

Research Article

What do Children with ADHD believe about Cigarette Smoking?

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ADHD (Attention Deficit Hyperactivity Disorder) is a common psychiatric disorder in children and adolescents. Studies show that children and adolescents with ADHD are at a higher risk of smoking cigarettes and abusing substances at an earlier age of onset.

The main purpose of this study was to examine the attitude toward cigarette smoking in 7 to 12 year old children with ADHD compared to their siblings without ADHD and a non-related control group in the same age range.

This was a comparative cross-sectional study performed in 2009 on three groups of 7 to 12 year old children. Our study showed no significant difference between the three groups in regard to their attitude toward cigarette smoking, although children with ADHD had a more negative attitude toward smoking than the control groups. There was no significant difference between boys and girls. There was a negative correlation between age and attitude toward cigarette smoking ($r=-0.618$); as older children had a less negative attitude toward smoking. Although not significant, a relatively high number of children thought that cigarette smoking makes them fit and has a relaxing and calming effect at the time of stress.

Our findings of negative attitude toward cigarette smoking in 7 to 12 year old children may imply that children can change their attitude toward cigarette smoking later in life. Adolescents under study showed a more positive attitude about being fit and feeling relaxed by cigarette smoking; although not statistically significant, but this may imply motor and mind restlessness and can be an indication for treatment of ADHD symptoms. The results of this study could be a preliminary step for conducting more studies to determine groups of children with higher risks for future cigarette smoking and the critical age for planning the prevention programs.

Keywords: Attention Deficit and Hyperactivity Disorder; Attitude; Children; Smoking

Introduction

Attention Deficit Hyperactivity Disorder (ADHD) is a sustained pattern of inattention, hyperactivity, and impulsive behavior which is stronger and more than predicted in normal children with similar age and developmental level. ADHD is a common cause of psychiatry clinic visits in children. The prevalence of this disorder has been reported between 5% to 12% with a higher rate in boys (2/1 to 9/1) [1]. ADHD follows a variable trend and some signs and symptoms may continue throughout adolescence and adulthood. Many patients may experience amelioration of symptoms by adulthood but they remain susceptible to other psychiatric morbidities including anti-social behaviors, substance abuse, and mood disorders. Some studies have shown that more than half of patients demonstrate sustained symptoms until adulthood and the prevalence of ADHD in adults is estimated to be about 5% [2].

Epidemiologic studies confirm the relationship between cigarette smoking and psychiatric disorders as a risk factor and among them patients with ADHD have a considerably higher risk [3]. Adolescents with ADHD have a higher risk for developing conduct disorder.

Children with comorbid diagnosis of ADHD and conduct disorders are at a higher risk for substance-related disorders. ADHD by itself, i.e. without conduct disorder, is associated with the increased probability of substance abuse in adulthood [4,5]. Several studies show that ADHD is a risk factor for early substance abuse and serious substance dependency [6-8]. There is also a relationship between ADHD and early regular cigarette smoking and severe nicotine dependency [9,10]. It is proposed that ADHD in childhood provides a background for the increased probability of cigarette smoking and substance abuse [11]. Previous studies carried out on Iranian adolescents with ADHD indicate early age and higher risk of cigarette smoking compared with a control non-ADHD group [12].

Cigarette smoking in children and adolescents is a worldwide public health concern. Prolonged smoking causes shorter life expectancy. The earlier age of smoking, the more serious nicotine dependency; also, there is less likely chance of quitting in adulthood [13]. According to a study carried out on Iranian high school students, 22% of senior high school students smoke cigarettes at some point [14].

According to “gateway theory”, the onset of early smoking is a predictor of using illegal substances during adolescence and adulthood [9,13]. In general, children and adolescents start smoking cigarettes after acquiring information about this substance, and this awareness is a background for future attitude toward this substance [15, 16]. Therefore, understanding children’s attitude toward smoking and developing creative proper preventive measures and interventions during childhood is important [17,18]. Since establishing a positive attitude toward safe behavior is easier than changing negative ones, effective interventions are being based on the accurate assessment of knowledge and belief of the target group [15]. However, there are only a few studies assessing the attitude toward smoking before adolescent years [19]. Freeman et al studied children’s perception about cigarettes and concluded that 97% of fifth grade students believed that smoking is not a suitable behavior for their age. Although 90% of children agreed with the negative impacts of cigarettes on their health, about 3% of second graders believed that smoking is pleasurable, about 20% thought that smoking helps them to remain fit, and 10% thought it makes them appear attractive. They also believed that smoking improves their self-confidence. These rates were even higher in 5th grade students (19 and 22 percent, accordingly). About 40 percent of fifth grade students believed that smoking causes relaxation and 30% stated that smoking improves bad temper [20].

In a study carried out by Porcellato et al about the attitude of 4 to 8 year old children toward smoking, 91% of the population under study believed that smoking is a bad behavior, 3% believed that it is a good behavior, and 6% had no idea. However, 70% of the students with a positive attitude toward smoking had smoker parents and 60% of these students were 4-5 years old. The number of boys who believed that smoking is a good behavior was twice as much as that of girls. It was interesting that although the children had a generally negative attitude toward smoking, most of them believed that this would be an acceptable behavior when they grow up [15].

Iranian researchers found that having smoker friends and curiosity are two major factors that affect attitude toward smoking [14]. Greenland et al studied third to fifth grade students and reported that they generally agreed with the negative effects of smoking on physical and mental health and social performance. They did not find statistically significant difference between boys and girls [19].

Wang et al concluded that children who believed cigarette addiction happens after a period of time were more inclined to try smoking in order to obtain experience. In this study, the children who believed that even one-time smoking can result in addiction were less inclined to experience smoking [17].

Sigelmen argued that elementary school students are aware of some facts such as the name and physical properties of substances, but their knowledge about the effects of substances on their health and well-being is not so deep. It seems that the attitude of children toward the behavioral effects of substances becomes positive sometime in the middle of elementary school period [18].

The attitude of children toward smoking could predict this behavior in the future, so the positive attitude toward cigarette smoking in childhood can be a precondition for the use of this substance by adolescents in the future. ADHD is a common disorder

and the affected individuals are at a higher risk for cigarette smoking. Although there are many studies on the prevalence and pattern of cigarette smoking among adolescents and adults with ADHD, there is no study in available literatures about the attitude of children with ADHD toward smoking.

The aim of this study was to determine the attitude of elementary school aged children with ADHD toward cigarette smoking compared with their siblings and a control group of the same age group without diagnosis of ADHD. We hypothesized that children with ADHD show a more positive attitude toward cigarette smoking compared to children without ADHD.

Materials and Methods

This was a comparative cross-sectional study. The study was approved by the Ethical Committee at Research Center of Guilan University of Medical Sciences in accordance with declaration of Helsinki. We obtained written informed consent from parents after explaining the purpose and the procedure of the study as well as reassurance of confidentiality.

Participants

The study was performed on three groups of 7 to 12 years old children in 2009 in Rasht, a city in Northern Iran. The first group was patients with ADHD who were referred and followed at Shafa Hospital in Rasht. We identified children with ADHD who had siblings between 7 to 12 years old, using a registration list which contained personal information of the children. We recruited the siblings of the first group if they were in the age range of the study and did not have ADHD. The third group was recruited with the coordination of the Dental School of Guilan Medical Science University. The group constituted children at the study age range who were seen at the Guilan University dental clinic for their dental appointment and did not have the diagnosis of ADHD. The diagnosis was made by our child and adolescent psychiatrist using a clinical interview and semi-structured K-SADS (Kiddies Schedule for Affective Disorders and Schizophrenia for school age children) questionnaire. Both control groups were assessed to rule out the diagnosis of ADHD using the same clinical interview and K-SADS questionnaire. To confirm the diagnosis of ADHD and other co-morbidities in the first group and reject the diagnosis of ADHD in two control groups, participants and their parents were interviewed by well-trained interviewers using the Persian version of K-SADS [21]. All variables were sorted according to the questionnaire scores. We also collected demographic data and attitude toward cigarette smoking using a hand-written questionnaire.

Measures

1. Demographic questionnaire included family and social information including age, sex, current status of smoking, and substance use in family members.

2. Questionnaire about attitude toward cigarette smoking: This questionnaire was similar to the one that was used in Freeman et al studies [20]. In order to confirm the reliability of the questionnaire, it was first translated from English to Persian and then retranslated from Persian to English. The validity of the questionnaire was confirmed by consulting with 7 faculty members. Each question had 4 possible answers, and the answer selected by the children was registered in

Table 1: Demographic characteristics of participants.

Variables	Groups	ADHD	Siblings	Group 3	p-Value
Age (Mean±SD)	-	9.48 ±1.92	10.10±2.13	9.48±1.92	NS
Gender (n)	Male	22	19	22	NS
	Female	20	23	20	
Attitudes toward smoking (n)	Positive	0	1	0	NS
	Negative	42	41	42	
Smoking in family member (n)	Yes	21	21	18	NS
	No	21	21	24	
Substance use in family member (n)	Yes	8	8	6	NS
	No	34	34	36	

NS: Not Significant

Table 2: Average score of attitude toward cigarette smoking.

Group	Mean±Standard Deviation	p-Value
ADHD	10.05±1.30	NS
Siblings	9.31±1.58	
Group 3	9.50±1.61	

the questionnaire. “Yes” and “Maybe” answers meant “I agree” while “I do not think so” and “No” answers meant “I disagree.” Scoring direction of given questions was different so that the maximum score of negative attitude was 12 while the maximum score of positive attitude was zero and the boundary point was 6.

3. Kiddies Schedule for Affective Disorders and Schizophrenia for school age children (K-SADS) Persian version: This questionnaire was used to confirm the diagnosis of ADHD and other co-morbidities in the first group and reject the diagnosis of ADHD in their siblings and the other control group. This is a semi-structured questionnaire employed to determine different emotional and schizophrenia disorders and is used for people aged 6 to 18.

An interviewer asked questions from children as well as their parents and filled in the questionnaire. Each question was answered by the parent and the child (the patient) in both past and present tenses. If the interviewer found the preliminary questions confusing

and/or had doubts about the diagnosis, then the supplementary section of the questionnaire with more comprehensive questions was used. The supplementary questionnaire covered the following ranges of disorders: mood disorders, psychoses, anxiety disorders, destructive behavior disorders, tic disorders, substance abuse, and post-traumatic stress disorder. The final diagnosis was made by the therapist by assessing and comparing information gathered from children and parents. The validity and reliability of this tool has been previously confirmed in Iran [21].

Statistical analysis

Data was analyzed by SPSS version 16. The frequency, percentage, t-test, and chi-square statistical tests calculated. A p-value < 0.05 was considered significant.

The variables included the ADHD or absence of ADHD diagnosis, age, sex, smoking in family members, substance abuse by a family member, presence of co-existing morbidity, and attitude of children toward smoking. The selection process of the study was intended to homogenize the effect of socio-economic factors on the attitude of participants when chosen within same families.

Results

This study included 126 children in three groups of patients and controls. Each group consisted of 42 members. Table 1 shows

Table 3: Attitude toward smoking.

Proposition	Attitude	
	Positive N(%)	Negative N(%)
Smoking is good for girls my age.	2 (1.6)	124 (98.4)
Smoking is good for boys my age.	2 (1.6)	124 (98.4)
People seem stupid when they are smoking.	110 (87.3)	16 (12.7)
Smoking is a very bad behavior.	6 (4.8)	120 (95.2)
Smoking causes sickness and disease.	1 (0.8)	125 (99.2)
I would be annoyed if one of my friends started to smoke.	3 (2.4)	123 (97.6)
Smoking is enjoyable.	1 (0.8)	125 (99.2)
Smoking increases the body’s fitness.	58 (46)	68 (54)
People seem attractive when they are smoking.	2 (1.6)	124 (98.4)
Smoking makes people self-confident.	4 (3.2)	122 (96.8)
Smoking relaxes people.	53 (42.1)	73 (57.9)
Smoking calms people when they are upset or stressed.	58 (46)	68 (54)

demographic information of participants. Thirty children with ADHD (71%) had other psychiatric comorbid conditions.

In the families of the studied children, 60 individuals stated that they were smoking cigarettes (47.6%) while 66 individuals had no smoking background (52.4%). The average attitude scores among girls and boys toward cigarette smoking were 9.5 ± 1.4 and 9.7 ± 1.7 , respectively ($p > 0.05$).

There was no significant difference between attitude toward smoking cigarettes and age. There was a negative correlation between age and negative attitude toward cigarette smoking; as age increased the positive attitude toward smoking cigarettes increased ($r = -0.618$).

There was no significant difference in the average score of attitude toward cigarette smoking between the groups Table 2. Table 3 shows the children's attitude toward each question. The average score of attitude toward cigarette smoking in ADHD children with and without smoker family members was 10.63 ± 1.06 and 9.91 ± 1.33 , respectively ($p > 0.05$). The average score of attitude toward cigarette smoking in ADHD children with and without co-morbidities was 10.17 ± 1.26 and 9.75 ± 1.42 , respectively ($p > 0.05$).

Although not significant, a relatively high number of children thought that cigarette smoking makes them fit and similarly, many children believed that smoking makes them feel relaxed Table 3.

Discussion

The main purpose of this study was to assess the attitude of 7 to 12 year old children and adolescents with the diagnosis of ADHD toward cigarette smoking compared to that of siblings without a diagnosis of ADHD and a non-related control group. We found a negative attitude toward cigarette smoking in 7 to 12 year old children and adolescents of the studied sample, while there was no significant difference among the three studied groups and between boys and girls. The negative correlation between age and negative attitude toward cigarette smoking was evident so that as age increased, attitude toward smoking cigarette increased in a positive direction.

The results of this study are similar to those of previous studies [15,18,19]. Similar to Procellato's study, in which 91% of children believed that smoking, is a bad behavior, in our study, 98.4% of children thought so. It should be noted that in Procellato's study, smoker parents influenced the development of a positive attitude toward cigarette smoking in their children, and boys had a more positive attitude than girls [15]. Our findings were in agreement with Greenland et al study as they found no difference between boys and girls in regard to their attitude about smoking [19]. Similarly, Freeman et al showed no correlation between positive attitude about smoking and having a smoker in family. Freeman et al showed that 97% of children believed that smoking is not a proper behavior for their age [20]. Our finding of correlation between increasing age and positive attitude toward smoking cigarettes has been similar with the results of previous studies [18].

Smoking is an evolutionary phenomenon and most psychological models indicate that positive attitude toward cigarette smoking in childhood can be a predictor of smoking behavior in adolescents [22]. On the other hand, all studies carried out in Iran and across the world indicate that the common age of smoking onset is below

18 years [12-14, 22-24]. Therefore, it seems that the beginning of adolescence is a critical period in which a negative attitude toward cigarette smoking changes to positive and results in the initiation of the smoking behavior. In a similar study in male students of a high school in Rasht, the average age of smoking onset was 12.8 ± 2 [14]. In our study, the average age of the studied groups was 9.48 and 10.10 respectively, indicating a short time between change of attitude from negative to positive and beginning of smoking behavior. This finding provides important direction for future studies in finding the critical time of planning preventive programs.

It should be noted that Mohtasham-Amiri et al studied all kinds of smoking, including smoking for obtaining experience, so only 15% of adolescents were current smokers and a majority of participants were only experimental smokers. Smoking for experience might play a weaker role in the development of a positive attitude toward smoking in adolescents, as the main motivation is curiosity. In fact, smoking for obtaining experience and smoking after acquiring a positive attitude toward smoking are two separate motives that can affect the beginning of smoking in the early adolescent years [23].

This was the first study to investigate the attitude of Iranian children with ADHD toward cigarette smoking. None of the previous studies about the attitude toward smoking examined the association in children and adolescents with ADHD. The fact that we did not find any significant difference between the general attitude of these children and that of the sibling and the other control group, despite early age of smoking in children with ADHD [9,22], can be attributed to the younger age of the participants in our study.

Presence of co-morbid conditions of oppositional behavior and conduct disorders with ADHD is believed to be associated with the increased risk of smoking behavior over ADHD by itself [24]. In this study, the co-existence of oppositional behavior disorders and ADHD did not affect the attitude toward smoking. Our sample size was small and none of the participants suffered from conduct disorder as a comorbid condition along with ADHD.

Participants in the study responded more positively to the question about the positive effect of smoking in fitness and being calm and relaxed. This finding can imply a prediction of attitude change in this group of youth compared with other groups, so that even though there was no significant difference in the general attitude toward smoking between ADHD and control groups, the attitude toward being fit and relaxed by smoking was obvious. This change may be the preposition to changes in their attitudes and a prelude for early smoking. In addition, this finding can highlight the presence of restlessness as a symptom in this group of participants. Since these children believe that smoking can have a relaxing function, this may increase their risk of smoking. It is known that mental and physical restlessness is an important sign of ADHD and in the evolutionary course of the disorder, from childhood to adolescence, the motor restlessness and hyperactivity evolves to mental restlessness in adolescence and adulthood [1]. Thus, the need for proper attention to early diagnosis of ADHD-related symptomatology and effective treatment is very important.

Limitations

Our sample size was small as finding 7 to 12 year old children

with ADHD who had siblings without diagnosis of ADHD was a challenge. Therefore, we included a second control group to increase sample size. Additionally, the authors believe that smoking is a multi-factorial entity and a questionnaire may not be a very good tool for assessing the attitude in the community.

Summary and Suggestions for Future Research

This study was the first to investigate the attitude of Iranian children with ADHD toward cigarette smoking. We found no significant difference between different groups of 7 to 12 year old children, and between boys and girls. There was a negative correlation between age and attitude toward cigarette smoking. Despite a negative attitude of the three studied groups toward cigarette smoking, many children believed that smoking results in relaxation and fitness, and improves bad feelings. The emergence of these inaccurate beliefs in children is a notable finding of this study, which can be a step for broader studies about the attitude, as well as awareness, of children and their mental background about smoking. The applicable result of this study can be a small step for determining the target age group for preventive educational interventions in cigarette smoking. It seems that educational programs aiming to establish a correct attitude are successful if implemented in late childhood or early adolescence.

References

- Lewis's Child and Adolescent Psychiatry. IVth Edition. 2007.
- Adler L, Cohen J. Diagnosis and evaluation of adults with attention-deficit/hyperactivity disorder. *Psychiatr Clin North Am.* 2004; 27: 187-201.
- Moolchan ET, Ernst M, Henningfield JE. A review of tobacco smoking in adolescents: treatment implications. *J Am Acad Child Adolesc Psychiatry.* 2000; 39: 682-693.
- Wilens TE. Attention-deficit/hyperactivity disorder and the substance use disorders: the nature of the relationship subtypes at risk, and treatment issues. *Psychiatr Clin North Am.* 2004; 27: 283-301.
- Barkley RA, Fischer M, Smallish L, Fletcher K. Young adult follow-up of hyperactive children: antisocial activities and drug use. *J Child Psychol Psychiatry.* 2004; 45: 195-211.
- Looby A. Childhood attention deficit hyperactivity disorder and the development of substance use disorder: valid concern or exaggeration? *Addict Behav.* 2008; 33: 451- 463.
- King VL, Brooner RK, Kidrof MS, Stoller KB, Mirsky AF. Attention deficit hyperactivity disorder and treatment outcome in opioid abusers entering treatment. *J Nerv Ment Dis.* 1999; 187: 487- 495.
- Riggs PD, Hall SK, Mikulich-Gilbertson SK, Lohman M, Kayser A. A randomized controlled trial of pemoline for attention-deficit/hyperactivity disorder in substance-abusing adolescents. *J Am Acad Child Adolesc Psychiatry.* 2004; 43: 420-429.
- Riggs PD, Mikulich SK, Whitmore EA, Crowley TJ. Relationship of ADHD, depression, and non-tobacco substance use disorders to nicotine dependence in substance-dependent delinquents. *Drug Alcohol Depend.* 1999; 54: 195-205.
- Molina BS, Pelham WE. Childhood predictors of adolescent substance use in a longitudinal study of children with ADHD. *J Abnorm Psychol.* 2003; 112: 497-507.
- Arias AJ, Gelernter J, Chan G, Weiss RD, Brady KT, Farrer L, et al. Correlates of co-occurring ADHD in drug-dependent subjects: Prevalence and features of substance dependence and psychiatric disorders. *Addict Behav.* 2008; 33: 1199-1207.
- Kousha M, Shahrivar Z, Alaghband-rad J. Substance use disorder and ADHD: is ADHD a particularly "Specific" risk factor? *J Atten Disord.* 2012; 16: 325-332.
- Milton B, Cook PA, Dugdill L, Porcellato L, Springett J, Woods SE. Why do primary school children smoke? A longitudinal analysis of predictors of smoking uptake during pre-adolescence. *Public Health.* 2004; 118: 247-255.
- Amiri ZM, Bakht CS, Rad RN. Cigarette Smoking Among Male High School Students in Rasht. *Journal of Guilan University of Medical Sciences.* 2008; 17: 100-107.
- Porcellato L, Dugdill L, Springett J, Sanderson FH. Primary school children's perceptions of smoking: implication for health education. *Health Educ Res.* 1999; 14: 71-83.
- Andrews JA, Tildesley E, Hops H, Duncan SC, Serverson HH. Elementary School Age Children's Future Intentions and Use of Substances. *J Clin Child Adolesc Psychol.* 2003; 32: 556-567.
- Wang C, Henley N, Donovan RJ. Exploring children's conceptions of smoking addiction. *Health Educ Res.* 2004; 19: 626-634.
- Sigelman CK, Rinehart CS, Sorongon AG, Bridges LJ, Wirtz PW. Teaching a coherent theory of drug action to elementary school children. *Health Educ Res.* 2004; 19: 501-513.
- Greenland KJ, Johnson CC, Webber LS, Berenson GS. Cigarette smoking attitudes and first use among third- through sixth-Grade students: the Bogalusa Heart Study. *Am J Public Health.* 1997; 87: 1345-1348.
- Freeman D, Brucks M, Wallendorf M. Young children's understandings of cigarette smoking. *Addiction.* 2005; 100: 1537-1545.
- Shahrivar Z, Kousha M, Moallemi S, Tehrani-Doost M, Alaghband-Rad J. The Reliability and Validity of Kiddie-Schedule for Affective Disorders and Schizophrenia - Present and Life-time Version - Persian Version. *Child and Adolescent Mental Health.* 2010; 15: 97-102.
- Kaplan & Sadock's synopsis of psychiatry: behavioral sciences/clinical psychiatry. Xth Edition. 2007.
- Kaplan & Sadock's comprehensive textbook of psychiatry. IXth Edition. 2009.
- Clure C, Brady KT, Saladin ME, Johnson D, Waid R, Rittenbury M. Attention-deficit/hyperactivity disorder substance use: symptom pattern and drug choice. *Am J Drug Alcohol Abuse.* 1999; 25: 441-448.