CSP CADERNOS DE SAÚDE PÚBLICA
REPORTS IN PUBLIC HEALTH

ARTIGO
ARTICLE

Does parents' perception of the environment associates with outdoor physical activity duration in low-income preschoolers?

A percepção dos pais sobre o ambiente se associa à duração da atividade física ao ar livre em pré-escolares de baixa renda?

¿La percepción de los padres sobre el entorno se asocia con la duración de la actividad física al aire libre en preescolares de bajos ingresos?

Cleene Tavares de Souza [1,2]
Glauber Carvalho Nobre [3]
Anastácio Neco de Souza Filho [3]
Roseanne Gomes Autran [4]
Andréia Pizarro [4]
Jorge Augusto Pinto da Silva Mota [4]
Clarice Maria de Lucena Martins [1]

doi: 10.1590/0102-311XEN051822

Abstract

Parents' perception of the environment may influence the time spent in outdoor physical activities in pre-school children. This study aimed to analyze the association between parents' perception of the environment and outdoor physical activities outside the school in low-income preschoolers. In total, 129 preschoolers aged 3 to 5 years (4.4 years ± 0.7 years, 50% boys) and their parents participated in the study. An adapted version of the Neighborhood Environmental Walkability Scale *was used to obtain parents' environmental perceptions. Outdoor physical activities was measured based on two questions considering the usual time spent in these activities during week and weekend days. Information on sociodemographic was collected by interview. Logistic regression was used to analyze the associations. Statistical analyses were conducted using SPSS, version 21.0. Most preschoolers (76.9%) had ≤ 2 hours/day in outdoor physical activities during the week while at the weekend, 65.9% reached > 2 hours. Parents' perception of unsafe traffic (OR = 0.39; p = 0.03) was associated with higher chances for a shorter time in outdoor physical activities both during the week and at the weekend (OR = 0.46; p = 0.04). Moreover, preschoolers' whose parents perceive a lack of places to walk (OR = 0.33; p = 0.02) and unsafe night time (OR = 0.36; p = 0.04) are more likely to spend less time in outdoor physical activities during the week. After adjustments for sociodemographic confounders, the perception of unsafe traffic (OR = 0.26; p = 0.01) and places to walk (OR = 0.15; p = 0.01) were predictors of preschooler's shorter time in outdoor physical activities during the week. Parents' perception of unsafe traffic and places to walk were associated with less time in outdoor physical activities in low-income preschoolers.*

Motor Activity; Built Environment; Child

Correspondence
C. T. Souza
Rua Presbítero Wilame Façanha 37, Iguatu, CE
63505-616, Brasil.
cleenetavares@gmail.com

[1] Universidade Federal da Paraíba, João Pessoa, Brasil.
[2] Universidade Regional do Cariri, Iguatu, Brasil.
[3] Instituto Federal de Ciência, Educação e Tecnologia do Ceará, Canindé, Brasil.
[4] Faculdade de Desporto, Universidade do Porto, Porto, Portugal.

Introduction

Outdoor physical activity is defined as broad or global body movements, performed freely, chosen by children, and practiced in streets, squares, parks, and playgrounds [1]. These are engaging, fun, and favored activities among children that contribute to greater autonomy and socialization [2]. Preschool-aged children should be encouraged to practice physical active, especially outdoors, since outdoor physical activity associates with children's physical and mental health, and cognitive and social development [3]. Outdoor physical activity can also promote adherence to global and Brazilian recommendations for physical activity [4,5]. Therefore, encouraging children to spend more time outdoors during flexible periods (e.g., after preschool and on weekends) may be a low-cost and easily implemented strategy to promote a healthy development.

Ecological models consider multiple aspects of an individual's societal and community context that can inhibit or enhance physical activity [6,7]. Thus, different barriers or facilitators can influence outdoor physical activity, such as demographic, social, psychological, and environmental factors [8]. The built environment is an essential element favoring or restricting outdoor physical activity in early childhood [9,10]. The characteristics of the built environment, such as the presence and access to physical structures, adequate facilities, safe traffic, low crime rates, and neighborhood safety, are positively associated with the children's outdoor physical activity [11,12]. For instance, preschoolers living in greenness neighborhoods are more likely to engage in outdoor physical activity [13].

However, due to the globalization and urbanization of large cities, the places used by children have undergone social, economic, and spatial changes, often becoming unsafe for outdoor physical activity [14]. This reality is even more pronounced in low-income areas. The common lack of resources and infrastructure, the often seen unsuitable conditions for use, or the high rate of violence recorded in these locations [15] may provide children with fewer opportunities for outdoor physical activity [16]. For example, due to a negative perception of safety, parents from low-income families may prefer their children to play at school or inside their houses, restricting their play on the street or in public facilities [17].

Recently, a study assessed the environmental barriers to outdoor physical activity perceived by parents in five European countries (Croatia, Estonia, Greece, Norway, and Portugal), reporting traffic as the greater difficulty. The main barriers in Portugal and Greece were violence and poor conditions of the facilities, respectively [18]. Longitudinal studies [19,20] observed that infrastructures of the environment did not present a significant association with outdoor physical activity, whereas aspects of the social environment seem to be more critical in this relationship. Furthermore, sociodemographic characteristics such as the child's age and sex, parents' schooling level, family income, and having siblings influence the relationship between environment characteristics and children's outdoor physical activity [17,20].

Children aged from 3 to 5 years with access to day-care centers may have greater chances to be active on weekdays [21]. A systematic review has shown that preschoolers are more engaged in outdoor physical activity in day-care centers [1] and less engaged at other times of the day, with fewer opportunities for outdoor physical activity outside of school [22]. However, Barbosa et al. [23] observed that Brazilian children spend more time in sedentary behavior during the school period. Therefore, time in outdoor physical activity is limited to domestic or community environments, after-school hours, and on weekends [24].

As afore mentioned, evidence indicates controversial results, since the studies are from countries with different social, cultural, and economic characteristics, compared to Brazil [25]. Furthermore, the relationship between built environment and outdoor physical activity seems inconclusive regarding the perception of preschoolers' parents [15], especially in low-income settings. Thus, our aim was to analyze the association between parents' perception of the environment and time spent in outdoor physical activity among low-income preschool children.

Methods

Study design

This cross-sectional study is part of the Movement's Cool project, which aimed to analyze the associations between children's movement behaviors and health outcomes in low-income preschoolers. Data were collected over four months (from August to October 2019 and in February 2020). In meetings with the project coordinator, all preschools principals and parents or guardians were informed of study protocols and procedures (one meeting at each school whose principal has agreed to participate). Children with parental signed consent were evaluated. The Ethics Research Committee of the Health Sciences Center, Federal University of Paraíba approved the project (protocol n. 2727698).

Context and participants

João Pessoa is a large coastal city in Northeastern Brazil, capital city of the State of Paraíba. With an estimated population of 825,796 inhabitants in 2021, the city is divided in 59 districts and 78.4% of the forested land presents tropical climate with an average temperature of 29ºC. The municipal Human Development Index is 0.7 and ranges from 0.4 to 0.5 in the low-income areas [26].

According to the Municipal Department of Education of João Pessoa, in 2019 there were approximately 20,000 enrollments in public preschools [27], distributed among the 90 Reference Centers in Early Childhood Education, organized at nine educational areas. Among these, ten are located in low-income contexts, and six have children aged 3 to 5 years. Due to the COVID-19 pandemic, assessments were performed in three of the six possible preschools in the low-income areas. All the children aged 3 to 5 years enrolled in these three preschools who presented typical development were invited to participate in the study (n = 204). From those, 34 parents did not present the informed consent, and 41 did not fulfill the questionnaire. A total of 129 preschoolers (50.8% boys) composed the final sample.

Measurements

- **Perception of the environment**

The *Environmental Perception Scale for Physical Activity Practice* [27] was developed for the Brazilian adult population. This instrument is based on the *Neighborhood Environmental Walkability Scale* (NEWS) [28] and on the *Scale of Social Support for Physical Activity* [29]. The scale is adapted for the Brazilian context, validated for a sample from a low-income region of São Paulo, and showed good construct reproducibility (from r = 0.51 to r = 0.94 between domains). The instrument has 38 questions, organized into 10 structures: (1) built environment structures for practice (18 questions); (2) sidewalks (two questions); (3) green areas (two questions); (4) topography of streets (one question); (5) environmental pollution (three questions); (6) traffic safety (three questions); (7) general safety (three questions); (8) social support (three questions); (9) weather (one question); (10) pet/dog (two questions).

For this study, the dimensional structure of the original questionnaire was tested via confirmatory factor analysis, with a mean and variance adjusted weighted least squares estimator. The original model did not converge and, therefore, by theoretical criteria, items referring to the accessibility of shops and services were excluded. Subsequently, the items that did not show variability were removed from the measurement model, thus remaining a model with two dimensions, and items with factor loadings less than 0.30 and multicollinearity were excluded. Thus, the final model resulted in an instrument with nine items and the following dimensional structure: (1) places for the practice of physical activity (five items): squares, sports court, soccer field, parks, places for walking; (2) environmental safety (four items): traffic safety, night, day, and night lighting. This model showed adequate fit indices (comparative fit index – CFI = 0.94; Tucker Lewis index – TLI = 0.91; root mean square error of approximation – RMSEA = 0.044) and the composite reliability of the full scale was 0.78. The dichotomized items were considered: 0 = no and 1 = yes.

- **Outdoor physical activity**

Time spent in outdoor physical activity outside school was assessed by in-person interview. Parents were asked for: (1) "Over the last month, during a typical day of the week, how much time did your child spend playing outdoors (backyard, street, square, park, etc.) after preschool hours?", (2) "Over the last month, during a typical weekend day, how much time did your child spent playing outdoors (backyard, street, square, park, etc.)?". This procedure was previously used in Burdette et al. [30] study, showing a significant correlation with direct measures of physical activity in preschool-aged children. Responses were categorized into ≤ 2 hours/day or > 2 hours/day. For analysis purposes, time in outdoor physical activity during the week and on the weekend days were considered.

Sociodemographic variables

The sociodemographic variables assessed were: sex, age (aged groups ranged from 3 to 4 years and 5 months; from 4 years and 6 months to 5 years and 11 months), siblings (yes; no); schooling level (illiterate; incomplete elementary education; complete elementary education; incomplete high school; complete high school; incomplete higher education; complete higher education or higher); family income (less than 255.00; 255.00 to 510.00; 510.00 to 1,020.00; 1,020.00 to 2,040.00; 2,240.00 to 5,100.00; more than 5,100.00; does not know; does not want to answer). For analysis purposes, schooling level and family income were dichotomized into: 0 = incomplete high school or lower; 1 = complete high school or higher and 0 = up to 2 minimum wages; 1 = more than 2.1 minimum wages.

Data analysis

Descriptive data were presented using descriptive statistics (mean, standard deviation, frequency, and percentage, when applicable). Two models were created to verify the association between parents' perception of the environment and outdoor physical activity out of school, using binary logistic regression. Considering that all independent variables are important to explain the outcome and should remain in both models, the Enter method was used. Model 1 considered the perception of "no" environment infrastructure or security as a reference category. For the adjusted analysis, the categories: sex (male), age (3 to 4.5 years), siblings (yes), schooling level (high school or lower), and income (up to two minimum wages) were used. The category ≤ 2 hours/day in outdoor physical activity during the week was considered the reference for the outcome variable. For Model 2, the same procedures were used, with the outcome being ≤ 2 hours in the weekend days. The categories of independent variables that presented a p-value < 0.05 in the Wald test were associated with the study outcomes.

To assess the model goodness of fit, the Hosmer and Lemeshow test was used. In this analysis, the data are divided according to the predicted probabilities into ten equal groups, and the predicted and actual numbers are compared with the chi-square statistic. The best fit of the model is indicated by a smaller difference in rank between the observed and predicted values, thus a non-significant chi-square value indicates a good fit of the model [31]. Data were analyzed using the SPSS, version 21.0 (https://www.ibm.com/).

Results

Most parents in the study were from low-income families, with a month income up to two minimum wage, and low schooling level. A total of 76.9% of preschoolers had ≤ 2 hours/day in outdoor physical acivity during the week. On the weekend, 65.9% of the children accumulated > 2 hours/day in outdoor physical acivity. Table 1 shows sample characteristics and parents' environmental perceptions by outdoor physical acivity time per day spent during week and weekend days.

Table 1

Distribution of predictors of time spent in outdoor physical activity during week and weekend days in low-income pre-schoolers. João Pessoa, Paraíba State, Brazil.

Outcome	Outdoor physical activity			
	≤ 2h (weekdays) n = 100 (76.9%)	> 2h (weekdays) n = 29 (23.1%)	≤ 2h (weekend days) n = 44 (34.1%)	> 2h (weekend days) n = 85 (65.9%)
Sex				
Male	49 (49.0)	16 (55.2)	21 (47.7)	44 (51.8)
Female	51 (51.0)	13 (44.8)	23 (52.3)	41 (48.2)
Age (years)				
3-4	43 (43.0)	7 (24.1)	14 (31.8)	36 (42.4)
4-5	57 (57.0)	22 (75.9)	30 (68.2)	49 (57.6)
Siblings				
Yes	75 (75.0)	25 (86.2)	29 (65.9)	71 (83.5)
No	25 (25.0)	4 (13.8)	15 (34.1)	14 (16.5)
Income (minimum wages)				
Up to 2	97 (97.0)	29 (100.0)	41 (93.2)	85 (100.0)
More than 2.1	3 (3.0)	0 (0.0)	3 (6.8)	0 (0.0)
Schooling level				
Incomplete high school or lower	85 (85.0)	25 (86.2)	39 (88.6)	71 (83.5)
Complete high school or higher	15 (15.0)	4 (13.8)	5 (11.4)	14 (16.5)
Square				
No	14 (14.0)	3 (10.3)	4 (9.1)	13 (15.3)
Yes	86 (86.0)	26 (89.7)	40 (90.9)	72 (84.7)
Place to walk				
No	16 (16.0)	10 (34.5)	8 (18.2)	18 (21.2)
Yes	84 (84.0)	19 (65.5)	36 (81.8)	67 (78.8)
Gym				
No	56 (56.0)	19 65.5)	23 (52.3)	52 (61.2)
Yes	44 (44.0)	10 (34.5)	21 (47.7)	33 (38.8)
Sports court				
No	41 (41.0)	11 (37.9)	18 (40.9)	34 (40.0)
Yes	59 (59.0)	18 (62.1)	26 (59.1)	51 (60.0)
Soccer field				
No	26 (26.0)	5 (17.2)	11 (25.0)	20 (23.5)
Yes	74 (74.0)	24 (82.8)	33 (75.0)	65 (76.5)
Traffic safety				
No	44 (44.0)	19 (65.5)	16 (36.4)	47 (55.3)
Yes	56 (56.0)	10 (34.5)	28 (63.6)	38 (47.7)
Night illumination				
No	64 (64.0)	19 (65.5)	25 (56.8)	58 (68.2)
Yes	36 (36.0)	10 (34.5)	19 (43.2)	27 (31.8)
Night safety				
No	15 (15.0)	9 (31.0)	9 (20.5)	15 (17.6)
Yes	85 (85.0)	20 (69.0)	35 (79.5)	70 (82.4)
Day safety				
No	60 (60.0)	16 (55.2)	30 (68.2)	46 (54.1)
Yes	40 (40.0)	13 (44.8)	14 (31.8)	39 (45.9)

According to the Hosmer and Lemeshow test (R^2 = 8.24; p = 0.41), the association between environmental factors and ≤ 2 hours/day spent in outdoor physical acivity during the week (Table 2) showed adequate adjustments regarding the null model and presented good quality, with Akaike information criterion – AIC values: 140; Bayesian information criterion – BIC: 186, and collinearity with the value of variance inflation factor – VIF (< 5.0) ranging from 1.12 to 2.07 among the variables. The crude analysis showed significant associations between parental perceptions of absence of places to walk (p = 0.02), lack of traffic safety (odds ratio – OR = 0.39; p = 0.03), lack of night safety (OR = 0.36; p = 0.04), and preschoolers spending less time in outdoor physical activity (≤ 2 hours). After adjustments, the traffic insecurity perception (OR = 0.26; p = 0.01) and the lack of places to walk (OR = 0.15; p = 0.01) remained significant predictors of ≤ 2 hours/day in outdoor physical activity, with odds ratios ranging from 15% to 26% during weekdays. The chi-square significance values (p > 0.05) indicate a good fit of the model.

Considering the time in outdoor physical activity during weekend (Table 3), the Hosmer and Lemeshow test (R^2 = 7.19; p = 0.51) demonstrated adequate adjustments to the null model for the outcome of the ≤ 2 hours condition of outdoor physical activity during the weekend, and the values of AIC: 173; BIC: 216 and VIF (< 5.0) ranged from 1.00 to 1.60. The crude analysis showed that the parent's perception of lack of traffic safety (OR = 0.46; p = 0.04) showed odds 46% higher for spending ≤ 2 hours/day in outdoor physical activity. However, after adjustments, none of the predictor variables remained significant. The chi-square significance values (p > 0.05) indicate a good fit of the model.

Discussion

This study aimed to explore the association between parents' perception of environmental features and outdoor physical activity of preschoolers after school hours in a low-income context. The results revealed that, even after adjustments for possible confounders, parents' perception of traffic insecurity and the absence of places to walk explained 26% and 15%, respectively, of preschoolers outdoor physical activity outside the school during the weekdays. Moreover, most children (76.9%) spent ≤ 2 hours/day in outdoor physical activity after school hours during weekdays, and on weekend days 65.9% achieved > 2 hours/day in outdoor physical activity.

Brazilian children in this age group spend most of their day in preschools and day-care centers [23], with a predominance of indoor sedentary activities [32]. However, when out of school, structural and social factors seem to affect children's outdoor physical activity time [8]. Parents' perception about the

Table 2

Associations between time spent in outdoor physical activity (≤ 2 hours) during weekdays and the lack of built environment features. João Pessoa, Paraíba State, Brazil.

Environment factors	Crude OR (95%CI)	p-value	Adjusted OR * (95%CI)	p-value
Square	1.31 (0.34-4.95)	0.69	4.85 (0.78-30.0)	0.08
Place to walk	0.33 (0.13-0.87)	0.02	0.15 (0.03-0.69)	0.01 **
Gym	0.68 (0.28-1.62)	0.39	0.57 (0.19-1.68)	0.31
Sports court	1.15 (0.49-2.70)	0.73	1.85 (0.61-5.64)	0.27
Soccer field	1.71 (0.59-4.94)	0.32	2.20 (0.53-9.09)	0.27
Traffic safety	0.39 (0.16-0.93)	0.03	0.26 (0.08-0.77)	0.01 **
Night illumination	0.92 (0.38-2.19)	0.85	0.98 (0.34-2.77)	0.97
Night safety	0.36 (0.13-0.96)	0.04	0.31 (0.09-1.11)	0.07
Day safety	1.19 (0.52-2.76)	0.67	1.24 (0.41-3.70)	0.69

95%CI: 95% confidence interval; OR: odds ratio.

* Adjustments for sex, age, siblings, mother's schooling level, and income;

** p-value < 0.05.

Table 3

Associations between time spent in outdoor physical activity (≤ 2 hours) during weekend days and absence of built environment features. João Pessoa, Paraíba State, Brazil.

Environment factors	Crude OR (95%CI)	p-value	Adjusted OR * (95%CI)	p-value
Square	0.55 (0.16-1.81)	0.32	0.72 (0.16-3.09)	0.65
Place to walk	0.82 (0.32-2.08)	0.68	0.81 (0.22-2.95)	0.75
Gym	0.69 (0.33-1.45)	0.33	0.60 (0.23-1.57)	0.30
Sports court	1.03 (0.49-2.17)	0.92	1.42 (0.55-3.65)	0.46
Soccer field	1.08 (0.46-2.52)	0.85	1.30 (0.47-3.59)	0.60
Traffic safety	0.46 (0.21-0.97)	0.04	0.56 (0.24-1.31)	0.18
Night illumination	0.61 (0.28-1.29)	0.20	0.53 (0.22-1.28)	0.97
Night safety	1.20 (0.47-3.01)	0.69	1.33 (0.44-4.04)	0.60
Day safety	1.81 (0.84-3.90)	1.12	1.58 (0.63-3.95)	0.32

95%CI: 95% confidence interval; OR: odds ratio.

* Adjustments for sex, age, siblings, mother's schooling level, and income.

lack of traffic safety was the main predictor of low outdoor physical activity (≤ 2 hours/day) observed in children, corroborating Sandseter et al. [18] findings, which identified unsafe traffic as the most common barrier to outdoor physical activity among children in five European countries. Urban environments are generally planned and designed to facilitate the movement of vehicles [33] and lack favorable physical activity facilities. In a middle-to-high income country like Brazil [34], the urbanization process in recent years was fast, resulting in unstructured and unplanned urban environments [35], which may lead to more significant vehicle traffic and higher traffic accident rates [36,37]. Although in Brazil deaths due to traffic accidents in the recent years decreased, they still occupy a prominent position globally [38]. We can understand this scenario based on data from the Traffic Department of Paraíba [39], which recorded an increase in vehicle traffic, due to credit access policies that facilitated the purchase of motorcycles – the most involved vehicle in traffic accidents. Moreover, another possible factor attributed to traffic insecurity is the absence of public policies for traffic education in the first years of schooling, well-established rules, and strict inspections for offenders.

We also observed the predictive power of the lack of places to walk even after adjustment for sociodemographic correlates. Large cities have a high residential and commercial density, thus specific places for children engagement in physical activity are scarce. Notably, the low perception of suitable areas for physical activity may be related to the perception of parents on unsafe traffic [40], contributing to the judgment of the absence of these places.

Moreover, even after adjustments, perceiving a lack of different built environment infrastructure for physical activity was not a predictor of a shorter time spent in outdoor physical activity. Accordingly, in a longitudinal study aiming to understand individual, social, and physical environmental influences on longitudinal changes in urban time outdoors. Cleland et al. [19] observed that individual and social factors, like parental encouragement for activity and having someone to go outdoor with were more important predictors of children's time outdoors than built environmental factors [21]. The fact that aspects related to safety are more important than the available infrastructure for the low-income population may explain our outcomes. Since these are poor neighborhoods, traditionally presenting high crime rates [41], poorly established social norms, and less investment in public facilities and equipment [42], our results were expected. Therefore, Tandon et al. [15] suggested that low-income parents feel insecure allowing their children to engage in outdoor physical activity. This supports the hypothesis that physical structure is not enough for parents to support children's outdoor physical activity, instead the presence of a safe social environment is. Furthermore, urban violence in low-income neighborhoods – reported daily by the media – contributes to a greater sense of insecurity in parents [18].

To understand the modern family organization – in which women are commonly directly responsible for the care of children, accumulating different attributions – is essential to comprehend their restrictions in accompanying their children in outdoor physical activity [43]. Thus, the family context may explain the increased time spent in outdoor physical activity among preschoolers during the weekends, corroborating previous studies [17,44]. However, other studies have shown different results, with greater participation in outdoor physical activity in week days during the school period [1]. Brazendale et al. [45] reported that children aged 3 to 18 years from various countries – including Brazil – are more active during the week than in the weekend days. The hypothesis raised by the authors to understand these differences between weekdays and the weekends is the "structured day". This hypothesis refers to an organized, mandatory, and supervised routine by adults during the weekdays, starting when waking up to bedtime, including school hours, eating times, and performing outdoor physical activity. The structure provides opportunities for children to be active both inside and outside school. On weekends, considered unstructured, children generally do not have a well-established routine [46].

However, our findings relating outdoor physical activity during the weekends and the environment perception of parents are controversial, with no significant associations. Children may have more autonomy during the weekends, choosing more sedentary activities based on screens, instead of the physically activities [46]. Moreover, low-income parents quite usually accumulate unformal extra jobs during the weekends to supplement family income. Nonetheless, we need further investigation to confirm this hypothesis.

Some limitations must be highlighted. Despite the analyses presented good fits of the models, with superficial evidence about the analyzed relationships, the sample size does not allow for the generalization of the results. Furthermore, outdoor physical activity has been indirectly assessed. To improve this issue, we used an approach previously advocated in preschoolers and validated against estimates from objective actigraphy [30]. The environment assessment is a construct that undergoes significant variability as a function of time, context, and social and personal factors. Thus, we assessed environment perceptions of parents and outdoor physical activity by an individual in-face interview with the parents, which should be seen as a strength of this study, especially considering a population with low schooling level that could present difficulties in interpreting the constructs assessed.

By understanding how parents perceive the environment can determine outdoor physical activity of preschoolers, this study covers an essential portion of the population whose opportunities to outdoor physical activity should be encouraged to have a generation of active individuals in the future.

Conclusions

Our results showed that in low-income contexts, a negative parental perception about the presence of places to walk and traffic safety was associated with a lower time spent by preschoolers in outdoor physical activity outside the school during weekdays. Therefore, we suggest that interventions to increase preschoolers' time in outdoor physical activity outside preschools should incorporate an ecological approach focusing on investments in infrastructure, and traffic and personal safety. Moreover, broader political actions aiming at combining educational actions, for both parents and children, on the benefits of physical activity should be taken.

Contributors

C. T. Souza contributed to data collection and article writing. G. C. Nobre contributed in the statistical analysis, description, interpretation of results and final review of the article. A. N. Souza Filho contributed in data collection and methodology and final review of the article. R. G. Autran contributed to the final review of the article. J. A. P. S. Mota contributed to the final review of the article. A. Pizarro contributed in the discussion and final review of the article. C. M. L. Martins contributed in the writing of the manuscript.

Additional information

ORCID: Cleene Tavares de Souza (0000-0001-5987-5387); Glauber Carvalho Nobre (0000-0002-3570-8493); Anastácio Neco de Souza Filho (0000-0002-0724-4513); Roseanne Gomes Autran (0000-0002-7483-0213); Andréia Pizarro (0000-0001-6518-5569); Jorge Augusto Pinto da Silva Mota (0000-0001-7571-9181); Clarice Maria de Lucena Martins (0000-0002-4947-9329).

Acknowledgments

To the study group on physical activity and health outcomes. To the Reference Centers in Early Childhood Education in the municipality of João Pessoa, Paraíba State, Brazil.

References

1. Truelove S, Vanderloo LM, Tucker P. Defining and measuring active play among young children: a systematic review. J Phys Act Health 2017; 14:155-66.
2. Tortella P, Haga M, Ingebrigtsen JE, Fumafalli GF, Sigmundsson H. Comparing free play and partly structured play in 4-5-years-old children in an outdoor playground. Front Public Health 2019; 7:197.
3. Wyver S. The influence of outdoor play on social and cognitive development. https://www.child-encyclopedia.com/pdf/expert/outdoor-play/according-experts/influence-outdoor-play-social-and-cognitive-development (accessed on 03/Feb/2022).
4. Wolfenden L, Jones J, Parmenter B, Razak LA, Wiggers J, Morgan PJ, et al. Efficacy of a free-play intervention to increase physical activity during childcare: a randomized controlled trial. Health Educ Res 2019; 34:84-97.
5. Tanaka C, Ando T, Usui C, Hikihara Y, Sasaki R, Inayama T, et al. Physical activity in young children during outdoor and indoor free playing time and in physical education lessons in preschools. Japanese Journal of Physical Fitness and Sports Medicine 2019; 68:207-13.
6. Sallis JF, Cervero RB, Ascher W, Henderson KA, Kraft MK, Kerr J. An ecological approach to creating active living communities. Annu Rev Public Health 2006; 27:297-322.
7. Christian H, Zubrick SR, Foster S, Giles-Corti B, Bull F, Wood L, et al. The influence of the neighborhood physical environment on early child health and development: a review and call for research. Health Place 2015; 33:25-36.
8. Hinkley T, Salmon J, Okely AD, Crawford D, Hesketh K. Preschool activity, screen time, and compliance with recommendations. Med Sci Sports Exerc 2012; 44:458-65.
9. Da Luz GM, Kuhnen A. Use of urban spaces by children: exploring the behavior of playing in public squares. Psicol Reflex Crít 2013; 26:552.
10. Carson V, Rosu A, Janssen I. A cross-sectional study of the environment, physical activity, and screen time among young children and their parents. BMC Public Health 2014; 14:61.
11. Fjortoft I. Landscape as playscape: the effects of natural environments on children's play and motor development. Children Youth and Environments 2004; 14:21-44.
12. Reimers AK, Schoeppe S, Demetriou Y, Knapp G. Physical activity and outdoor play of children in public playgrounds – do gender and social environment matter? Int J Environ Res Public Health 2018; 15:1356.
13. Grigsby-Toussaint DS, Sang-Hyun C, Fiese BH. Where they live, how they play: neighborhood greenness and outdoor physical activity among preschoolers. Int J Health Geogr 2011; 10:66.

14. Gil-Madrona P, López MM, Ayuso AP, Saraiva L, Vecina-Cifuentes J, Vicente-Ballesteros T, et al. Contribution of public playgrounds to motor, social, and creative development and obesity reduction in children. Sustainability 2019; 11:3787.
15. Tandon PS, Saelens BE, Copeland KA. A comparison of parent and childcare provider's attitudes and perceptions about preschoolers' physical activity and outdoor time. Child Care Health Dev 2017; 43:679-86.
16. Katzmarzyk PT, Denstel KD, Beals K, Bolling C, Wright C, Crouter SE, et al. Results from the United States of America's 2016 report card on physical activity for children and youth. J Phys Activ Health 2016; 13:307-13.
17. Boxberger K, Reimers AK. Parental correlates of outdoor play in boys and girls aged 0 to 12 – a systematic review. Int J Environ Res Public Health 2019; 16:190.
18. Sandseter EBH, Cordovil R, Hagen TL, Lopes F. Barriers for outdoor play in early childhood education and care (ECEC) institutions: perception of risk in children's play among European parents and ECEC practitioners. Child Care Pract 2019; 26:111-9.
19. Cleland V, Timperio A, Salmon J, Hume C, Baur LA, Crawford D. Predictors of time spent outdoors among children: 5-year longitudinal findings. J Epidemiol Community Health 2010; 64:400-6.
20. Remmers T, Broeren SML, Renders CM, Hirasing RA, Grieken AV, Raat H. A longitudinal study of children's outside play using family environment and perceived physical environment as predictors. Int J Behav Nutr Phys Act 2014; 11:76.
21. Vanderloo LM. Screen-viewing among preschoolers in childcare: a systematic review. BMC Pediatr 2014; 14:205.
22. Vanderloo LM, Tucker P, Johnson AM, Holmes JD. Physical activity among preschoolers during indoor and outdoor childcare play periods. Appl Physiol Nutr Metab 2013; 38:1173-5.
23. Barbosa SC, Coledam DHC, Stabelini Neto A, Elias RGM, Oliveira AR. Ambiente escolar, comportamento sedentário e atividade física em pré-escolares. Rev Paul Pediatr 2016; 34:301-8.
24. Gray C, Gibbons R, Larouche R, Sandseter EBH, Bienenstock A, Brussoni M, et al. What is the relationship between outdoor time and physical activity, sedentary behaviour, and physical fitness in children? A systematic review. Int J Environ Res Public Health 2015; 12:6455-74.
25. Little H, Sandseter EBH, Wyver S. Early childhood teachers' beliefs about children's risky play in Australia and Norway. Contemporary Issues in Early Childhood 2012; 13:300-16.
26. Instituto Brasileiro de Geografia e Estatística. Censo demográfico de 2010. Rio de Janeiro: Instituto Brasileiro de Geografia e Estatística; 2010.
27. Florindo AA, Guimarães VV, Farias Júnior JC, Salvador EP, Sá TH, Reis RS, et al. Validação de uma escala de percepção do ambiente para a prática de atividade física em adultos de uma região de baixo nível socioeconômico. Rev Bras Cineantropom Desempenho Hum 2012; 14:647-59.
28. Saelens BE, Sallis JF, Black JB, Chen D. Neighborhood-based differences in physical activity: an environment scale evaluation. Am J Public Health 2003; 93:1552-8.
29. Reis MS, Reis RS, Hallal PC. Validity and reliability of a physical activity social support assessment scale. Rev Saúde Pública 2011; 45:294-301.
30. Burdette HL, Whitaker RC, Daniels SR. Parental report of outdoor playtime as a measure of physical activity in preschool-aged children. Arch Pediat Adol Med 2004; 158:353-7.
31. Hair JF, Black WC, Babin BJ, Anderson RE, Tatham RL. Análise multivariada de dados. 6ª Ed. São Paulo: Bookman; 2009.
32. Connelly JA, Manningham S, Champagne M. Factors related to energetic play during outdoor time in childcare centres. Early Child Educ J 2021; 49:441-9.
33. Tonucci F. Citizen child: play as welfare parameter for urban life. Topoi 2005; 24:183-95.
34. Banco Mundial. World development indicators database: total GDP 2019. https://data.worldbank.org/country/brazil?locale=pt (accessed on 26/Mar/2021).
35. Chen M, Zhang H, Liu W, Zhang W. The global pattern of urbanization and economic growth: evidence from the last three decades. PLoS One 2014; 9:103799.
36. Lopes F, Cordovil R, Neto C. Children's independent mobility in Portugal: effects of urbanization degree and motorized modes of travel. J Transp Geogr 2014; 41:210-9.
37. Witten K, Kearns R, Carroll P, Asiasiga L, Tava'e N. New Zealand parents' understandings of the intergenerational decline in children's independent outdoor play and active travel. Child Geogr 2013; 11:215-29.
38. Lima TF, Macena RHM, Mota RMS. Prevalência e caracterização dos acidentes viários automobilísticos no nordeste brasileiro: resultados da Pesquisa Nacional de Saúde-PNS, 2013. Cadernos ESP-Revista Científica da Escola de Saúde Pública do Ceará 2020; 14:9-15.
39. Departamento de Trânsito da Paraíba. Estatísticas. https://detran.pb.gov.br/portalparaiba/portal_detranpb/estatisticas (acessado em 25/Fev/2021).
40. Farias Júnior JC, Reis RS, Hallal PC. Physical activity, psychosocial and perceived environmental factors in adolescents from Northeast Brazil. Cad Saúde Pública 2014; 30:941-51.
41. Hofferth SL. Changes in American children's time – 1997 to 2003. Electron Int J Time Use Res 2009; 6:26-47.
42. Oliveira C. O ambiente urbano e a formação da criança. São Paulo: Aleph; 2004.

43. Hilbrecht M, Shaw SM, Johnson LC, Andrey J. 'I'm home for the kids': contradictory implications for work-life balance of teleworking mothers. Gender Work & Organization 2008; 15:454-76.
44. Marino AJ, Fletcher EN, Whitaker RC, Anderson SE. Amount and environmental predictors of outdoor playtime at home and school: a cross-sectional analysis of a national sample of preschool-aged children attending Head Start. Health Place 2012; 18:1224-30.
45. Brazendale K, Beets MW, Armstrong B, Weaver RG, Hunt ET, Pate RR, et al. Children's moderate-to-vigorous physical activity on weekdays versus weekend days: a multi-country analysis. Int J Behav Nutr Phys Act 2021; 18:28.
46. Brazendale K, Beets MW, Weaver RG, Pate RR, Turner-McGrievy GM, Kaczynski AT, et al. Understanding differences between summer vs. school obesogenic behaviors of children: the structured days hypothesis. Int J Behav Nutr Phys Act 2017; 14:100.

Resumo

A percepção dos pais sobre o ambiente pode influenciar o tempo gasto em atividades físicas ao ar livre em crianças pré-escolares. Este estudo teve como objetivo analisar a associação entre a percepção dos pais sobre o ambiente e atividades físicas ao ar livre fora da escola em pré-escolares de baixa renda. No total, 129 pré-escolares de 3 a 5 anos (4,4 anos ± 0,7 anos, 50% meninos) e seus pais participaram do estudo. Uma versão adaptada da Escala de Caminhabilidade Ambiental do Bairro *foi usada para obter as percepções ambientais dos pais. A atividade física ao ar livre foi mensurada com base em duas questões considerando o tempo habitual despendido nessas atividades durante a semana e os dias de fim de semana. As informações sociodemográficas foram coletadas por meio de entrevista. Foi utilizada regressão logística para analisar as associações. As análises estatísticas foram realizadas no SPSS, versão 21.0. A maioria dos pré-escolares (76,9%) teve ≤ 2 horas/dia em atividade física ao ar livre durante a semana enquanto no final de semana, 65,9% atingiu > 2 horas. A percepção dos pais sobre o trânsito inseguro (OR = 0,39; p = 0,03) foi associada a maiores chances de menor tempo de atividade física ao ar livre tanto durante a semana quanto no final de semana (OR = 0,46; p = 0,04). Além disso, pré-escolares cujos pais percebem falta de lugares para caminhar (OR = 0,33; p = 0,02) e período noturno inseguro (OR = 0,36; p = 0,04) são mais propensos a passar menos tempo em atividade física ao ar livre durante a semana. Após ajustes para fatores de confusão sociodemográficos, a percepção de trânsito inseguro (OR = 0,26; p = 0,01) e locais para caminhar (OR = 0,15; p = 0,01) foram preditores de menor tempo do pré-escolar em atividade física ao ar livre durante a semana. A percepção dos pais sobre o trânsito inseguro e os lugares para caminhar foram associados ao menor tempo de atividade física ao ar livre entre pré-escolares de baixa renda.*

Atividade Motora; Ambiente Contruído; Criança

Resumen

La percepción de los padres sobre el entorno puede influir en el tiempo dedicado a actividades físicas al aire libre en niños en edad preescolar. Este estudio tuvo como objetivo analizar la asociación entre la percepción de los padres sobre el ambiente y la actividade física al aire libre fuera de la escuela en preescolares de bajos recursos. En total, participaron en el estudio 129 preescolares de 3 a 5 años (4,4 años ± 0,7 años, 50% niños) y sus padres. Se utilizó una versión adaptada de la Escala de Caminabilidad Ambiental del Vecindario *para obtener las percepciones ambientales de los padres. La actividade física al aire libre se midió a partir de dos preguntas considerando el tiempo habitual dedicado a estas actividades durante los días de semana y los fines de semana. La información sociodemográfica se recogió mediante entrevista. Se utilizó regresión logística para analizar las asociaciones. Los análisis estadísticos se realizaron con SPSS, versión 21.0. La mayoría de los preescolares (76,9%) tenían ≤ 2 horas/día en actividade física al aire libre durante la semana mientras que el fin de semana, el 65,9% alcanzaba > 2 horas. La percepción de los padres sobre el tráfico inseguro (OR = 0,39; p = 0,03) se asoció con mayores posibilidades de pasar menos tiempo en actividade física al aire libre tanto entre semana como en fin de semana (OR = 0,46; p = 0,04). Además, los preescolares cuyos padres perciben la falta de lugares para caminar (OR = 0,33; p = 0,02) e inseguridad en la noche (OR = 0,36; p = 0,04) tienen más probabilidades de pasar menos tiempo en actividade física al aire libre durante la semana. Después de los ajustes por factores de confusión sociodemográficos, la percepción de tráfico inseguro (OR = 0,26; p = 0,01) y lugares para caminar (OR = 0,15; p = 0,01) fueron predictores de menor tiempo en actividade física al aire libre de los preescolares durante la semana. La percepción de los padres sobre el tráfico inseguro y los lugares para caminar se asoció con menos tiempo en actividades físicas al aire libre en preescolares de bajos ingresos.*

Actividad Motora; Entorno Construido; Niño

Submitted on 23/Mar/2022
Final version resubmitted on 05/Sep/2022
Approved on 24/Oct/2022