



Evaluating Intervention Programs Targeting Parents to Manage Childhood Overweight and Obesity: A Systematic Review Using the RE-AIM Framework

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Intervention programs targeting parents to manage childhood overweight and obesity have emerged based on parents influence on the health behaviors of their children. The purpose of this review was to systematically evaluate intervention programs targeting parents to manage childhood overweight and obesity using the Reach, Efficacy, Adopt, Implementation, and Maintenance (RE-AIM) framework. There was a moderate risk of bias across all studies. The overall proportion of studies ($n = 7$) reporting on each dimension of the RE-AIM framework ranged from 78.6% (reach) to 23.8% (maintenance). The majority of intervention programs demonstrated improvement in child BMI. However intervention programs did not reach families of diverse race/ethnicity, were provided by highly trained professionals, and demonstrated high attrition, thus limiting generalizability.

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CHILDHOOD OVERWEIGHT AND obesity continue to be major health problems impacting approximately 31.8% of children ages 2–19 years in the United States (Ogden, Carroll, Kit, & Flegal, 2014). Children and adolescents who are overweight or obese are at risk for major health problems such as hypertension, diabetes, cancer, and depression (Centers for Disease Control and Prevention, 2011). A considerable number of studies have been conducted to establish effective intervention programs to manage childhood overweight and obesity (Bleich, Segal, Wu, Wilson, & Wang, 2013; Showell et al., 2013; Whitlock, O'Connor, Williams, Beil, & Lutz, 2010). However, intervention programs are heterogeneous with various program components, settings, targeted populations as well as measured

outcomes. Parent involvement has emerged as a key element for childhood overweight and obesity intervention programs (Faith et al., 2012; Kitzmann & Beech, 2006). Since parents play a main role in establishing the health behaviors of their children, they have the potential to act as agents to influence health behaviors of children and subsequently impact childhood overweight and obesity (Golan & Crow, 2004a, 2004b; Pocock, Trivedi, Wills, Bunn, & Magnusson, 2010).

Parents can exert both positive and negative influences on their children's health behaviors including diet and physical activity. Patterns of health behaviors are usually similar between parents and their children, because they share genetic, environmental, and behavioral characteristics (Patrick & Nicklas, 2005). The association of health behaviors between parents and their children may reflect the fact that parents provide modeling for their child's health behaviors (Gray et al., 2007; Scaglioni, Arrizza, Vecchi, & Tedeschi, 2011; Scaglioni, Salvioni, & Galimberti, 2008).

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Additionally, parents largely control their children's food environment. Foods provided to children are determined by food availability and accessibility as well as parents' food preferences, beliefs, and attitudes (Patrick & Nicklas, 2005; Scaglioni et al., 2011). The food environment is also influenced by feeding practices of parents for their children (Birch & Davison, 2001; Scaglioni et al., 2011). For example, higher parental control over children's eating is associated with increased BMI in children (Clark, Goyder, Bissell, Blank, & Peters, 2007; Saelens, Ernst, & Epstein, 2000; Spruijt-Metz, Lindquist, Birch, Fisher, & Goran, 2002). Moreover, parenting style, parental support, and parental knowledge of nutrition are strongly associated with health behaviors and weight status of children (Faith & Kerns, 2005; Farrow & Blissett, 2008; Gibson, Wardle, & Watts, 1998; Pugliese & Tinsley, 2007; Rhee, 2008).

Numerous approaches to manage childhood overweight and obesity have been developed. Some approaches target either parents or children while others include both parents and children. Through a series of studies, Golan and colleagues (Golan & Crow, 2004a, 2004b; Golan, Fainaru, & Weizman, 1998; Golan, Kaufman, & Shahar, 2006; Golan, Weizman, Apter, & Fainaru, 1998) compared the efficacy of an intervention program targeting parents versus an intervention program targeting children and found that the intervention program targeting parents was more effective than the intervention program targeting children in managing childhood overweight and obesity. Another study has shown that an intervention program targeting parents had greater effect on reducing BMI in children than an intervention program that included both parents and children (Okely et al., 2010). Several systematic reviews have also shown that greater parental involvement and participation in intervention programs addressing overweight and obesity in children contributes to a decrease in children's BMI (Golley, Hendrie, Slater, & Corsini, 2011; McLean, Griffin, Toney, & Hardeman, 2003; Niemeier, Hektner, & Enger, 2012; Skouteris et al., 2011).

Two recent systematic reviews of randomized controlled trials (RCTs) were conducted to compare intervention programs targeting parents versus both parents and children (Ewald, Kirby, Rees, & Robertson, 2013; Jull & Chen, 2013). Intervention programs targeting parents had a similarly positive effect on child weight and health behaviors as parent-children intervention programs. Intervention programs targeting parents may be easier to implement, require fewer resources, and be less costly than parent-children intervention programs; however, intervention programs targeting parents have higher dropout rates than parent-children intervention programs (Ewald et al., 2013; Jull & Chen, 2013). More systematic evaluation of intervention programs targeting parents is needed to inform clinical practice and research. Previous reviews have primarily focused on evaluating the internal validity of the intervention programs (i.e., how efficacious the program is relative to a control or active comparison); thus better understanding of

the external validity of intervention programs targeting parents for childhood overweight or obesity is indicated.

The Reach, Effectiveness, Adoption, Implementation, and Maintenance (RE-AIM) framework has been proposed as a guide to improve and increase the consistency of reporting internal and external validity criteria across behavioral intervention studies (VirginiaTech College of Agriculture and Science, 2014b, 2014a). The RE-AIM framework highlights the need for intervention studies to demonstrate more than efficacy and, thus, enhance generalizability of the intervention into clinical practice (Whittemore, 2009). Summarizing and reporting internal and external validity factors of intervention studies helps to provide further directions for research and practice (Akers, Estabrooks, & Davy, 2010; Allen, Zoellner, Motley, & Estabrooks, 2011; Blackman et al., 2013).

The five main dimensions of the RE-AIM framework are: (1) reach, the percent and representativeness of individuals who participated in the program; (2) efficacy/effectiveness, the impact of the programs on outcomes including potential negative effects and quality of life; (3) adoption, the percent and representativeness of settings and intervention staff that are willing to initiate a program; (4) implementation, the intervention fidelity with which various program elements are delivered by various staff; and (5) maintenance, the extent to which individual participants maintain behavior change over the time and, at the setting level, the degree to which the program is sustained over time (Gaglio, Shoup, & Glasgow, 2013; Glasgow, Klesges, Dziewaltowski, Estabrooks, & Vogt, 2006; VirginiaTech College of Agriculture and Science, 2014b, 2014a). Thus, the purpose of this review was to evaluate the internal and external validity of intervention studies targeting parents for the management of childhood overweight and obesity using the RE-AIM framework.

Methods

Selection of Studies

For this review, we followed guidelines by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA)(Moher et al., 2009). A literature search was undertaken using PubMed, CINAHL, SCOPUS, and PsychINFO using the search keywords: parent, parent-only, children, overweight, obesity, management, and intervention. The primary outcome of interest was child body mass index (BMI). Inclusion criteria were: 1) RCTs that evaluated a program for the treatment of childhood overweight or obesity; 2) targeted only parent(s)/guardian(s); and 3) was published between January 1990 and April 2015. We excluded studies targeting parents of infants or pregnant women, studies with sessions for children as a part of the program, non-English publications, and studies focusing on participants with other chronic diseases including diabetes, eating disorders, depression, or other genetic diseases. The literature search process was iterative. Various combinations of the keywords using "AND" and "OR" phrases were used for identifying relative studies. We also conducted additional

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