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A Case Control Study on Macro Nutrients Intake of Children with Autism Spectrum Disorder

Research Article

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Abstract

Background: Children with Autism Spectrum Disorder (ASD) have various eating abnormalities like restrictive eating habits, poor table behaviour, food refusal and food selectivity.

Objective: The present study relates to a survey of 24 hours diet recall and daily nutritional intake (total calories, protein) in ASD children against normal healthy children within the age group of 2-6 years of age.

Method: 40 diagnosed cases of ASD children were selected with similar sample size of normal healthy children free from any disease or disorder. Questionnaire was prepared, validated and then survey on 24 hours diet recall was conducted. The data was obtained from mothers of children in both groups after the signing of consent form.

Results: The analysis was conducted using SPSS 20.0. The result showed that ASD children were deficient in all categories of daily supply of nutrients as compared to controls. The mean standard deviation was done as a part of analysis. The data was further analysed using "t" test. The mean standard deviation of energy and proteins was calculated separately which showed deficiency in both domains. There was subsequent statistical difference found in nutrient intake between two groups at 5 % level of significance.

Conclusion: The survey conducted showed significant difference in the dietary intake of macronutrients among the ASD children.

Keywords: Autism Spectrum Disorder; Calories; Proteins; 24 hours diet recall.

Introduction

Nutrition is what we get from food we eat. It's that part of food that gives our bodies what they need to function- to live and move around, to think and breathe, play and work. Without nutrition we could not survive for very long [1].

The science of nutrition helps us to improve our food choices by identifying and amount of nutrition we need, the best source of those nutrients and the other components in foods that may be helpful or harmful [2]. Good nutrition is of paramount importance for both infants and children [3].

Optimum nutrition is important during childhood for three major reasons:

- It allows the child to grow and develop and reach its genetic potential for physical size and intelligence.
- Childhood offers an important opportunity to establish healthy eating patterns and food preferences. Diet habits learned during this period often become lifelong habits.

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 A poor quality diet can increase risk of chronic disease later in life [2].

Malnutrition includes both under and over nutrition. In developing countries under nutrition is a major public health problem. Under nutrition which is better understood than intelligence behavior or cognition is defined as a state wherein adequate nutrients are not delivered to the cells to provide the substrate for optimal functioning [4].

A diet survey provided information about dietary intake patterns of specific food consumed and estimated nutrients intakes. It indicates relative dietary inadequacies, which is helpful in planning health education activities. Diet history are the diet recalls, generally covering 24 hours. It can be easily elicited from most subjects. 3 days food records provided a reasonable way to obtain a qualitative estimate of nutrient intakes. Food record maintained by subjects for 1 to 7 days can be used to know the diet history.

In 24 hours diet recall method, a set of standardized cups suited to local conditions are used. Information on the total cooked amount of each preparations is noted in terms of standardized cups. The intake of each food items by specific individual in the family such as the pre school child, adolescent girl or pregnant or lactating woman is assessed by using cups [5].

In 24 hours diet recall method, dietary data is obtained from the respondent through an oral questionnaire of diet survey using a set of standardized cups suited to local conditions [6].

24 hours diet recall method is also a report of daily habits, but interviewed or written information about the previous day's intake. The participants has to remember the actual food consumed and give information on portion weights from memory. The respondents burden for a single 24 hour recall is less than for several days for food records and the method is typically used for determining average usual intake of a large population / group [7].

The term Autism Spectrum disorder (ASD) refers to range of neuro developmental disorders that include the more specific diagnoses of autism, Asperger syndrome, and pervasive developmental disorder not otherwise specified [8]. The defining features of ASD include impairments in social interaction, communication, imagination, restricted interest, and stereotypic behaviours. These symptoms range in severity from mild to debilitating and usually persist throughout the lifespan [9]. In addition to the symptoms used in diagnosis, several serious co morbid conditions are also commonly associated with ASD including intellectual disability, depression, and epilepsy [10]. Current estimates suggest that the prevalence of ASD is approximately 6.7 cases per 1000 children or approximately 1 in every 150 children [11].

While the etiology of ASD remains unknown, emerging evidence suggests multiple gene defects may be involved in tandem with an environmental catalyst [12]. The ongoing confusion regarding the etiology of ASD has lead to the consideration of many possible causes. Often these potential causes are translated into treatments and then propagated to the public before sufficient evidence regarding effectiveness or safety exists [13].

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Food preferences are shaped by a combination of genetic and environmental factors. The development of children's food preferences involves a complex interplay of genetic, familial and environmental factors. There is evidence of a strong genetic influence on appetite traits in children, but environment plays an important in modelling children's eating behaviour. Satiety is closely related to diet composition, and foods with low energy density contribute to prevent overeating. Food preferences are the product of an interplay between genetic and environmental factors that result in substantial individual differences in the extent to which children are suspicious and fussy about food in general and their likes and dislikes for specific foods. To encourage a healthy attitude to food and prevent overweight, one should monitor children's growth, dietary habits and life style and parents strategies (control or disinhibition). A child's dietary practice should be investigated at different ages with particular attention to the overall diet quality (how many times, the variety of foods) and self regulation [14].

The purpose of this study was to ascertain, if there is any statistical co relation between the macronutrients intake of calories and protein in ASD and normal children of same age group. The focus of this study is to explore these macronutrient deficiencies in these children in Indian set up as there are literally very few studies done on it. This will help in turn give an insight of their dietary patterns and help identify malnutrition if any and thus will help care givers and parents to these ASD children to overcome it.

Methods

The study was approved by Ethics Committee. 40 diagnosed cases of ASD children from the age group of 2-6 years of age were included in the study. The normal subjects/ control (n=40) were selected from the school randomly. Questionnaire and was designed to collect data from mothers. Consent from mothers were taken prior to the survey. After preparing the questionnaire and validating it with a pilot study, the survey was carried out to collect information. The data was collected in one to one process by speaking to mothers of each child. 24 hours diet recall was taken from mothers in order to calculate on energy and protein intake of children. Cups and glasses were standardized and were used for collecting information accurately. The data was analysed statistically using SPSS Version 20.0. The mean standard deviation of macronutrients (calories and proteins) was calculated. Each of them were further subjected to "t" test to see the significance (p < 0.05).

Results and Discussion

Table 1 shows the mean standard distribution of energy and protein intake of ASD and normal children. The mean of energy was found to be significantly on the lower side compared to normal children of the same age group. The mean (s.d) of daily energy intake was 895.00 (147.54) and 1388.75 (149.13) for cases and control group respectively.

Similarly, the intake of protein was also calculated and the mean (s.d) was found to be 20 (8.5) and 35.13 (8.2) in cases and control group children.

Parents of children with ASD commonly report concerns

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 Table 1: Distribution of Energy and Protein Intake in Cases and Control (n=40 in each group).

Groups	Energy	Protein	
	Mean±SD	Mean±SD	
Cases	895.00±147.54	20±8.5	
Control	1388.75±149.13	35.13±8.2	

Table 2: Energy Intake in Cases and Control (n=40 in each group).

Groups	Mean±SD	F	" t " value	df	Significance
Cases	895.00±147.54	0.00	14.88	78	0.00
Control	1388.75±149.13	0.92			

p<0.05

Table 3: Protein Intake in Cases and Control (n=40 in each group).

Groups	Mean±SD	F	" t " value	df	Significance
Cases	20±8.5	0.22	8.07	78	0.00
Control	35.13±8.2	0.33			

p<0.05





regarding feeding difficulties and poor nutrition. Feeding difficulties, in the form of undesirable mealtime behaviours and/or skill deficits, can cause parental concern and impact on family dynamics. Poor nutrition can have an impact on development and health issues [15].

Figure 1 and 2 depicts the energy and protein intake within two groups.

The data collected was further analysed using "t" test. Table 2 and Table 3 represents the energy and protein intake of children of both groups. These macronutrients intake were found to be statistically significant

(p<0.05) thus proving to malnutrition in ASD children.

Inadequate nutrient intake of children with autism spectrum disorder (ASD) have been reported. The study examined the nutritional statuses of children with ASD and nutritional intake. These children consumed significantly fewer macronutrients compared with children without ASD. Thus results suggests that reduced macronutrient intake are quite common among children with ASD [16].

Conclusion

Over all, according to the study there seems to be existing significant difference between the macronutrient intake of Autism Spectrum Disorder and normal children within the same age group in Indian children. Further research can be conducted to see other nutrient intake and there deficiencies in the ASD children in India. Apart from it, the parents and care givers should be given regular counseling/ training sessions by health professionals which will educate them regarding healthy eating habits to overcome malnutrition within these children.

This article is for Phd study.

There is no conflict of interest to be declared

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