

Factors associated with team sport participation in South African children

Sharief Hendricks,¹ Monika Uys,¹ Stephanie T Broyles,² Niri Naidoo,¹ Peter T Katzmarzyk,² Estelle V Lambert¹

To cite: Hendricks S, Uys M, Broyles ST, *et al.* Factors associated with team sport participation in South African children. *BMJ Paediatrics Open* 2019;**3**:e000495. doi:10.1136/bmjpo-2019-000495

Received 28 March 2019
Accepted 2 June 2019

ABSTRACT

The study purpose was to determine if sex, anthropometry, age or birth period are associated with team sport participation in children aged 9–11 years. Data from the International Study of Childhood Obesity, Lifestyle and the Environment were used (n=550, 59% girls). Anthropometric measurements included height, body mass, waist circumference, mid-upper arm circumference and body fat percentage. Birth period and team sport participation were measured using a questionnaire. Girls had a 69% lower odds (OR=0.31, 0.19–0.49, p<0.001, n=528) of participating in team sport. For every centimetre of waist circumference, the OR for participating in team sport was 0.94 (0.88–1.00, p<0.05, n=528).

Childhood obesity is a complex interaction of behavioural, biological and environmental factors that adversely impact long-term energy balance.¹ Physical activity (PA) is an effective countermeasure for obesity. Participation in sport offers children a potential means of obtaining recommended levels of PA.² Considering this, it is important to understand why some children participate in sport while others do not. South Africa is a lower- to middle-income country with rising childhood obesity. Data indicate that 2.7%–4.5% of South African children aged 6–9 years are overweight and obese, with the level of obesity higher for girls than boys.³ Given the growing concern for childhood obesity in lower- to middle-income countries like South Africa, and the potential benefits of PA through sport participation, the purpose of this study was to determine if factors such as sex, anthropometry or birth period are associated with team sport participation in children aged 9–11 years.

The study used data from the South African site of the International Study of Childhood Obesity, Lifestyle and the Environment (ISCOLE), a multinational cross-sectional study conducted in 12 countries. The study design and methods for data collection are described in detail elsewhere.³ The ISCOLE protocol was approved by the Pennington Biomedical Research Center Institutional

Review Board and the University of Cape Town Faculty of Health Sciences, Human Research Ethics Committee. Informed parent consent/child assent was obtained from all participants.

Data were collected from 540 children (59% girls) from 20 schools. Anthropometric measurements included height, body mass, waist circumference, mid-upper arm circumference and body fat percentage. Birth period and team sport participation were measured using a questionnaire. Multilevel logistic regression was used to determine which putative correlates are associated with team sport participation, given that measurements and responses may be clustered by school. A null model without the predictors was fitted to the data to compute the intraclass correlation coefficient to estimate the variance accounted for by school on team sport participation. Thereafter, a model with sex, age, height, weight, waist circumference, mid-upper arm circumference, body fat, birth period (whether the child's birthday falls in the first or second half of the year), and school socioeconomic status quintile as predictors in the fixed-effects part of the model and school in the random-effects part of the model, was computed. For the multilevel logistic regression, coefficients and ORs are reported for each predictor, with the estimated SD reported for the random intercept. All analyses were performed using Stata 12 (StataCorp), with the level of significance set at p<0.05.

Descriptive statistics are reported in [table 1](#). Girls had a 69% lower odds (OR=0.31, 0.19–0.49, p<0.001, n=528) of participating in team sport, when compared with their male counterparts ([table 2](#)). For every centimetre of waist circumference, the OR for participating in team sport was 0.94 (0.88–1.00, p<0.05, n=528). No other predictors were significant. The intraclass correlation coefficient for the null model for school was 0.07 (7%).

Just over 50% of children aged 9–11 years in South Africa participated in team sport. This finding is similar to studies in more developed countries.^{4,5} Girls are less likely to participate



© Author(s) (or their employer(s)) 2019. Re-use permitted under CC BY-NC. No commercial re-use. See rights and permissions. Published by BMJ.

¹Division of Exercise Science and Sports Medicine, Department of Human Biology, Faculty of Health Sciences, University of Cape Town, Cape Town, South Africa

²Pennington Biomedical Research Center, Baton Rouge, Louisiana, USA

Correspondence to

Dr Sharief Hendricks, University of Cape Town, Cape Town 7701, South Africa; sharief.hendricks01@gmail.com

**Table 1** Anthropometric characteristics by sport participation and sex (N=540)

	Sport participation		No sport participation	
	Girls (n=139)	Boys (n=156)	Girls (n=183)	Boys (n=62)
	Mean±SD	Mean±SD	Mean±SD	Mean±SD
Age (years)	10.1±0.6	10.3±0.7	10.3±0.7	10.4±0.7
Height (cm)	138.4±7.8	138.1±7.5	138.8±7.4	137.4±8.3
Weight (kg)	34.8±8.5	34.0±8.7	35.6±9.9	33.4±8.9
Waist circumference (cm)	61.9±8.2	61.1±8.6	63.6±10.1	61.6±8.4
Body Mass index percentile (WHO)	57.0±30.3	53.4±31.8	55.2±33.8	51.4±33.3
Body mass index	18.0±3.7	17.6±3.2	18.2±4.0	17.5±2.9
Mid-upper arm circumference (cm)	21.2±3.2	20.6±3.0	21.4±3.5	20.3±2.8
Body fat (%)	22.8±7.2	17.5±6.9	22.8±8.2	18.6±7.9

Table 2 Multilevel logistic regression for sex, anthropometric measurements and birth period as predictors for team sport participation with random effect of school (n=528)

	OR	95% CI	Significance
Sex	0.31	0.19 to 0.49	p<0.001
Age (months)	0.97	0.95 to 1.00	p>0.05
Height (cm)	0.98	0.93 to 1.02	p>0.05
Weight (kg)	1.05	0.95 to 1.16	p>0.05
Waist circumference (cm)	0.94	0.88 to 1.00	p<0.05
Mid-upper arm circumference (cm)	1.13	0.94 to 1.35	p>0.05
Body fat (%)	0.97	0.90 to 1.04	p>0.05
Birth period (born in first vs second half of year)	0.79	0.54 to 1.16	p>0.05
School SES quintile	1.11	0.91 to 1.38	p>0.05
Random- effects	Estimate	95% CI	
School deviation	0.51	0.28 to 0.93	p=0.001

Data are reported as coefficients and OR with 95% CI. SES, socioeconomic status.

in team sport, which may be explained by factors such as accessibility and self-perception.⁶ Waist circumference was significantly associated with team sport participation, where leaner children participated in team sport more frequently. With that said, it is unclear whether children participating in team sport have a leaner waist circumference as a result of sport participation or leaner children are more likely to choose to play sport. Future work in this area should investigate details of the quality, frequency, duration, intensity, context and type of sport when measuring sport participation.

PUBLIC INVOLVEMENT

The public was not directly involved in the design of this study.

Twitter @Sharief_H

Acknowledgements We wish to thank the ISCOLE Research Group and the ISCOLE External Advisory Board and the ISCOLE participants and their families who made this study possible.

Contributors SH drafted the manuscript and all other authors provided input.

Funding ISCOLE was funded by Coca-Cola Company. With the exception of requiring that the study be global in nature, the study sponsor had no role in study design, data collection and analysis, decision to publish, or preparation of manuscripts.

Competing interests None declared.

Patient consent for publication Not required.

Provenance and peer review Not commissioned; externally peer reviewed.

Open access This is an open access article distributed in accordance with the Creative Commons Attribution Non Commercial (CC BY-NC 4.0) license, which permits others to distribute, remix, adapt, build upon this work non-commercially, and license their derivative works on different terms, provided the original work is properly cited, appropriate credit is given, any changes made indicated, and the use is non-commercial. See: <http://creativecommons.org/licenses/by-nc/4.0/>.

REFERENCES

1. Sirard JR, Pfeiffer KA, Pate RR. Motivational factors associated with sports program participation in middle school students. *J Adolesc Health* 2006;38:696–703.
2. Jones S, Hendricks S, Draper CE. Assessment of physical activity and sedentary behavior at preschools in Cape town, South Africa. *Child Obes* 2014;10:501–10.
3. Katzmarzyk PT, Barreira TV, Broyles ST, et al. The International study of childhood obesity, lifestyle and the environment (ISCOLE): design and methods. *BMC Public Health* 2013;13.
4. Seabra AF, Mendonça DM, Thomis MA, et al. Associations between sport participation, demographic and socio-cultural factors in Portuguese children and adolescents. *Eur J Public Health* 2008;18:25–30.
5. Tremblay MS, Gray CE, Akinroye K, et al. Physical activity of children: a global matrix of grades comparing 15 countries. *J Phys Act Health* 2014;11 Suppl 1:S113–S125.
6. Casper JM, Bocarro JN, Kanters MA, et al. "Just let me play!" - understanding constraints that limit adolescent sport participation. *J Phys Act Health* 2011;8 Suppl 1:S32–S39.