characteristics of mothers and children participating in the 2012 ELOS-Pré

Variable	Boys		Girls		All	
	n	%	n	%	n	%
School type						
Public	126	48.6	115	49.6	241	49.1
Private	133	51.4	117	50.4	250	50.9
Period						
Morning	150	57.9	135	58.2	285	58.0
Afternoon	109	42.1	97	41.8	206	42.0
Number of children						
1	62	24.0	72	31.0	134	27.3
2 or 3	157	60.9	127	54.7	284	58.0
≥4	39	15.1	33	14.3	72	14.7
Current family income (minimum wage)						
≤ 2	172	67.2	149	64.8	321	66.0
> 2	84	32.8	81	35.2	165	34.0
Mother's age at gestation						
< 25 years old	107	42.3	100	44.8	207	43.5
25 - 35 years old	113	44.7	100	44.8	213	44.7
> 35 years old	33	13.0	23	10.4	56	11.8
Child's age (full years)						
5	42	16.6	41	18.2	83	17.4
6	91	36.0	87	38.7	178	37.2
7	120	47.4	97	43.1	217	45.4
Child's excessive weight						
No	196	78.1	173	78.3	369	77.8
Yes	55	21.9	48	21.7	103	22.2
Breastfeeding time						
< 6 months	208	81.6	181	78.7	389	78.2
≥ 6 months	47	18.4	49	21.3	96	21.8
Preterm birth						
Term	223	86.4	188	81.0	411	83.9
Preterm	35	13.6	44	19.0	79	16.1
Birth order						
1st child	108	41.9	111	48.1	219	44.8
2nd or 3rd child	126	48.8	100	43.3	226	46.2
≥ 4th child	24	9.3	20	8.6	44	9.0
Birth weight						
Low weight	21	8.4	28	12.4	49	10.3
Normal weight	199	79.6	183	81.3	382	80.4
Excessive weight	30	12.0	14	6.3	44	9.3

Source: The authors

It was possible to find that 23.8% of the children were classified with a low percentage of daily time spent on physical activities of moderate intensity, 37.1% of the children were classified with a low percentage of daily time spent on physical activities of vigorous intensity, and 39.1% were classified with low percentage of daily time spent on moderate to vigorous intensity. As for the prevalence of daily time spent on physical activities of all intensities, it differed significantly between boys and girls, and it is worth noting that boys were more active than girls were, as shown in Figure 2.

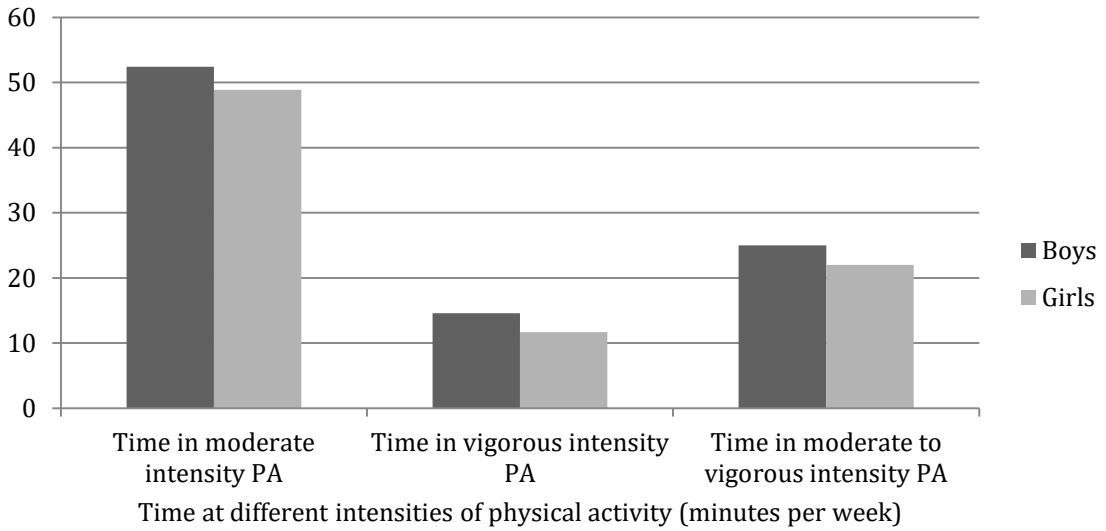

Figure 2. Prevalence of daily time spent on physical activities of different intensities by child's sex.
Note: PA: Physical Activity; *p<0.02 by the Mann-Whitney test
Source: The authors

The early life factors were not statistically associated with the percentages of daily time spent on physical activities of moderate intensity (Table 2), vigorous intensity (Table 3) and moderate to vigorous intensity (Table 4), except for birth order, which was negatively associated with low percentage of daily time spent on physical activities of moderate intensity.

Table 2. Odds Ratio (OR) and confidence interval values for association between early life factors and low percentage of physical activity level of moderate intensity in children

Variable	Crude OR (95% CI)	p Value	Adjusted OR (95% CI)	p Value
Birth weight§				
Normal weight	1		1	
Low weight	1.77 (0.94-3.34)	0.07	1.33 (0.54-3.23)	0.53
High weight	1.25 (0.62-2.53)	0.53	1.19 (0.47-3.00)	0.71
Preterm birth				
No	1		1	
Yes	1.28 (0.74-2.21)	0.36	1.58 (0.54-2.48)	0.70
Breastfeeding time				
≤ 6 months	1		1	
> 6 months	0.93 (0.55-1.58)	0.79	0.74 (0.35-1.56)	0.43
Birth weight				
1st child°	1		1	
2nd or 3rd child°°	0.96 (0.62-1.46)	0.84	0.84 (0.49-1.43)	0.52
4th child or over°	0.21 (0.06-0.70)	**0.01**	0.17 (0.03-0.80)	**0.02**

Note: p values for linear trend in the crude analysis: §n = 0.72, ¶n=0.04. *Adjusted in binary logistic regression by: mother's job during pregnancy, mother's physical activity engagement during pregnancy, guidance on physical activity engagement during pregnancy, alcohol consumption during pregnancy, current family income, mother's current physical activity level, and child's sex.
Source: The authors

Table 3. Odds Ratio (OR) and confidence interval values for association between early life factors and low percentage of physical activity level of vigorous intensity in children

Variable	Crude OR (95% CI)	p Value	Adjusted OR (95% CI)	p Value
Birth weight§				
Normal weight	1		1	
Low weight	0.99 (0.49-1.98)	0.98	0.81 (0.37-1.76)	0.60
High weight	0.78 (0.36-1.70)	0.54	0.79 (0.34-1.83)	0.58
Preterm birth				
No	1		1	
Yes	1.19 (0.68-2.05)	0.54	1.16 (0.62-2.18)	0.63
Breastfeeding time				
≤ 6 months	1		1	
> 6 months	0.94 (0.55-1.60)	0.84	1.07 (0.61-1.89)	0.80
Birth weight				
1st child°	1		1	
2nd or 3rd child°°	0.75 (0.49-1.16)	0.20	0.72 (0.45-1.15)	0.17
4th child or over°	0.50 (0.21-1.18)	0.11	0.67 (0.25-1.77)	0.42

Note: p values for linear trend in the crude analysis: §n=0.71, ¶n=0.06. *Adjusted in binary logistic regression by: mother's job during pregnancy, gestational diabetes, prenatal examinations, mother's tobacco smoking habit during pregnancy, and child's sex.
Source: The authors

Table 4. Odds Ratio (OR) and confidence interval values for association between early factors and low percentage of physical activity level of moderate to vigorous intensity in children

Variable	Crude OR (95% CI)	p Value	Adjusted OR (95% CI)	p Value
Birth weight§				
Normal weight	1		1	
Low weight	1.26 (0.69-2.29)	0.45	1.00 (0.44-2.29)	0.99
High weight	0.97 (0.51-1.85)	0.93	0.86 (0.37-2.00)	0.74
Preterm birth				
No	1		1	
Yes	1.37 (0.84-2.22)	0.20	1.39 (0.70-2.75)	0.34
Breastfeeding time				
≤ 6 months	1		1	
> 6 months	0.78 (0.49-1.25)	0.30	0.73 (0.39-1.39)	0.34
Birth weight				
1st child°	1		1	
2nd or 3rd child°°	0.95 (0.65-1.38)	0.78	0.81 (0.50-1.30)	0.38
4th child or over°	0.41 (0.19-0.88)	0.02	0.37 (0.13-1.01)	0.05

Note: p values for linear trend in the crude analysis: §n=0.62, ¶n=0.07. *Adjusted in binary logistic regression by: mother's job during pregnancy, mother's physical activity engagement during pregnancy, guidance on physical activity engagement during pregnancy, mother's tobacco smoking habit during pregnancy, mother's current physical activity level, current family income, child's sex and age.
Source: The authors

Discussion

This study aimed to verify whether there is an association between early life factors and physical activity measures at different intensities in children aged 5 to 7 years old. The findings showed that younger children (classified as the fourth one or over), in terms of birth

order, were less likely to have a low level of daily percentage in moderate physical activities compared to older ones (first child).

Taking into account that this study has some limitations to the interpretation of its results, the latter must be analyzed carefully. Such limitations refer to: low sampling power and a possible selection bias, since the children who were not found due to having changed schools or moved to another house may have caused the prevalence of physical activity to be underestimated, and may have influenced the association between exposure and response variables. Despite the limitations presented, this study has its strengths as well, such as using physical activity measurement by accelerometry, since this instrument provides a more accurate estimate of physical activity levels; considering important confounding variables in the analyses, such as physical activity level, diabetes, tobacco smoking, and maternal alcohol consumption during pregnancy. In addition, this is one of the first national investigations on the theme that has included the analysis of several early life factors and physical activity from objective measures.

Similarly, results from previous studies have shown no association between birth weight and physical activity level in children and adolescents[1,8,16]. On the other hand, a longitudinal study carried out with 166 young adults born with extremely low weight identified that men were more likely not to participate in sports and vigorous physical activities on a regular basis compared to those with normal weight, but this difference was not statistically associated in women[25].

A meta-analysis study, conducted by Andersen et al.[2], revealed that adults who reported low and high birth weight were less likely to engage in physical activities during their leisure time and to be classified as physically active, compared to individuals with normal weight. The aforementioned authors suggest that birth weight can influence behaviors related to physical activity engagement in adulthood, and that birth weight can be a mediator between prenatal influences and risk for developing late diseases.

A result similar to that of the present study, with respect to the negative association between birth order and low percentage of daily time spent on moderate physical activities, was reinforced by Hallal et al.[1] in a cohort study with 4,456 adolescents (10-12 years old), which suggests that behavioral and social factors (physical activity at 4 years of age, and being a firstborn child) are more important predictors than biological factors are for determining physical activity in adolescence. Divergently, the study by Barros, Lopes and Barros[26] did not show a statistically significant association between being the firstborn and low level of participation in outdoor games and play among 260 preschool children (2 to 5 years old).

Regarding the results referring to birth order and low physical activity level, research has suggested that firstborns were born with lower body weight than children born subsequently to the same mother[27]. This seems to be linked to blood concentrations of hormones in the umbilical cord, which can also cause a low level of intellectual activity[28]. Some studies have indicated that kids classified as second or third children were more advanced in their cooperative skills compared to firstborns, which can influence their behavior related to physical activity[29,30].

Another possible explanation would be the presence of siblings and/or a larger number of siblings in the household, which would facilitate engagement in games and other types and contexts of physical activities, and would result in increased levels of physical activity for these children[31]. Moreover, parents with higher socioeconomic levels can be better educated about the benefits of physical activity in childhood and engage their families in more active physical activities, in order to protect them against sedentary lifestyles and chronic non-communicable diseases, such as obesity, as stated by the theory of family aggregation as to physical activity[32].

Despite the possible explanation about biological factors, studies have revealed that increased prevalence of low physical activity levels in childhood can be influenced by sociodemographic factors, such as mothers' low educational level and parents' younger age[33]. On the other hand, studies have shown that parental and environmental factors, such as parents participating in physical activity with their children, social support from friends and family in stimulating physical activity engagement[34], and school environment – for instance, larger schools (> 100 children), having at least one break per day – can be a protective factor for physical activity engagement at the preschool stage[35,36]. In this context, recognizing these associated factors favor the designing and planning of more effective interventions towards promoting population-based physical activity[21].

A possible explanation to the absence of associations in this study between the other early life factors, such as birth weight and preterm birth, and percentage of daily physical activity time at different intensities, may be due to biological factors seeming to have a greater influence on child behavior at early stages of life[2]. Environmental factors, such as socioeconomic conditions, are more important as the child develops, mainly when it comes to physical activity engagement[1,11].

These results can also be influenced by differences in the operationalization of variables, different criteria for sample selection, failures in controlling important confounding variables (gestational age and birth size), and use of different methods (subjective and objective) for measuring physical activity, which makes it difficult to compare the findings. In epidemiological studies, for instance, questionnaires are widely used, as they provide measures on a variety of information (type, place of practice) that, eventually, cannot be sourced by objective means, in addition to having a relatively lower cost and faster application[18,37]. Accelerometers, in their turn, provide accurate data on different physical activity intensities[37,38].

Furthermore, the cutoff points adopted to classify physical activity intensity and time using the accelerometer may have underestimated physical activity engagement time in the most active children, for instance. Another plausible explanation to this difference may lie in the representativeness of the sample and in the accuracy of the studies, which may be related to the weak power of the sample. In view of the other influences, the results were not statistically significant for the different early life factors, which can be associated with different physical activity level measures in children.

Nevertheless, it should be noted that this is an exploratory study in the field of behaviors related to physical activity; the lack of studies addressing factors established in early life and different physical activity intensities and domains also makes it difficult to discuss the results, mainly due to a lack of knowledge about how these factors and underlying mechanisms inter-relate.

In this context, further studies should be conducted in order to analyze possible influences of early factors in this period of life, since the understanding of these influences on the behavior of children with low birth weight or born prematurely is fundamental for planning interventions aimed at raising physical activity levels and lessening the limitations caused by genetic programming in early life.

Conclusions

It is concluded that children classified as the first child were less likely to have a low percentage of daily time spent on physical activity of moderate intensity compared to those classified as the fourth child or over. However, further studies could be conducted in order to verify the consistency of these findings and to explore additional factors that may be involved in this influence.

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