

Dieting in children: a population-based study in children aged between 9 and 12 years

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Abstract

Aim: Dieting can be a burden for the child and can have side effects. Insight into dieting is therefore important. A recent study showed that 13.7% (95% CI 11.5–15.9%) of the children referred to a general paediatric outpatient clinic were or had been on a diet. However, it is unknown how many children in a random population are or have been on a diet.

Methods: Parents of children in the fifth grade of primary schools in the Dutch province of Friesland were asked to complete a structured questionnaire.

Results: From 2500 questionnaires 90% were returned. Two hundred and thirty-one children aged between 9 and 12 years had been on a diet (10.3%, 95% CI 9.0%–11.6%). A cow's milk free diet was used most frequently (50% of the dieting children). Other diets were: diets excluding additives (16%), peanuts (16%), sugar (15%) and lactose (11%).

Conclusion: The use of diets by children in a general population is widespread: one in every ten children was or had been on a diet. Due to the known health risks associated with diets excluding one or more foods, such diets should only be advised by healthcare professionals.

INTRODUCTION

People on a diet (any change in food to affect physical or psychological condition) often attribute complaints to food. In general the media, overemphasizes the efficacy of diets. Dieting can be a burden for the child and the family and may cause medical, psychological and socio-economic side effects (1). Insight into the frequency, indications and implications of dieting in the paediatric age group is therefore required.

One study into children who had been referred to a general paediatric outpatient clinic revealed that 13.7% (95%CI 11.5–15.9%) of these children was or had been on a diet (2). This group had been referred by their general practitioner and is therefore likely to be less healthy than the general population. It is unknown how many children in a general population have ever been on a diet. The present study is designed to remedy this situation.

SUBJECTS AND METHODS

The Dutch healthcare system examines all schoolchildren on specific occasions. We asked parents or carers of children in the fifth grade (9–12 years) of primary schools in the Dutch province Friesland to complete a structured questionnaire. The data was collected in the period between January and June 2003. The parents returned the questionnaire when the children attended the health examination. The questionnaire collects data on the children's sex, age, age of the par-

ents, social class, method of feeding during the first year and diet prior and during the completion of the questionnaire. If a child was or had been on a diet, additional information was obtained regarding the reason, duration, characteristics and the person who had advised the diet. Data related to the success of the diet in reducing the symptoms for which the diet was started and any problems caused by the diet were also obtained. As part of the health examination experienced nurses measured the height and weight of each child and recorded them on an analogous scale. An average age was calculated for 10-, 11- and 12-year-old children separately. SDS length, SDS weight and SDS BMI were calculated from the individual data for weight and height, using the Dutch reference standard (3). The average SDS was used to compare different diet groups. A diet was defined as a 'change in the child's food for at least 2 weeks to influence physical or psychological conditions'. In some cases, more than one diet was used. In such cases, information was obtained on the diet that had the longest duration. When one or both of the parents/carers had attended university, social class was defined as 'higher'.

Normally distributed data was analysed using the Student's *t*-test, not normally distributed data was analysed using the Mann-Whitney test. To compare the SDS length, SDS weight and SDS BMI a One-way ANOVA was used. When appropriate, logistic regression analysis was performed; $p < 0.05$ was considered to be statistically significant. The study was submitted to and approved

by the Medical Ethics Committee of the Medical Centre Leeuwarden.

RESULTS

A total of 2500 questionnaires were issued. Of these 2253 (90%) were returned and analysed. The remaining 247 questionnaires were not returned (136) or were not appropriate for analysis (111) due to missing data. The children were aged between 9 and 12 years, 94% of the children were 10- or 11-year old and 51% were boys. According to the new cut-off values for overweight and obese children (3), 85% of the children had a normal weight, 13% of the children were overweight and 2% of the children were obese. A total of 231 children (10.3%) had been on a diet (95% CI 9.0%–11.6%). Eighty-four of the 231 children (36%) were still on a diet at the time of the study. Of the remainder, the reason for discontinuation was not asked.

Table S1 (in Supplementary material online) shows a comparison between the children who were or had been on a diet and those who had never been on a diet. Some differences between the two groups were statistically significant. Children from a higher social class were more likely to be or have been on a diet than children from a lower social class. Also children who were exclusively breast-fed in the first three months of life were more likely to have been on a diet compared with children who were exclusively bottle-fed. There were no statistically significant differences between dieting in boys or girls. Urban or rural living did not affect prevalence of dieting.

Table S2 (in Supplementary material online) shows the characteristics of the diets used. The most commonly observed diet is a cow's milk free diet (50%), which means a prevalence of cow's milk free diet of 5%. Other diets used were diets excluding the following: additives (16%), peanuts (16%), sugar (15%) and lactose (11%). The most frequently stated reasons for starting a diet were abdominal complaints (44%), skin disorders (39%), behavioural disorders (17%) or pulmonary problems (15%). The diet was advised by a paediatrician in 52 cases (23%) and by a general practitioner in 42 cases (19%). Alternative healthcare workers (not a medical doctor) advised a diet in 35 cases (15%) and a public health officer did so in 27 cases (12%). Dieticians advised the diet in only seven cases (3%). About 45% of the children with a diet consulted a paediatrician for the complaints leading to the diet. Most of the children started the diet before the age of three and used it for over a year.

In 152 children (65%), the diet was reported to be effective, while in 192 children (82%) no problems were reported as a consequence of the diet. Efficacy was defined as reduction in the complaints since starting the diet as judged by the parents. Problems reported included: the diet being too restrictive in eight children (3.5%) and having problems adhering to the diet in 11 children (4.8%). Parents reported the diet without sugar or additives to be effective in 70% of the cases. However, following this diet was more difficult than other diets (30% vs. 20%). In 60% of the cases the diet without sugar or additives had been followed for over a year.

Seventy four children (65%) with a cow's milk free diet started the diet in the first year of life. Of the 114 children who had started a cow's milk free diet, 25 children (22%) were still using the diet at the time of the study.

The average age of 10-, 11- and 12-year-old children were estimated as 10.71, 11.33 and 12.16 years, respectively. There were no statistically significant differences in average weight, height and BMI of the children who were and who were not on a diet. Table S3 (in Supplementary material online) shows the differences in average SDS weight, SDS height and SDS BMI among children who were on a diet. Children who were on a diet free of gluten are significantly heavier in statistical terms than controls. The weights and heights of children on other diets do not differ from those without a diet (Table S3).

DISCUSSION

Our study estimates the incidence of dieting in children in a normal population. It appears that 10.3% (95% CI 9.0%–11.6%) of the children was or had been on a diet. The strength of our study is that data was collected from a large group of schoolchildren in a random population which produced a high response rate (90%). The high response was due to the way in which we structured the study. The study questionnaire was added to the questionnaire that parents/carers are normally given before their visit to the general health practitioner. The distribution of social class of the parents and ethnic background of the children was comparable to that reported by Statistics Netherlands (data not shown). A potential weakness of our study is the possibility of recall bias. However, other studies such as O'Callaghan et al. show that maternal recall can be a surprisingly accurate source (4).

One in ten children aged between 9 and 12 years was or had been on a diet. We find this surprisingly high. This number was remarkably lower than the number of children who had been on an elimination diet and/or addition of a food-stuff in a survey in New Zealand (5).

The characteristics of the diets, the reasons for dieting and the person advising the diet used by the children in this study do not significantly differ from the same characteristics of the diets used by children referred to an outpatient paediatric clinic (2).

Breastfeeding was associated with increased incidence of dieting. Breastfeeding is also associated with social class. However, even after controlling for this, the difference was still statistically significant. We have no explanation for this.

The diet most often used was an avoidance of cow's milk. The prevalence of a cow's milk free diet in our study is 5%. The prevalence of a cow's milk allergy reported in literature is 2.8% (6). Cow's milk allergy/intolerance usually develops in the first year of life and by the age of three most children are able to tolerate milk (7). However, in this study 40 children (35%) started with a cow's milk free diet after their first birthday and 25 children (22%) were still using the diet at time of the study. Clearly, this is of concern.

In this study 69 children (3%) were or had been on a diet without sugar or additives. The most commonly stated

reason for being on this diet was behavioural problems, including Attention Deficit Hyperactivity Disorder (ADHD), in 57 cases (83%). Whether dieting has a favourable effect on the behaviour of children with ADHD is still under discussion. Bateman et al. observed a reduction of hyperactivity in 3-year-old children on a diet without artificial colourings or benzoate preservative. However, Eigenmann and Haenggeli believe that unnecessary diets should not be instituted for hyperactivity (8). In our study, parents reported the diet without sugar or additives to be effective in 70% of the cases. The positive effect of the diet is based on the parental opinions. This may also explain why this difficult diet was followed for so long.

In 39% of the cases the diet was advised by someone other than a medical doctor. Due to the potential impact of dieting on normal life, this suggests a worrying trend. The diets free from sugar and additives were more likely to be advised by someone other than a medical doctor. We also found that someone other than a medical doctor was more likely to advise more diets for which there was no evidence. We therefore believe that there is further scope for study of dietary advice.

Most diets were reported to be effective. However, we did not investigate whether the complaints were self-limiting or whether other therapies were used. According to parental reports, most diets presented no problems (80%). Elimination diets involve a risk of deficiencies (9). As in a study by Isolari et al. (9) we also found that elimination of cow's milk resulted in a decrease of mean length, although in our study the difference was not statistically significant.

We found that children on a gluten-free diet significantly heavier than children who were not on a diet at all. Damen et al. found that after the start of therapy for celiac disease, weight-for-height normalized within 3 months, overshot in the second half year of treatment, and returned to normal afterwards (10).

The use of diets by children in our study population was widespread: one child in every ten children was or had been on a diet. Surprisingly, the frequency of dieting in this 'normal' population does not significantly differ from the frequency of dieting in children referred to a paediatrician (2). Due to the health risks associated with diets excluding one or more foods (9), such diets should only be advised by health-care professionals.

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Supplementary material

The following supplementary material is available for this article:

Table S1 Comparison between the children who had been on a diet.

Table S2 Some characteristics of the diets used.

Table S3 Differences in average SDS and 95% Confidence Intervals for children who were on a diet compared with children who had never been on a diet at all (n = 2012). Number of subjects are given between brackets.

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