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Prevalence Comparison of Constipation and Fecal Incontinence Associated between Attention Deficit Hyperactivity Disorder in Children referred to a Psychiatric Clinic and Healthy Children in 2014-2015

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KEYWORDS

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A B S T R A C T

Attention deficit hyperactivity disorder, one of the most common behavioral disorders in childhood. Attention deficit hyperactivity disorder through three primary symptoms including inattention, hyperactivity and impulsivity becomes clear that each child may cause for other disorders. One of these disorders is functional constipation. Fecal incontinence also occurs with functional chronic constipation. The objective of this study was to evaluate the incidence of defecation disorders and gastrointestinal symptoms in people with attention deficit hyperactivity disorder. This study was a cross - sectional study in 2014- 2015. The control group of 100 children 4-16 years old at the level of several schools in the city of Ahvaz was randomly selected. And for the people with questionnaires Parent Rating Scale-Revised Conner's (CRSP) for ADHD disorder rejected. The target group of 100 children who were referred to child psychiatry and by two Child and Adolescent psychiatrists, according to DMS-IV criteria for ADHD has been diagnosed recently and their rankings determined by questionnaire CRSP; Were taken History of constipation and fecal incontinence and symptoms gastrointestinal, such as nausea, vomiting and abdominal pain and demographic questionnaire completed by the researcher for both groups The data were analyzed using SPSS version 22 and chi-square test and P. Value significant amount of less than 0.05 was determined. ADHD was not increasing the risk of defecation disorders including constipation and fecal incontinence and gastrointestinal symptoms including nausea, vomiting and abdominal pain. Statistical analysis of each of the variables include constipation :(% 35.1 of children with ADHDvs. 23.3 % children without ADHD; P = .06) and fecal incontinence (3.1% of children with ADHDvs. 2.9% of children without ADHD; P =0.94). Abdominal pain (13.4% of children with ADHDvs. 6.8% of children without ADHD; P =0.12). Nausea (3.1% of children with ADHDvs. 2.9% of children without ADHD; P =0.94) and vomiting (1% of children with ADHDvs. 1.9% of children without ADHD; P =0.59). No clear didn't exist association between the prevalence of functional constipation and fecal incontinence and gastrointestinal symptoms including abdominal pain, nausea and vomiting with risk of ADHD.

Introduction

Attention deficit hyperactivity disorder, one of the most common behavioral disorders in childhood and through three primary symptoms including inattention, hyperactivity and impulsivity disorders known each other for the child (1). One of these disorders is functional constipation in children due to neglect it ignores the need for disposal and disposal into delays. This leads to stool retention and constipation (2). Fecal incontinence in children with Attention deficit hyperactivity disorder and chronic constipation can be seen in the most severe form. As the children due to complete loss of natural landmarks go to the toilet, Disposal as flooding and leaking into their underwear(3). Other side effects include constipation, chronic abdominal pain, anus and rectum, severe attacks of abdominal pain before bowel movements caused and urinary symptoms including urinary incontinence (29%) during the day or night (34%), urinary tract infection girls (33%) and boys (3%) can be seen (4).

Attention deficit hyperactivity disorder is a major issue mental health and its importance is due to its high prevalence. Overall, 3.7% of children in the population and 50% of children with psychiatric disorders to suffer from it (5, 6). In a study to assess the prevalence of ADHD in Ahvaz city of Iran on the male preschoolers was to show that the frequency of this disorder with parents' censer's questionnaire was 4.51% (7).

Constipation is a common gastrointestinal problem in children and adults in the community and found many that would impose a huge cost to society. The prevalence of constipation in children is estimated to be 3-8%. The main complaining at 3-5% outpatient physicians and pediatricians and 25% of the patient of

pediatric gastroenterologists are included (8).

One of the reasons for treatment failure in people with gastric disorders is behavioral issues such as counter-seeking behaviors and Attention deficit hyperactivity disorder (9, 10, 11). The study Mckeown and *et al.*, in 2013 increased prevalence of constipation and fecal incontinence in children with Attention deficit hyperactivity disorder indicated(3) and we also study the prevalence of constipation and fecal incontinence and gastrointestinal disorders such as nausea, vomiting and abdominal pain in children with attention deficit hyperactivity disorder to examine these patients in order to treat your digestive problems better, more precise behavior of individual psychotherapy and Group one approach is used.

Methods

This study is a cross-sectional epidemiological study in 2014-2015 and 200 children 4-16 years old in the city of Ahvaz. The sample size of the study using Mckeown *et al.*, (3). And by using Cochran formula with $d = .04$ and $P = 0.041$ and the percentage of 95% was determined. The control group of 100 children 4-16 years old at the level of several schools in the city of Ahvaz was randomly selected. And for the people with questionnaires Parent Rating Scale-Revised Conner's (CRSP) for ADHD disorder rejected .also The target group of 100 children who were referred to child psychiatry and by tow Child and Adolescent psychiatrists, according to DMS-IV criteria for ADHD has been diagnosed recently and their rankings determined by questionnaire CRSP, were selected and After explaining the purpose of the study and obtaining informed consent in two groups, a questionnaire consisting of three

parts: In the first part demographic data including age, gender, first child of family, city of residence, ethnicity, education level of parents, age, and occupation-parent family population and family economic status, history of addiction, psychiatric disorders and physical illness in family subjects, as well as physical illness and use of drugs in children and In the second part the history of bowel problems include constipation and fecal incontinence, gastrointestinal symptoms such as nausea, vomiting and abdominal pain, are included, of the participants were asked. Noting that the six criteria for functional constipation have been shown to have at least two criteria exists in children as young as 4 years (criteria Rome III) (12).

The third section, ADHD questionnaire that much abbreviated version Connors rating scale for parent is provided by Keith Conner in 1973 and includes ten items to assess hyperactivity and inattention. Scoring questions using a four-grade scale (not at all, somewhat, high and very high) was carried out with the full score was 30 points higher than 15 is considered positive for ADHD, score 15 to 20 as mild, 21 to 25 as moderate and 26 to 30 is classified as severe (12). This questionnaire of more than 90% sensitivity and specificity of 77% to 98% correct classification rate (Correct Classification Rate)% 84 to % 96 (13) This measure tools as the most common symptoms of attention deficit disorder Hyperactivity used (12) and in Iran is normalized (14) in the absence of satisfaction to participate in the study, did not interfere in the process of therapy and in case of other major psychiatric disorders and mental retardation and severe physical disease based on clinical assessment and constipation-inducing drugs, patients were excluded from the study. The study Ethical Committee of Ahvaz University School of

Medicine was approved with a number IR.AJUMS.REC.1394.614.

After collecting the required data using SPSS version 22 to analyze the data collected data is analyzed by chi-square test was used to compare the prevalence of constipation and fecal incontinence and gastrointestinal symptoms, including nausea, vomiting and abdominal pain in both ADHD and children were used. According to statistical considerations P.Value meaningful amount for the project was set less than 0.05.

Results and Discussion

In this study, 100 ADHD and 100 healthy children, whit aged 4-16 years in terms of bowel disorders including constipation and fecal incontinence and gastrointestinal symptoms including nausea, vomiting and abdominal pain were compared using chi-square.

The prevalence of constipation in patients with ADHD was 35.1% and healthy children was 23.3% and no was difference between the two groups the statistically significant, there was no risk of functional constipation (P=0.06).

By comparing the fecal incontinence in people with ADHD, 3.1% have fecal incontinence and 2.9% among healthy children with fecal incontinence that weren't significant differences between the two groups, there was no risk of fecal incontinence (P=0.94).

The Prevalence of abdominal pain in patients with ADHD and healthy children showed that is 13.4% of patients with ADHD and were 6.8% healthy children (P=0.12) a significant relationship between

the prevalence of abdominal pain in patients with ADHD and healthy controls not found.

In a survey of nausea among people with ADHD and healthy children showed that people with ADHD 3.1% and healthy children were 2.9% that had nausea and a statistically significant difference between the two groups wasn't seen($P=0.94$).

In this study, the check of prevalence of vomiting in people with ADHD and healthy children showed that people with ADHD 1% and healthy children were 1.9% that had vomiting And a statistically significant difference between the two groups wasn't seen($P=0.59$).

In this study by comparing the criteria for functional constipation individually showed that two criteria of functional constipation including hard stools and associated whit pain with $P= 0.00$ and large diameter stool whit $P= 0.03$ has found a significant relationship between the two groups. In Table 2, compare the prevalence of functional constipation in ADHD and healthy children.

In this study, demographic data on people with ADHD Studied that include age, gender, and first child of family , city of residence, ethnicity, level of education parent and people, age and occupation of the parents, family and economic situation of the population, their history of addiction, psychiatric disorders and physical illness in the family subjects, as well as a history of physical illness and consumption of drugs in children showed that age, maternal age population and family history of psychiatric disorders have the highest correlation in ADHD people. Also first child of family and gender as variables in other studies in people ADHD, studied, and a statistically

significant association in this study; have been examined.

According to a survey ADHD disorder in age groups 8-4 years, 9-12 years and 16-13 years respectively disorder ADHD, 42%, 60% and 47%, and the prevalence in the age group 9-12 years with $P= 0.00$ had the highest prevalence.

According to this study, the prevalence of ADHD in boys 55% and 37% of girls say prevalence of the disorder among boys was higher by $P= 0.01$. Also in this study considering that 54.8% of ADHD birth of the first child of the family and other children constituted 40% and was $P= 0.03$ Reflects the increase ADHD who were first child of family. In the relationship between maternal age and the prevalence of ADHD showed that 55.6% of women aged 30-40 and 34.3% of women aged 41-50 years and due to the $P=0.00$, ADHD disorder in children of mothers who fourth decade of life have been more than mothers aged 40-50 years. The prevalence of ADHD in the people who lived in an extended family, 30% and 56.4% of the population Low population with regard to the $P= 0.00$ showed the prevalence of ADHD in large families has declined.

The relationship between the prevalence of psychiatric disorders in families with a history ADHD, 68.8% of people in your family have a history of psychiatric disorders and was 46.7% of patients without a psychiatric disorders and according to the $P=0.05$, the increased prevalence of ADHD in association with a the patient had a history of psychiatric disorders in relatives. In the Table 3 is shown the prevalence demographic data in ADHD.

Because the most significant relationship in our study of ADHD, in relation to age,

maternal age, family history of psychiatric disorders and population of family, the correlation mentioned in other statistical analysis, the prevalence of functional constipation in patients with ADHD, paid to other possible factors in the creation of functional constipation in patients with ADHD, and to discover and with consideration of these factors, make better decisions on individuals in order to provide treatment to this group.

The results of the statistical analysis according to the above table shows that in the age group 9-12 years, 26.5% of people with ADHD, has been constipation and 47.6% of people don't have been constipation. Due to the P-value = 0.06 more than 0.05 suggests that in people with ADHD in this age, there isn't an increased prevalence of constipation.

ADHD persons who were mothers aged 30-40 years was 61.8% of them have constipation, while 84.1% of them don't have constipation. according to the P-value=0.01, which is less than 0.05, indicating in people with ADHD, there is a significant relationship between maternal age and the risk of constipation and the prevalence of constipation in people with ADHD that mothers with lower age is less.

Also in this analysis due to the populated family of people with ADHD, 20.6% of them have constipation and 17.5% with ADHD has not constipation and P-value = 0.7 and more than 0.05. So the crowd population of family and individuals having constipation in the people with ADHD there is no significant relationship.

The study in patients with ADHD that have a history of psychiatric disorder in family, 2.9% of them have constipation and 15.9% of patients don't have constipation were

given p-value = 0.9 was more than 0.05 then between familial history of psychiatric in people with ADHD and coalition constipation there is no significant relation.

In Table 4 constipation correlation with demographic data has been measured in people with ADHD.

The results of this study showed that among people with ADHD, 35.1% and 23.3% among healthy children with constipation that were not a significant correlation between the incidence of constipation and ADHD. However, due to the P= 0.06 can say that perhaps Will be significant this relationship with increasing sample size and prevalence of constipation in patients with ADHD increase.

However, in this study by comparing the criteria for functional constipation individually in those two criteria, including hard stools associated with the pain and stool large diameter, has found a significant relationship Although bowel disorders, functional constipation criteria completely in these patients has not filled. McKeown and *et al.*, in 2013 on 750,000 children 4-12 years old, showed the prevalence of constipation in people with ADHD higher (3). In other study Attention deficit hyperactivity disorder prevalence in children with functional constipation in patients of digestive Abuzar hospitals in Ahwaz at 2012 also showed Attention deficit hyperactivity disorder in children with functional constipation, which is 13.5% be suggestive of ADHD as one of the causes of functional constipation in children (15).

In this study, Schlander and *et al.*, on 630 patients ADHD known with age less than 20 years of age, showed there are a range of disorders, that gastrointestinal diseases and metabolic disorders as well as part them in

patients with ADHD(16). Other studies also show ADHD has high comorbidity with other disorders (17).

Studies in 2010 and 2011 in relation to the dietary patterns in people with ADHD showed low intake of vitamin c, leading to lower levels of zinc and copper in their diet and this can also be as an influential factor on constipation and fecal incontinence in ADHDchildren (18, 19). Also, in our study the prevalence of fecal incontinence in patients with ADHD and healthy children showed doesn't exist a correlation between the prevalence of fecal incontinence in people with ADHD. While McKeown and *et al.*, studied the relationship is a significant and the prevalence of fecal incontinence was higher in subjects with ADHD (3). And we can say this relationship is not significant in our study may be due to the sample size is low.

There is a neurobiological disorder that described in other studies behavior problems like ADHD was demonstrated in This disorder can change the relationship between the nervous system and bowel system, delay in bowel movements and changes in bowel distension perception of can explain to constipation and bowel disorder as the study Beaker and cooperation in this field showed that in people with constipation and fecal incontinence and bowel dysfunction it's related to between perceptual processing in the nervous system and intestinal system And this study may suggest an association between behavioral problems and disorders of the bowel (20).

In a study case report in a child who has been treated with sertraline drug and a significant improvement in terms of fecal incontinence; Stronger evidence to explain the enteric nervous system and environment changes and showed possible associations to

describe the relationship between ADHD and fecal incontinence (21).

Also known association ADHD and urinary incontinence stronger evidence provided to explain the neurobiological cause (22).

In addition ADHD and bowel disorders may be structured as a nervous disorder associated with aging are reduced (23).

In another study in 2008 by Van Everdingen-Faasen and *et al.*, in relation to psychosocial problems impact on treatment outcome was fecal incontinence Showed that of 150 children with fecal incontinence who had not recovered a year with regular treatments There was at least one problem in 95% of Psycho-Social and psychotherapy at the same time, 69% of people over 12 month successful, But treatment in children with ADHD, in children with problems associated with parents and mentally retarded children was not successful(24).

In our study, healthy children and ADHD, gastrointestinal symptoms such as nausea, vomiting and abdominal pain have also been determined that correlation was not found between the two groups in these gastrointestinal symptoms.

In a study Almog *et al.*, in 2010, 62 children with ADHD and 57 healthy children compare by in terms of frequency of gastrointestinal symptoms such as abdominal pain, diarrhea, constipation, food allergies and showed a higher frequency of food allergies in children with ADHD, and in general there was no obvious correlation between gastrointestinal symptoms and ADHD (25).

But in a study in 1999 by Helen and colleagues examined the relationship between physical symptoms with anxiety

disorders, depression, conduct disorder and oppositional defiant disorder and ADHD children and adults with biopsy was performed, showed on the girls the prevalence of abdominal pain, headache and musculoskeletal pain associated with anxiety disorders, but boys with ADHD and oppositional defiant disorder are abdominal pain and musculoskeletal pain associated with depression in both sexes (26).

On the other hand benninga and colleagues who study the relation between bowel disorders and behavioral programs for children with anorectal function parameters and associated colon transit time was indicated in 215 Patients' age group 5-14 with bowel disorders, 135 people with constipation, 56 patients with fecal incontinence and 24 with recurrent abdominal pain were children with bowel disorders, behavioral problems than the control group, but there were no behavioral problems in children with abdominal pain(27).

In another study by sally and colleagues in 2007 on the prevalence of psychiatric symptoms in children and adults with the frequent vomiting syndrome, Showed in children with anxiety disorders, but this syndrome in adults with panic disorder after the accident (PTSD) and somatization disorders associated (28). But no study has been done on the prevalence of disorder in ADHD.

In our study also examined demographic information, gender, first child of the family, age, psychiatric disorders and maternal age and population family has significant relationship with ADHD So that ADHD disorder is more common in men, and this finding in all studies have had similar results (29).

Our study more prevalent in the age group 9-12 years in ADHD but kochakzadesalemi and etal study of healthy and colleagues as well as in the study Moradi and etal highest incidence in the age of 5 years (30,31).

In another study in our country at the age of 3-4 years, the rate of these disorders is more; but in another study there was no significant relationship between age and ADHD (32, 33).

In Review Prevalence of ADHD and rank of birth, our results showed that the frequency of the first child of the family is more common in ADHD and this result was similar in McKeown and colleagues, the study Abdollahian and etal and kochakzadesalemi and etal in rasht(3,30,33).

ADHD in children of mothers who were the living quarters was more than mothers with the age group 40-50 years. And in study of kochakzadesalemi and etal also showed that between attention deficit disorder and hyperactivity and age were significantly correlated parents. So that the mean age of fathers and mothers was lower in ADHD children (30). In our study, the same frequency with the age of the fathers was not significant. By comparing the population of family in the incidence of this disorder, showed the prevalence of ADHD in large families (more than four) decreased.

While the study Abdollahian and etal and kochakzadesalemi and etal don't found a significant relationship between the population family and ADHD (30, 31).

Considering that our study of age, maternal age, family history of psychiatric disorders and populations family have most statistically significant relationship with the occurrence of ADHD. In another statistical analysis studied the correlation between

variables in ADHD with functional constipation to discover other possible factors in the creation functional constipation in patients with ADHD, and by taking these factors, make better decisions on individuals in the treatment group. Given that the similar studies haven't been done to investigate the correlation.

In this analysis considering that ADHD was the highest prevalence in the age group 9-12 but the prevalence of constipation in these patients were not more than other patients in other age groups.

Statistical analysis also compared to the family crowd and having constipation in patients with ADHD. Statistically significant was not found relationship and with the population growing family, not increase the risk of constipation.

In this study, the relationship between the incidences of constipation in patients with ADHD has mothers 30-40 years and mothers with ages 40-50 years were measured. The results showed that in patients with ADHD, there is a significant relationship between mother age and the risk of constipation. It can be concluded in ADHD with constipation, mothers are older.

Table.1 Comparison of dification disorders and gastrointestinal symptoms in ADHD children and healthy children

Group Disorder	ADHD	Healthy children	P
constipation	35.1%	23.3%	0.06
fecal incontineny	3.1%	2.9%	0.94
abdominal pain	13.4%	%68	0.12
nausea	3.1%	2.9%	0.94
vomiting	1%	1.9%	0.59

Table.2 Comparison of the prevalence of functional constipation in ADHD and other people

Criteria of functional constipation	ADHD	Healthy children	p
Dification time <2 in week	20.6%	14.6%	0.26
Special posture	21.6%	20.4%	0.82
Large diametr stool	39.2%	25.2%	0.03
Large diametr fecal in rectum	6.2%	7.8%	0.78
Hard diffication	21.6%	7.8%	0.00

Table.3 ADHD individual distribution based on demographic characteristic

Variable		numeric	Percent	P
Age	4-8	50	42%	0.00
	9-12	39	60%	
	13-16	8	47%	
Gender	Male	70	55%	0.01
	Female	27	37%	
Birth	first child	63	54.8%	0.03
	Other children	34	40%	
maternal age	30-40	74	55.6%	0.00
	41-50	33	34.3%	
Family population	Over crowded	18	30%	0.00
	Low population	79	56%	
psychiatric disorders	Yes	11	68.8%	0.05
	No	86	46.7%	

Table.4 Demographic data correlation constipation with ADHD

	ADHD-constipation	ADHD-no constipation	P
Age(9-12)	26.5%	47.6%	0.06
Maternal age(30-40)	61.8%	84.1%	0.01
Over crowded	%20.6	17.5%	0.7
With psychiatric disorders	2.9%	15.9%	0.9

So overall, we can conclude our study age, family population history of psychiatric disorders in ADHD with constipation does not increase of risk of constipation. In the event that the mother's age it's related the prevalence of constipation in people with ADHD and those older mothers have a higher incidence of constipation.

Which may cause a lack of awareness of on the regulation of ADHD diet and learn the correct pattern dification to children by mothers was associated and leading to increased prevalence of constipation in these individuals. Of course, proving this, more and more studies are needed .

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