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## BASIC STUDY

# What do we know about physical activity in infants and toddlers: A review of the literature and future research directions

*Que savons-nous à propos de l'activité physique des tout-petits?  
Revue de la littérature et perspectives pour la recherche*

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### KEYWORDS

Childhood;  
Young children;  
Physical activity;  
Sedentary behaviour;  
Health

### Summary

**Objectives.** – To search the literature for studies evaluating physical activity levels and sedentary behaviours in infants and toddlers, thus in children under the age of three.

**News.** – Only two studies could be located, evaluating physical activity levels in this young age group and only four studies could be identified looking into sedentary behaviours in infants and toddlers. The limited evidence shows that TV viewing is already common and that the time spent in moderate to vigorous physical activity is limited in infants and toddlers.

**Prospects and projects.** – To gain a comprehensive understanding of physical activity and sedentary behaviour during the toddler and infant years, more research is needed. Due to the short intermittent bursts of activities of young children, only direct observation or objective measures, like accelerometers, should be used to define activity levels in infants and toddlers. However, studies on the validity and feasibility of accelerometers in toddlers and infants are lacking.

**Conclusion.** – More research is needed to improve understanding of basic aspects and valid measurement of physical activity and sedentary behaviours in infants and toddlers. Efforts to promote physical activity and to minimize sedentary behaviour (e.g., media use) in infants and toddlers are advocated.

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**MOTS CLÉS**

Tout-petits ;  
 Enfance ;  
 Activité physique ;  
 Comportement  
 sédentaire ;  
 Santé

**Résumé**

*Objectif.* – Réaliser, par une revue de la littérature, un état de l'art concernant l'évaluation des niveaux d'intensité de l'activité physique et les comportements sédentaires chez les tout-petits, c'est-à-dire les enfants âgés de moins de six ans.

*Résultats.* – Seules deux études évaluent les niveaux d'activité physique des tout-petits et seules quatre portent sur les comportements sédentaires. Elles suggèrent, avec un niveau de preuve peu élevé, que regarder la télévision est déjà courant à cet âge, et que les activités physiques d'intensité moyenne ou fortes sont limitées chez les tout-petits.

*Perspectives.* – Pour mieux comprendre l'activité physique et le comportement sédentaire des tout-petits, d'autres études s'avèrent nécessaires. En raison du caractère intermittent et sporadique des activités chez les très jeunes enfants, seules des observations directes ou des méthodes objectives, comme le port d'accéléromètres, peuvent être utilisés pour définir les niveaux d'activité des tout-petits. Pourtant, des études sur la validité et la faisabilité de l'utilisation d'accéléromètres dans les tout-petits, en particulier les enfants âgés de moins que trois ans, font défaut dans la littérature scientifique.

*Conclusion.* – Il est nécessaire d'améliorer la connaissance des aspects de base et des méthodes de mesure de l'activité physique des tout-petits, en particulier ceux de moins de trois ans. Des efforts pour promouvoir l'activité physique et pour diminuer le comportement sédentaire (par exemple, regarder la télévision) sont recommandés dès ce jeune âge.

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**1. Introduction**

Globally, at least 20 million children under the age of five were estimated to be overweight in 2005 [1]. The paediatric obesity epidemic has heightened interest in physical activity and sedentary behaviours during early childhood as important correlates of energy balance and body composition. Physical activity participation in young children also plays an integral role in their overall development, including decreased likelihood of exhibiting cardiovascular disease risk factors and improved bone health, fundamental motor skills and social and psychological development [2]. Moreover, early childhood is one of the critical time periods for the establishment of sedentary and physical activity behaviours [3]. However, upon a review of the evidence by Reilly [4], studies of objectively measured physical activity and sedentary behaviour in preschool children show that levels of physical activity are typically low and sedentary behaviour high.

While the interest in physical activity in preschool children, incorporating ages 3–5 years, has raised over the past decade, studies looking into physical activity levels and sedentary behaviours in children under the age of three are very scarce.

However, data on physical activity levels and sedentary behaviours from 3- to 5-year-old children may not be transferable to younger children since the age range 0–5 years encompasses three developmental periods, each of which is characterised by quite different physical activity patterns [5,6].

The infant period generally encompasses the first 12 months of life. Activity or movement in the first 6 months is restricted to reaching and grasping objects, turning of the head toward a stimulus, and movement of the arms and legs. The second 6 months is characterised by the learning of rudimentary movement skills. The developmental stage from 1 to 3 years of age is often described as the toddler period. Around 1 year of age, children commence walking.

With this increased opportunity for exploration and learning, toddlers develop locomotor skills such as running, jumping and hopping. Further, manipulative skills emerge in the toddler years. The preschool period incorporates ages 3–5 years and is characterised by further development of stability and locomotor and manipulative skills.

Next to differences in activity patterns between 3- to 5-year-olds and younger children, estimates of daily physical activity in infants and toddlers are more likely to be influenced by daytime sleeping patterns [6].

Therefore the literature was searched for studies evaluating physical activity levels and sedentary behaviours in infants and toddlers, thus in children under the age of three.

**2. Methods**

Computerized searches were carried out using Medline® and Pubmed®. Searching was conducted in August and September 2010, with the relevant literature included in the review up to September 12th and including the search date. Manual searches of the reference lists of recovered articles and the authors' extensive personal files were also conducted.

Eligibility for inclusion was restricted to the inclusion of non-pooled physical activity or sedentary behaviour data in children under the age of three. Due to the limited number of studies, a narrative approach was used for data analysis.

**3. Research results**

Only two studies could be located, evaluating physical activity levels in this young age group.

Gubbels et al. [7] observed 75 2- and 100 3-year-olds at nine Dutch child-care centers with the Observational System for Recording Physical Activity in Children - Preschool Version [8]. A large proportion of the observed activities (59.4% of the indoor and 31.2% of the outdoor observations) were classified as sedentary, while only 5.5% of the indoor and

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