Family ecological predictors of physical activity parenting in low income families

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Abstract

Physical activity (PA) parenting, or strategies parents use to promote PA in children, has been associated with increased PA in children of all ages, including preschool-aged children. However, little is known about the circumstances under which parents adopt such behaviors. This study examined family ecological factors associated with PA parenting. Low-income parents (N = 145) of preschool-aged children (aged 2 to 5 years) were recruited from five Head Start centers in upstate New York. Guided by the Family Ecological Model (FEM), parents completed surveys assessing PA parenting and relevant family and community factors. Hierarchical regression analysis identified independent predictors of PA parenting. Parent depressive symptoms, life pressures that interfere with PA and perceived empowerment to access PA resources were associated with PA parenting. Community factors, including neighborhood play safety and social capital, were not independently associated with PA parenting in the multivariate model. Together, family ecological factors accounted for a large proportion of the variance in PA parenting (R^2 = .37). Findings highlight the need to look beyond cognitive predictors of PA parenting in low-income families and to examine the impact of their broader life circumstances including indicators of stress.

Keywords

parenting; child; physical activity; family ecology

Many preschool-aged children do not engage in adequate physical activity (PA).[1] Insufficient PA in children is of public health concern given its noted benefits for children's physical and mental health.[2–6] The Institute of Medicine Committee on Prevention of Obesity in Children and Youth has identified increased child PA as a core component of obesity prevention goals and emphasized the role of families in promoting active lifestyles

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in children.[7] As highlighted in recent reviews of the literature, parenting practices play a central role in facilitating and encouraging child PA.[8–12] Parents promote and support children's PA by modeling PA, co-participating in PA, encouraging or prompting PA, and providing instrumental support (e.g., transport, fee-paying, and purchasing equipment).[8–12] Given the need to increase PA in children, PA parenting is an important intervention target.

Increasing PA parenting may be particularly important in low-income families. Children in low-income families may be less exposed to PA parenting, with fewer family role models for PA, less transport support, less parental watching of PA, and less joint activity with parents.[13,14] PA parenting may also be more important for children in low-income families who are exposed to neighborhood conditions, including fewer parks and street lighting, which may inhibit independent play and are associated with less PA in youth.[15] Systematic reviews have found that lower socioeconomic status (SES) in youth is associated with lower PA.[16,17] A cross-national survey conducted by the World Health Organization found that low-income youth were less likely to meet PA recommendations than high-income youth in 25 out of 32 surveyed countries.[18] In the US, low-income youth were 42% more likely to fail to meet PA recommendations than high-income youth.[18] While a comprehensive approach is needed to address this health disparity, improving PA parenting will be one important component. Research needs to identify ways to support positive parenting practices specific to PA in low-income families.

The Family Ecological Model (FEM) proposes that the ecology of parenting plays an important role in facilitating or inhibiting positive parenting practices that influence child obesity risk behaviors, including PA.[19] In the case of PA parenting, the FEM posits that parenting is shaped by factors proximal to families (e.g., child characteristics, parent stress and mental health, and family dynamics) in combination with the broader contexts in which parents and families are embedded, such as parents' place of employment and associated job demands, community infrastructure and PA-related resources, and social capital.[19]

The FEM differs from ecological models previously outlined[20,21] in that it directs attention to factors that shape parenting rather than viewing parenting as one of many factors on the causal chain to child behavior. The use of traditional ecological models has not translated into programs that recognize the often complicated circumstances under which parenting takes place, particularly for low-income families. Research framed by the FEM can inform the development of family-centered PA interventions, which target improved PA outcomes for children and adolescents, address contextual factors affecting family well-being, and enhance the functioning of the entire family system.[22]

Few interventions to promote child PA are family-centered as defined above. O'Connor, Jago, and Baranowski[23] conducted a systematic review of PA interventions for children that included parents or families to improve child PA outcomes. Intervention strategies adopted across the 35 reviewed studies include parent training or family counseling targeting nutrition education, food preparation and family behavioral management, family exercise sessions, family fun nights, and the distribution of educational materials. The majority of these interventions (63%) failed to show a positive effect on child PA outcomes. Yet, none of the interventions addressed the broader life experiences of families. With this in mind, the

overarching objective of the current study is to examine a broad range of family and community factors, or family ecological factors, that may affect PA parenting and which can be addressed in future family-centered programs.

While few studies have examined predictors of PA parenting, a number of studies have examined family and community predictors of children's PA. These studies, along with the FEM, highlight predictors of PA parenting to consider. Results from these studies suggest that children are more physically active when they live in communities with higher social capital,[24] greater neighborhood play safety,[24] and when parents' report lower levels of depression.[25] To our knowledge, only one study to date has examined ecological predictors of PA parenting. This study, which focused on rural predominantly white families, found that parents of adolescents reported higher support for PA when they perceived higher neighborhood social capital.[26]

The current study builds on this limited body of research to examine a broad range of family ecological predictors of PA parenting in a sample of low-income parents of preschool-aged children who are disproportionately at risk of insufficient PA. Family ecological variables assessed in this study include parent depressive symptoms, parent attitudes regarding the importance of PA, concern about childhood obesity, resource empowerment to support child PA, family time pressures and priorities in relation to PA, neighborhood play safety, and social capital. Based on the FEM and prior research on predictors of child PA, we hypothesized that these variables would be associated with PA parenting above and beyond relevant family demographic and child characteristics.

Method

Participants

Parents or caregivers (hereafter referred to as parents) of children attending one of five Head Start centers in upstate New York were recruited between September and November 2010. All Head Start centers in the county were included in the current study. Parents of all 2- to 5-year old children attending the centers ($n = 423$) were eligible to participate and 154 returned completed surveys (36.4% of the eligible sample). A three stage recruitment strategy was employed. First, poster displays in Head Start centers and flyers sent home with children were used to generate awareness of the study. Contact details were included on these materials and parents could directly contact the research team to organize participation. Second, a participation package was mailed to all parents, including an information sheet, consent form, survey, and reply-paid envelope. Third, research assistants attended the Head Start centers at child drop-off and pick-up times and communicated with parents about the study. At this time, parents who expressed interest were provided a participation package. Of the 154 parents who returned the survey package, 145 completed all items used to assess PA parenting and reported information for a child in the target age range of this study (2–5 years). The majority of parents (93%) and children (55%) were female. Procedures were reviewed and approved by the Institutional Review Board at the University at Albany.

Measures

Demographic factors and covariates—Parents completed a self-report survey assessing demographic characteristics (parent weight, height, education, ethnicity, marital status, and relationship to child) and child characteristics (sex and date of birth). Child weight and height data, measured and provided by Head Start, were used to calculate age and sex-specific body mass index (BMI) z-scores and to identify children who were overweight (85–94.9th BMI percentile) or obese (95th BMI percentile), based on CDC 2000 growth charts.[27] Self-reported parent weight and height data were used to calculate parent BMI (kg/m^2). Parents were classified as non-overweight (BMI < 25), overweight (25 BMI < 30), or obese (BMI 30) in accordance with World Health Organization[28] classifications.

Parent leisure time PA was assessed using the International Physical Activity Questionnaire (IPAQ) short form.[29] Prior research supports the validity and reliability of the IPAQ short form.[29] Minutes of moderate and vigorous PA were assessed using separate items and then combined to form a measure of parent leisure time PA (minutes per day).

PA parenting—PA parenting was assessed using four items from the Activity Support Scale (ACTS)[30]. The ACTS is a 12-item scale that has demonstrated reliability (alpha range .69 to .88) and factorial invariance across racial/ethnic groups[30]. The four items included in the current study were, "We do active things as a family, such as going for a walk", "I encourage my child to play outdoors, with supervision, when the weather is nice", "I take my child to places where he/she can be active", and "I enroll my child in programs where he/she can be active". Parents rated each item using a four-point scale (1 = *strongly disagree* to 4 = *strongly agree*). Scores were averaged to create a total PA parenting score, with higher scores indicating greater PA parenting (sample alpha = .78).

Family ecological factors—Two community factors were assessed. Parents' perceived neighborhood safety (*play safety*) was measured using a single item ("How safe is it for your child to play outside your home in the yard or on the sidewalk?") to which parents responded using a five point scale (1 = *extremely dangerous* to 5 = *extremely safe*). Social capital was assessed using four items adapted from the National Survey on Children's Health including "People in my community help each other out", "We watch out for each other's children in this community", "There are people I can count on in this community", and "If my child were outside playing and got hurt or scared, there are adults nearby who I trust to help my child". Parents responded to each item using a four point scale (ranging from 1 = *definitely disagree* to 4 = *definitely agree*). Item scores were averaged; higher scores indicate greater social capital (sample alpha = .86).

Five family factors were assessed, including parent attitudes regarding the importance of PA, concern about childhood obesity, parent depressive symptoms, life pressures and priorities related to PA, and resource empowerment to support child PA. Importance of PA was assessed with two investigator-developed items ("For me to make sure my child gets enough physical activity each day is …" and "For me to make sure my child has a healthy body weight is…"). Parents responded to each statement using a seven-point scale (ranging

from 1 = *extremely unimportant* to 7 = *extremely important)*. Items were averaged; higher scores indicate greater assigned importance to PA (alpha = .88). Concern about childhood obesity was assessed with the investigator-developed item, "To what extent do you feel that obesity is a health problem affecting preschool-aged children?" rated on a five-point scale (ranging from 1 = *not a problem at all* to 5 = *a very large problem*).

Parent depression was assessed using the nine-item Patient Health Questionnaire[31] (PHQ-9), which is associated with lower functional status and higher symptom-related difficulty in adults.[31] Items (e.g., "Over the last 2 weeks, how often have you been bothered by feeling down, depressed, or hopeless") were rated on a four-point scale (ranging from 0 = *not at all* to 3 = *nearly every day*), with higher scores indicating more severe depression (sample alpha = .89).

Parent perceived life pressures and implications for child PA (*life pressures*) were assessed using three investigator developed items ("Sometimes life is so stressful that making sure my child gets enough physical activity is the least of my worries", "I have bigger problems to worry about than whether my child gets enough physical activity" and "Because our schedules are so busy, I don't get time to take my child to places where he or she can play"). Parents rated each item using a four point scale (ranging from 1 = *strongly disagree* to 4 = *strongly agree*). Scores were averaged with higher scores indicating greater perceived life pressures (sample alpha = .88).

PA-related resource empowerment, including parents' knowledge of PA resources and their perceived ability to access such resources, was measured using five items (e.g., "I know of resources that I can use to make sure my child is physically active", "I have the ability to access resources I need to make sure my child is physically active", and "When I need additional resources to increase my child's physical activity, I know how to find them"). Item development was informed by the Empowerment Scale.[32] Parents responded to each item using a four point scale (ranging from 1 = *strongly disagree* to 4 = *strongly agree*). Scores were averaged with higher scores indicating greater PA-related resource empowerment (sample alpha = .94).

Data analysis

In preliminary analyses, the data were examined to ensure assumptions for regression analysis were met. Seventeen cases were missing one data value (1.3% of all data). Missing data were imputed using expectation maximization in SPSS as Little's Missing Completely At Random (MCAR) test was non-significant (χ^2 (32) = 42.64, *p* = .10). Visual inspection of the histogram and Q-Q plot indicated that regression residuals were normally distributed. No evidence of multi-colinearity was observed (maximum variance influence factor = 1.33, minimum tolerance = .75).

Bivariate associations between PA parenting and study variables (i.e., demographic factors, covariates, and family ecological factors) were initially examined to identify variables for inclusion (*p* < .10) in the regression analysis. Hierarchical regression analysis was performed using SPSS version 20. Variables were entered into the regression analysis in two steps to determine the contribution of family ecological factors (Step 2) above and beyond

relevant parent and child characteristics (Step 1). Adjusted R^2 was examined as a measure of the variance accounted for in PA parenting. Change in R^2 was examined for Step 2 to determine the contribution of family ecological factors, including family and community factors combined.

Results

Participant characteristics are presented in Table 1. Approximately 31% of parents were overweight and 35% were obese. Among children, 26% were overweight and 20% were obese. The majority of respondents were mothers (89%), non-Hispanic white (72%), high school graduates (97%), and were not currently in a relationship (57%; single or divorced/separated).

Descriptive statistics and correlations between study variables are reported in Table 2. PA parenting did not differ by child sex [t (138) = .68, p = .50, d = .12], parent ethnicity (black vs. white) [t (126) = .69, p = .49, d = .14], or parent education [F (2,138) = .67, p = .51, partial eta^2 = .01], nor was PA parenting associated with parent age ($r = -.05$, $p = .53$), child age ($r = -.04$, $p = .65$), or parent BMI ($r = -.13$, $p = .13$). All remaining study variables were associated with PA parenting (Table 2) and entered into the regression analysis.

Hierarchical regression analysis was performed to examine predictors of PA parenting (Table 3). In Step 1, relevant child and parent characteristics (child BMI z-score and parent leisure time PA) accounted for a significant proportion of variance in PA parenting [R^2 = .13; F (2,142) = 10.57, p <.001]. In Step 2, model R^2 significantly improved with the addition of family ecological factors [R^2 = .37, F_{change} (7,135) = 14.43, p <.001]. Fewer parent depressive symptoms, fewer life pressures, and greater resource empowerment were significantly associated with greater PA parenting. Parent attitudes regarding the importance of PA and concern about childhood obesity were not associated with PA parenting. Similarly, community factors such as neighborhood play safety and social capital were not associated with PA parenting. Overall, the model accounted for a large proportion of the variance in PA parenting [adjusted R^2 = .47, F (9,135) = 15.13, p <.001].

Comment

This study found associations between a number of family ecological factors and PA parenting in low-income families with preschool-aged children. Results suggest that greater parental depressive symptoms, lower resource empowerment, and greater time pressures that interfere with PA may inhibit positive parenting practices related to PA and may be important intervention targets. It is noteworthy that depressive symptoms and PA-related resource empowerment exhibited the strongest relationship, in conjunction with life pressures, with PA parenting across all family ecological factors. These factors are rarely considered in research examining PA parenting or in family interventions to promote child PA. As such, these findings highlight the need for a broader perspective when promoting PA parenting.

While all family factors were correlated with PA parenting, parent beliefs regarding the importance of child PA and concern about childhood obesity did not predict PA parenting in

multivariate analysis. This finding suggests that interventions solely aimed at changing parents' attitudes regarding the physical health benefits of child PA will likely fail to produce meaningful and sustainable changes in parents' behavior. This result is consistent with the findings of a recent review of family PA interventions, which concluded that parent-based educational material, including newsletters or homework packages, are not an effective intervention strategy for increasing PA in children.[23]

Perceived community factors examined in this study were not related to PA parenting. Neither parents' perceptions of neighborhood play safety nor social capital were associated with PA parenting in multivariate analysis. A previous study found that social capital was associated with PA parenting in older children (age 13 to 19 years), but not in younger children (aged 6 to 12 years),[26] indicating that this association may be age-dependent. This study further suggests that links between social capital and PA parenting may be limited to older children. The absence of associations for community predictors should not be interpreted to mean that community factors have no effect on PA parenting. This study examined a limited number of community factors. It is possible that community factors not considered in this study, such as transportation and recreation infrastructure, may indeed affect PA parenting. Such associations could be explored in future research.

Given that family ecological factors accounted for a large percentage of variance ($R^2 = .37$) in PA parenting, above and beyond parent PA, study results are consistent with FEM predictions regarding the importance of family ecological factors in supporting or inhibiting positive parenting practices related to child health. Obesity prevention efforts are typically child or youth-focused. Findings from this study support calls for a greater emphasis on family-centered interventions in childhood obesity prevention.[22] More specifically, this study highlights the need to address broader family functioning and root causes of the challenges experienced by low-income families in conjunction with efforts to promote PA parenting. That is, efforts to increase PA parenting in low-income families will be futile if these larger issues are not addressed. This can be achieved by integrating messages promoting PA parenting into existing community programs targeting more expansive outcomes in vulnerable families (i.e., family well-being, child abuse prevention, and school readiness), such as home visiting programs and community mental health services.

Limitations of this study include self-reported parent PA and common method variance bias, as parents simultaneously reported family ecological factors and PA parenting. The use of an abbreviated measure of PA parenting, which combined instrumental support for PA, co-participation in PA, and encouragement of PA, prevented the examination of family ecological correlates of different types of PA support. Further, PA parenting was measured based on parent agreement with statements reflecting PA parenting (e.g., "We do active things as a family, such as going for a walk"), rather than a measure of the frequency of parenting strategies. While estimates may differ with the use of a frequency measurement scale, the direction of the relationships identified in this study would likely remain unchanged. In addition, while modest participation rates are not uncommon for community-based research, there is the potential for selection bias as 36% of the eligible sample responded. Further, the conclusions that can be drawn from this study are limited by the use of cross-sectional data.

This research represents a first step in understanding family ecological factors associated with parents' support for PA. Longitudinal research is needed to test temporal relations between variables. Research is also needed to understand PA parenting beyond low-income families. It is likely that the identified family ecological factors, specifically parent depression, time pressures, and difficulty accessing resources to support child PA, may be more prevalent in low-income families. Nonetheless, to the extent that these factors occur in any family, regardless of income, they may be relevant for PA parenting. Alternatively, higher income families may have greater access to resources to deal with these difficulties when they do occur. This study does not provide an exhaustive test of all family ecological factors that may be associated with PA parenting and focused on factors that may be particularly relevant for low-income families. Additional factors, including organizational, policy, and media factors, may facilitate or inhibit PA parenting and provide opportunities to expand upon the results of this study.

In sum, this study addressed an important research gap regarding family ecological predictors of PA parenting practices. Participants were sampled from a low-income population, which enabled correlates of positive PA parenting practices to be identified in a population at-risk for lower PA. Low-income parents are faced with a range of stressors and difficulties on a daily basis that constrain their ability to support and prioritize PA. There is a need to identify factors that influence parenting practices specific to PA in order to intervene effectively. This study identified family factors associated with PA parenting, including parent depressive symptoms, resource empowerment, and life pressures, which have received little attention in the obesity prevention literature to date. Interventions that are informed by an understanding of the family ecology and chronic stressors experienced by families may be more sensitive to parents' needs and constraints, and consequently, more effective in facilitating positive PA parenting practices and improved PA outcomes in children.

Acknowledgments

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Table 1

Demographic characteristics of the study sample

Demographic variable	Summary statistic
Parent age (years; Mean, SD)	31.3 (11.2)
Child age (years; Mean, SD)	3.7 (.9)
Parent weight status (%)	
Overweight	31
Obese	35
Child weight status (%)	
Overweight	26
Obese	20
Respondent relationship to child (%)	
Mother	89
Father	4
Grandmother/other	7
Ethnicity (%)	
Non-Hispanic White	72
Non-Hispanic Black	22
Other	6
Highest education level (%)	
Completed some high school	3
High school graduate	18
Some college	37
College graduate	42
Marital status (%)	
Married	18
Divorced, widowed or separated	13
Never married/single	44
Member of unmarried couple	25

Note: SD, standard deviation.

Table 2

Descriptive statistics and correlations between study variables

Variable	n	Mean	SD	2.	3.	4.	5.	6.	7.	8.	9.	10.
1. PA parenting	145	3.4	.5	$-.16^+$	$.34^{***}$	$.20^*$	$.17^*$	$.29^{***}$	$.15^+$	$-.32^{***}$	$-.54^{***}$	$.51^{***}$
2. Child BMI z-score	136	.9	1.3	–	$-.08$	$-.11$	$-.05$	$-.05$	$.06$	$-.08$	$.02$	$-.13$
3. Parent leisure time PA	140	48.5	51.3		–	$-.02$	$.09$	$.01$	$.21^*$	$-.04$	$-.11$	$.17^*$
4. Play safety	143	3.8	1.1			–	$.34^{***}$	$.27^{**}$	$-.14$	$-.06$	$-.14^+$	$.11$
5. Social capital	145	2.7	.8				–	$.19^*$	$.15^+$	$-.12$	$-.15^+$	$.13$
6. Importance of PA	145	6.4	1.0					–	$.22^{**}$	$.03$	$-.27^{**}$	$.24^{**}$
7. Concern about obesity	144	2.7	1.1						–	$-.06$	$-.17^*$	$.01$
8. Depression	145	4.7	5.0							–	$.29^{**}$	$-.26^{**}$
9. Life pressures	145	1.6	.6								–	$-.40^{***}$
10. Resource empowerment	145	3.2	.6									–

Note: PA, physical activity; SD, standard deviation;

*
$p < .05$;

**
$p < .01$;

***
$p < .001$;

+
$p < .10$.

Table 3

Hierarchical regression analysis predicting physical activity parenting

	b	SE	β	*p*
Step 1: Parent and child characteristics				
Child BMI z-score	−.05	.03	−.13	.11
Parent leisure time PA	.003	.001	.33	<.001
Step 2: Family ecological factors				
Community factors				
Play safety	.04	.03	.09	.20
Social capital	−.01	.04	−.01	.87
Family factors				
Importance of PA	.06	.03	.12	.10
Concern about obesity	.02	.03	.03	.62
Depression	−.02	.006	−.15	.021
Life pressures	−.24	.05	−.32	<.001
Resource empowerment	.20	.05	.26	<.001

Note: b, unstandardized estimate; β, standardized estimate; PA, physical activity; SE, standard error.