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Original research

Exploring changes in physical activity, sedentary behaviors and hypothesized mediators in the NEAT girls group randomized controlled trial☆

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ABSTRACT

Objective: To evaluate the impact of a 12-month school-based multi-component program on adolescent girls' physical activity and sedentary behaviors, and hypothesized mediators of physical activity behavior change.
Design: Group randomized controlled trial with 12-month follow-up.
Methods: The intervention, guided by Social Cognitive Theory, involved 357 adolescent girls (13.2 ± 0.5 years) from 12 secondary schools (6 intervention schools, 6 control schools) in low-income communities in the Hunter and Central Coast regions of New South Wales, Australia.

The intervention included enhanced school sport, lunchtime physical activity sessions, interactive seminars, student handbooks, nutrition workshops, pedometers, parent newsletters and text messages to encourage physical activity and healthy eating, and a decrease in sedentary behavior. Outcomes were assessed at baseline and 12-months and included: physical activity (accelerometers), sedentary behaviors (questionnaire and accelerometers), and social-cognitive mediators of physical activity (questionnaire).
Results: There were significant between group differences in favor of the intervention group for self-reported recreational computer use (−26.0 min; 95% CI, −46.9 to −5.1), and sedentary activities summed (−56.4 min; 95% CI, −110.1 to −2.7), however objective sedentary behavior showed no differences. There were no group-by-time effects for any of the physical activity outcomes or hypothesized mediators.
Conclusions: A school-based intervention tailored for adolescent girls from schools located in low-income communities significantly reduced time spent in sedentary activities. However, improvements in physical activity and hypothesized mediators of physical activity behavior were not observed. Future studies are encouraged to explore alternative mechanisms of behavior change derived from integrated and socio-ecological theories.

1. Introduction

Considering the consequences of obesity[1] and the high likelihood of obesity persisting into adulthood,[2] obesity prevention is a global health priority. However, evidence for effective obesity prevention and treatment interventions targeting adolescents have been limited by a lack of high quality of studies. Methodological weaknesses of previous studies include the lack of a theoretical framework to guide behavior change, self-reported outcome measures, inadequate intervention duration and/or intensity, poor program compliance and short-term follow-up.[3] Furthermore, few obesity prevention interventions have examined hypothesized mediators of intervention effects on targeted behaviors such as physical activity.[4] This process is important for establishing the causal mechanisms of behavior change, which can inform the design and delivery of more effective programs in the future. Clearly, the evaluation of more rigorously designed studies for adolescents is needed.

Evidence suggests that multi-component, school-based interventions that target behavior change at multiple levels can prevent short-term unhealthy weight gain.[5] Moreover, it has been indicated that these interventions may be more efficacious if targeted toward certain groups and differentiated on the basis of sex, age and socio-economic status (SES).[6] Despite higher levels of obesity and overweight typically observed in areas of social and economic disadvantage,[7] few school-based interventions have

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targeted youth living in low-income communities. The transition from childhood to adolescence is characterized by a marked deterioration in physical activity and dietary behaviours.[8,9] Moreover, higher levels of sedentary behavior and poorer dietary and physical activity behaviors are often found for those living in low-income communities, especially in girls,[10,11] placing this group at an even greater risk of obesity.

The current study aims to address the limitations of previous obesity-related prevention interventions that have targeted adolescents. The Nutrition and Enjoyable Activity for Teen Girls (NEAT Girls) program was a 12-month school-based group randomized control trial designed to prevent unhealthy weight gain in adolescent girls living in low-income communities through improving physical activity, dietary and sedentary behaviors. The impact of the NEAT Girls intervention on the study's primary outcome (BMI) has been reported elsewhere.[12] This paper provides a comprehensive report of the 12-month intervention effects on secondary outcomes including (i) time spent in moderate (MPA), vigorous (VPA) and moderate-to-vigorous physical activity (MVPA) within and beyond the school day, and (ii) time spent in total and selected screen-based and non screen-based sedentary behaviors, and (iii) hypothesized mediators of physical activity behavior change.

2. Methods

Detail of the NEAT Girls study design, methods and participant characteristics at baseline have been described previously.[13] Briefly, the 12-month school-based intervention was evaluated using a clustered randomized control trial with a 12- and 24-month follow-up. The program was developed for adolescent girls attending public secondary schools located in 'low-income' communities as determined by the Socio-Economic Indexes for Areas of relative socioeconomic disadvantage (SEIFA Index) deciles.[14] Schools were eligible to participate if located in areas that had an allocated SEIFA index of ≤5 (bottom 50%). 18 schools were randomly selected from a list of eligible schools in the Hunter,

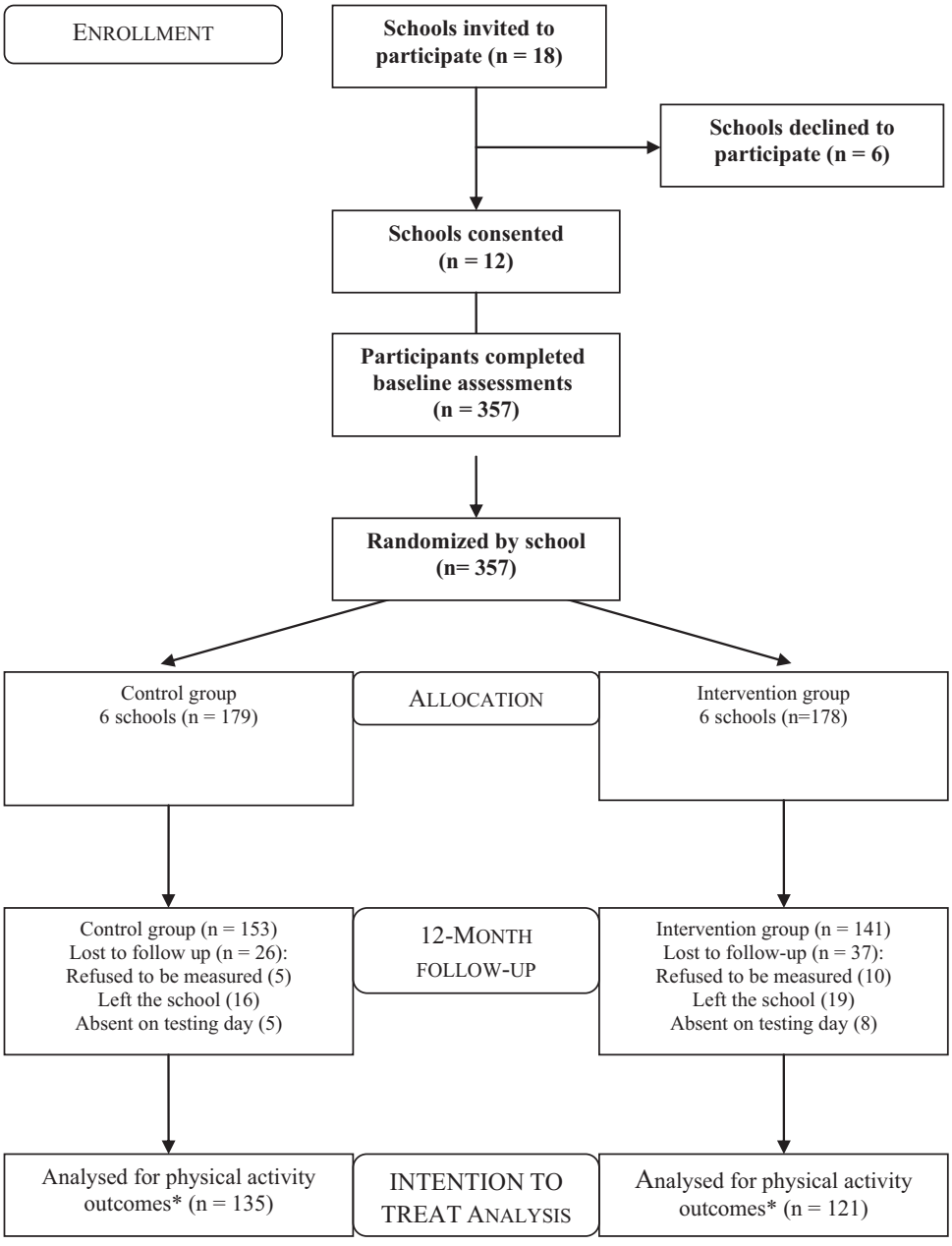

Fig. 1. Flow of Participants through the study. *Eligible number of cases for analyses.