



Research report

The influence of parents' dietary beliefs and behaviours on children's dietary beliefs and behaviours. The CYKIDS study

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ABSTRACT

We investigated the association between parental dietary beliefs and behaviours (DBB) and those of their children behaviours. Data were derived from a national cross-sectional study using multistage sampling design, among 1140 children (9–13 years). Principal component analysis was employed to extract the main factors out of eight variables assessing children's dietary beliefs and behaviours ($N = 991$); those eight factors were then regressed, on 16 dependent variables, describing different parental dietary beliefs and behaviours, adjusted for potential confounders. Three factors emerged as important in explaining the variance in children's dietary beliefs and behaviours: "guilty about eating" (factor 1), "concerned about own body weight" (factor 2) and "eating all my food" (factor 3). Children with types 1–3 behaviour: were 30% more likely to have parents who did not control what and how much their child ate, have parents who are 40% more likely to think that their child is overweight/obese and seem to have more availability of high fat foods, respectively. Breastfeeding was associated with the acquisition of positive dietary beliefs and behaviours by children, independently of child's age, gender, place of residence, socio-economic status, diet quality, and child's and parents' obesity status. We propose that parents are likely to exert their influence in shaping eating habits and subsequently obesity development in their children, by influencing their children's dietary beliefs and behaviours.

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Introduction

Family environment and especially parents, exert important influences on the development and shaping of young children's eating habits and weight status (Clark, Goyder, Bissell, Blank, & Peters, 2007; Davison & Birch, 2001; Patrick & Nicklas, 2005). Understanding the possible mechanisms by which these influences are mediated, may give useful insights into how children's food preferences are acquired and for planning of successful public health programs related to the promotion of good dietary habits, obesity prevention and intervention among children.

Possible mechanisms that have been proposed via which parents may exert their influence on shaping their children's dietary habits are modelling, child-feeding practices such as restriction or restraint and the general parenting style (Davison & Birch, 2001; Lederman et al., 2004; Savage, Fisher, & Birch, 2007). In addition, another potential pathway by which parents may exert their influence on their children's dietary patterns, which has not

been investigated, is by influencing their children's dietary beliefs and behaviours (DBB), i.e. commonly held beliefs and behaviours regarding diet, nutrition and body image.

The impact that parents might have on their children's DBB, is important since cognitive schemas are developed during childhood and social psychology places high importance to the role of cognitive schemas and ideas for the development and shaping of children's dietary preferences and habits (Loewen & Pliner, 1999), which ultimately may influence their weight status and other markers of well-being. Thus, it would be of interest to investigate this aspect of parental influence on the shaping of their children's DBB.

Subjects and methods

Study population

The study was nation-wide and covered all the freely accessed districts of the Republic of Cyprus. A total of 1589 children of 4th, 5th and 6th grade (9–13 years, $x = 11 \pm 0.98$) in 24 primary schools were randomly identified for potential inclusion; 1140 agreed to participate (72% participation rate), representing 3.7% of the total population.

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Sampling was multistage and stratified by the number of students in each of the five provinces, as provided by the Ministry of Education (data not published, printed data available on request from the Department of Primary Education) and by place of residence (place of school was used as a proxy), urban or rural, as provided by the Cyprus Statistical Service (Department of Statistics and Research, Ministry of Finance, 2000). The research and all the means used were approved by the Ministry of Education and Culture.

Informed consent was signed by the parent or the guardian of each participant.

Socio-demographic variables

Questions regarding socio-demographic characteristics such as age, gender, place of residence and size of family, were included in a section of the food frequency questionnaire (FFQ) filled out by the children. Characteristics however, which could be not answered with sufficient reliability by children, such as parents' educational level, income, and profession, were collected via the short questionnaire that was filled out by the parents. Socioeconomic status was estimated from parents' educational level and type of occupation.

Anthropometry and obesity definition

Children's height and weight were reported by parents. Obesity and overweight among children were calculated using the International Obesity Task Force (IOTF) age and sex-specific body mass index (BMI) cut-off criteria (Cole, Bellizzi, Flegal, & Dietz, 2000). Parents' obesity and overweight percentages were also estimated from self-reported values of body weight and height. BMI measures were used to define adult (parents) obesity ($BMI \geq 30 \text{ kg/m}^2$) and adult overweight ($BMI 25\text{--}29.9 \text{ kg/m}^2$).

Although BMI calculated from reported values may be underestimated (Andersen et al., 2005; Boutelle, Fulkerson, Neumark-Sztainer, & Story, 2004; Jackson, Strauss, Lee, & Hunter, 1990; Jansen, van de Looij-Jansen, Ferreira, de Wilde, & Brug, 2006), this practice has been used with satisfactory results by many researchers in previous studies, both for estimating children's BMI from parental reference (Goodman, Hinden, & Khandelwal, 2000; Sekine, Yamagami, Hamanishi, & Kagamimori, 2002) and for estimating adults' BMI and obesity status from self-reference (Bolton-Smith, Woodward, Tunstall-Pedoe, & Morrison, 2000).

Assessment of diet quality

We applied the KIDMED index (Mediterranean Diet Quality Index for children and adolescents), to evaluate the quality of

children's diet. KIDMED index is the only index that has specifically been developed for children in Mediterranean countries (Serra-Majem et al., 2004; Serra-Majem, Ribas, García, Pérez-Rodrigo, & Aranceta, 2003). It has been validated against diet quality as assessed by nutrient adequacy, in a sample of children from Spain of the same age-span as ours (Serra-Majem et al., 2003). Same as Cyprus, Spain is also a Mediterranean country with similar food culture. The index (Serra-Majem et al., 2004) includes 16 components, which are based on and summarize the principles of the Mediterranean diet by an arithmetic score, which ranges from 0 to 12. According to authors, a score of 0–3 reflects a poor diet in relation to the Mediterranean diet principles, whereas values 4–7 and 8–12 represent average and good adherence to the principles of the Mediterranean diet, respectively.

Dietary beliefs and behaviours assessment

A specific section, aiming at evaluating children's dietary beliefs (such as body image and quality of diet-self-perception) and dietary behaviours (such as dieting) was attached to the semi-quantitative food frequency questionnaire, consisting of 154 foods, which was used for the dietary assessment of the sample. The eight questions used to evaluate children's dietary beliefs and behaviours are presented in Table 1. Response categories, for these questions were "none", "some", "much" and "very much".

The questionnaire was administered to whole class, during school hours, from February 2005 until June of the same year, by the same person, according to a written protocol, by which it was ensured that circumstances (such as type of explanations for each question, wording for each explanation, etc.) were held constant for all participants.

Parental DBB were assessed via the short questionnaire, which was attached to the consent form and which also included questions regarding socio-demographic characteristics. Questions included cooking habits, breastfeeding, control over their children's diet and dietary behaviour and dietary practices and beliefs regarding their children (Tables 3–6).

Statistical analysis

Continuous variables are presented as mean \pm S.D., whereas categorical variables are presented as absolute and relative frequencies. Normality of distribution was tested by Kolmogorov–Smirnov test. Associations between normally distributed variables were tested by Student's *t*-test, whereas Mann–Whitney *U*-test was used for non-normally distributed continuous variables. Associations between categorical variables were tested by contingency tables and Chi-square test without Yate's continuity in 2×2 tables.

Table 1
Factor-loading matrix and eigen vectors for the three identified factors of dietary beliefs/behaviours of the sample

	Identified factors of dietary beliefs/behaviours		
	Guilty about eating	Concerned about body weight	Eating all my food
Degree which I feel guilty when I eat something which I know is fattening	0.848		
Degree which I feel guilty when I eat something which I know is not healthy	0.825		
Degree which I think that my diet is healthy	0.207	–0.665	0.120
Degree which I think that my weight is above normal	0.420	0.647	
Degree which I have tried to be on a diet	0.420	0.575	
Degree which I eat things which I know are fattening		0.553	0.400
Degree which I eat something I like even not hungry			0.785
Degree which my parents insist eating all my food			0.741
Eigen values	2.038	1.390	1.225
Total variance explained	22.572	18.785	16.808

Extraction method: principal component analysis; rotation method: varimax with Kaiser normalization. Absolute values ≤ 0.10 are omitted. Bartlett's test of sphericity Chi-square = 917,805; d.f. = 28, $p < 0.0001$. Kaiser–Meyer–Olkin measure of sampling adequacy = 0.607.

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