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Influencing the Home Food and Activity Environment of Families of Preschool Children Receiving Home-Based Treatment for Obesity

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Introduction

The prevalence of overweight and obesity remains notably higher for Hispanic preschool children (16.7%) compared with African Americans (11.3%), Asians (3.4%), and non-Hispanic White children (3.5%).[1] While socioeconomic status may partially explain some of the risk for obesity between racial and ethnic groups, other behavioral and environmental modifiable factors require further study.[2] The home physical environment has recently been identified as a potential target for not only intervention (eg, changing the availability of home foods) but also as a setting for the delivery of clinical intervention.[3,4]

To date, few treatment studies have been developed and tested to directly improve the home food environment of preschoolers with obesity and its associations with weight outcome. An exception has been the LAUNCH program (Learning about Activity and Understanding Nutrition for Child Health), which was based on behavioral family-based programs for school-aged children and adapted for families of preschoolers.[4–6] The LAUNCH program was delivered over 18 sessions that alternated between clinic and home visitations. Feasibility and pilot study results showed promising improvements in weight outcomes for preschoolers with obesity[4,6] and comparison of clinic only visits versus clinic plus home visits showed support for the inclusion of home visitations when treating preschool obesity.[5] In particular, significant changes in the home food environment were shown for the clinic plus home visit group, including fewer high-calorie foods and more fruits and vegetables at the end of treatment [5]. However, the LAUNCH studies primarily included white families from middle to upper income levels and it remains relatively unknown how families of preschoolers from diverse backgrounds may construct their home food and activity environment and modify them during the course of a home-based obesity intervention.

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Declaration of Conflicting Interests

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The goal of this study was to characterize the home food and activity environments of overweight and obese preschool-aged children from low socioeconomic status Latino families. Additionally, differences in available key foods and activity devices at the beginning of treatment were compared with end of treatment changes to assess program impact on the home health environment. Characterization of the home food and activity environment for treatment seeking families was considered exploratory. Based on prior studies, participants who completed the program were hypothesized to show increased availability of fruits and vegetables at posttreatment compared with baseline.[3,4] In addition, preschool participants who showed a decreased body mass index (BMI) trajectory at posttreatment compared with baseline were hypothesized to have a higher availability of fruits and vegetables and devices that promote physical activity compared with participants who showed smaller change or no change in zBMI.[4–6]

Methods

Participants

Children between 2 and 6 years old receiving care at a Denver Heath Community Health Service who are overweight (BMI >85th percentile for age) or obese (BMI >95th percentile for age) were contacted by telephone by a research assistant and invited to participate in this home-based childhood obesity program.

Study Description

The Center for Research in Implementation Science and Prevention Community Outreach Obesity Prevention Trial (CO-OPT) was a 3-year project aimed to assist and educate families with an overweight or obese preschooler in achieving healthy behaviors through evidence-based, patient navigator home visits. This novel childhood obesity education program was delivered by bilingual and bicultural patient navigators at the participants' home and consisted of a 16-session curriculum of structured lessons around nutrition, exercise, behavior, and parenting style. The curriculum was tested and adapted from the Kaiser Permanente Family Connections program by experts in childhood obesity prevention programs. As part of the curriculum, a home health assessment survey was conducted at sessions 5 and 15 to assess for the presence of fruits and vegetables and physical activity devices around the house. This study was approved by an institutional review board.

Assessments

Demographic Questionnaire—Participants self reported age, gender, years of education, and race/ethnicity. Height and weight were measured during the first home visit using a portable stadiometer (Charder HM200P) and digital scale (LifeSourceTM UC-321 Precision Scale). Measurements were taken in triplicate and averaged to calculate zBMI, based on Centers for Disease Control and Prevention growth charts standardized across sex and age.[7]

Home Health Assessment—The home health assessment (HHA) survey consists of 34 items about the presence and availability of fruits and vegetables in the house (fresh, frozen, or canned). The HHA also includes 11 items about the availability of physical activity

devices around the house and the presence of electronic media devices in the child's bedroom (TV, video games, computers). Prior psychometric validation of this instrument has been reported with families of preschool children.[3]

Procedures—Patient navigators completed an evaluation of the home environment by completing the HHA. The parent was also asked to complete the HHA survey on her own and the results of parent's and the patient navigator's surveys were compared and discrepancies were discussed. Data presented for this study only used the surveys collected by the patient navigators.

Data Analysis—Descriptive statistics were calculated for sample characteristics. Changes in the home food and activity environment were tested using dependent *t* tests.

Results

Sample

A total of 58 children completed the intervention. The average parent age was 33 years with 89.7% reported being white Hispanic, 6.9% white non-Hispanic, and 3.4% African American. The average number of years of education was 10.3 years. Children (44% female) were on average 4.6 (±1.3) years old.

Home Food Environment

Families at baseline were observed to have about 6 fruits and nearly 8 vegetables, on average, which remained statistically similar to postintervention ($P > .05$) (Table 1).

Home Activity and Bedroom Media Environment

At baseline, families were observed to have about 5 physical activity devices at home and at least 1 electronic device in the child's bedroom, on average (Table 1). Specifically, 69% of the sample had an observed TV in the child's bedroom. There was no significant change from baseline to posttreatment ($P > .05$).

Change in Home Environment by changes in zBMI

There were no significant associations between home environment subscales and child zBMI for the entire sample ($P > .05$). Two groups of responders were created in which "Strong Responders" (n = 30) were defined as having a reduction in zBMI greater than or equal to 0.1 zBMI units, while "Weak Responders" showed less than 0.1 reduction in zBMI from baseline to postintervention (n = 25). Among Weak Responders, a significant increase in fruit availability was observed, $t(24) = -2.2$, $P < .05$. There were no other significant changes in measured home food and activity environment subscales for either group (Table 2).

Discussion

This study showed that despite a small, but significant reduction in preschool zBMI for a subsample, families showed little change in the home food and activity environment. The

home food and activity environment has rarely been studied with treatment seeking families from diverse backgrounds. This study adds to the literature by showing the potential challenges in making environmental changes related to healthy weight outcomes. While no significant increase in fruits and vegetables was observed in the home environment for the overall sample, subgroup post hoc analysis surprisingly showed greater fruit availability in the weak responder group, suggesting that increasing the availability of fruits may still require other changes in the home environment to affect weight outcomes. The data also showed, however, that strong treatment responders maintained their availability of fruits and vegetables, which may be important given other similar reported data showed lower baseline levels of fruits and vegetables compared with our sample or even reductions following treatment.[3,6]

Changing the home food and activity environment of low socioeconomic status families from minority backgrounds may involve additional considerations to facilitate improved environmental outcomes. For example, families from low-resource backgrounds may have greater difficulty purchasing fruits and vegetables on a frequent basis, making constant availability less achievable. In addition, recommendations to remove media from children's bedrooms may actually present more perceived problems to parents who use such devices to help support child behavior management or bedtime routines, an important risk factor known to exist for minority families.[8]

Practical clinical implications are identified for treatment seeking families of overweight and obese preschoolers. The importance of increasing or at least maintaining the availability of fruits and vegetables in the home should be emphasized. Additionally, given the high availability of televisions in children's bedrooms, recommendations to remove the TV should first consider the parental beliefs on the perceived *benefits* of the TV to balance against the known negative effects of having a TV in the sleep environment.[8]

The present findings include the following limitations. Our home environment survey may not have captured fruits and vegetables for families with diversity. Although we included fresh, frozen, and canned varieties, there may have been culturally unique foods not captured. In addition, patient navigators emphasized the importance of eliminating unhealthy foods from the home environment. However, the availability of sugar-sweetened beverages and high-fat and high-calorie foods was not measured, which may have affected changes in *z*BMI outcomes. Future home intervention studies should continue to assess the availability of fruits and vegetables given the evidence linked to consumption of these foods and weight status and consider including assessment of less healthy foods and drinks[3,4,9] to provide a more complete picture of the home food environment.

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Table 1

Baseline and Postintervention Mean Scores (SD) for Home Health Assessment Subscales (n = 58).

Home Health Assessment	Baseline	Postintervention
Fruit availability	6.24 (3.20)	7.02 (2.92)
Vegetable availability	7.98 (2.45)	8.36 (2.45)
Media in child's bedroom	1.21 (0.92)	1.11 (0.88)
TV in child's bedroom	69.0% (40/58)	66.1% (37/56)
Physical activity devices	5.09 (2.10)	5.17 (1.99)

Table 2

Comparison of Treatment Responders Among Home Health Assessment Subscales.

	Weaker Responder	Stronger Responder
Baseline		
Child zBMI	1.7 (1.0)	2.2 (0.9)
Home Health Assessment		
Fruit availability	5.6 (3.2)*	6.7 (3.2)
Vegetable availability	8.0 (2.4)	8.0 (2.6)
Physical activity devices	5.3 (1.9)	5.1 (2.2)
Postintervention		
Child zBMI	1.9 (1.0)	1.9 (1.0)
Home Health Assessment		
Fruit availability	7.0 (2.4)*	6.8 (3.1)
Vegetable availability	8.4 (2.6)	8.4 (2.3)
Physical activity devices	5.5 (1.8)	5.2 (2.0)

* $P < .05$ (statistically significant).