Patient Education and Counseling xxx (2015) xxx–xxx

Contents lists available at ScienceDirect

Patient Education and Counseling

journal homepage: www.elsevier.com/locate/pateducou

Engaging children in the development of obesity interventions: Exploring outcomes that matter most among obesity positive outliers

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ARTICLE INFO

Article history:
Received 10 November 2014
Received in revised form 26 May 2015
Accepted 15 June 2015

Keywords:
Obesity
Overweight
Positive deviance
Children
Attitude to health
Qualitative

ABSTRACT

Objective: To explore outcomes and measures of success that matter most to 'positive outlier' children who improved their body mass index (BMI) despite living in obesogenic neighborhoods.
Methods: We collected residential address and longitudinal height/weight data from electronic health records of 22,657 children ages 6–12 years in Massachusetts. We defined obesity "hotspots" as zip codes where >15% of children had a BMI ≥95th percentile. Using linear mixed effects models, we generated a BMI *z*-score slope for each child with a history of obesity. We recruited 10–12 year-olds with negative slopes living in hotspots for focus groups. We analyzed group transcripts and discussed emerging themes in iterative meetings using an immersion/crystallization approach.
Results: We reached thematic saturation after 4 focus groups with 21 children. Children identified bullying and negative peer comparisons related to physical appearance, clothing size, and athletic ability as motivating them to achieve a healthier weight, and they measured success as improvement in these domains. Positive relationships with friends and family facilitated both behavior change initiation and maintenance.
Conclusions: The perspectives of positive outlier children can provide insight into children's motivations leading to successful obesity management.
Practice implications: Child/family engagement should guide the development of patient-centered obesity interventions.

1. Introduction

Despite a recent leveling off in the rapidly increasing rate of childhood obesity, the high prevalence of children with obesity remains a major public health issue with alarming socioeconomic, racial, and geographic disparities [1]. Promising approaches to address childhood obesity and associated health disparities exist, such as multi-sector strategies that support change at the individual, family, and community levels [2,3], yet their effectiveness is often limited by the complex social and environmental factors that modify and mediate obesity-related behaviors.

The "positive deviance" or "positive outlier" theoretical approach offers avenues for identifying solutions to public health problems that are highly adaptive to social–environmental context because the strategies emerge from within the context of interest [4]. This strategy seeks to identify individuals who perform better than the majority of their peers on some outcome of interest and applies qualitative exploration to identify the potential mechanisms underlying their success. While prior investigators have studied successful individuals with respect to obesity [5,6], most studies have taken a quantitative approach to test the predictors of success; yet, it is precisely these *a priori* assumptions that must be limited in a positive outlier theoretical approach in order to identify unique and novel strategies [7]. We have previously suggested that the positive outlier approach may advance progress in childhood obesity by identifying and learning from successful children and families within obesogenic socio-environmental contexts [8]. We have also applied the approach to examine the perceptions and strategies of parents of positive outlier children who have improved their weight status despite living in neighborhoods with high obesity prevalence [9].

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http://dx.doi.org/10.1016/j.pec.2015.06.007
0738-3991/

Qualitative methods, particularly focus groups, can be an effective tool for exploratory research among children, with some researchers even finding valuable information from children as young as 4–6 years old [10]. While methodological challenges and ethical considerations must be taken into account when working with children, it is important to acknowledge and include children's voices when evaluating and addressing the health issues that affect them.

In this study, we sought to explore the perspectives of the positive outlier children themselves. Specifically, we examined the factors that motivated change and the outcomes that mattered most to these successful children. Such patient-centered insight into successful childhood obesity management can be used by health care systems and communities to address childhood obesity in a language and manner that is relevant and accessible to children with obesity and their families.

2. Methods

2.1. Sampling

We recruited focus group participants from among children seen for well-child care at the 14 practices of Harvard Vanguard Medical Associates (HVMA), a multi-specialty group practice in eastern Massachusetts. Using up to 5 years of longitudinal height and weight data from the electronic health records of 22,443 Massachusetts children ages 6 to 12 years-old in February 2013, we used linear mixed effects models and a purposive sampling approach [11] to identify 521 positive outlier children with a negative BMI *z*-score slope living in obesity hotspots (i.e., zip codes with >15% prevalence of childhood obesity), as previously described in greater detail [9]. We excluded children with medical problems affecting growth or nutrition documented in their electronic health record problem list or billing record. We calculated BMI as kg/m^2 and used participants' age- and sex-specific BMI percentiles and *z*-scores [12]. We defined obesity as a BMI percentile ≥95th percentile.

We further limited the recruitment sample to children who were 10–12 years-old at the time of study recruitment in February 2014 (n = 193) and had maintained a negative BMI *z*-score slope through October 2013 (n = 174). The study was limited to this age group of children rather than younger children or adolescents, who are distinct in their levels of autonomy over their behaviors and environments.

Among this sample, 12 children's parents had participated in parent focus groups the prior year and had agreed to be contacted, and two had previously indicated interest in attending parent focus groups but had been unable to attend. The Institutional Review Boards of Partners Health Care approved the study protocol.

2.2. Recruitment and enrollment

Study staff sent out recruitment letters to the children's parents explaining the study and providing an opt-out phone number. Two families called the study hotline to opt out. We ranked the remaining 172 children in our recruitment sample by BMI *z*-score slope. Children with the most negative slopes and parents who participated in previous focus groups were contacted for recruitment first. One week after the letters were mailed, study staff began to contact parents by phone to explain the study, confirm their child's eligibility, conduct a brief demographic survey, answer questions about the study, and schedule children for focus groups. Staff recruited 6–10 participants for each focus group and discontinued calls upon thematic saturation. Ultimately, all 172 parents were called, 36 participants were recruited, and 21 children attended four focus groups.

2.3. Qualitative protocol

Our study team of pediatricians, health services and public health researchers, and an anthropologist developed a focus group discussion guide (Table 1) through an iterative process. The guide was informed by a review of prior studies exploring child perspectives related to obesity as well as literature describing methodological considerations unique to child focus groups with respect to both structure and content. In particular, we used drawings and activities [13], included breaks [14], minimized age variation within groups, and limited the total time of each group to 90 min [15]. The guide was designed using an adaptation of Sorenson's social contextual model [16] to help identify context and mediating mechanisms around improvement of BMI. Core questions were supplemented with spontaneous follow-up questions during the groups to provide a more robust exploration of relevant topics. We completed four 1.5-h focus groups at three HVMA locations selected for accessibility to obesity hot spot neighborhoods (Fig. 1). We provided participants and their accompanying parents with a light meal and one $50 gift card per participating child as an incentive for participation.

The groups were moderated by the project team anthropologist (R.G.), and started with an exploration of rules and limits in the children's homes around obesity-related behaviors (e.g., sugar-sweetened beverage consumption, screen time, and sleep) and then moved to three activities. In the first activity, children were asked to discuss and compare their projections of the experiences and perceptions of two fictional groups of children in an illustration labeled groups J and K (Fig. 2). The images represented different races/ethnicities and genders and the pictures in groups J and K were identical in all ways except weight status. The J image portrayed children with a healthy BMI while the K image portrayed children with obesity. In the second activity, children were given an illustration with 4 quadrants representing family, the doctor's office, schools, and neighborhoods, and they were asked to place stickers on the domains they thought could help children get to healthier weights; each child received 10 stickers and was instructed that placing more stickers on a domain would mean it was more important. The moderator used the activity to drive discussion around ways in which each domain could serve as a facilitator or barrier to healthful behavior change. In the final activity, we investigated how the children would measure success getting to a healthier weight. The children verbally created a list of successful outcomes and these were recorded by the moderator on a flip chart. Then the children were asked to vote on which outcomes were most important, again using stickers, and then discuss their choices. Both voting exercises were designed to stimulate rich, comparative discussion of key topics rather than to provide quantitative value, although we did record voting outcomes.

2.4. Piloting

We conducted a pilot focus group with a convenience sample of seven children ages 7–11 years in order to test the feasibility of our planned activities and the age appropriateness of the focus group guide. Based on observations from this pilot focus group, we discovered that the comments and discussion points from the 10 and 11 year-olds were clear, focused, and insightful compared to those of the 7 to 9 year-olds. Children in the younger group had more difficulty staying focused and expressing their thoughts clearly. During the pilot, we produced large poster size illustrations for the activities and presented them to the whole group. We found

Please cite this article in press as: Sharifi M, et al. Engaging children in the development of obesity interventions: Exploring outcomes that matter most among obesity positive outliers. Patient Educ Couns (2015), http://dx.doi.org/10.1016/j.pec.2015.06.007