Seizure 25 (2015) 173–177

Contents lists available at ScienceDirect

Seizure

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

# Exploring the relationship between preferences for high fat foods and efficacy of the ketogenic and modified Atkins diets among children with seizure disorders

Adrianna Amari [a,b,*], Zahava Turner [c], James E. Rubenstein [c], Jonathan R. Miller [a,b], Eric H. Kossoff [c]

[a] Department of Behavioral Psychology, The Kennedy Krieger Institute, 707 North Broadway, Baltimore, MD 21205, USA
[b] Department of Psychiatry and Behavioral Sciences, The Johns Hopkins Medical Institutions, 600 North Wolfe Street, Baltimore, MD 21287, USA
[c] Departments of Neurology and Pediatrics, The John M Freeman Pediatric Epilepsy Center, The Johns Hopkins Medical Institutions, 200 North Wolfe Street, Baltimore, MD 21287, USA

ARTICLE INFO

*Article history:*
Received 23 June 2014
Received in revised form 27 October 2014
Accepted 3 November 2014

*Keywords:*
Ketogenic diet
Modified Atkins diet
Seizures
Children
Food preference

ABSTRACT

*Purpose:* Previous research has indicated that children with seizures may prefer high fat foods – a preference compatible with ketogenic and modified Atkins dietary therapies. The purpose of this prospective study was to examine the relationship between fat preference and efficacy of therapeutic diets in treating intractable seizures among a pediatric population.
*Methods:* Preference for high fat foods was directly assessed in a sample of 30 children prior to commencing either the ketogenic or modified Atkins diet. Seizure control was assessed at 1, 3, 6, and 12 months following diet initiation. Using an intent-to-treat analysis, correlations between fat preference and diet efficacy were examined at each follow-up and across the follow-up period.
*Results:* At individual follow-ups, correlations between fat preference and diet efficacy varied in terms of both strength and significance; however, modest, positive correlations with fat preference were significant when examining high levels of efficacy (100% seizure reduction, ≥90% seizure reduction) across a 1-year follow-up period.
*Conclusion:* These findings provide preliminary evidence that fat preference, when directly assessed, may be a useful predictor of treatment efficacy for the ketogenic and modified Atkins diets; however, further research is necessary.
© 2014 British Epilepsy Association. Published by Elsevier Ltd. All rights reserved.

## 1. Introduction

The ketogenic diet, a high fat and low carbohydrate regimen, is effective for the treatment of intractable epilepsy.[1] Research suggests that the modified Atkins diet is similarly effective.[2,3] Historically, the ketogenic diet is not always considered highly in the treatment option hierarchy, in part due to perceptions that children will find the high fat and low carbohydrate foods unpalatable. However, we found that children with seizures actually exhibit preferences for foods compatible with the ketogenic diet.[4] In our study, children with seizures exhibited higher preferences for high fat items and lower preferences for high carbohydrate items in comparison to children without seizures.[4] Children with seizures were observed to frequently choose items such as mayonnaise, butter, and cream cheese over high carbohydrate items such as candy and chips, often to the surprise of their parents.

Clinicians and researchers have proposed that the ketogenic and modified Atkins diets be considered earlier in the course of the treatment of epilepsy, rather than as a "last resort", and have advocated for research to identify variables that might predict the best responders to these diets.[5] Research into EEG prediction factors have led to mixed results.[6,7] Results from our previous study led us to question whether the extent of a child's fat preferences could also have predictive value.

Dekker et al.[8] examined the preferences of 43 children and did not identify a significant correlation between fat preferences and ketogenic diet efficacy. However, these researchers utilized a

* Corresponding author at: Department of Behavioral Psychology, The Kennedy Krieger Institute, 707 North Broadway, Baltimore, MD 21205, USA.
Tel.: +1 443 923 2824; fax: +1 443 923 2835.
*E-mail address:* Amari@kennedykrieger.org (A. Amari).

http://dx.doi.org/10.1016/j.seizure.2014.11.001
1059-1311/© 2014 British Epilepsy Association. Published by Elsevier Ltd. All rights reserved.

retrospective, non-validated questionnaire completed by the children's parents (at times recollecting up to 5 years in the past) in addition to review of a parent-report food log completed prior to diet commencement, measuring consumption and not preference specifically. Given the noted inaccuracy of parent report of child food preferences,[4,9,10] as well as other methodological limitations of a retrospective study, Dekker et al. stated that further research should be prospective and should utilize methods that more closely correlate with a forced-choice paradigm.

To further explore fat preference as a potential predictor of efficacy of dietary therapy, a systematic forced-choice food preference assessment procedure was conducted with children with seizures who were about to start the ketogenic or modified Atkins diets and their subsequent response to the diets was assessed for the year following initiation. Although the preference assessment included both fat and carbohydrates, only fat preference was of interest, as dietary treatment involves increased consumption of such foods. It was hypothesized that strong preferences for high fat foods would be positively correlated with diet efficacy.

## 2. Materials and methods

### 2.1. Study population

A group of 33 children and adolescents with a history of seizures and who were scheduled to begin either the ketogenic or modified Atkins diets were recruited from the outpatient Pediatric Epilepsy clinic at the Johns Hopkins Hospital in Baltimore, MD. Prior to diet implementation, the study neurologist (EK) described the assessment procedure to parents and verbal agreement was obtained. Study research assistants then scheduled an appointment to obtain informed consent and assent, answer additional questions, and then implement assessment procedures immediately before or after the neurology visit. For children starting the traditional ketogenic diet, the testing was done on the morning of the admission during a 24-h fasting period (and hence in those cases, the fast was broken slightly by the small amount of foods). Starting the diet without a fasting period has been shown to still maintain long-term diet effectiveness.[11] For those starting the modified Atkins diet, the testing was done immediately following the 1-h outpatient clinic visit. These children were then initiated on the modified Atkins diet as recommended several days later.

During recruitment, children with significant feeding problems (e.g., gastrostomy tube-fed or formula dependence), severe food allergies, adherence to special diets (e.g., vegetarian or kosher), or with prior use of the ketogenic or modified Atkins diets were excluded. After recruitment, one female child was disqualified from the study due to total noncompliance with study procedures; two others (one male and one female) did not participate secondary to family time constraints.

Of the 30 subjects who participated in the study, 15 started the ketogenic diet and 15 the modified Atkins diet. From the total group (15 males and 15 females), 12 were classified with partial and 18 with generalized epilepsy. Etiologies included: myoclonic-astatic epilepsy (Doose syndrome) – 9, childhood absence epilepsy – 5, temporal lobe epilepsy – 4, idiopathic partial – 3, myoclonic-absence epilepsy – 2, Sturge–Weber syndrome – 2, Dravet syndrome – 1, tuberous sclerosis complex – 1, nodular heterotopias – 1, encephalitis – 1, and juvenile myoclonic epilepsy – 1. The mean age for the total group at diet onset was 6.4 years (*SEM* = 0.65), and the mean seizure frequency at diet onset was 487 seizures per month (*SEM* = 16.4). There were no significant differences in seizure frequency at baseline between children in the ketogenic diet or modified Atkins diet subgroups.

Participants were recruited consecutively from among children who were being started on the ketogenic or modified Atkins diet at Johns Hopkins Hospital. This study was approved by the Kennedy Krieger Institute and Johns Hopkins Hospital Institutional Review Boards.

### 2.2. Food preference assessment procedure

In this prospective study, food preferences were directly evaluated via a paired choice assessment procedure as described by Fisher et al.,[12] with behavioral definitions as originally described by Pace et al.[13] This applied behavior analysis method was refined for use with populations of varying degrees of cognitive disability, and has demonstrated good validity and reliability.[12,14]

The same standard group of 14 food items from the original study[4] was utilized. These items had been reviewed by a licensed dietician and chosen on the basis of their nutritional composition (i.e., high fat/low carbohydrate content versus high carbohydrate/low fat content).[4] For both groups, attempts were made to represent both higher and lower intensity (e.g., bland) flavors, and to avoid brand-name and heavily advertised foods.[4] The seven high fat/low carbohydrate items consisted of butter, mayonnaise, American cheese, cream cheese, bacon, hot dogs, and bologna; the seven high carbohydrate/low fat items consisted of tortilla chip, candy corn, jelly bean, pretzel, potato, white bread, and noodles. They were presented in "sample-size" quantities (e.g., less than approximately one teaspoon or one bite) in 30 ml clear plastic cups. Foods that were required to be prepared according to the manufacturer's directions were served at the appropriate temperature.

Identical to our previous study,[4] the food preference assessment consisted of a single 15- to 30-min session of repeated presentations, such that every food item was randomly paired with every other food item. Items were presented simultaneously, and the child was asked to choose (either by tasting, fully consuming, pointing, or verbally stating) one item from each pair. Choices were noted on pen and paper datasheets. The percentage of trials in which the child exhibited a positive choice response for each item was calculated by dividing the number of trials in which the item was chosen by the number of trials in which it was presented. As in the prior study,[4] an aggregate score for each food group (fat or carbohydrate) for each child was then obtained by summing those percentages for all items in each category (fat or carbohydrate). The highest possible score for a food group was 539 (i.e., if each of the 7 items in one food group was chosen for all paired trials in which it was presented).

### 2.3. Assessment of treatment efficacy

Efficacy of dietary therapy was determined via parental report of seizure frequency. Neurologists obtained reports, either during clinic visits or via phone communication, immediately prior to treatment (baseline) and at 1, 3, 6, and 12 months following initiation. Diet duration and additional medication changes were also documented. Diet efficacy was evaluated in terms of reduction from baseline seizure frequency and was categorized as seizure free (100%), 90–99%, 50–89%, or <50% reduction.

### 2.4. Scoring and data analyses

All analyses were done with 'SPSS for Windows', version 20.0. Diet efficacy raw scores were divided into the following categories: 1 = seizure free, 2 = 90–99% reduction, 3 = 50–89% reduction, and 4 = <50% reduction in seizures. We used intent-to-treat analysis. If a child stopped the diet, we entered their current outcomes (and used 0% improvement if they were lost to follow-up).

Download English Version:

https://daneshyari.com/en/article/340542

Download Persian Version:

https://daneshyari.com/article/340542

Daneshyari.com