

Sports Participation and Parent-Reported Health-Related Quality of Life in Children: Longitudinal Associations

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Objective To investigate the longitudinal association between sports participation and parent-reported health-related quality of life (HRQOL) in children.

Study design Cohort study that used data drawn from the Longitudinal Study of Australian Children in waves 3 (2008) and 4 (2010). Participants were a nationally representative sample of 4042 Australian children ages 8.25 (SD = 0.44) years at baseline and followed-up 24 months later.

Results After we adjusted for multiple covariates, children who continued to participate in sports between the ages of 8 and 10 years had greater parent-reported HRQOL at age 10 ($\text{Eta}^2 = .02$) compared with children who did not participate in sports ($P \leq .001$), children who commenced participation after 8 years of age ($P = .004$), and children who dropped out of sports before reaching 10 years of age ($P = .04$). Children who participated in both team and individual sports ($P = .02$) or team sports alone ($P = .04$) had greater HRQOL compared with children who participated in individual sports alone ($\text{Eta}^2 = .01$). The benefits of sports participation were strongest for girls ($P < .05$; $\text{Eta}^2 = .003$).

Conclusions Children's participation in developmentally appropriate team sports helps to protect HRQOL and should be encouraged at an early age and maintained for as long as possible. (*J Pediatr* 2014;164:1469-74).

Health-related quality of life (HRQOL) is an outcome of increasing importance to researchers, clinicians, and policy makers.^{1,2} HRQOL encompasses an individual's perceptions, beliefs, expectations, and experiences relative to their physical, social, and psychological health.³ In childhood, various chronic conditions and diseases, including cancer,⁴ heart disease,⁵ and type 1 and 2 diabetes⁶ are associated with low levels of HRQOL. As such, it is important to investigate factors that may increase HRQOL. However, HRQOL is also an important health outcome in its own right,⁷ and for this reason, constructs known to predict children's HRQOL, such as their weight⁸ and amount of physical activity,⁹ are also important areas of investigation.

Sport is one component of leisure-time physical activity that can contribute to health at a national level.¹⁰ Sports participation is common among children; approximately two-thirds of all US children participate in at least one sport per year.¹¹ Evidence suggests that sports participation could have benefits to HRQOL above and beyond those associated with physical activity.^{12,13} The psychosocial health benefits of sports participation are evident among children and adolescents, including self-esteem, positive social interactions, and a reduction in depressive symptoms.¹³ Cross-sectional research demonstrates that adolescent athletes have greater HRQOL than the general adolescent population.¹⁴ However, this literature is hindered by a lack of longitudinal evidence, and a focus on adolescent and adult populations.¹²⁻¹⁷

The purpose of this study was to extend the evidence base by examining the longitudinal associations between sports participation and HRQOL in childhood. We hypothesized that children who maintained sports participation from ages 8 to 10 years would report greater levels of HRQOL at age 10, including total, physical, emotional, social, and school functioning, than children who dropped out of sports during this period, children who had never participated in sports, and children who commenced sports participation after the age of 8 years. We also hypothesized that children who maintained participation in team sports would report greater levels of HRQOL than children who maintained participation in individual sports.

Methods

The reporting of this study has followed the guidelines set out in the STROBE statement.¹⁸ Data were obtained from the K-cohort of the Longitudinal Study of Australian Children (LSAC).¹⁹ LSAC is a nationally representative longitudinal

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| BMI | Body mass index |
| HRQOL | Health-related quality of life |
| LSAC | Longitudinal Study of Australian Children |
| PedsQL | Pediatric Quality of Life Scale |
| SEP | Socioeconomic position |

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survey of Australian children that examines the social, environmental, and economic impacts on children's development and wellbeing. Data were collected by trained professionals from the child's primary parent (the person most responsible for the care of the child, usually the child's mother) by the use of face-to-face interviews, parental self-report questionnaires, and parent-reported time-use diaries. The K-cohort of LSAC included data from 4983 children who were 4-5 years of age at Wave 1 in 2004. This study used data from Waves 3 (2008) and 4 (2010), as information on children's sport participation was not collected in Waves 1 and 2. Wave 4 included 4164 children. Cases were excluded where attrition had occurred from Wave 1. Data were included from a total of 4042 children who had complete sport participation data from both Waves 3 and 4 when they were ages 8-9 and 10-11 years, respectively. Ethics approval for the LSAC study was given by the Australian Institute of Family Studies Ethics Committee. Parents provided written informed consent.

Because relevant child-reported data were not available in the respective waves of the LSAC, pediatric HRQOL was assessed by use of the parent-report version of the Pediatric Quality of Life Scale (PedsQL) 4.0.⁷ The PedsQL assesses HRQOL with 23 items over 4 scales of physical (8 items), social, emotional, and school functioning (5 items each). Scales were used to compute total, physical, and psychosocial health summary scores. The parent-report version of the PedsQL has a high level of internal consistency in 8- to 12-year old children²⁰ and has been shown to result in almost identical scores to the child self-report version in an Australian sample.⁸

Sports participation was measured using two items assessing regular participation in team and individual sports at both Time 1 (Wave 3; aged 8 years) and Time 2 (Wave 4; aged 10 yrs). First, parents were asked "In the last 12 months, has (your) child regularly participated in team sport (eg, football, cricket or netball)?" Second, parents were asked "In the last 12 months, has (your) child regularly participated in individual sport (eg, tennis, karate or gymnastics)?" "Sport" was further specified as a regular activity undertaken outside of school as well as normal outside of school hours' care. "Regularly" was defined as at least once per week for 3 months or more (eg, a sports season). Parents could answer either "yes" or "no" for each item, and children were defined as participating in sports if parents answered "yes" to at least one of the items. Using these data, we categorized children as belonging to one of 4 groups: (1) regularly participated in sports at both Time 1 and Time 2 ("participants"); (2) did not regularly participate in any sport at Time 1 or Time 2 ("nonparticipants"); (3) dropped out of sport between Time 1 and Time 2 ("dropouts"); and (4) commenced regular participation in sport between Time 1 and Time 2 ("commencers").

Participants' sex, age, and home postal code were reported by the primary parent at Time 1. On the basis of the participants' home postal code, a measure of neighborhood socioeconomic position (SEP) was determined according to the Socio-Economic Indexes for Areas Index of Relative Socio-Economic Disadvantage.²¹ Self-reported education of the primary parent (usually the mother) was used

as a proxy measure of household SEP, as was family income. Primary parent education was categorized as "did not finish high school," "high school completion," or "tertiary education." Family income was self-reported by the primary parent for the whole family in dollars per week and was standardized to household size by dividing by the square root of the number of people residing in the house.²² The resulting variable had a slight positive skew (skewness statistic = 2.80).

Each child had their height and weight measured by trained researchers at Time 1; these data were used to calculate body mass index (BMI; kg/m²). Height was measured using a portable rigid stadiometer (Model IP0955; Invicta Plastics, Leicester, United Kingdom), and weight was measured using digital scales (Model 79985; Springvale, Victoria, Australia). For descriptive purposes, child's weight status was determined according to the Cole and International Obesity Task Force definitions.^{23,24} Pubertal progression at Time 1 was measured by use of the mean of 2 parent-reported items. For boys, the development of adult type body odor and the development of body hair were assessed. For girls, skin changes (such as acne) and breast development were assessed. Items were scored on a 4-point Likert Scale from 1 (Has not started yet) to 4 (Seems complete).

Statistical Analyses

Data were analyzed using IBM SPSS statistical software (version 19; IBM, Armonk, New York). Univariate general linear models, weighted by 2010 population weights specified in the LSAC dataset,²⁵ were used to examine the association between sports participation and HRQOL (PedsQL full scale and subscale scores). Initially, an unadjusted model was used to examine potential differences by the 4 groups (participants, nonparticipants, dropouts, and commencers). Subsequently, we used a fully adjusted model, adjusting for the aforementioned covariates, including baseline HRQOL (only fully adjusted models are reported). Prespecified interactions were included one at a time to examine whether the relationship between sports participation and HRQOL differed by sex or BMI. Bonferroni analyses were performed post-hoc to examine the pairwise comparisons between groups of sports participation. For all analyses statistical significance was set at $P < .05$.

The second stage of the analyses focused only on children who had maintained regular participation in sports at both Time 1 and Time 2; this allowed for an examination of the potential differences between types of sport participation (ie, team vs individual). These children were subsequently categorized as belonging to 1 of 3 groups: regular participation in both team sports and individual sports at both Time 1 and Time 2 (team and individual sports); regular participation in team sports only (team sport only); and, regular participation in individual sports only (individual sport only). These relationships were examined using the same analytic approach reported above, and included the same covariates.

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