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Original research

Increasing girls' physical activity during a short-term organized youth sport basketball program: A randomized controlled trial

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ABSTRACT

Objectives: To evaluate the short-term efficacy of coach education on basketball players' physical activity (PA) intensity during practices. Intervention effects on players' motivation were also investigated.
Design: Randomized controlled trial.
Methods: This study took place over the course of a 5-day organized youth sport (OYS) basketball program in 2 sports centres in Greater Western Sydney, Australia (September, 2013). A convenience sample of 76 players and 8 coaches were recruited. Players were girls aged 9 to 12 years. Following the first 2 days of the basketball program, coaches allocated into the intervention condition attended 2 coach education sessions where strategies to increase moderate-to-vigorous physical activity (MVPA) and decrease inactivity were discussed. Each coach education session lasted approximately 2 h.
Results: Compared to the control group, players in the intervention group spent a significantly higher proportion of practice time in MVPA (mean difference [MD] = 14.6%; standard error [SE] = 2.2%), vigorous PA (VPA; MD = 12.6%; SE = 1.9%), moderate PA (MD = 2.0%; SE = 0.5%) and a significantly lower proportion of practice time inactive (MD = −14.5%; SE = 2.3%) from baseline to follow-up. There were no significant changes in motivation from baseline to follow-up in either group.
Conclusions: Brief coach education sessions can increase MVPA and decrease inactivity without deleterious effects on players' motivation. Also, substantial increases in VPA were found, which is an important finding because VPA has been associated with health benefits, over and above benefits accrued from lower-intensity activity.

1. Introduction

Sports are one of the most popular and time-consuming leisure activities for youth.[1] Recent prevalence data indicate that 66% of Australian youth, aged 5–17, participate in at least one organized youth sport (OYS) outside of school hours.[2] Similarly, high proportions of participation in OYS can be found among youth in countries across the world.[3]

Arguably, one of the most pertinent attributes of OYS, is its potential to contribute considerably to levels of moderate-to-vigorous physical activity (MVPA) in participating youth.[4,5] OYS participation is positively associated with an increased likelihood of complying with national physical activity (PA) and sedentary behavior guidelines;[6] which recommend accumulating at least one hour of MVPA and less than two hours of screen time daily.[2] Considering only one-fifth of Australian youth met recommended PA guidelines every day of the week,[2] OYS participation may have substantial public health implications. Studies have found that girls accumulate less PA than boys throughout childhood,[7] and their participation in PA drops more steeply than boys during the transition into adolescence.[8] As such, girls have been identified as a high priority group for PA promotion[9] and constitute the population of focus for this study.

Although OYS may provide an ideal opportunity for youth to accumulate substantial amounts of MVPA, a large proportion of players' time during OYS is spent inactive or in light-intensity PA.[4,10,11] In OYS, coaches carry considerable influence over their players.[12] Coaches, then, may be able to increase their players' PA levels, particularly during practice, where coaches are more capable of influencing PA intensity, as compared to games. Furthermore,

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there has been a call to evaluate strategies for increasing MVPA in OYS.[10] Researchers aiming to increase MVPA during OYS, however, should consider monitoring player motivation as a precaution as a recent study revealed that coaches were wary of increasing girls' MVPA, due to a belief that it could result in reduced motivation and dropout from OYS.[13]

The current study presents, to our knowledge, the first randomized controlled trial (RCT) conducted in an OYS context aimed at determining the short-term efficacy of coach education on player MVPA. Primarily, this two-armed RCT aimed to assess whether coach education, relative to a standard-care control, can increase the proportion of time players spent in MVPA during practices over a five-day basketball program. The secondary aims were to: (1) assess whether coach education can lower the proportion of practice time players spent inactive; and (2) investigate effects on players' motivation. Given that highly controlled studies are lacking, this study was conducted as a five-day basketball program because it was essential to first determine if this intervention was efficacious under optimum conditions before determining its effectiveness with community-based OYS teams.

Compared with a standard-care control, we hypothesized those players whose coaches attended coach education sessions would: (1) spend a greater proportion of practice time in MVPA, (2) spend a lower proportion of practice time inactive, and (3) exhibit no difference in motivation scores.

2. Methods

This study was a two-armed, parallel-group, RCT, using a 1:1 allocation ratio. The complete study protocol has been described elsewhere.[14] The University of Western Sydney's Human Research Ethics Committee provided ethical approval for this study (approval number: H10215). This trial is also registered with the Australian New Zealand Clinical Trials Registry, ACTRN12613001099718. The reporting of this study adheres to the Consolidated Standards of Reporting Trials guidelines.[15]

Between August and September 2013, basketball coaches and players were recruited to participate in a 5-day basketball program. The primary researcher (JMG) screened all interested participants for eligibility using a standardised script or email message. Eligible coaches were required to possess basketball coaching credentials and previous experience coaching girls' basketball teams. All coaches were informed that participation might involve attending 2 coach education sessions after the first 2 program days for approximately 2 h in duration each. All coaches received payment at a rate of AUD$25/hour (including attendance at coach education sessions).

To be considered eligible to participate in the basketball program, players were required to be female, aged 9–12 years, and aim to attend the program for all 5 days. All coaches, parents, and players provided written consent/assent. The basketball program ran concurrently across 2 sports centres in Greater Western Sydney, Australia, in September 2013 (Australian Spring). The basketball program took place over the school vacation period for 5 consecutive weekdays (4 h/day). Each site was equipped with 2 full-size basketball courts and basketballs. Each day included 2 practices (45 min each) and 2 games (40 min each). Practices and games alternated with breaks in between (3 breaks of 15 min each).

Coaches were provided half of a court to deliver their practice and were instructed to focus on 2 skills in each practice; the method in which those skills were taught was at the coaches' discretion. Each day, the focus of the first practice was on dribbling and defending skills and the focus of the second practice was on passing/catching and shooting skills.

Baseline assessments were collected on the first day and follow up assessments were collected on the fifth day of the basketball program. Research assistants recorded players' step counts from sealed pedometers worn by players following each practice and entered that data onto a coach feedback form. Research assistants also generated data on lesson context and coach behavior according to the System for Observing Fitness Instruction Time (SOFIT).[16] SOFIT data was also included in the coach feedback form. Coaches randomly allocated to the intervention condition furtively received their coach feedback forms at the end of each day, while coaches in the control condition received no feedback.

Assuming an alpha of 0.05, 80% power, and an effect size $d = 0.60$, a minimum sample size of 72 female youth basketball players was required (36/group) to detect a significant differential change in MVPA between groups. The sample size was then increased by 10% to account for participant attrition; therefore, we endeavoured to recruit a total sample of 80 players.

A more detailed description of the study intervention can be found elsewhere.[14] All intervention coaches attended both coach education sessions in their entirety. Topics covered during the coach education sessions were: strategies to increase MVPA and decrease inactivity during practice, self-monitoring, goal-setting, and suggested target step counts/minute based on recommendations published by Scruggs.[17] Coaches were also given time to reflect on their practices, discuss their coach feedback form, role play, and plan future practice sessions during each coach education session. Coaches allocated into the control condition did not attend a workshop and were asked to coach as usual.

Study aims related to PA were assessed using ActiGraph GT3X+ accelerometers (ActiGraph; Pensacola, FL). Accelerometers were worn for the duration of the basketball program; however, only the PA levels accumulated during practices were assessed in this study. Based on validity evidence from recent studies,[18] we chose Evenson et al.[19] cut-points to process raw data and estimate PA intensities for our primary analysis. Analysis based on data generated using Freedson et al.[20] cut-points are presented as a supplement to the Evenson et al.[19] cut-points and to facilitate comparisons with previous studies[4,5,10] in which those cut-points were employed.

Following the afternoon practices on day 1 (baseline) and day 5 (follow-up), players were asked to complete the Situational Motivation Scale (SIMS)[21] which included 14 items from 4 subscales, measuring intrinsic motivation, identified regulation, external regulation, and amotivation. Based on players' average scores from the 4 subscales of the SIMS, a self-determination index (SDI) was created (SDI = 2 × intrinsic motivation + identified motivation – external regulation – 2 × extrinsic motivation). Scores on the SIMS can range from −18 to 18, where higher scores were indicative of greater self-determined motivation towards a situation (i.e., basketball practice).[22,23] The SIMS has received empirical support for reliability and validity.[24,25]

Research assistants, who collected all data, were blinded to study hypotheses and condition allocation. Players were also blinded to study hypotheses and condition allocation. Coaches, however, were necessarily made aware of their condition allocation after baseline assessments and randomization. Lastly, JMG conducted all analyses and was blinded to participants' condition allocation during analysis.

Using simple randomization (a computer-generated algorithm), coaches were randomly assigned (prior to study commencement) by JMG to 1 of 2 sites, ensuring an equal number of coaches at each site. Following baseline assessments, coaches were pair-matched based on their players' average step counts over the 2 baseline practices (i.e., the coaches with the 2 highest average group step counts were paired and the coaches with the 2 lowest average group step counts were paired). Once paired, a computer-generated algorithm was used to randomly allocate 1 coach from each pair into the intervention condition and the other into the control condition. The decision to pair-match coaches was made to ensure that