

Comparing the Dietary Behaviors of Hyperactive - Attention Deficit Children with Healthy Children and Its Relationship with Weight Indices in Both Groups

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Abstract

Field and aim: One of the factors that effects on children's weight and health status is their eating behavior. The aim of this study is to investigate and compare eating behaviors in hyperactive – attention deficit children with healthy children in Kerman.

Method: The investigated population in this study was 80 children including 40 healthy children and 40 hyperactive – attention deficit children that their weight, height, body mass index and information related to their eating behaviors were measured and recorded in children by using food behaviors questionnaire.

Results: Mean body mass index in the whole population was 16.9 ± 3.7 Kg/m² that was 17.48 ± 4.05 in hyperactive – attention deficit children and 15.96 ± 3.29 in healthy children. There was a significant relationship between body mass index and the presence of this disorder in the investigated children, so that, the mean body mass index was higher in children with this disorder. Weight loss prevalence in the whole investigated population was 19.5% that 7.3% was related to hyperactive children and 12.2% healthy children. Overweight prevalence in the whole population was 12.2% that 6.1% was related to both hyperactive – attention deficit and healthy children. Obesity prevalence was 17.1% in the whole population that 13.4% of it was related to hyperactive children and 3.7% of it to healthy children. There was a significant difference between the two groups regarding eating behaviors, moderate eating behavior in hyperactive – lack of concentration children, fast eating behavior, low eating in fatigue time and activity rate. There was no significant difference between eating behaviors and weight indices.

Discussion and conclusion: Considering that the specific dietary and eating behaviors were higher in obese and low weight children with significant difference, investigating eating behaviors in children with deviations from normal weight and BMI must be a part of the comprehensive assessment and treatment program for such children to prevent its negative consequences on health in the next period of life by intervening in a timely manner.

Keywords: Hyperactivity-disorientation; Eating behavior; Body mass index; Obesity

Introduction

Obesity and overweight prevalence has been increased among children of all over the world in the recent decades [1]. Iran is not isolated from this situation either [2]. This situation in childhood leads to obesity in adulthood and following that Incidence of non-transmissible diseases such as diabetes, hypertension, increased lipids in the blood and etc. [3,4].

It seems that one of the factors than can effect on weight status of children is their eating behaviors [5-7]. Correcting these factors can lead to the promotion of interventional programs to prevent overweight and obesity in children. One of the most common methods to investigate eating behaviors in children is children's eating behaviors

questionnaire (CEBQ). CEBQ was validated in England for the first time [8], and then it was also assessed and studied in other countries such as Portuguese [5]. The CEBQ was also valid and reliable in our study (correlation coefficient of 71%). This method has been used in various investigations and researches including for investigating the relationship between the components of this method and BMI [5-9] and/or for investigating polyphagia among the children who have fat or thin families [9,10] and/or eating habits in children who have idiopathic short-height. CEBQ includes 8 subsets: 1) food responsive, 2) enjoyment of food that these factors are responses to environmental factors that are effective on eating. Studies have shown that appetizing and eating rate responses effect severely on increasing overweight or obesity in children [6-11]. Another subset is desire to drink (dd) that shows the tendency of children to drinks that are generally with them that are generally drinks sweetened by sugar [6]. There is a positive

relationship between BMI and frequent consumption of drinks sweetened by sugar [12].

Another subset is satiety responsive that shows the child's ability to regulate his/her received energy and decrease getting food after eating food. During childhood, children gradually lose their ability of spontaneous regulation of their received energy, effectively. The increased implicit factors are also due to the cause that will result in excessive consumption and following that the increased incidence of overweight [13]. Another indicator and subset is slow eating, which can be due to a lack of pleasure and interest in food [13]. Another subset is food fussiness that is true more about homemade and new foods that this leads to the consumption of foods that do not have enough variety [10]. Some studies have been conducted that have shown the relationship between food fussiness and BMI [13-15]. Emotional over eating and under eating indices also show the increased or decreased emotional eating (angriness or happiness). The obtained results from the investigations show that over-emotional-eating has direct relationship and vice versa, under-eating has reverse relationship with BMI in children [9,10].

Hyperactivity and attention deficit disorder is one of the most common mental disorders in children and its prevalence in male gender is 2.9 times more than female gender. In most cases, hyperactivity is associated with other disorders, and in 60% of cases symptoms persist until adulthood. Some disorders that occur with hyperactivity include depression, anxiety, bipolar disorder, integrity disorders, learning disorders and social problems. These cases have significant effect on the person's emotional health and his/her life quality and family. Various causes have been mentioned for this syndrome. Environmental and biological factors play role in occurring hyperactivity [16]. Although many nutritional factors have relationship with this syndrome, the conducted studies on total sample of food consumption in them is very restricted in Iran. The relationship between consumption of sweet and ready-made food with hyperactivity prevalence in Iranian children has been confirmed [16]. No study has been conducted about dietary behaviors in these children and also its relationship with weight indicators in these children so far,

so, the aim of the present research is to investigate dietary behaviors (CEBQ) in these children and compare it with healthy children and also its relationship with weight indicators in both children groups. Submissions are written with an abbreviation for ease of writing materials.

- Food responsive (fr)
- Enjoyment of food (ef)
- Desire to drink (dd)
- Satiety responsiveness (sr)
- Slowness in eating (se)
- Food fussiness (ff)
- Emotional overeating (eo)
- Emotional under eating (eu).

Method

The investigated population in this study was 80 children (40 hyperactive-attention deficit children and 40 healthy children). CEBQ that includes 12 questions about dietary behaviors was asked from children's parents and completed by a trained questioner. The investigated children were the ones referred to children psychiatrists and healthy children were also selected randomly from society. Anthropometric measures including height, weight and BMI were measured and recorded by the trained questioner. Z score method was used to determine overweight and obesity status based on BMI. Thus, BMI higher than z score 3 was calculated as obesity and 2 zscore<BMI<3 zscore overweight. Information related to the children's age and gender was extracted from their files. Reliability and validity of this questionnaire was conducted by Vincent Ebenbery et al. in 2009. These researchers confirmed the questionnaire in both reliability and validity dimensions. This questionnaire was also reinvestigated in the present study. Paired test showed good stability of answers for each question. Cronbach's alpha was used for questions' internal correlation. This coefficient was obtained 71% for the whole questionnaire that showed good correlation of questions with each other.

Dietary behaviors	Children	Percentage in the whole population	P-value
My child is interested in eating food	Normal	29.30%	0.573
	ADHD	13.40%	
My child loves eating food	Normal	7.40%	0.243
	ADHD	8.60%	
My child eats more when he/she worries	Normal	1.20%	0.02
	ADHD	1.20%	
My child eats less when he/she is angry	Normal	2.40%	0.071
	ADHD	8.50%	
My child eats less when he/she is tired	Normal	3.70%	0.016
	ADHD	2.40%	
My child enjoys eating new foods	Normal	11.00%	0.416
	ADHD	13.40%	

My child likes food diversity	Normal	20.70%	0.6
	ADHD	22.00%	
My child is polyphagous	Normal	4.90%	0.185
	ADHD	3.70%	
My child eats food very fast	Normal	7.30%	0.028
	ADHD	1.20%	
My child eats food calmly	Normal	4.90%	0.005
	ADHD	9.80%	
My child interested in activity and mobility	Normal	37.80%	0.001
	ADHD	18.30%	
My child picks up a selection of meals from advertising and television	Normal	2.40%	0.843
	ADHD	4.90%	

Table 1: Dietary behaviors in hyperactive-attention deficit children and healthy children.

Results

The investigated population in this project was 80 children (40 hyperactive-attention deficit children and 40 healthy children). Mean age of this population was 83.43 ± 30.7 months. Mean weight of these children was 24.58 ± 9.06 kg that was 24.9 ± 7.97 in hyperactive-attention deficit children and 24.26 ± 11.08 in healthy children. Mean height was 119.38 cm in all children that was 118.15 ± 18.04 in hyperactive-attention deficit children and 120.61 ± 18.72 in healthy children. Mean BMI was 16.09 ± 3.7 kg/m² in the whole population that was 17.84 ± 4.05 in hyperactive-attention deficit children and 15.96 ± 3.29 in healthy children. There was a significant relationship between BMI and the existence of this disorder in the investigated children, so that mean BMI was higher in children with this disorder. Underweight prevalence was 19.5% in the whole investigated population that 7.3% was related to hyperactive children and 12.2% to healthy children. Overweight prevalence was 12.2% in the whole population that 6.1% was related to both hyperactive-attention deficit and healthy children. Obesity prevalence was 17.1% in the whole population that 13.4% of it was related to hyperactive children and 3.7% of it to healthy children.

Table 1 shows dietary behaviors in the two children groups. Table 2 shows the prevalence rate of eating behaviors in two children groups.

Scales	Children	BMI	Prevalence	P-value
Slow eating	ADHD	Underweight	4.70%	0.016
		Overweight	11.90%	
		Obese	21.42%	
	Normal	Underweight	9.52%	
		Overweight	14.20%	
		Obese	4.70%	
Emotional eating	ADHD	Underweight	9.52%	0.017

Food fussiness	Normal	Overweight	9.52%	0.5
		Obese	19.04%	
		Underweight	9.52%	
		Overweight	7.14%	
	ADHD	Obese	2.38%	
		Underweight	11.90%	
		Overweight	11.90%	
		Obese	26.19%	
Eating enjoyment	Normal	Underweight	21.42%	0.093
		Overweight	11.90%	
		Obese	7.14%	
	ADHD	Underweight	14.28%	
		Overweight	14.28%	
		Obese	26.19%	

Table 2: Prevalence rate of eating behaviors in both hyperactive-attention deficit and healthy children groups.

Discussion

The present research investigates the prevalence of underweight, overweight and obesity in hyperactive-attention deficit and healthy children and also eating behaviors in these children and comparing it with healthy children. The underweight prevalence was 19.5% in the

investigated children in this study that 7.3% was related to hyperactive children and 12.2% to healthy children. Overweight prevalence was 12.2% that was the same in both groups. Obesity prevalence was 17.1% in the whole population that this prevalence was 13.4% in hyperactive children and 3.7% in healthy children. In other words, overweight and obesity prevalence in hyperactive children was more than healthy children based on our results. A number of 42 studies have been conducted on more than 700,000 people that show that there is a significant relationship between obesity and hyperactivity-attention deficit. Based on these studies, obesity prevalence in adults with hyperactivity-attention deficit has been 70% and in children with this disorder 40% more than healthy adults or children [17]. Altfas and Strimas have also referred to the significant relationship between obesity and ADHD severity in their studies [13-15]. Serdal mentioned the significant relationship between obesity and ADHD severity in his study and considered it as a risk factor for increasing eating disorders in children [18]. The results of these researches confirm the obtained results from our study. All of them show the attention to overweight and obesity in hyperactive-attention deficit children by the relevant specialists and considering certain therapeutic interventions including changing lifestyle in these children's comprehensive treatment plan. In our study, the prevalence of slow eating behavior in hyperactive-attention deficit children has been reported more than healthy children. There is a significant relationship between the prevalence of this behavior in children with this disorder and healthy children ($p=0.016$). At the same time, the prevalence of this behavior in obese hyperactive children and overweight healthy children was higher, although the difference was not significant. In a study that was conducted by Viana, this dietary behavior had the least relationship with children's weight [19]. This difference can be due to different dietary behaviors in different regions.

Regarding emotional eating that the subsets of this behavior included less eating at the time of anger, less eating at the time of fatigue, more eating at the time of worry and particle eating; over eating at the time of worry in healthy children was more than hyperactive-attention deficit children with a significant difference ($p=0.017$). Low eating at the time of fatigue also had significant difference between two groups and hyperactive children had reported this behavior more than others ($p=0.016$). Fast eating behavior was also another behavior that had significant difference between two groups, so that the prevalence of this behavior had been reported more than others in healthy children ($p=0.028$). At the same time, over eating at the time of worry also had significant difference between two groups ($p=0.020$). No study regarding the investigation of the prevalence of these dietary behaviors in hyperactive-attention deficit children and/or adults has been observed but in a study that was conducted by Selena et al. a significant relationship between emotional eating and BMI has been observed. In our study, there was a significant difference regarding some subsets of emotional eating between hyperactive-attention deficit children and healthy children that had been reported in obese hyperactive children and underweight healthy children more than others. No study regarding the investigation of these behaviors in hyperactive-attention deficit children or adults was found but regarding BMI with this behavior, emotional eating prevalence in underweight healthy children like Allan study was more than others. In fact, in children with and without hyperactivity-attention deficit disorder that is associated with weight loss or obesity, these eating behaviors should be investigated and necessary interventions taken.

The prevalence of behaviors such as emphasizing on food diversity and form and enjoying from new foods (food fussiness) and the prevalence of behaviors such as being interested in eating food, polyphagia, love to eat, being interested in breakfast and snack (enjoy eating) had no significant difference between two groups, statistically.

A weak significant relationship has been observed between BMI and food fussiness in various studies [10-14]. In our study, the prevalence of this behavior in healthy children was more than hyperactive children and a weak significant relationship was observed among weight indicators in the whole population ($p=0.048$). At the same time, these behaviors have been observed in hyperactive obese children and healthy underweight children more than other groups. Considering that the present study is the first study on investigating the dietary behaviors in hyperactivity-attention deficit children, there is therefore no documentation on comparing the results of previous studies with this study. However, it is necessary to investigate these eating food behaviors in children with deviation from normal weight and to take certain educational and therapeutic interventions.

The results of a study that was conducted by Jose L Santos et al. showed that there was a direct relationship between "enjoyment of food", "emotional overeating" and "food responsiveness" with children's obesity [20]. In our study, there was no significant difference between any one of these eating behaviors and weight indicators (obesity, overweight and underweight), although except calm eating behavior, other behaviors in obese hyperactive-attention deficit and healthy underweight children were observed compared to other weight groups in each category of children. In spite of our expectation, interest in physical activity and mobility was observed in healthy children more than others and a significant difference was existed between two children groups in this regard ($p=0.001$) that may be because of the drugs that hyperactive children have been consumed. Finally, the existence of some mental disorders can effect on the incidence or severity of obesity and overweight in children because of various causes, meanwhile, some eating behaviors will exacerbate this condition. In our study, the prevalence of overweight and obesity in hyperactive children was also more than healthy children. Of course, it should not be ignored that different studies originate from different cultures of food in different regions. However, since most differences in eating behaviors appear in adolescence, it is recommended that this study is also being conducted in this age group. Considering the low volume of the case study's sample, the generalization of the results to the entire community of children should be done with caution. In this study, the effective and confounding factors of parents' economic and educational level, the type of drugs used in hyperactive children, the presence of the associated physical and psychological disorders have not been studied, which should be considered and analyzed in future studies.

Conclusion

Investigating eating behaviors in children with deviation from normal weight and BMI must be part of the comprehensive assessment and treatment program for such children to prevent its negative health outcomes on health in the next period of life by intervening in a timely manner.

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