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Physical Activity Recommendations for Early Childhood

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Introduction

Early childhood (0-5 years) is a critical time for the development of healthy behaviours, such as physical activity.[1] Participation in regular physical activity from birth prevents short- and long-term health complications, such as overweight and obesity, cardiovascular disease and musculoskeletal health.[2-4] Furthermore, the promotion of physical activity should start as early as possible as physical activity levels track from early childhood to childhood and adolescence.[5]

Subject and Research Context

Given the international trend of less than optimal physical activity levels among young children, several countries have recently developed physical activity recommendations for the Early Years.[6-10] Additionally, the World Health Organization has developed physical activity recommendations for children aged birth to 5 years.[11] These recommendations are evidence-based and provide a guide for how much and what type of physical activity is appropriate for infants (birth-1 year), toddlers (1-3 years) and preschool aged children (3-5 years). The majority of the guidelines also

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recognize the importance of adequate sleep (in conjunction with physical activity and sedentary behaviours (specifically screen time) and are operationalized as 24-hour Movement Guidelines.[6-8,10] All physical activity guidelines support the notion that physical activity is a natural and life-long activity that should be encouraged from birth. Parents and/or caregivers are encouraged to be positive role models and provide daily physical activity opportunities incorporating developmentally appropriate activities. Both structured and unstructured physical activity opportunities should be spread throughout the day and be provided in safe indoor and outdoor environments and the emphasis should be on “fun” and “participation” rather than competition.

Key Research Questions

The aim of this chapter is to summarize the empirical research supporting recently developed physical activity recommendations, in multiple countries, for children birth to 5 years of age.

The key research questions addressed in this chapter are:

1. What is the current evidence supporting the association between physical activity and health outcomes in early childhood?
2. Based on the current evidence, how much time should young children spend in physical activity and what type of physical activity should young children participate in.

Current evidence

Canada was one of the first countries to update their physical activity guidelines for children aged 0-5 years.[7] Researchers involved in the development of these guidelines published a comprehensive systematic review which investigated the associations between physical activity and health-related outcomes.[12] This systematic review provides an excellent summary of the latest evidence.[12] Studies included in the review varied significantly in design and sample size and included randomized controlled trials, cross-sectional studies and longitudinal studies.[12] This chapter provides an overview of data presented in the review, as well as providing updated evidence since publication of the review. The association between physical activity and several health outcomes, namely, adiposity, motor development, psychosocial health, cognitive development, fitness, bone and skeletal health and cardiometabolic health are reviewed.

Fifty-seven studies investigated the relationship between physical activity and adiposity. Mixed results were reported with some studies reporting significant relationships between physical

activity and adiposity and others reporting no relationships. Mixed findings were reported irrespective of the design of the study. For example, of the 40 cross sectional studies, physical activity was positively associated with adiposity in 12 studies[13-24] and of the seven longitudinal studies physical activity was positively associated with adiposity in three studies.[25-27] For all studies the relationship was stronger if a more direct measure of adiposity was used, for example, percent body fat as opposed to body mass index. The methodological quality of the studies, irrespective of design, was deemed as low or very low. Twenty-three studies investigated the association between physical activity and motor development. Seventy five percent of randomized controlled trials (n=4) reported positive associations[28-30] as did 50% of clustered randomized controlled trials (n=2),[31] 70% of cross-sectional studies (n=10)[15,32-37] and 83% of the non-randomized interventions (n=6).[38-42]

In the Canadian systematic review,[12] less than 15 studies reported on the associations between physical activity and psychosocial health and cognitive development and less than 10 studies reported on the associations between physical activity and fitness, bone and skeletal health and cardiometabolic health. Two randomized controlled trials reported greater increases for psychosocial health outcomes in the intervention group compared to the control group[28,43] and among the two longitudinal studies, physical activity, assessed as sport participation, was positively associated with psychosocial health in one study.[44] The association between physical activity and cognitive development were mixed. For the clustered randomized controlled trials (n=4), significant positive associations between physical activity and cognitive development were reported.[45-48] These four studies had high methodological quality. Physical activity was positively associated with fitness in all studies (n=3).[14,25,49] The majority (83%, 5/6) of cross-sectional studies reporting the association between physical activity and bone and skeletal health identified significant associations.[50-54] Nine studies assessed the association between physical activity and cardiometabolic health. Mixed results were reported for studies investigating the relationship between blood pressure, cholesterol or triglycerides in both longitudinal studies and cross-sectional studies.[26,55]

In summary, there is now more convincing evidence to suggest that physical activity of at least moderate- to vigorous-intensity is consistently associated with better health indicators.[13,14,56,57] Furthermore, the evidence pertaining to younger children (0-2 years) has increased thus highlighting the importance of participating in physical activity from birth. Based on these findings the following guidelines were recommended (Table 1). The new guidelines specify the intensity of physical activity (i.e., whether the activity is light, moderate or vigorous) for preschool aged

children. Sixty minutes of moderate- to vigorous-intensity, also termed energetic play that results in ‘huff and puff’ is now recommended as part of the total 180 minutes per day.[6-11] Additionally, the most recent guidelines recommend a time for tummy time for infants (i.e., 30 minutes per day, accumulated throughout the day).

Table 1: Country-specific physical activity recommendations for children birth to five years

Country	Infants	Toddlers	Preschoolers
Australia* (released 2017) Infants: 0-1 year Toddlers: 1-3 years Preschoolers: 3-5 years[6]	Be physically active several times in a variety of ways, particularly through interactive floor-based play; more is better. For those not yet mobile, this includes at least 30 minutes of tummy time spread throughout the day while awake.	At least 180 minutes spent in a variety of physical activities including energetic play, spread throughout the day; more is better.	At least 180 minutes spent in a variety of physical activities, of which at least 60 minutes is energetic play, spread throughout the day; more is better.
Canada* (released 2017) Infants: 0-1 year Toddlers: 1-2 years Preschoolers: 3-4 years[7]	Be physically active several times in a variety of ways, particularly through interactive floor-based play—more is better. For those not yet mobile, this includes at least 30 minutes of tummy time spread throughout the day while awake.	At least 180 minutes spent in a variety of physical activities at any intensity, including energetic play, spread throughout the day—more is better.	At least 180 minutes spent in a variety of physical activities spread throughout the day, of which at least 60 minutes is energetic play—more is better.

New Zealand* (released 2017) Recommendations for specific ages groups not provided[8]	Provide fund activities the support physical, social, emotion and spiritual grown (at least three hours every day for toddlers and preschoolers, spread throughout the day). Include plenty of opportunities for active play: that develop movement competence and confidence; that provide sufficient challenges to build resilience and encourage creativity through exploration; where children are by themselves as well as interacting with others, such as parents, siblings, friends, whanau/family and other caregivers that include a variety of indoor and outdoor activities, especially activities involving nature.

United Kingdom (released 2019) Infants: 0-1 year Toddlers: 1-2 years Preschoolers: 3-4 years[9]	Babies should be encouraged to be active throughout the day, every day in a variety of ways, including crawling. If they're not yet crawling, encourage them to be physically active by reaching and grasping, pulling and pushing, moving their head, body and limbs during daily routines, and during supervised floor play. Try to include at least 30 minutes of tummy time spread throughout the day when they're awake. Once babies can move around, encourage them to be as active as possible in safe and supervised play environments.	Toddlers should be physically active every day for at least 180 minutes (3 hours). The more the better. This should be spread throughout the day, including playing outdoors. The 180 minutes can include light activity such as standing up, moving around, rolling and playing, as well as more energetic activity like skipping, hopping, running and jumping. Active play, such as using a climbing frame, riding a bike, playing in water, chasing games and ball games, is the best way for this age group to get moving.	Pre-schoolers should spend at least 180 minutes (3 hours) a day doing a variety of physical activities spread throughout the day, including active and outdoor play. The more the better. The 180 minutes should include at least 60 minutes of moderate-to-vigorous intensity physical activity. Children under 5 should not be inactive for long periods, except when they're asleep. Watching TV, travelling by car, bus or train, or being strapped into a buggy for long periods are not good for a child's health and development.

South Africa* (released 2018) Infants: 0-1 year Toddlers: 1-3 years Preschoolers: 3-5 years[10]	Be physically active several times a day in a variety of ways through interactive floor-based play, including crawling. For babies not yet mobile, this included at least 30 minutes of tummy time spread throughout the day while awake, and other movements such as reaching and grasping.	At least 180 minutes spent in a variety of physical activities including energetic play, spread through the day, more is better.	At least 180 minutes spent in a variety of physical activities of which at least 60 minutes is energetic play that raises heart rate and makes children “huff and puff” (i.e., running, jumping, dancing), spread throughout the day, more is better
World Health Organization* (released 2019) Infants: 0-1 year Toddlers: 1-2 years Preschoolers: 3-4 years[11]	Be physically active several times a day in a variety of ways, particularly through interactive floor-based play; more is better. For those not yet mobile, this includes at least 30 minutes in prone position (tummy time) spread throughout the day while awake.	Spend at least 180 minutes in a variety of types of physical activities at any intensity, including moderate-to-vigorous-intensity physical activity, spread throughout the day; more is better.	Spend at least 180 minutes in a variety of types of physical activities at any intensity, of which at least 60 minutes is moderate- to vigorous intensity physical activity, spread throughout the day; more is better.

*Included as part of 24-hour Movement behavior Guidelines

Research Gaps

Since the release of the revised country-specific physical activity recommendations, substantial international collaborative work has continued to address the research gaps. For example, surveillance studies which assess the proportion of children who meet the recommendations are

currently underway. The SUNRISE study is currently investigating this in 31 countries; two thirds of which are low- or middle-income countries. Data collection for the pilot study will be completed in 2020 (https://sunrise-study.com). Simple well-designed interventions have been reported, for example a recent study showed that by increasing the number of scheduled outdoor times in early childhood education and care settings, children spent significant more time in moderate- to vigorous-intensity physical activity.[58] Further innovative studies are called for to ensure optimal levels of physical activity are achieved.

Additional studies monitoring the awareness and uptake of the recommendations by stakeholders such as health professionals, childcare workers and parents are needed, however this type of investigation is often hindered by difficulty in securing funding. There have been small gains in this area, with some countries successfully increasing awareness of the recommendations among key stakeholders, however progress is generally slow.

Many studies which provided the evidence for the revised country-specific guidelines were low methodological quality. Based on the GRADE framework, in the Carson review,[12] only a few studies were deemed to have moderate or high methodological quality.[28,45] It is important that all studies are methodologically sound to ensure the most robust evidence is provided which will in turn better inform policy and practice.

Conclusions

Life-long physical activity habits need to be established in the first five years of life as participation in regular physical activity has many health benefits. The release of a number of country-specific physical activity recommendations in the last five years provides clear recommendations on the appropriate type, intensity and amounts of physical activity for young children. Adhering to such recommendations will enhance health outcomes for children and provide the best possible start. Establishing healthy physical activity habits from a young age, through adherence to evidence-based physical activity recommendations, will be beneficial.

Implications for Parents, Services and Policy

The development of physical activity recommendations for children from birth to 5 years will have several notable implications for parents, services and policy makers. Current prescriptive physical activity recommendations, which are based on solid empirical evidence, will:

1. Assist key stakeholders to understand the importance of physical activity for health benefits among young children;

2. Inform government policy in relation to health-promoting physical activity for children birth to 5 years of age;

3. Assist consumers, childcare workers and other health professionals to understand the importance of physical activity for health in children; and

4. Underpin and support health promotion activities and intervention by workers across a range of sectors and all levels of government.

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