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RESEARCH ARTICLE

EFFECT OF NUTRITION INTERVENTION ON AWARENESS AND FOOD CHOICES OF MOTHERS HAVING CHILDREN WITH ATTENTION DEFICIT HYPERACTIVITY DISORDER (ADHD)

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ABSTRACT

This study was carried out to assess the nutritional status of children with Attention Deficit Hyperactivity Disorder (ADHD) between 4 -12 years, based on their height, weight and to analyze their eating practices. The study also examined the impact of nutrition intervention on awareness and food choices of mothers having children with ADHD. This is a specific population study, conducted in a special school of Chennai city. The sample recruited for the given study consisted of 60 mothers having children with ADHD. The purposive sampling technique was adapted for the selection of the sample. The nutrition intervention was designed based on the height, weight, BMI percentile (NCHS-CDC)[6] of children with ADHD and preference of food choices of their mothers. The choices made by them had low consumption of protective foods like fruits vegetables, pulses and eggs and high consumption of high fat, processed and fast foods. The investigator gathered the data from 60 mothers having children with ADHD using an interview based questionnaire at the baseline and also after the one month of the intervention. This tool consisted of 12 items targeting to assess the awareness about nutrition and preferences about food choices of the respondents. The intervention program involved group counseling form others and food display on packed lunch and healthy eating. The qualitative data was assessed using the content analysis for intervention (Scoring key for the questionnaire) and the quantitative data was analyzed by using SPSS software version 17. Results of the study revealed that, before the intervention children with ADHD were found to have weight imbalances and their mothers exhibited very little knowledge on nutrition and healthy food choices. Whereas post intervention, mothers showed a statistically significant increased awareness on nutrition and food selection when compared to the baseline data. However no significant change was observed in the weight of the children with ADHD. The nutrition intervention for mothers having children with ADHD had a significantly positive impact on their knowledge and food selection practices. The awareness and the knowledge about healthy food choices among the mother scan play a key role in managing the symptoms like hyperactivity or attention deficit. The study emphasizes the need of many such interventions in this area of nutrition and ADHD.

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INTRODUCTION

Attention deficit hyperactivity disorder (ADHD) is a chronic behavioral disorder characterized by persistent hyperactivity, impulsivity and inattention that impairs educational achievement and/or social functioning (American Psychiatric Association. Diagnostic and Statistical Manual of Mental Disorders, 2000) The prevalence of ADHD is varied. The most recent worldwide pooled prevalence as published in Pubmed after assessing 175 eligible studies is 7.2 %. (Thomas *et al*., 2015) In India, the prevalence is stated as 11.32%. (Venkata and Panicker, 2013) The incidence of ADHD among boys is more than among girls. (Mukhopadhyay *et al*., 2003) It has also been observed that ADHD of the hyperactive type is more prevalent among boys. This difference suggests the possibility of choosing different treatment plans. Treatment of ADHD involves medication, behavioral modification and other intervention strategies like modification of the diet and/or supplementation of vital dietary nutrients which play an important role in the production of specific molecules that help in optimal functioning of the brain.

There is no "cure" for ADHD. Using multiple interventions, this condition can be managed. Children with ADHD can be high achievers and can be taught ways to g*et al*ong with this learning disability. However, literature has shown that children with ADHD often show poor physical and mental health than

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other children. Health and nutrition in relation to ADHD is a very broad subject. The link between nutrition and ADHD is yet to be established. But there is research showing the prevalence of micronutrient deficiencies (vitamin A, iodine, folic acid) among these children. (Kant and Graubard, 2003)

Dietary approaches to ADHD involve, providing optimum nutrition to the children and the prevention of nutrition related secondary disabilities. Obvious links have shown deficiencies of iron, folate, essential fatty acids, iodine and many other trace elements. This can lead to decreased attention span, reduced mental abilities and nutritional deficiency disorders among these children. (http://www.cdc.gov/ncbddd/disabilityandhealth/relatedconditions.html)

Other nutrition specific problems of children with ADHD include weight imbalance; leaky gut syndrome, malnourishment, altered food intake and lowered immunity. The World Bank supports a multi-sectoral approach to nutrition that targets especially young children and their mothers who are the primary caregivers. The awareness, knowledge and healthy food choices related to the nutrition acquired by the mothers having children with ADHD can play a key role in management of the symptoms. Mothers are the ones who are maximally receptive to bring in any positive change in the affected children, hence should be targeted populations. To reach them, the World Bank emphasizes community-and school-based nutrition education interventions. The Bank's nutrition portfolio is also giving increased attention to micronutrient deficiencies and the impact of nutrition on education and learning ability. (http://www.cdc.gov/ncbddd/disability and health/relatedconditions.html)

Nutrition Education is any combination of educational strategies, accompanied by environmental supports, designed to facilitate voluntary adoption of food choices and other food- and nutrition-related behaviors conducive to health and well-being. (www.wikipedia.org)

This thought process is not yet common in the area of ADHD in India. The present study, one of its kinds is an earnest effort to estimate the extent to which ADHD affects the childhood nutrition. It also includes a nutrition based intervention, which quantitatively assessed knowledge and food choices made by the mothers. (Posner *et al*., 1992)

Nutrition is a core pillar of human development. Large-scale nutrition programming when coupled with awareness of causative factors can help the society to face this common yet unfamiliar learning disorder. With this as the rationale, the present study has been proposed with the following aim and specific objectives.

Aim of the study

The present study was undertaken with an aim to assess the effect of Nutrition intervention on awareness and food choices mothers having children with ADHD.

Specific objectives of the study

1) To evaluate the nutritional status of children with ADHD between 4 -12 years, based on their height, weight, BMI percentile for the age.
2) To study the nutritional status of children with ADHD with regard to their nutritional intake and eating practices.
3) To assess the effect of nutrition intervention on the awareness and the food choices of mothers having children with ADHD.

METHODOLOGY

The design for the present study was an experimental design. The study was carried out in a special school of Central Chennai.

Selection of the Sample

The selection of the sample for this investigation consisted of 60 mothers having children with ADHD. These mothers were offered participation in the current study based on willingness. The purposive sampling technique was adapted for the selection of the sample. After taking an informed consent from the mothers, an assessment was carried out on children with ADHD. Inclusion criteria were age between 4–12 years and clinical diagnosis of ADHD. Exclusion criteria were the use of any additional medication known to alter food intake and children with mental retardation and severe impairments.

Tools used

Calibrated stadiometers, weighing scales, BMI percentile comparable standard growth charts, Food Frequency Questionnaire (FFQ) and an interview based questionnaire.

Anthropometric Data Analysis

Height and weight of children with ADHD were assessed using calibrated stadiometers and weighing scales and age wise BMI percentile was calculated and compared with standard growth charts from the Centre for Disease Control.

Dietary Intake and Food Practices Analysis

Dietary intakes from Food Frequency Questionnaire (FFQ) were used to examine the quantitative and qualitative of nutrient density of foods and overall consumption pattern and food choices made in the diet of the children. (Mukhopadhyay *et al*., 2003) The queries in the FFQ consisted of consumption and frequency of daily foods like cereals, pulses, vegetables, fruits which are protective and essential and also on specific foods like caffeinated drinks, ice creams, chocolates etc. The data was generated for 60 children having ADHD. Both mothers and the children were jointly involved to determine portion sizes, frequency and food choices made by them. (National Center for Health Statistics, 2000)

Further the mothers were assessed by a pretested interview based questionnaire which had 12 items. This tool was principally designed to analyze the awareness on nutrition and food choices of the respondents. According to the Scoring key which was formulated for the tool showed that, the subjects with a score of 0-8 meant least awareness, 9-16 as moderate and 17-24 as sound awareness on nutrition.

The intervention was designed for the mothers having children with ADHD which was, based on the deficit observed in their awareness regarding nutrition. Mothers, who were primary caregivers for these children were subjected to nutrition intervention for this study. This education module involved group counseling on nutrition, information on correct cooking practices, food demonstrations about packed lunches and food choices.

Mothers of children having ADHD were provided with the actual visual estimates to aid in getting the information. After quantitative and qualitative analysis obtained from the baseline data, the observations on the anthropometric data of children were recorded and scoring was done for the mothers on their awareness about nutrition and healthy choices made.

One month after the intervention, weight of the children was recorded and the tool was administered on mothers again for post intervention results. Scoring was done and the results were noted.

Analysis of the Data

Both pretest and post test data were analyzed using SPSS software and statistical comparisons like mean, percentage and t- test. Paired sample t-test was used to evaluate differences in responses between pre and post intervention results.

RESULTS AND DISCUSSION

The important results of the study are discussed below with respect to their Mean, Percentage, Standard Deviation and't'-test.

Descriptive Statistics

Table 1. Details on Age and Anthropometric profile of 4-12 year old children with ADHD

	N	Minimum	Maximum	Mean	Std. Deviation
Age(years)	60	4	12	8.16	2.85
Height(cm.)	60	60	168	121.49	26.80
Weight(kg.)	60	12.0	55.0	26.15	11.92
BMI Percentile	60	7	80	18.68	10.77
Total	60				

Results from Table 1 revealed that the number of children who participated in the study were altogether 60, with the mean age of 8.16 years.

Minimum height and weight was found to be 60 cm and 12 Kg respectively, whereas Maximum height and weight were recorded as 168 cm and 55 Kg. The mean height and weight was found to be 121.49 cm and 26.15 Kg.

The mean BMI percentile of children was recorded as 18.68, above 5th percentile for weight-for-age. The minimum BMI percentile was 7 and 80 being the maximum.

Table 2. Details of gender wise Demographic profile of 4-12 year old children with ADHD

Details		Frequency	Percentage	Cumulative Percentage
Gender	Male	45	74.6	74.6
	Female	15	25.4	25.4
Family	Joint	18	30.2	30.2
type	Nuclear	42	69.8	69.8
Birth	1	32	52.4	52.4
order	2	21	34.9	34.9
	3	6	4.1	4.1
	4	1	1.6	1.6

On observation of Table 2, it was noted that this study was composed of 45 boys (75%) and 15girls (25%) as the sample. The majority of children with ADHD in the study were from nuclear families (70%) Most Children belonged to two children families. Ordinal position wise, 52 percent children were first born children in the family, 35 percent were second born and only 6 percent were laterborn.

Table 3. Details of Gender wise Food consumption pattern among 4-12 year old children with ADHD

S.No.	Foods		Consumption Frequency	Percentage	Cumulative Percentage
1	Cereals	Male	54	88.9	88.9
		Female	6	11.1	11.1
2	Pulses	Male	14	46.0	23.8
		Female	46	76.2	76.2
3	Vegetables	Male	43	71.4	71.4
		Female	17	28.6	28.6
4	Leafy Veg.	Male	6	11.1	11.1
		Female	54	88.9	88.9
5	Fruits	Male	8	14.3	14.3
		Female	52	85.7	85.7
6	Non-veg	Male	48	79.4	79.4
	Products	Female	12	20.6	20.6
7	Milk &	Male	3	6.3	6.3
	Milk	Female	57	93.7	93.7
	Products.				
8	Sweets	Male	15	25.4	25.4
		Female	45	74.6	74.6
9	Ice-cream	Male	42	69.8	69.8
	/chocolates	Female	18	30.2	30.2
10	Outside and	Male	39	65.1	65.1
	Processed	Female	21	34.9	34.9
	Foods				

It is evident from Table 3 that, the selected children with ADHD followed in this study comprised of 45 boys and 15 girls. When the gender wise frequency of food consumption pattern was compared it was observed that, the consumption of pulses, leafy vegetables, fruits, milk and milk products and sweets was lower in boys when compared to the girls. Whereas the consumption pattern of cereals, vegetables, non-vegetarian foods, ice-creams and outside foods was found to be higher in boys than that of the girls. Although the number of girls was relatively smaller (N =15) in the study, but health wise consumption pattern of girls was faired better than the boys.

Table 4. Details of comparison of the Pre and post intervention scores among mothers having children with ADHD

Study Period	N	Mean	Std. Deviation	't' Value
Pre Intervention	60	7.44	1.61	29.254**
Post Intervention	60	17.73	2.35	

**Statistically significant at 1% level

Table 4 shows indicates the results of pre and post intervention scores among mothers having children with ADHD. It is evident that, there exists a significant difference in pre and post intervention score values of mothers having children with ADHD. The calculated 't' value (29.254) is greater than the table value (t = 2.56) at 1% level of significance.

Further perusal of the table shows that, before the intervention the mothers having children with ADHD were found to have a low score (Mean 7.44) about awareness regarding nutrition and healthy food choices. Whereas post intervention, mothers exhibited increase in the score values (Mean 17.73) which were based on their awareness regarding nutrition and healthier food choices. This amplifies the effect of such nutrition interventions.

Summary and Conclusion

It has been concluded from the present study that boys were found to have higher proportion of ADHD than girls. With reference to the BMI percentile, most children with ADHD were found to have a lower range of healthy body weight for the age. Ordinal position wise majority of the first born children were found to have ADHD. With regard to gender, girls exhibited a better health wise consumption pattern than that of boys. It was observed that Nutrition education intervention for mothers of children having ADHD had a statistically significant positive impact on the awareness and food choices.

The awareness, knowledge and food choices regarding nutrition acquired by the mothers of children having ADHD can play a key role in managing the symptoms like hyperactivity or attention deficit in children. The study strongly emphasizes the need of many such interventions in this area, as the mothers of such children tend to show extreme willingness and cooperation even for a slightest improvement in the symptoms of their children.

This study is limited by a relatively small timeframe, sample size and by lack of a specific normal control group.

This study adds to the limited existing literature highlighting the importance of Nutrition intervention in the area of children with ADHD.

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