
Physical Activity Among Adolescents

When Do Parks Matter?

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Background: The availability of places to engage in physical activity may influence physical activity levels. This study examined whether the relationship between physical activity and access to parks differs depending on adolescents' sociodemographic, housing, and neighborhood characteristics.

Methods: Data were analyzed from 4010 adolescents who responded to the 2003 California Health Interview Survey (CHIS). Analyses were conducted in 2005–2006. Five sets of logistic regressions were conducted to examine the relationship between physical activity and access to a safe park among adolescents living in (1) urban versus rural areas; (2) apartment buildings versus houses, (3) neighborhoods perceived as unsafe versus safe; (4) lower- versus higher-income families; and (5) adolescents who were Latino, African American, Asian, or white. Analyses also examined interactions between park access and these factors.

Results: Access to a safe park was positively associated with regular physical activity and negatively associated with inactivity for adolescents in urban areas, but not rural areas. Additionally, adolescents with access to a safe park were less likely to be inactive than those without access among those living in (1) apartment buildings, (2) unsafe neighborhoods, and (3) lower-income families. Park access was not associated with regular physical activity for these groups. The association between park access and physical activity varied by race/ethnicity.

Conclusions: These findings suggest that the relationship between physical activity and access to parks differs depending on adolescents' sociodemographic, housing, and neighborhood characteristics, and that parks may be particularly important for promoting physical activity among urban adolescents.

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Introduction

Insufficient physical activity contributes to obesity and the risk of complications from chronic conditions such as type 2 diabetes.¹ The availability of places to engage in physical activity is an important environmental characteristic that may influence physical activity levels. Evidence supports this association in adults.^{2–7} However, research on adolescents has been more limited, and results have been mixed.^{8–11} One possible explanation for inconsistent findings is that the availability of places for physical activity is more important for some groups of adolescents than others. This study examined whether the relationship between physical activity and access to parks among adolescents differs depending on adolescents' sociodemographic, housing, and neighborhood characteristics. We hypoth-

esized that access to a safe park would be positively associated with regular physical activity and negatively associated with inactivity for (1) adolescents living in urban areas, but not rural areas, (2) those living in apartments but not houses, (3) those living in unsafe neighborhoods but not safe neighborhoods, and (4) those from lower-income but not higher-income families. Because physical activity varies by race,¹² the association between park access and activity was also examined for different racial groups.

Methods

Data were from the 2003 California Health Interview Survey (CHIS), a random-digit-dial telephone survey of 42,000 households designed to be representative of California's non-institutionalized population.^{13–15} Responses from 4010 adolescents aged 12–17 were analyzed. Two physical activity outcomes were examined. Regular activity was defined as either at least 20 minutes of vigorous activity on 3 or more of the last 7 days or at least 30 minutes of moderate activity on 5 or more of the last 7 days. Inactivity was defined as either less than 20 minutes of vigorous activity or 30 minutes of moder-

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Table 1. Association of access to safe park with physical activity in stratified logistic regression models^a

| Population included in model | N | Regular physical activity RR ^b (95% CI) | Physical inactivity RR ^b (95% CI) |
|--|------|---|---|
| Model 1: Adolescents in urban areas ^c | 3269 | 1.10 (1.01–1.17)** | 0.58 (0.39–0.86)*** |
| Model 2: Adolescents in rural areas ^c | 741 | 0.95 (0.80–1.06) | 1.79 (0.59–5.05) |
| Model 3: Adolescents in multi-unit buildings ^d | 869 | 1.13 (0.95–1.29) | 0.52 (0.28–0.96)** |
| Model 4: Adolescents in houses ^d | 3141 | 1.04 (0.96–1.11) | 0.70 (0.44–1.12) |
| Model 5: Adolescents in neighborhoods perceived as unsafe ^c | 759 | 1.07 (0.87–1.23) | 0.47 (0.23–0.93)** |
| Model 6: Adolescents in neighborhoods perceived as safe ^c | 3251 | 1.06 (0.98–1.13) | 0.75 (0.48–1.15) |
| Model 7: Adolescents in families with income below 300% FPL ^f | 1973 | 1.10 (0.99–1.19)* | 0.62 (0.39–0.97)** |
| Model 8: Adolescents in families with income of 300% FPL and above ^f | 2037 | 1.00 (0.90–1.08) | 0.71 (0.38–1.29) |

^aResults are weighted to be representative of the California population and are adjusted for complex survey design effects. In logistic regression models including all adolescents and adjusting for age, gender, race/ethnicity, housing type, parental perception of neighborhood safety, and family income; there was a significant interaction between urbanicity and access to a safe park in models of both regular physical activity (Wald $\chi^2(1)=3.8, p=0.05$) and physical inactivity (Wald $\chi^2(1)=5.1, p<0.05$).

^bRelative risk calculated from adjusted odds ratios.¹⁶

^cAdjusted for age, gender, race/ethnicity, housing type, parental perception of neighborhood safety, and family income.

^dAdjusted for age, gender, race/ethnicity, urbanicity, parental perception of neighborhood safety, and family income.

^eAdjusted for age, gender, race/ethnicity, urbanicity, housing type, and family income.

^fAdjusted for age, gender, race/ethnicity, urbanicity, housing type, and parental perception of neighborhood safety.

* $p<0.10$; ** $p<0.05$; *** $p<0.01$.

FPL, federal poverty level; RR, relative risk.

ate activity in the last 7 days. Adolescents who reported a park or open space within walking distance of home that was safe during the day were considered to have access to a safe park. Analyses, conducted in 2005–2006, used survey weights and adjusted for CHIS's complex survey design.

Four sets of stratified logistic regressions were conducted to examine the relationship between physical activity and access to a safe park among adolescents in (1) urban versus rural areas, (2) apartment buildings versus houses, (3) neighborhoods perceived as unsafe versus safe, and (4) lower- versus higher-income families. A fifth set of analyses examined this relationship among Latino, African-American, Asian, and white adolescents. Logistic regressions of regular activity and inactivity including interactions between access to a safe park and each of the five factors listed above were conducted. All models included age, gender, race/ethnicity, urbanicity, housing type, neighborhood safety, family income, and park access unless the characteristic was used as a stratifying variable. Age, gender, race/ethnicity, access to a safe park, and physical activity were self-reported by the adolescent. Housing type, neighborhood safety, and family income were reported by the adult respondent. Urbanicity was based on the population density of the adolescent's ZIP code. For ease of interpretation, estimated relative risks were calculated using adjusted ORs from the logistic regression models.¹⁶

Results

One in four adolescents (25%) reported having no access to a safe park, 71% engaged in regular physical activity, and 7% were inactive. Table 1 shows associations between park access and physical activity for models stratified by urbanicity, housing type, neighborhood safety, and income.

Results supported the first hypothesis. The interaction between access to a safe park and urbanicity was significant in models of both regular physical activity and inactivity. Stratified analyses revealed that access to a safe park was positively associated with regular activity and negatively associated with inactivity for adolescents in urban areas, but not rural areas. The other hypotheses received more limited support. In stratified analyses, adolescents with access to a safe park were less likely to be inactive than those without access for (1) adolescents living in apartments but not houses, (2) adolescents living in neighborhoods perceived as unsafe but not those living in safe neighborhoods, and (3) adolescents from lower-income but not higher-income families. However, access to a safe park was not significantly associated with regular activity for these groups. In addition, models of regular activity and inactivity that tested interactions between access to a safe park and (1) housing type, (2) perceived neighborhood safety, and (3) family income showed these interactions were not significant (data not shown). These results suggest that although the association between park access and inactivity may be significant for some groups and not others, the nature of the relationship between park access and inactivity is not different across these groups.

The interaction between race/ethnicity and access to a safe park was significant in models of regular activity and inactivity. Table 2 shows associations between access to a safe park and physical activity among Latino, Asian, African-American, and white adolescents. Access to a safe park was not associated with regular activity for these groups. In models of inactivity, Asian and white

Table 2. Association of access to safe park with physical activity in regression models stratified by race/ethnicity^a

| Population included in model | N | Regular physical activity RR ^b (95% CI) | Physical inactivity RR ^b (95% CI) |
|------------------------------|------|--|--|
| Model 1: Latino | 1125 | 1.08 (0.95–1.20) | 0.69 (0.39–1.20) |
| Model 2: Asian | 313 | 1.03 (0.70–1.31) | 0.38 (0.14–0.97)* |
| Model 3: African-American | 263 | 0.93 (0.64–1.18) | 1.93 (0.62–4.95) |
| Model 4: white | 2071 | 1.01 (0.93–1.08) | 0.57 (0.31–0.99)* |

^aResults are weighted to be representative of the California population and are adjusted for complex survey design effects. Results for American Indians and Pacific Islanders are not shown due to insufficient sample size. In logistic regression models including all adolescents and adjusting for age, gender, urbanicity, housing type, parental perception of neighborhood safety, and family income; there was a significant interaction between race/ethnicity and access to a safe park in models of both regular physical activity (Wald $\chi^2(5)=18.3$, $p<0.01$) and physical inactivity (Wald $\chi^2(5)=17.0$, $p<0.01$).

^bRelative risk calculated from adjusted odds ratios¹⁶ and adjusted for age, gender, urbanicity, housing type, parental perception of neighborhood safety, and family income.

* $p<0.05$.

RR, relative risk.

adolescents with access to a safe park were less likely to be inactive than those without access.

Discussion

These findings suggest that the relationship between physical activity and access to parks may differ depending on adolescents' sociodemographic, housing, and neighborhood characteristics. Previous research has produced limited evidence of an association between availability of places to be active and physical activity levels among youth, with some studies finding associations and others finding none.^{8–11} The current findings are consistent with a recent study that found that the number of recreational facilities was positively associated with physical activity in a national sample of adolescents.⁸ The present study is also consistent with the conclusions of a review by Sallis and colleagues.¹² However, a more recent review concluded there was no consistent association between activity and availability of facilities.⁹ Some of the inconsistency in the literature may be due either to variation in the association between access to places for activity and activity levels by sample characteristics or to differences in measures of physical activity.¹² For example, two previous studies found no association between number of recreation facilities nearby and vigorous exercise among lower-income adolescents.^{10,17} The current study also found no association between park access and regular activity among lower-income adolescents, but access to a safe park was associated with lower rates of inactivity.

There are some limitations to this study. Adolescent self-reports of having a park near home and safety of

the park may be more indicative of perceived than objective access and safety. However, perceptions are important predictors of physical activity.¹⁸ In addition, physically active adolescents may be more likely to know that parks are available. This study examined access to parks and open spaces but not to other recreational facilities that may also be important for youth physical activity.

The results add to our understanding of the relationship between access to parks and adolescent physical activity. These findings suggest that availability of safe places for activity is particularly important in promoting physical activity for adolescents in urban areas. The relationship between park access and physical activity for adolescents living in apartments, unsafe neighborhoods, and low-income families warrants further investigation. However, results suggest that adolescents in these groups may be less likely to be inactive if they have access to safe parks. Expanding park access and safety, particularly for adolescents living in urban areas, is a promising strategy for promoting physical activity among youth.

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