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REVIEW

Measurement of obesity prevention in childcare settings: A systematic review of current instruments

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Summary
Objective: The incidence of childhood obesity is highest among children entering kindergarten. Overweight and obesity in early childhood track through adulthood. Programs increasingly target children in early life for obesity prevention. However, the published literature lacks a review on tools available for measuring behaviour and environmental level change in child care. The objective is to describe measurement tools currently in use in evaluating obesity-prevention in preschool-aged children.
Methods: Literature searches were conducted in PubMed using the keywords ''early childhood obesity,'' ''early childhood measurement,'' ''early childhood nutrition'' and ''early childhood physical activity.'' Inclusion criteria included a discussion of: (1) obesity prevention, risk assessment or treatment in children ages 1—5 years; and (2) measurement of nutrition or physical activity.
Results: One hundred thirty-four publications were selected for analysis. Data on measurement tools, population and outcomes were abstracted into tables. Tables are divided by individual and environmental level measures and further divided into physical activity, diet and physical health outcomes. Recommendations are made for weighing advantages and disadvantages of tools.
Conclusion: Despite rising numbers of interventions targeting obesity-prevention and treatment in preschool-aged children, there is no consensus for which tools represent a gold standard or threshold of accuracy.

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Contents

Introduction

In the United States, the incidence of childhood obesity is highest among children entering kindergarten [1]. In addition, children who enter kindergarten overweight are four times more likely to become obese by adolescence [1]. Data from prospective studies has shown that childhood obesity tracks through life and elevates individual risk for cardiovascular and metabolic diseases in adulthood [2,3]. Thus, preschool years may provide a critical window for preventing childhood and adult obesity and related disease.

In the past decade, there has been a growing emphasis on beginning obesity prevention efforts early in life [4,5]. Childcare is an appropriate setting for interventions. According to 2012 data, 61% of U.S. children (ages 3—6) are enrolled in centre-based childcare [6]. Moreover, states are able to use funding from the federal Child Care and Development Block Grant program to support quality rated programs [7,8]. Quality rated programs are state-run systems in which childcare centres are evaluated on standards related to health, environment, and learning. Though systems vary, all include aspects of health promotion, providing childcare centres and day care homes an incentive to participate in obesity-prevention interventions.

Increasing numbers of interventions in childcare settings focus on obesity-related health behaviours, particularly healthy eating and physical activity [5,9]. However, despite obesity-related research accelerating in this setting, there is a lack of consensus on how and when to measure the effects of behaviour change interventions among young children. Moreover, there are multiple challenges to measuring change in early childhood settings, such as a transient population, busy staff and safety considerations. Preschool-aged children also present challenges in accurately measuring physical activity and dietary intake beyond those in adults or older children. There is a range of type and quality of measures for physical activity and nutrition in preschool-aged children.

Physical activity measures are classified as direct or indirect measures, with direct measures including objective tools such as accelerometers and indirect measures including proxy-reported activity. Even using objective measures, the intermittent nature of activity in young children can make accelerometer or heart rate monitor output inaccurate [10—12]. There are a number of validation studies of accelerometer, pedometer and heart rate monitors for this age group [13—16]. Three notable papers offer information on this subject. One provides a review of subjective and objective measures of physical activity in preschool-aged children, including discussion of available information on validity and reliability of each measure compared to a standard measure [11]. The second discusses issues specific to accelerometer use in this age group, including placement, ways to quantify outcome measures and which models have been validated for preschool-aged children [14]. The last paper discusses challenges inherent to the measurement of physical activity in this age group, particularly the intermittent nature of physical activity in young children [16]. These papers together provide a thorough basis for decisions regarding validity and accuracy of tools to measure

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