



Effectiveness of the *Lunch is in the Bag* program on communication between the parent, child and child-care provider around fruits, vegetables and whole grain foods: A group-randomized controlled trial



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ABSTRACT

Objective. To evaluate the effectiveness of the parent- and early care education (ECE) center-based *Lunch is in the Bag* program on communication between parent, child, and their ECE center providers around fruits, vegetables and whole grain foods (FVWG).

Method. A total of $n = 30$ ECE center; 577 parent–child dyads participated in this group-randomized controlled trial conducted from 2011 to 2013 in Texas ($n = 15$ ECE center, 327 dyads intervention group; $n = 15$ ECE center, 250 dyads comparison group). Parent–child and parent–ECE center provider communication was measured using a parent-reported survey administered at baseline and end of the five-week intervention period. Multilevel linear regression analysis was used to compare the pre-to-post intervention changes in the parent–child and parent–ECE center provider communication scales. Significance was set at $p < 0.05$.

Results. At baseline, parent–child and parent–ECE center provider communication scores were low. There was a significant increase post-intervention in the parent–ECE center provider communication around vegetables (Adjusted $\beta = 0.78$, 95%CI: 0.13, 1.43, $p = 0.002$), and around fruit (Adjusted $\beta = 0.62$, 95%CI: 0.04, 0.20, $p = 0.04$) among the parents in the intervention group as compared to those in the comparison group. There were no significant intervention effects on parent–child communication.

Conclusion. *Lunch is in the Bag* had significant positive effects on improving communication between the parents and ECE center providers around FVWG.

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Introduction

Recent data indicates that children ages 2 to 18 years in the United States (U.S.) fail to meet the recommended intakes of healthy food such as fruits, vegetables and whole grains (FVWG), with 60% not consuming enough fruit and 93% not consuming enough vegetables (Kim et al., 2014). While the intake of FVWG has declined steadily

over the last few years, the enrollment of preschool-age children in early care and education (ECE) centers has increased. Approximately 80% of preschoolers in the U.S. attend some form of non-parental childcare (Mamedova and Redford, 2013). These preschoolers depend on their parents and the ECE center providers for their dietary needs, highlighting the importance of communication around child dietary needs and habits between parent–child as well as the parent–ECE center providers.

The literature evaluating the communication between parent–child and parent–ECE center providers around healthy foods such as FVWG is sparse. Studies have shown that the quantity and quality of messages given by parents are correlated (positively or negatively) to nutrition knowledge scores among children of preschool age (Anliker et al., 1990). Other studies have shown that food preferences of young

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children are affected by the context in which they are presented, indicating that children develop an understanding of food not only through taste, sight and smell, but also conversations with their parents and providers (Birch et al., 1981; McPhie et al., 2011). The 2011 position paper by the *Academy of Nutrition and Dietetics on Benchmarks for Nutrition in Child care* recommends that nutrition education for children and families should be a component of ECE center-based programs, and that providers should talk with families about nutrition education and engage them in the process of communicating nutrition information to the children and vice versa (Benjamin Neelon and Briley, 2011). In Texas, there is an increasing trend for ECE centers that require parents to provide food from home (Sweitzer et al., 2009). Thus, the interaction between ECE center, parent and the child around the preschooler's nutrition becomes even more important. Studies have shown that lunches packed from home for preschoolers have inadequate calories, often include foods high in fat, sugar and sodium such as sweets and chips (Kelly et al., 2010; Peterson, 2009), and do not meet the Child and Adult Care Food Program (CACFP) recommendations for fruits and vegetables (Sweitzer et al., 2009). Furthermore, Dev et al. reported that Head Start providers had significantly greater nutrition training and mealtime communication with their children as compared to non-Head Start providers (Dev and McBride, 2013). Thus, strategies encouraging parent-child and parent-ECE center provider communication around healthy nutrition, especially for non-Head Start ECE centers are needed.

Lunch is in the Bag is a parent and ECE center-based program aimed at increasing dialogue between parent, child and ECE center providers to promote intake of FVWG by educating parents and providers on how to pack healthy lunches for their preschool-age children ages 3 to 5 years (Hoelscher et al., under review). The efficacy trial of the *Lunch is in the Bag* program was conducted across 30 non-Head Start ECE centers in Texas (Briley et al., under review). The purpose of this study is to evaluate the effect of the *Lunch is in the Bag* program on communication between parent and their child, as well as parent and the ECE center providers around FVWG.

Materials and methods

The primary aim of the *Lunch is in the Bag* study was to determine the efficacy of the program on servings of FVWG packed in the sack lunches and consumed by preschoolers, ages 3 to 5 years, using a group-randomized controlled trial design ($n = 30$ ECE centers; 577 parent/child dyads). Results of the primary outcomes are presented elsewhere (Briley et al., under review). For this paper, the effectiveness of *Lunch is in the Bag* program strategies on parent-child and parent-ECE center provider communication around FVWG was evaluated, which was an important secondary objective of the parent study.

A convenience sample of 30 ECE centers were recruited in two cohorts (school year 2011–2012 and school year 2012–2013) across three metropolitan statistical areas of central and south Texas with $n = 15$ of the centers randomly assigned to intervention and $n = 15$ to wait-list comparison group (Hoelscher et al., under review) see Fig. 1 for study flow. Eligibility criteria for ECE center included: a) serves children ages 3 to 5 years, and b) requires parents to send packed lunches from home. A letter of invitation to participate in the study was sent to parents of children ages 3 to 5 in the participating centers. Informed consent was obtained from all interested parents for themselves as well as their child to participate in the study. While the program was implemented across the ECE center, only those consenting to participate were measured. Teachers received \$15 and parents received up to \$50 worth of gift cards for their time. Primary outcome measures for the parent study were amounts of FVWG, dairy, and snack foods in sack lunches parents provided for their children to eat at the ECE center (Hoelscher et al., under review). The study was approved by the University of Texas Health Science Center, Center for Protection of Human Subjects.

Lunch is in the Bag intervention: Detailed description of the *Lunch is in the Bag* program is available elsewhere (Hoelscher et al., under review). The program was implemented over five weeks in the fall semester of the school year with a one week booster in the spring semester. The program enlists the ECE center, teachers, parents, and children in cueing and reinforcing changes in the home-based food environment to increase parents' packing sack lunches

that enable children to achieve healthy eating patterns. A 1-hour teacher training was conducted by trained project staff at each ECE center prior to program implementation. Weekly newsletters containing nutrition recommendations using MyPlate guidelines, healthy lunch, snack and beverage ideas, recipes and how to engage children in nutrition learning were sent home to parents. At the ECE center, weekly activity stations were displayed combined with classroom-based activities, and notes from teacher to parent were implemented. Ancillary resources including commercially available story books around healthy eating, MyPlate placemats, 'gold medal lunch' stickers were provided to ECE center teachers. Pilot evaluation of the program has shown positive effects on increasing intake of vegetables and whole grains in previous studies (Sweitzer et al., 2010). This paper evaluates effectiveness of the program in improving parent-child and parent-ECE center provider communication at the end of initial five week intervention period.

Data collection

All measurements were conducted before the intervention (T0), and immediately after the initial five weeks of intervention (T1).

Parent and child demographics

Socio-demographic variables including parent and child age, parent and child gender and race/ethnicity, parent marital status, income level, education level were collected at baseline using parent self-report surveys.

Parent-child and parent-ECE center provider communication (Table 2)

Parent-child and parent-ECE center provider communication was measured using a parent-reported survey administered at baseline and end of the five-week intervention period. Project staff sent the surveys home to the consenting parents. Communication between parent and child was assessed using four questions for each of the FVWG adapted from previously validated questionnaires (Baranowski et al., 2006). These four questions asked the parents about their child's approval of packing FVWG foods in the sack lunches; how often the child has asked the parent regarding packing FVWG foods in the sack lunches; child reminded parents to buy FVWG foods for his or her sack lunches; and frequency of child talking about FVWG foods for his or her sack lunch.

Communication between parent and ECE center provider was also assessed using four questions for each of the FVWG. These included asking the parents regarding how often someone from ECE center approved FVWG foods in their child's sack lunches; how often ECE center provider has asked the parent regarding packing FVWG foods in their child's sack lunches, reminded parents to buy FVWG foods for their child's sack lunches, and communicated with parents about FVWG. Response options for each question were on a five point Likert-type scale ranging from 'Never' (coded as 0) to 'All the time' (coded as 4). Six summative scales, one each for FVWG, were developed; three scales for the parent-child communication, and three scales for the parent-ECE center provider communication (possible range per scale: 0 to 16 with four questions per scale and 5 response options per question ranging from 0 to 4; Cronbach's alpha = 0.79 to 0.92).

Parent and child anthropometrics

Child height and weight were measured at baseline using stadiometers and digital scales by trained project staff during regular preschool hours. Height and weight was used to compute age and gender specific BMI percentiles using growth charts. This was then classified to determine child weight status as underweight (<5th percentile) normal weight (BMI 5th to <85th percentile), overweight (BMI ≥ 85th to 94th percentile) or obese (BMI ≥ 95th percentile) (Centers for Disease Control and Prevention, 2014b).

Parent height and weight were self-reported on the parent survey which was used to compute BMI and weight status. BMI < 18.5 classified as underweight, BMI ≥ 18.5 to <25.0 normal weight, BMI ≥ 25.0 to <30.0 overweight and BMI ≥ 30.0 obese (Centers for Disease Control and Prevention, 2014a).

Statistical analysis

STATA version 13.0 statistical software was used for all analysis (STATA Corp, College Station, TX). A total of 633 parent-child dyads were measured at baseline, of which $n = 577$ complete parent-child dyad data ($n = 15$ ECE center, 327 dyads intervention group; $n = 15$ ECE center, 250 dyads comparison group) was available for analysis at the end of the five week period (91% completion rate). Missing data were excluded from the analysis. Sensitivity analysis showed no difference between the completers and non-completers

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