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Sedentary Behavior in Children and Youth: An Overview of an Emerging Public Health Issue

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Abstract

Objective: The aim of this paper was to overview the prevalence and harms associated with sedentary behavior in children (age 5-11) and youth (age 11-19) in Canada and identify some strategies that show promise in reducing time spent sedentary in this population. **Methods:** This article provides a commentary on the role sedentary behaviour plays in the health of children. A narrative review of current publications was conducted. **Key Findings:** High levels of sedentary behavior pose exceptional health risks to Canadian youth today. A variety of strategies to reduce hours spent sedentary can be implemented in the home, school, and after-school settings to address this emerging public health issue. **Conclusions:** The profoundly negative physical, behavioral and cognitive consequences associated with sedentary behavior are affecting children at increasingly younger ages. This calls for clearer evidence-based guidelines and practical implementation strategies to promote physical activity and ultimately greater health in this population. **Health & Fitness Journal of Canada 2017;10(3):54-60.**

Keywords: Sedentary Behaviour; Physical activity; Health; Children; Lifestyle

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Introduction

Rapidly emerging as an important public health issue in children and youth, researchers are now exploring the role that sedentary behavior has across multiple health and behavioral outcomes,

including obesity, cardiovascular disease, diabetes, increased violence and substance use, poor school performance, and body image issues (American Academy of Pediatrics, 2001; Prentice-Dunn and Prentice-Dunn, 2012; Rey-Lopez et al., 2008; Tremblay et al., 2011a; 2011b). Various studies (including objective and/subjective indicators) have found sedentary behaviour to be an independent risk factor for obesity and other metabolic threats in children, regardless of overall physical activity levels (Atkin et al., 2013; Ekelund et al., 2006; Hanley et al., 2000; Mitchell et al., 2013; Salmon et al., 2000). Although it is recommended that children engage in no more than two hours of sedentary time per day (Tremblay et al., 2011a), young Canadians are sedentary for an average of 516 min/day (8.6 hr), or 62% of their waking hours (Colley et al., 2011; Colley et al., 2013).

Harms Associated with Being Sedentary

Physical activity levels have consistently been shown to decline during the transition from childhood to adolescence (Kimm et al., 2002; Sallis, 1993; Troiano et al., 2008). However, recent research has shown that drops in activity are occurring before the teenage years, with great declines being observed between the ages of seven and nine

(Basterfield et al., 2011). This is of great concern given the low levels of exercise and high amounts of sitting time observed at baseline in this same report. Public health interventions aimed at preventing declines in physical activity should be targeting children at a younger age than previously thought, as unfavorable behavioral trends in health seem to be begin before puberty (Basterfield et al., 2011).

It has been reported that only 7% of Canadian youth ages 5-17 meet the Canadian Physical Activity Guidelines (Colley et al., 2011), which is problematic given the dose-response relationship that has been identified between weight status, and the amount of steps taken per day in children (Eisenmann et al., 2007). Becoming overweight or obese is one predominant danger associated with leisure time sedentary behavior (Hume et al., 2009; Rey-Lopez et al., 2008), with hours spent watching television, specifically and consistently being connected to excess body fat in youth (Dietz and Gortmaker, 1985; Wiecha et al., 2006). For example, in a sample of 461 children from Mexico, every amassed hour spent viewing television resulted in a 12% increase in the odds of being classified as obese (Hernández et al., 1999).

Evidence would suggest that the after school period is an important “window” of opportunity for implementation of programs that will increase physical activity in young people, while consequently lessening time spent sedentary (Atkin et al., 2008). Given the inevitable time spent sitting during school, if children and adolescents expend a high proportion of after school hours accumulating more sitting time, unhealthy food and drink consumption will be more likely and physical activity

less probable (Atkin et al., 2008). Sitting time has been inversely associated with fruit and vegetable consumption and positively linked to ingestion of energy-dense snacks, drinks and fast foods, providing an explanation for the strong association between sitting time and weight status (Boynnton-Jarrett et al., 2003; Lowry et al., 2002; Pearson and Biddle, 2011). Early socialization of youth into establishing a connection between sedentary behaviours and a poor diet is of concern, making it important that parents do not always couple food consumption with sitting time in their children (Lemish, 1987).

Strategies to Reduce Sedentary Behaviour

Recent reviews of interventions that have targeted sedentary behaviours in youth have concentrated primarily on reducing screen time, given its obvious correlation with total sitting time (DeMattia et al., 2007; Summerbell et al., 2005). A review analysis of various types of both population and clinic-based interventions determined that when sedentary time in the form of television or video viewing was reduced, concomitant changes in body mass were observed, making it important that parents attempt to minimize screen time in their children (Summerbell et al., 2005).

An array of home-based systems have shown promise in reducing sedentary time, although often thought to be ineffective long term, and economically unrealistic on a population level (Faith et al., 2001; Goldfield et al., 2006; Mhurchu et al., 2009). For example, one study found that making television viewing contingent with pedalling on a stationary cycle ergometer, was successful, albeit an expensive option (Faith et al., 2001). Other interventions, such as television

locking (Mhurchu et al., 2009), while technically effective, has also prompted scepticism in the long term. However, utilizing interventions such as these may be worth endeavouring, given the importance of targeting harmful behaviours at such a lucrative time (Rolland-Cachera et al., 2006).

School-based interventions are seemingly the most efficacious at reducing self-reported sedentary behaviour in youth, supporting the use of public health initiatives to combat this issue (DeMattia et al., 2007). Interestingly, educational strategies alone are ineffective (Summerbell et al., 2005). Conversely, behavioural mediations that focus on contracts, reward contingencies, goal setting, and planning of time have been more successful, and should perhaps be the direction that health professionals take moving forward (Summerbell et al., 2005).

Active transport to and from school is globally on the decline amongst children and youth (Buliung et al., 2009; Lewis et al., 2008; McDonald, 2007) despite the distance between home and school remaining the same, according to Statistics Canada (Statistics Canada, 2011). Interestingly, active transport does not only provide an opportunity to replace sedentary commuting time with physical activity (walking, cycling etc.), but also increases activity levels outside of the time spent travelling to and from school (Faulkner et al., 2009). The immediate and delayed benefits throughout the day associated with active transport should urge parents to encourage their children to travel to school using more active modalities.

Given the inevitable time spent sedentary during school hours, progressive decreases in active play during recess periods is problematic

(Gray et al., 2014). Two recent studies have found that lowering playground density has a significant effect on decreasing sedentary time, while concurrently increasing moderate to vigorous physical exercise (D'Haese et al., 2013; Van Cauwenberghe et al., 2012). During these interventions, splitting up recesses periods shrinks the number of children sharing the playground at one time, resulting in more space to be active. Furthermore, adding different types of play equipment, and playground markings also effectually increase activity levels in during recess periods, even in those children who are typically more sedentary (Bundy et al., 2009; Ickes et al., 2013; Loucaides et al., 2009; Stratton and Mullan, 2005). Larger effects could possibly be found via a multicomponent intervention that focuses on combining the above strategies (D'Haese et al., 2013).

Conclusion

More prospective randomized trials are needed to examine how changes in correlates of sedentary behaviour translate to actual behavioural improvements. Additional studies that exclusively target reductions in sedentary behaviour would be useful to more thoroughly understand this phenomenon.

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Author's Qualifications

The author's qualifications are as follows: Jacqueline C. Regan, MKIN, undergraduate medical student UBC

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