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Research report

Preliminary validation of the Parent Mealtime Action Scale and its association with food intake in children from São Paulo, Brazil

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ABSTRACT

The present study aimed to translate the Parent Mealtime Action Scale (PMAS) into Portuguese and to evaluate the factorial structure and the psychometric characteristics of this version. Further, we investigated the associations between parent mealtime actions and the intake of fruits, vegetables and energy-dense foods in 6–10 years-old children from São Paulo city, Brazil, controlling for potential confounding variables. A total of 582 parents (86% mothers) answered questions regarding their mealtime actions, their children's food intake, the characteristics of the family meals and their socioeconomic conditions. Factorial analyses grouped all of the 31 questions in the same factors as the original scale, except one item that was transferred to another dimension. Internal reliability and reproducibility analyses obtained satisfactory results. Children who ate fruits and vegetables more frequently had parents who often ate these foods and made them available; these parents also seldom offered their children special meals. Children who more often consumed energy-dense foods had parents who frequently ate this type of food and rarely set limits on its intake. The Portuguese version of the PMAS may be a good tool for evaluating the influence of parent mealtime actions on Brazilian children's food intake.

Introduction

The consumption of a diet that is rich in fruits and vegetables (FV) is strongly recommended because such a diet provides health benefits (World Health Organization, 2002). In contrast, the frequent intake of industrialized, energy-dense (Berenson, Srinivasan, & Nicklas, 1998) and *trans* fatty-acid rich foods (Mozaffarian, Aro, & Willett, 2009) is known to be a risk factor for obesity and associated diseases. An emphasis should be placed on promoting healthy eating habits in children and adolescents because their eating behavior and food choices appear to continue through the adulthood (Kelder, Perry, Klepp, & Lytle, 1994; Mikkila, Rasanen, Raitakari, Pietinen, & Viikari, 2004). As observed in other countries (Glynn, Emmett, & Rogers, 2005; Kristjansdottir et al., 2006), children living in the urban centers of Brazil have an insufficient intake of FV and an excessive intake of high-fat, high-sugar and high-salt foods (Assis et al., 2010; Mondini et al., 2007).

Family meals appear to be important for promoting a better food intake; however, there are discrepancies among the results of various studies (Chermont Prochnik Estima, da Costa, Sichieri, Pereira, & da Veiga, 2009; Fulkerson, Neumark-Sztainer, Hannan, & Story, 2008; Gillman et al., 2000; Sen, 2006), which indicates a complex relationship between family meals and food intake. There are many factors during a family meal that can influence the child's food intake and, consequently, his/her body weight, including the parents' own eating behaviors, the strategies utilized by the parents to encourage or discourage certain foods, the food options that the parents make available at home and whether the parents allow television (TV) viewing during mealtime. Several studies show that the availability of food and the parents' model of food consumption are positively associated with children's FV intake (Jones, Steer, Rogers, & Emmett, 2010; Pearson, Biddle, & Gorely, 2008; Tibbs et al., 2001). In addition, children's tastes are also relevant to the amount of FV in their diets (Baxter & Thompson, 2002; Kristjansdottir et al., 2006). In this case, parents also play an important role because they can promote a repeated exposure to foods from a varied diet to allow children to develop their own taste (Sullivan & Birch, 1994).

It is unclear whether other strategies used to promote FV consumption by children result in a healthier diet. Pressuring children to eat has been associated with aversion (Batsell, Brown, Ansfield, & Paschall, 2002) and reduced intake (Galloway, Fiorito, Francis, & Birch, 2006) of these foods. Using foods as reward for eating FV did not result in an increase in acceptance of the goal-food (Newman & Taylor, 1992); however, the use of tokens increased the preference

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for and the intake of vegetables in American children (Hendy, Williams, & Camise, 2005). In studies with picky eaters, it was observed that if the parents are permissive and offer to the children a special meal that is different from the family's meal or give them too many food choices, the parents contribute to a lack of variety in their children's diet (Hendy, Williams, Riegel, & Paul, 2010; Timimi, Douglas, & Tsiftsopoulou, 1997).

Parents are also responsible for an increased consumption of energy-dense foods, such as chips, soft drinks and cookies, if they eat and make those foods available (Lee & Birch, 2002; Longbottom, Wrieden, & Pine, 2002). Because children naturally prefer foods that are rich in fat, salt or sugar, parental intervention is necessary (Klesges, Stein, Eck, Isbell, & Klesges, 1991). However, imposing a restriction to limit the consumption of unhealthy foods may not be effective and may even produce adverse effects, depending on the control method used (Ogden, Reynolds, & Smith, 2006). According to Fisher and Birch (1999), a snack restriction imposed by parents may actually increase the children's desire and cause the children to eat more "forbidden foods" in the absence of hunger. An alternative approach to control the excessive ingestion of certain foods would be to use more flexible limits in place of severe restriction, as observed by Ogden et al. (2006).

It is important to evaluate parent's mealtime actions and identify those that are positively or negatively associated with children's food consumption to develop effective strategies to prevent and control overweight in children. The Parent Mealtime Action Scale (PMAS) is a recently developed tool that was validated using American parents (Hendy, Williams, Camise, Eckman, & Hedemann, 2009). In contrast to other questionnaires that evaluate perceptions, concerns, attitudes and parenting styles (Birch et al., 2001; Wardle, Guthrie, Sanderson, & Rapoport, 2001), this scale is used to identify the actions most frequently used by parents during mealtime. In Brazil, there is not a validated questionnaire that evaluates parent's feeding behaviors. Therefore, this work sought to translate the PMAS into Portuguese and evaluate its factorial structure and psychometric characteristics in a large sample of parents from São Paulo city, Brazil. Furthermore, we investigated the association between parents' mealtime actions and children's intake of FV and energy-dense foods, controlling for potential confounding variables.

Methods

Subjects and procedure

Parents or official caregivers of 6–10 years-old children who were regularly registered in seven schools located in São Paulo city, Brazil were invited to participate in this study. After obtaining their agreement and signature of written consent, data collection was initiated. If families had two or more children from the age groups defined, the parents were instructed to answer the questionnaire for only one child. Children were excluded from the study if they had two or fewer main meals (lunch or dinner) per week with their family, if they had any chronic diseases that might compromise food intake and/or nutritional status and if their questionnaires were incomplete. All of the answers were entered in duplicate in a separate database, and any differences found were corrected.

Socioeconomic status and characteristics of family meals

The volunteers answered a structured questionnaire containing questions pertaining to the following topics: children's sex and age, parents' educational levels, family monthly income and the number of family members, frequency of main meals (lunch and dinner) spent with at least one of the parents or official caregivers in a typical week, presence of a TV during the family meals and the location where lunch and dinner were consumed. Parents were asked to inform their educational level, according to the following categories: elementary school (adding up to 5 years of education); middle school (9 years) high school (12 years); and college (16 years of education on average), as well as the family monthly income in Brazilian minimum wages (BMW) (1 BMW corresponds to approximately US $270.00) and the number of people in the family so that we determined the per capita monthly income.

Parent mealtime actions

Parent mealtime actions were determined by the Portuguese version of the PMAS, a scale that evaluates how often (1 = never, 2 = sometimes, 3 = always) parents perform different behaviors. PMAS is composed of 31 items grouped into nine dimensions: *Daily FV availability* (FVA), *Positive Persuasion* (PP), *Snack Limits* (SLs), *Use of Reward* (UR), *Insistence on Eating* (IE), *Snack Modeling* (SM), *Special Meal* (SpM), *Fat Reduction* (FR) and *Many Food Choices* (MFC). All of the scale's questions are presented in Table 2. The frequency of each action is obtained by averaging all of the answers in that dimension. Therefore, the higher the value obtained, the more frequently that action is performed by the mother/father.

Authorization for translating and validating the scale was obtained from Helen M. Hendy. The original PMAS was translated into Portuguese by three Brazilian nutritionists who were fluent in English to produce a version that was then translated back into English by two separate Brazilian nutritionists who were also fluent in English. The obtained version was accepted by the author of the scale.

To assess the reproducibility, 20% of the parents were randomly chosen to answer the questionnaire a second time 2 weeks later. To assess the convergent validity, 20% of the participating families were randomly selected, and the other parent living with the family was asked to answer the questions according to how they believed their partner answered the questionnaire previously.

Food intake

Parents reported children's food intake by answering a questionnaire applied in surveys in Brazilian children and adolescents (Castro, Cardoso, Engstrom, Levy, & Monteiro, 2008; Mondini et al., 2007). They were asked to inform the number of times in a typical day and in a typical week that their children eat the following 13 food items: fruits, fresh fruit juices (100% fruit), salad (raw vegetables), cooked vegetables (except potato), beans, milk, soft drinks, sweets and candies, chocolate bars and cookies, French fries, hamburgers and hot dogs, cafeteria snacks (e.g., croissants), and chips. The total frequency of consumption of each food item in a week was obtained multiplying the number of times per day by the number of times per week. The six first food items of this questionnaire were chosen as indicators of a healthy diet and the last seven as indicators of an unhealthy diet. The choice for these foods was based on current nutritional recommendations for preventing non-communicable chronic diseases which consider energy density and amounts of saturated and trans fat, salt, sugar, fiber and micronutrients (World Health Organization, 2003).

For reproducibility analysis, 20% of the parents were randomly chosen to answer the questions a second time 2 weeks after their initial participation. To analyze the association between parent mealtime actions and food intake, only the data pertaining to the foods presented in the PMAS were used, i.e., fruits (determined by fruit and fruit juice), vegetables (determined by salad and vegetables), sweet snacks (determined by the sum of all sweet foods analyzed), soft drinks and chips.