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Participant characteristics and intervention processes associated with reductions in television viewing in the High Five for Kids study☆

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ABSTRACT

Objective. To evaluate the High Five for Kids intervention effect on television within subgroups, examine participant characteristics associated with process measures and assess perceived helpfulness of television intervention components.

Method. High Five (randomized controlled trial of 445 overweight/obese 2–7 year-olds in Massachusetts [2006–2008]) reduced television by 0.36 h/day. 1-year effects on television viewing, stratified by subgroup, were assessed using linear regression. Among intervention participants (n = 253), associations of intervention component helpfulness with television reduction were examined using linear regression and associations of participant characteristics with processes linked to television reduction (choosing television and completing intervention visits) were examined using logistic regression.

Results. High Five reduced television across subgroups. Parents of Latino (versus white) children had lower odds of completing ≥2 study visits (Odds Ratio: 0.39 [95% Confidence Interval: 0.18, 0.84]). Parents of black (versus white) children had higher odds of choosing television (Odds Ratio: 2.23 [95% Confidence Interval: 1.08, 4.59]), as did parents of obese (versus overweight) children and children watching ≥2 h/day (versus <2) at baseline. Greater perceived helpfulness was associated with greater television reduction.

Conclusion. Clinic-based motivational interviewing reduces television viewing in children. Low cost education approaches (e.g., printed materials) may be well-received. Parents of children at higher obesity risk could be more motivated to reduce television.

Introduction

Television (TV) viewing is highly prevalent among children, particularly those from low income and racial/ethnic minority families (Certain and Kahn, 2002; Ford et al., 2002). Many studies have shown associations between young children's TV viewing and prevalence of obesity (Anderson et al., 2001; Gortmaker et al., 1996; Kimbro et al., 2011; Tremblay et al., 2011), as well as other adverse health and psychosocial outcomes including irregular sleep (Thompson and Christakis, 2005) and behavioral problems (Rideout and Hamel, 2006).

Previous interventions have attempted to reduce TV viewing as an obesity prevention strategy (Bluford et al., 2007; Dennison et al., 2004; Epstein et al., 2008; Escobar-Chaves et al., 2010; Fitzgibbon et al., 2005; Ford et al., 2002; Goldfield et al., 2006; Harrison et al., 2006; Ni Mhurchu et al., 2009; Robinson et al., 2003; Salmon et al., 2008; Schmidt et al., 2012; Todd et al., 2008), and a recent meta-analysis of interventions focused on reducing children's screen time shows a small but significant effect (summary estimate over all studies was −0.15 h/day [95% CI: −0.22 to −0.10]) (Maniccia et al., 2011).

Evidence that TV viewing tracks from early into later childhood suggests that preschool may be a promising period for preventive intervention (Anderson et al., 2001; Certain and Kahn, 2002; Proctor et al., 2003). Among randomized controlled trials that have focused on preschool-aged children (Anderson and Whitaker, 2010; Dennison et al., 2004; Epstein et al., 2008; Fitzgibbon et al., 2005, 2006; Fitzgibbon et al., 2011), few have succeeded in reducing TV/video viewing (Dennison et al., 2004; Epstein et al., 2008; Fitzgibbon et al., 2005). Though only a small number of interventions have focused on young children in clinical settings (McCallum et al., 2007; Ray et al., 1994; Schwartz et al., 2007), a recent systematic review highlighted clinic-based counseling as an effective approach for reducing screen time

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among young children and emphasized the need to better understand key components of this approach (Schmidt et al., 2012).

In order to effectively reduce TV/video-viewing, interventionists must first understand what health education components and processes are effective and in what subpopulations these strategies are successful. The High Five for Kids study, a primary care based cluster-randomized controlled trial of overweight and obese 2–6.9 year-olds, only significantly reduced BMI among girls and low income participants but was effective in reducing overall TV/video viewing by 0.36 h/day. Year 1 analyses found two process measures (choosing to work on reducing TV and participating in ≥2 intervention activities) that were associated with greater reductions in TV (Taveras et al., 2011). The purpose of this study was to evaluate the effect of High Five for Kids on TV reduction within subgroups, examine participant characteristics associated with key process measures and assess perceived helpfulness of TV intervention components.

Methods

Participants

We studied children participating in the High Five for Kids intervention, a cluster randomized controlled trial in 10 pediatric offices of Harvard Vanguard Medical Associates (HVMA), a multisite group practice in Massachusetts. Eligible children were ages 2.0–6.9 years whose body mass index (BMI) was >95th percentile or whose BMI was 85th–<95th percentile if at least one parent was overweight (BMI ≥ 25 kg/m^2) and who received their pediatric care at any of the 10 pediatric offices of HVMA between August 2006 and October 2008. We excluded: 1) children whose parent or guardian could not respond to interviews in English or Spanish, 2) children whose families were planning to leave HVMA, 3) families for whom the primary care clinician thought the intervention was not appropriate, and 4) children with chronic medical conditions. Details of recruitment procedures and the 1-year intervention outcomes are available elsewhere (Taveras et al., 2011). Of the 475 children initially recruited, 253 (93%) in the intervention and 192 (94%) in the usual care arm had 1-year outcome data available including BMI and a behavioral survey.

Intervention design

Trained pediatric nurse practitioners intervened using motivational interviewing during four 25-minute, in-person chronic disease management visits and two 15-minute telephone calls. The nurse practitioners delivered educational modules targeting TV/video viewing (as well as fast food and sugar-sweetened beverage intake and other behaviors). High Five also provided intervention families with printed and electronic tools for self-management support, including lists of local resources for physical activity and an interactive website. In addition, the nurse practitioners offered interested families an electronic TV monitoring device to assist with the goal of reducing TV/video viewing.

Measurements

At baseline, research staff contacted parents of eligible children and completed a telephone interview after obtaining verbal informed consent. Participants were enrolled once we confirmed their BMI at the scheduled well child care visit and we received written informed consent. At 1-year (post-intervention), participants again completed a telephone interview. All study procedures were reviewed and approved by the Harvard Pilgrim Health Care Institute Institutional Review Board.

Participant characteristics and baseline behaviors

In a baseline interview with research staff, parents reported their educational attainment, annual household income, the child's age, sex, race/ethnicity, and whether there was a TV in the room where the child slept. Research staff confirmed height and weight using measurements in the electronic health record from the most recent well-child care visit.

Main outcome

The main outcome was change in TV/video viewing from baseline to 1 year measured in hours/day. We assessed child TV/video viewing via parent-report using validated measures from the National Longitudinal Study of Youth (NLSY) (Baker et al., 1993). The NLSY measures have been linked in a dose–response manner to incidence of child obesity (Gortmaker et al., 1996), and while parental reports show some limitations (parents slightly overestimate children's TV time compared to diaries or direct observation), they are commonly used in nationally representative surveys (ensuring comparability) and correlate well with videotaped observational measures (r = .60) (Anderson et al., 1985; Bryant et al., 2007). Further details on the measurements are available in the 1-year paper from this trial (Taveras et al., 2011).

Process measures and helpfulness of intervention components

In 1-year follow-up surveys, parents in the intervention arm reported whether they had chosen to work on specific behaviors, including TV, and which intervention components they had found helpful in changing those behaviors (e.g., nurse practitioner chronic disease management visits with educational modules, telephone calls from pediatric nurse practitioners, and printed and/or electronic tools for self-management support). We also culled data from the electronic medical records on completed study visits and telephone calls.

Statistical analysis

We calculated mean TV/video viewing by intervention assignment and subgroup separately for baseline and 1-year follow-up. We then calculated change in TV/video viewing from baseline to 1 year. We used linear regression models to estimate the intervention's effect on reducing TV/video viewing within subgroups defined by: child age at baseline (</≥60 months); child sex (male/female); child race/ethnicity (black/Latino/white/other); child BMI percentile category at baseline (85th to <95th/≥95th); child baseline TV/video viewing (</≥2 h/day); parent educational attainment (some college or below/college graduate); parental BMI at baseline (<25/25–<30/≥30); and annual household income (</≥$50,000). We stratified by subgroup and compared intervention to control participants within these restricted samples using linear regression models adjusted for child age, sex, race/ethnicity; parent education and BMI category at baseline; household income; and exact time elapsed from baseline to follow-up. Using the full, unrestricted sample, we also assessed interactions of each subgroup variable with change in TV/video viewing (Table 1). For discussion in the Results section, we calculated confidence intervals around group differences using the formulas provided by Altman and Bland (2003).

Among intervention arm participants, we used logistic regression models adjusted for child age, sex, and race/ethnicity; parent education and overweight/obesity status at baseline; household income; and exact time elapsed from baseline to follow-up to assess characteristics associated with two process measures previously associated with greater reduction in TV. These process measures were: 1) completing ≥2 intervention visits (intervention dose) and 2) choosing to work on reducing TV and video time (choosing TV). Table 2 presents descriptive results, and Table 3 shows model estimates for the associations between participant characteristics and the two process measures.

Among intervention participants choosing to work on reducing TV, we conducted descriptive analyses of how helpful participants considered each of the intervention's health education components (Table 4). We also used linear regression models adjusted for child age, sex, and race/ethnicity; parent education and overweight/obesity status at baseline; household income; and exact time elapsed from baseline to follow-up visit to assess the associations of perceived helpfulness of intervention components with change in parent-reported change in TV/video time (Table 4).

To account for intraclass correlation, we performed analyses using generalized linear mixed models that accounted for clustering by practices (PROC GLIMMIX in SAS version 9.3; SAS Institute Inc., Cary, North Carolina).

Results

This study included children ages 2.0–6.9 years that were already overweight or obese at baseline: child mean (SD) age was 4.9 (1.2) years and baseline BMI z-score (SD) was 1.85 (0.63). Overall, participants were 43% racial/ethnic minorities and 48% female (n = 445). Two thirds of participants in the intervention arm (n = 159) selected reducing TV/video viewing as a target behavior for their child. Table 1 shows sample characteristics by intervention assignment and participant subgroup. Characteristics of the full study sample have been reported previously (Taveras et al., 2011).