Original Research

Associations between meeting combinations of 24-h movement guidelines and health-related quality of life in children from 12 countries[☆]

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ABSTRACT

Objectives: To examine whether meeting vs not meeting movement/non-movement guidelines (moderate-to-vigorous physical activity [MVPA], screen time, sleep duration), and combinations of these recommendations, are associated with health-related quality of life (HRQoL) in children from 12 countries in five major geographic regions of the world and explore whether the associations vary by study site.

Study design: Observational, multinational cross-sectional study.

Methods: This study included 6106 children aged 9–11 years from sites in Australia, Brazil, Canada, China, Colombia, Finland, India, Kenya, Portugal, South Africa, the United Kingdom, and the United States. Participants completed the KIDSCREEN-10 to provide a global measure of their HRQoL. Sleep duration and MVPA were assessed using 24-h accelerometry. Screen time was assessed through self-report. Meeting the recommendations was defined as ≥60 min/day for MVPA, ≤2 h/day for screen time, and between 9 and 11 h/night for sleep duration. Age, sex, highest parental education, unhealthy diet pattern score, and body mass index z-score were included as covariates in statistical models.

Results: In the full sample, children meeting the screen time recommendation, the screen time + sleep recommendation, and all three recommendations had significantly better HRQoL than children not meeting any of these guidelines. Differences in HRQoL scores between sites were also found within combinations of movement/non-movement behaviors. For example, while children in Australia, Canada, and USA self-reported better HRQoL when meeting all three recommendations, children in Kenya and Portugal reported significantly lower HRQoL when meeting all three recommendations (relative to not meeting any).

Conclusions: Self-reported HRQoL is generally higher when children meet established movement/non-movement recommendations. However, differences between study sites also suggest that interventions aimed at improving lifestyle behaviors and HRQoL should be locally and culturally adapted.

Introduction

Health-related quality of life (HRQoL) is an important and multi-dimensional indicator of children's physical, mental, emotional, and social functioning.[1,2] Self-reported HRQoL has typically been studied in children with chronic diseases or specific health conditions.[3] More recently, scientists have started to examine the associations between HRQoL and life-style behaviors. For example, HRQoL has been associated with higher physical activity level, lower screen time, healthier sleep patterns, and healthier eating behaviors in children.[4–7] However, research to date has largely investigated relationships between movement/non-movement behaviors (including physical activity, sedentary behavior, and sleep) and health outcomes individually and in isolation from each other, ignoring the intrinsic and empirical interactions between these behaviors.[8,9] As reported in a recent systematic review aimed at determining how combinations of physical activity, sedentary behavior, and sleep are associated with various health outcomes in children and youth, no study to date has examined the combinations of these behaviors as they relate to psycho-social outcomes, including HRQoL.[10] A better understanding of the associations between various combinations of movement/non-movement behaviors and HRQoL is important to help determine the best cocktail of these behaviors for optimal HRQoL in children and for informing policy development. It is also important to move beyond the quantification of the health impacts of movement/non-movement behaviors on physical health (and especially body composition as recently reviewed)[10] and also assess psycho-social dimensions such as HRQoL in order to provide a better assessment of their influence on overall health.

The 24-h movement guidelines recently developed in Canada[11] represent a paradigm shift in thinking about movement behaviors from a focus on a single movement behavior (e.g. MVPA alone) to an integrated movement behavior approach. They include specific recommendations for the day, including moderate-to-vigorous physical activity (MVPA; $\geq$60 min/day), recreational screen time (no more than 2 h/day), and adequate sleep duration (e.g. between 9 and 11 h/night for children aged 5—13 years). How combinations of these movement/non-movement behaviors are associated with HRQoL is unknown as studies looking at combined analyses are non-existent. In addition, previous research on children's HRQoL and movement/non-movement behaviors has almost exclusively been conducted in high-income, developed countries.[4,12–15] It is generally accepted that there are discrepancies in the way children from different cultures rate their own health and well-being.[16] The International Study of Childhood Obesity, Lifestyle and the Environment (ISCOLE) is uniquely positioned to address the present research questions;[17] it was a global collaboration among scientists from low-, middle-, and high-income countries representing a wide range of sociocultural variability.

The objective of this study was to examine HRQoL as it relates to meeting vs not meeting movement/non-movement recommendations (MVPA, screen time, sleep duration), and combinations of these recommendations, across the 12 countries participating in ISCOLE and explore whether the associations vary by study site.

Methods

Setting

ISCOLE is a multinational, cross-sectional study conducted in 12 countries from all major world regions. ISCOLE sites included Australia, Brazil, Canada, China, Colombia, Finland, India, Kenya, Portugal, South Africa, the United Kingdom, and the United States. These countries have been selected because they represent a wide range of economic development (low to high income), human development index (0.509 in Kenya to 0.929 in Australia), and income inequality (Gini coefficient of 26.9 in Finland to 63.1 in South Africa). The design and methods have been published in detail elsewhere.[17] By design, the samples were not intended to be nationally representative. Rather, the primary sampling frame was schools, which were typically stratified by an indicator of socio-economic status to maximize variability within sites. Children were recruited from 256 schools in urban/suburban areas only. A