



## Review Article

# Physical activity and sedentary time during childcare outdoor play sessions: A systematic review and meta-analysis



Stephanie Truelove<sup>a</sup>, Brianne A. Bruijns<sup>a</sup>, Leigh M. Vanderloo<sup>a</sup>, Kathleen T. O'Brien<sup>b</sup>, Andrew M. Johnson<sup>c</sup>, Patricia Tucker<sup>d,\*</sup>

<sup>a</sup> Health and Rehabilitation Sciences, Faculty of Health Sciences, University of Western Ontario, London, Ontario, Canada

<sup>b</sup> Department of French Studies, Faculty of Arts and Humanities, University of Western Ontario, London, Ontario, Canada

<sup>c</sup> School of Health Studies, Faculty of Health Sciences, University of Western Ontario, London, Ontario, Canada

<sup>d</sup> School of Occupational Therapy, Faculty of Health Sciences, University of Western Ontario, 1201 Western Road, Elborn College, Room 2547, London, Ontario N6G 1H1, Canada

## ARTICLE INFO

## Keywords:

Physical activity  
Sedentary time  
Childcare  
Young children  
Outdoor play  
Systematic review  
Meta-analysis

## ABSTRACT

Outdoor playtime has been highly correlated with moderate-to vigorous-intensity physical activity (MVPA), while also being associated with decreased sedentary time. This systematic review and meta-analysis sought to examine the physical activity levels and sedentary time of young children (2–5 years) during outdoor play periods at centre-based childcare. Eight online databases were searched for peer-reviewed, English-language, original research. Two reviewers independently extracted data (study design, participants, method of measurement, and physical activity and/or sedentary time of participants). Time spent in outdoor activity intensities were converted to percentage of time, and averaged across the two measurement types: accelerometry and observational. Of the 26 included articles, 11 used accelerometry, 13 employed direct observation, and 2 adopted a combination of both measurement methods. Average percentage of time engaged in MVPA and sedentary pursuits ranged from 6.7% to 43% and 23.2% to 63.5% by accelerometry, and 2% to 53.9% and 46.1% to 80.2% by observation, respectively. Total physical activity (only measured by accelerometry) ranged from 23.2% to 63.5% of outdoor playtime. Meta-analysis of 11 accelerometer studies found that children spent a mean (95% CI) of: 13.99% (10.35–17.63) of outdoor playtime in MVPA, 43.77% (32.95–54.58) in TPA, and 52.81% (44.1–61.51) in sedentary time. Overall, young children have the potential to be highly active during outdoor play sessions at centre-based childcare; however, many children still engage in substantial amounts of sedentary time. Future research should explore the frequency and/or duration of outdoor time which best support young children's physical activity and limits sedentary time in childcare.

## 1. Introduction

The low levels of physical activity and markedly high levels of sedentary time among young children in childcare is concerning (Vanderloo et al., 2015). Researchers have determined that preschoolers in this environment accumulate a mere 1.54 min/h of moderate-to vigorous-intensity physical activity (MVPA) (Vanderloo et al., 2015), and spend the majority of their time (up to 40.64 min/h) being sedentary (Vanderloo et al., 2014; Reilly, 2010). Unfortunately, participation in physical activity negatively correlates with age; (Garriguet et al., 2016) young children's activity levels decrease by almost 50% between the ages of 3 and 5 years (Taylor et al., 2013). Canada, Australia, and the United Kingdom recommend that young children 2 to

4 years engage in at least 180 min of total physical activity (TPA) per day (Tremblay et al., 2017; Okely et al., 2017; Department of Health, 2011), while Canada and Australia have recently updated their guidelines recommending that children 3 years and older accumulate a minimum of 60 min of this time in energetic (i.e., MVPA) play (Tremblay et al., 2017; Okely et al., 2017). Acknowledging that activity behaviours established in early childhood have been shown to track across the lifespan (Cleveland et al., 2008), there is a need to promote healthy activity habits from a young age.

Not participating in physical activity in early childhood negatively affects healthy development (Tucker and Irwin, 2008). Physical activity is associated with a number of psychosocial, cognitive, and physical health benefits including increased mental wellness (Ahn and Fedewa,

\* Corresponding author.

E-mail addresses: [struelo2@uwo.ca](mailto:struelo2@uwo.ca) (S. Truelove), [bbruijns@uwo.ca](mailto:bbruijns@uwo.ca) (B.A. Bruijns), [lvande32@uwo.ca](mailto:lvande32@uwo.ca) (L.M. Vanderloo), [kobrie49@uwo.ca](mailto:kobrie49@uwo.ca) (K.T. O'Brien), [ajohnson@uwo.ca](mailto:ajohnson@uwo.ca) (A.M. Johnson), [tucker2@uwo.ca](mailto:tucker2@uwo.ca) (P. Tucker).

<https://doi.org/10.1016/j.ypmed.2017.12.022>

Received 7 June 2017; Received in revised form 19 December 2017; Accepted 22 December 2017

Available online 03 January 2018

0091-7435/ © 2018 Elsevier Inc. All rights reserved.

2011; Penedo and Dahn, 2005), enhanced socialization (Lees and Hopkins, 2013; Timmons et al., 2012), more favourable cardiometabolic health markers (Timmons et al., 2012), decreased insulin resistance (Bell et al., 2007), and greater academic achievement (Reed et al., 2010). Further, too much time spent being sedentary increases the likelihood of developing weight-related issues (childhood obesity is known to affect over 43 million children under the age of 5 worldwide) (World Health Organization, 2015), type 2 diabetes, and heart disease, which present additional health complications, including hyperlipidemia (Goel, 2015) and hypertension (Goel, 2015; Barton, 2012).

Centre-based childcare has been noted as a prime environment for targeting young children's health behaviours, as a significant portion of this population is enrolled in this type of childcare arrangement for approximately 30 h per week (Cleveland et al., 2008). Moreover, childcare centres have been identified as being a strong contributor to young children's physical activity levels (Vanderloo et al., 2014; Finn et al., 2002; Trost et al., 2010). With the childcare environment representing a good catchment area for this population, a number of physical activity interventions have transpired (Tucker and Irwin, 2008; Finn et al., 2002; Pate et al., 2008). Specifically, many interventions have used outdoor playtime as a mechanism to increase young children's physical activity levels (Brown et al., 2009a; Nicaise et al., 2011; Nicaise et al., 2012; Trost et al., 2008), as children are significantly more active when they are outdoors compared to indoors (Raustorp et al., 2012; Vanderloo et al., 2013). For example, Raustorp et al. (2012) reported that young children at childcare in the United States and Sweden spent 7.8% and 6.7% of their time outdoors in MVPA, compared to just 1.8% and 2.9% of their time in this behaviour indoors, respectively. Similarly, in Canada, Vanderloo et al. (2013) identified that preschoolers were actually 10 times more active outside than inside, with MVPA rates of 5.03 min/h and 0.54 min/h, respectively. Outdoors, children have the increased ability to engage in gross motor activity and master their emerging fundamental movement skills such as running, jumping, throwing, catching, and striking (Timmons et al., 2012). Children who engage in active outdoor play are able to explore their natural environment and learn to appreciate the outdoors (Tremblay et al., 2015), while also demonstrating resiliency, self-regulation, the ability to socialize with peers, and developing skills for dealing with stress later in life (Brussoni et al., 2012; Greever et al., 2015; Veitch et al., 2006). Highlighting the best available scientific evidence, an expert derived position statement on active outdoor play emphasized that the physical, mental, social, and environmental benefits of outdoor affordances greatly outnumber the perceived harms of injury and abduction, etc. (Tremblay et al., 2015)

Due to the large portion of time young children spend at childcare, it is an essential environment for this group to develop healthy lifestyle behaviours. While there is general consensus, via independent studies (Raustorp et al., 2012; Vanderloo et al., 2013), that children are more active outdoors than indoors, no synthesis has been completed to provide a comprehensive look at outdoor playtime among young children in centre-based childcare to date. Given the varied approaches in measurement and study design, and the inconsistencies in outdoor playtime allotment, a synthesis of outdoor physical activity and sedentary time in childcare centres is warranted. Therefore, the purpose of this systematic review and meta-analysis was to assess and synthesize young children's physical activity levels and sedentary time during outdoor play sessions at centre-based childcare. Highlighting the activity levels of young children in this specific setting has the potential to impact policy makers, early year's stakeholders, as well as early childhood educators in prioritizing outdoor time for optimal health in young children.

## 2. Methods

This review was registered with the International Prospective Register of Systematic Reviews (PROSPERO; registration no.

**Table 1**  
Sample Search Strategy (EMBASE).

#	Search term	Results	Search type
1	preschool child/	547,180	Advanced
2	"preschoolers".mp	5836	Advanced
3	toddler.mp.	7394	Advanced
4	toddlers.mp.	7518	Advanced
5	"early years".mp.	4177	Advanced
6	"early childhood".mp.	29,039	Advanced
7	"preschool-aged child".mp.	47	Advanced
8	"preschool-aged children".mp.	1616	Advanced
9	"young child".mp.	4684	Advanced
10	"young children".mp.	51,507	Advanced
11	1 OR 2 OR 3 OR 4 OR 5 OR 6 OR 7 OR 8 OR 9 OR 10	1,459,133	Advanced
12	childcare.mp OR exp child care/	64,155	Advanced
13	"childcare centre".mp.	31	Advanced
14	"centre-based childcare".mp.	17	Advanced
15	"centre-based childcare".mp.	18	Advanced
16	"centre-based childcare".mp.	18	Advanced
17	"centre-based childcare".mp.	17	Advanced
18	"day care".mp.	14,895	Advanced
19	"early learning centre".mp.	1	Advanced
20	"early learning centre".mp.	2	Advanced
21	physical activity.mp. OR physical activity/	155,492	Advanced
22	exercise.mp.	433,622	Advanced
23	movement.mp.	361,251	Advanced
24	"active play".mp.	220	Advanced
25	"locomotor activity".mp.	24,357	Advanced
26	"motor activity".mp.	54,511	Advanced
27	"physical exertion".mp.	2798	Advanced
28	"active movement".mp.	1274	Advanced
29	"outdoor play".mp.	217	Advanced
30	outdoor time.mp.	250	Advanced
31	recess.mp.	115	Advanced
32	"sedentary behaviour".mp.	1547	Advanced
33	sedentary lifestyle/or sedentary.mp	34,250	Advanced
34	Inactive.mp.	106,149	Advanced
35	stationary.mp.	57,673	Advanced
36	"physical inactivity".mp.	9087	Advanced
37	"sedentary activity".mp.	597	Advanced
38	12 OR 13 OR 14 OR 15 OR 16 OR 17 OR 18 OR 19 OR 20	170,150	Advanced
39	21 OR 22 OR 23 OR 23 OR 24 OR 25 OR 26 OR 27 OR 28 OR 29 OR 30 OR 31 OR 32 OR 33 OR 34 OR 35 OR 36 OR 37	1,593,829	Advanced
40	11 AND 38 AND 39	802	Advanced

CRD42017062337), and adheres to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement for systematic reviews (Liberati et al., 2009; Moher et al., 2015).

### 2.1. Search strategy

A comprehensive search strategy, designed by the Health Sciences Librarian, was implemented by the research team to assess the physical activity and sedentary time among young children during outdoor play sessions in centre-based childcare. Eight electronic databases (CINAHL, EMBASE, Medline, Physical Education Index, ProQuest, PsycInfo, SCOPUS, and Sport Discus) were searched for keywords such as "physical activity", "sedentary behaviours", "sedentary time", "preschoolers", "young children", "childcare", and "outdoor play". See Table 1 for a search strategy example. No date restrictions were applied, and limits were not placed on publication type to be inclusive during initial stages of the literature search. The final database search was run on February 10, 2017. All retrieved papers were exported into independent folders in Mendeley (version 1.17) referencing software. Papers from each database were then combined into one folder and duplicates were removed.

Download English Version:

<https://daneshyari.com/en/article/8693603>

Download Persian Version:

<https://daneshyari.com/article/8693603>

[Daneshyari.com](https://daneshyari.com)