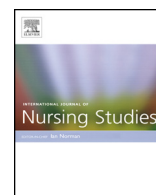




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Review

Interventions to prevent and manage overweight or obesity in preschool children: A systematic review

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ABSTRACT

Objectives: The preschool period is a pivotal time for lifestyle interventions to begin the establishment of long-term physical activity and healthy eating habits. This systematic review sought to (a) examine the effects of prevention and management interventions on overweight/obesity among children aged 2–5 years, and (b) explore factors that may influence intervention effects.

Design: A systematic review of randomized controlled studies was conducted.

Data sources: Six databases, including PubMed, CINAHL, EMBASE, PsycINFO, ERIC, and Cochrane library, were searched for relevant studies.

Review methods: Data were extracted and checked by two reviewers. Each study was appraised based on 4 quality indicators adapted from the Cochrane Handbook for Systematic Reviews of Interventions. A narrative summary technique was used to describe the review findings.

Results: Thirty-seven articles describing 32 randomized controlled trials and 29 unique interventions were retained. Eight of 23 prevention and 4 of 6 management interventions resulted in significant weight loss, with 3 prevention and 5 management interventions showing sustained effects over 6 to 24 months. Of the 12 efficacious interventions, 10 included physical activity and nutrition components, 9 actively involved parents, and only 4 were theory-based. Interactive education was the most common strategy used for parents in prevention interventions, compared to behavioral therapy techniques in management interventions. For children, interactive education and hands-on experiences involving physical activity and healthy eating were equally used.

Conclusions: Management interventions showed greater effects in weight loss compared to prevention interventions. Future prevention interventions in preschool children should target both parents and children, and focus on physical activity and nutrition through interactive education and hands-on experiences, although intervention effects were less than optimal. Management interventions should focus on parents as the “agents of change” for physical activity and nutrition while integrating behavioral therapy techniques and interactive education.

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What is already known about the topic?

- Preschool is a pivotal time for lifestyle interventions to begin the establishment of long-term healthy eating and physical activity habits.
- Evidence on overweight/obesity intervention effects is inconclusive.
- Previous systematic reviews on interventions to prevent and manage overweight/obesity in preschool children are limited by narrow scope search and lack of examination of factors that may influence intervention effects.

What this paper adds

- This systematic review provides evidence on the effects of previous overweight/obesity prevention and management interventions.
- Interactive education was found to be the most common strategy used for parents in prevention interventions, compared to behavioral therapy techniques in management interventions.
- For children, interactive education and hands-on experiences involving physical activity and healthy eating are promising intervention strategies.

1. Introduction

Approximately 43 million (6.7%), 35 million in developing countries, preschool children are overweight or obese, and the number is expected to reach 60 million (9.1%) by 2020 (de Onis et al., 2010). High preschool body mass index is not only correlated with children's poor cardiovascular health (Brogan et al., 2014; Messiah et al., 2012) and cognitive deficits (Smith et al., 2011), but also associated with adult obesity, central obesity, and metabolic syndrome (Graversen et al., 2014). Children who are overweight at age 5 are four times as likely as their peers with a healthy weight to become obese later in life (Cunningham et al., 2014).

Lifestyle behaviors, including sedentary activity, screen time, sweetened beverage intake, unhealthy diet, and inadequate sleep, can contribute to overweight/obesity in preschool children (Gubbels et al., 2012; Kuhl et al., 2012; te Velde et al., 2012). Therefore, lifestyle interventions focusing on physical activity, nutrition, and sleep hold promise in preventing and managing childhood obesity. Children who participate in a lifestyle intervention at an earlier age (4–7 years) have greater weight loss over 5 years than those participating in the intervention at an older age (>11 years) (Reinehr et al., 2010). Within that earlier age group, younger participants (<5 years) in a weight management program have greater weight loss over 2 years than older children (>5 years) (Cheng et al., 2014). In addition, evidence indicates that lifestyle interventions among children aged 4–5 years are potentially cost-effective, although cost savings as well as health benefits may not be apparent until the sixth decade of an individual's life (Hollingworth et al., 2012). Preventing overweight/obesity in preschool children may be beneficial to both childhood and adult health,

and preschool is a pivotal time for lifestyle interventions to begin the establishment of long-term healthy eating and PA habits.

Although overweight/obesity prevention and management research with preschool children is in its infancy, systematically reviewing previously implemented programs is important for optimizing future intervention design. Several systematic reviews on interventions to prevent and manage overweight/obesity in preschool children have been conducted (Bluford et al., 2007; Bond et al., 2011; Campbell and Hesketh, 2007; Hesketh and Campbell, 2010; Monasta et al., 2011; Nixon et al., 2012; Saunders, 2007; Zhou et al., 2013), but we identified several limitations, including: (a) narrow scoping search with number of included studies <10 (Bluford et al., 2007; Bond et al., 2011; Campbell and Hesketh, 2007; Monasta et al., 2011; Saunders, 2007); (b) exclusion of studies on managing overweight/obesity (Bond et al., 2011; Campbell and Hesketh, 2007; Hesketh and Campbell, 2010; Monasta et al., 2011; Nixon et al., 2012; Zhou et al., 2013); (c) exclusion of home- or community-based interventions (Hesketh and Campbell, 2010; Nixon et al., 2012; Zhou et al., 2013); (d) inclusion of studies without a control group (Bluford et al., 2007; Campbell and Hesketh, 2007; Hesketh and Campbell, 2010; Saunders, 2007); or (e) lack of examination of factors (e.g., intervention setting, length of intervention, interventionists, theory, parental involvement, intervention component, etc.) that may influence intervention effects (Bond et al., 2011; Campbell and Hesketh, 2007; Hesketh and Campbell, 2010; Monasta et al., 2011; Saunders, 2007; Zhou et al., 2013). These limitations hamper the ability to thoroughly understand the current state of the science of overweight/obesity interventions in this age group, especially the factors that may influence intervention effects.

This systematic review adds to the existing body of knowledge by including overweight/obesity prevention and management studies published up to February 2015. Narrative synthesis (Popay et al., 2006) was used to distinguish intervention effects related to preventing versus managing overweight/obesity. Factors that may influence intervention effects were identified to inform future research on preventing and managing overweight/obesity in preschool children. Guided by the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) Guidelines (Moher et al., 2010), the aims of this systematic review were to (a) examine the effects of prevention and management interventions on overweight/obesity among preschool children aged 2–5 years, and (b) explore factors that may influence intervention effects.

2. Methods

2.1. Search strategy

In February 2015, we conducted a scoping search of PubMed (from 1966) to assess the general quantity and quality of published journal articles on interventions to prevent and manage overweight/obesity in preschool children aged 2–5 years. The searching strategy in

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