Introduction

Preventable lifestyle diseases continue to be major contributors to the burden of disease internationally, and physical inactivity is among the top five risk factors contributing to global mortality.\(^1\) Intervention during the earliest developmental years might be required to ensure health promoting behaviours, such as physical activity, are established.\(^2\) Despite being the most active segment of the population, monitoring studies\(^3\)–\(^9\) suggest that a high proportion of young children may be insufficiently active for adequate development and health.

Subject

Physical activity is typically categorized into different intensities and is measured in metabolic equivalents (METs; 1 MET is equivalent to rest).\(^10\) Light intensity physical activities (1.5-2.9 METs) for young children include dressing up in costumes, standing and painting, and slow walking. Moderate-to-vigorous physical activities (MVPA)(3-8 METs) include those of a higher intensity, such as running, jumping, and playing ball games. Sedentary behaviours (<1.5 METs) are those characterized by sitting or lying down, and include TV viewing, using a computer, reading, and drawing. Young children’s natural activity patterns are described as intermittent, and are characterized by cycles of short intense bursts of activity followed by periods of rest or lower intensity activity.\(^3\) This activity should predominantly occur through active play.\(^11\)
Physical activity has beneficial effects on health and development in the early years of life and contributes to the prevention of obesity and cardiovascular disease risk factors, adequate bone and motor development, and positive cognitive and social development. Activity patterns also appear to track during childhood, and from childhood and adolescence to adulthood, suggesting that early life experiences of physical activity may shape later behaviour and subsequent health.

Although there is consensus that “more physical activity is better,” there is insufficient evidence of the precise “dose” or amount and intensity of physical activity required for adequate health and development in early childhood. For this reason, the amount of physical activity specified in recommendations for toddlers (1 to 3 years) and preschoolers (3 to 5 years) differ slightly between the United States and Australia. The National Association for Sport and Physical Education (NASPE) guidelines in the U.S. recommend that toddlers should accumulate at least 30 minutes of structured and at least 60 minutes to several hours of unstructured physical activity daily, while preschoolers should accumulate at least 60 minutes of structured and at least 60 minutes to several hours of unstructured physical activity daily. In Australia the recommendations specify that toddlers and preschoolers should be physically active every day for at least three hours, spread throughout the day. As it is unclear if this activity needs to be of a specific intensity for health benefits to occur, physical activity for this age group includes all daily movements at both light and moderate-to-vigorous intensities.

Problems and Research Context

Difficulties in accurately measuring the unique physical activity patterns of young children have delayed progress in this area. Self-reports are inappropriate and parent-proxy reports have inherent biases. In part, this is because young children’s physical activity does not occur in easily distinguishable blocks of exercise as is typical among adults. Direct observation offers a more objective approach, however this is only appropriate for confined settings, such as the child care centre/preschool. Accelerometers are feasible, acceptable and have adequate validity and reliability for assessing physical activity among youth, and because they collect objective, real-time data and are adequately sensitive to low intensity movements they are particularly suitable for use with young children. One limitation of accelerometry is that the most accurate cut-points for defining sedentary behaviour, light physical activity and MVPA have not yet been established among preschoolers, and the use of different definitions can have substantial effects on prevalence estimates.

Key Research Questions

Research using accelerometry has investigated young children’s habitual physical activity levels over the course of a typical week, and specifically when at child care/preschool. These studies have also attempted to quantify the amount of time preschoolers spend in light physical activity and MVPA, and some have investigated compliance with physical activity guidelines.

Recent Research Results

Findings from studies using accelerometry offer important insights into young children’s physical activity patterns. These studies indicate that 3- to 5-year-olds spend approximately 60 minutes per day in MVPA (range: 20-90 minutes), equating to around 8% (range: 3%-12%) of their 13 or so daily waking hours. Additionally, young children appear to accumulate a substantial amount of light intensity physical activity:
around 80-150 minutes per day or 11% to 20% (range: 5%-33%) of their waking hours. Therefore current estimates suggest that preschool-aged children spend a total of approximately 2 to 3½ hours per day in physical activity. It is plausible to assume that much of this activity might take place during child care/preschool, although a recent review of 13 studies that used objective measures concluded that young children’s typical levels of physical activity within child care centers were low and would have led to the accumulation of <60 minutes per day of MVPA.

It is important to note that substantial variation or inconsistency exists between studies. Recent reports from Australia and Portugal suggested that preschool children’s objectively measured total activity time was 110-120 minutes per day, whereas data from another study in the United States indicated that preschool children spent approximately 320 minutes per day in activity. Estimates of compliance with physical activity guidelines also vary. For example, in one Australian study 56% and 79% of preschoolers spent ≥3 hours per day in physical activity on weekdays and weekend days, respectively, according to parent reports. In contrast, only 74% of preschoolers spent ≥2 hours per day in physical activity measured using accelerometry in another study of Portuguese children. Likewise, a recent review of 39 studies concluded that only approximately 54% of young children achieved ≥60 minutes per day of MVPA. Methodological issues, such as the application of different measurement instruments, the use of different definitions for physical activity intensities, and differences in the interpretation of guidelines, have clearly influenced our understanding of physical activity patterns during the early years.

Research Gaps

As the development of physical activity guidelines for the early years has only recently been undertaken or is currently in progress in several countries, such as Australia and the United Kingdom, nationally representative data are not yet available. National monitoring surveys are urgently needed to understand more precisely how active young children are, and to ascertain the proportion of the early childhood population achieving the recommended amount of physical activity each day. Very little data are currently available for children under three years of age, and it is unclear if specific socio-demographic groups are in particular need of support to meet guidelines. Despite the existence of guidelines, there is not yet consensus on the precise amount and intensity of physical activity required for optimum health and development in the early years, resulting in different recommendations in the United States compared with Australia. Thus, research on the relationships between objectively measured physical activity and developmental and health outcomes is still needed.

Conclusions

Physical activity plays an important role in young children’s health and development, however contemporary lifestyles and environments appear to be preventing some young children from engaging in adequate levels of physical activity. As the origins of an active lifestyle begin in the early years of life, physical inactivity during early childhood might have consequences for children’s current and future health, behaviour, social and emotional development, and cognitive function.

Implications for Parents, Services and Policy

Influential people and institutions in the lives’ of young children must ensure they receive adequate
opportunities to engage in the recommended amount of developmentally-appropriate and health-enhancing physical activity. This should occur through unstructured active play and structured learning experiences, in the home and child care centres, through active transportation, and in socially- and culturally-accepted and enjoyable ways. National surveillance systems are required to accurately describe children’s activity levels and patterns during the early years and to determine if targeted interventions are required for specific segments of the population.

References


