



## Epidemiological and clinical study of patients with Alzheimer's in Five Cities of Khuzestan Province in 2016-2018

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**Introduction:** The most common form of dementia, which is the progressive loss of cognitive function and often occurs in old age, is Alzheimer's disease. Alzheimer's disease is a chronic progressive and debilitating brain disorder that has had profound effects on memory, intelligence and self-care. Considering that in some studies there was no significant relationship between Alzheimer's disease and diabetes. Therefore, this epidemiological study was conducted to investigate patients with Alzheimer's and some of its risk factors with the aim of determining the Epidemiological and clinical study of patients with Alzheimer's in Five Cities of Khuzestan Province in 2016-2018. **Materials and methods:** The study included 854 patients with Alzheimer's cases that were inhabited by five of the Khuzestan Province, and reviewing patient records was performed by ten researchers. After obtaining the necessary permissions and sponsorship by Behbahan University of medical sciences, Patients were informed through written consent; their files were used for this study. The data in this study included demographic, laboratory and clinical data of patients. Data were entered into SPSS software version 18 and analyzed by descriptive statistics, analytical tests and significant level of  $P < 0.05$ . **Results:** The study included 854 Alzheimer's patients with a mean age of  $63.00 \pm 11.51$  years. Of these, 66.8% were male and the rest were women. In this study, 230 (26.9%) patients had a history of smoking and did not consume the rest. Of the 225 (26.3%) patients with Alzheimer's family history, 144 (34.8%) had a history of diabetes. Also, 25.5% of the family history of diabetes, 99 (11.5%) had a history of mental illness. There was a significant relationship between marital status and diabetes history ( $p < 0.0001$ ). There was a significant relationship between marital status and smoking history ( $p = 0.003$ ). **Conclusion:** In this study, there was a significant relationship between the history of smoking and Alzheimer's history, and also was significant relationship between the history of diabetes and the history of Alzheimer's disease, So it can be said that diabetes and smoking are two risk factors for Alzheimer's disease. It is necessary to identify other important risk factors by conducting epidemiological studies such as the current study and even the larger sample size. It is also better to take the necessary measures to prevent the risk of a new factor for the disease.

### INTRODUCTION

The most common form of dementia, which is the progressive loss of cognitive function and often occurs in old age, is Alzheimer's disease. Alzheimer's disease is a chronic progressive and debilitating brain disorder that has been associated with profound effects on memory, intelligence and self-care (1-4). In 2010, about 35 million people in the world suffered from the disease, and it is expected that in 2050, one in every 85 people will suffer from this illness. In the United States, in 2010 nearly 5.5 million people had Alzheimer's disease. The cost of treatment, medicine and maintenance costs is estimated at \$230 million

per year (5,6). According to the World Health Organization (WHO) reports in 2014, there was 4,000 Alzheimer's death annually in Iran (7). Diabetes is one of the risk factors for this disease (1). Diabetes is the most commonly diagnosed disease of metabolic disorders and a major global challenge. It is a chronic, metabolic and genetically heterogeneous disease characterized by increased levels of blood glucose and carbohydrate metabolism disorders, protein and lipids. Inappropriate combination (low physical activity and unhealthy foods) has increased the uncontrolled prevalence of diabetes in the world (8-13). In fact, it can be said that insulin resistance is type 2 diabetes that causes Alzheimer's disease (1). New approaches to Alzheimer's treatment include nutritional interventions. Although some studies have shown the positive effects of the Mediterranean diet, but the current information for prescribing this kind of treatment is inadequate (14). The latest therapeutic approaches that have been studied in many studies on animal specimens and have shown a positive result are cell therapy and the use of stem cells. The next step for these studies is to design human studies by finding the best stem cell for injection (15-17). Given that the

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results of Madmoli et al. showed that there was a significant correlation between Alzheimer's disease and insulin consumption, but there was no statistically significant relationship between Alzheimer's disease and diabetes (1). And that Alzheimer's disease progresses immensely, and at first it destroys the structure of the brain and then it develops clinically. Which can be prevented by the diagnosis of these structural changes in the brain in the timely manner (6) and planning to increase the health of patients with Alzheimer's requires an epidemiological study of the disease and its risk factors to prevent it. Therefore, this epidemiological study was conducted to investigate patients with Alzheimer's and some of its risk factors with the aim of determining the Epidemiological and clinical study of patients with Alzheimer's in Five Cities of Khuzestan Province in 2016-2018.

## MATERIALS AND METHODS

This study is a retrospective cross-sectional descriptive study. The study included 854 Alzheimer's patient's resident in Ahwaz, Shoushtar, Behbahan, Masjed Soleyman and Abadan, that reviewing patient records was performed by ten researchers. The patients, who were diagnosed with Alzheimer's and referred to treatment centers in the five cities from 2016 to 2018, were included in the study. This article is the result of the research project of Behbahan University of Medical Sciences with the code of ethics IR.BHN.REC.1397.9544. After obtaining the necessary permissions and sponsorship by Behbahan University of medical sciences, Patients were informed through written consent; their files were used for this study. In this study, 854 cases of Alzheimer's patients who were referred to these hospitals were studied. The required data for this study were extracted from medical records of hospitals during 2016-2018. The criteria for entering the study included all Alzheimer's patients in each age group and sexually diagnosed with this disease. The Cases who had medical diagnosis other than the disease, and cases that were incompletely filled were not used and were excluded. To study the cases and collecting data first, a written letter was received from the Research Vice Chancellor of the Medical Sciences Universities of these cities then; records of patients referring to health centers in the archives department were used. The required information was collected through a researcher checklist from the records.

The data in this study included demographic, laboratory and clinical data of patients. That Includes: gender, age, marital status, ethnicity, occupation, economic status, educational level, history of smoking, history of diabetes, history of psychiatric diseases, family history of diabetes and Alzheimer's disease. Then Data was then entered into SPSS software version 20. and analyzed by descriptive statistics, including enumerated tables, mean, standard deviation and variance, and analytical tests including Chi-square and Chi-square Pearson, T-test, ANOVA and at a significant level of  $P < 0.05$ .

## RESULTS

The study included 854 Alzheimer's patients with a mean age of  $63.00 \pm 11.51$  years. Of these, 66.8% were male and the rest were women. In terms of marital status, the highest percentage was for single people with 45.7%. There was a significant relationship between marital status and diabetes history ( $p < 0.0001$ ). Also There was a significant relationship between marital status and smoking ( $p = 0.003$ ). Among the different ethnic groups, the largest number of people was Lor people, with 322 persons, Shoushtari-Dezfuli with 223 people, Arabs with 214 people and 195 Kurds. Table 1 shows the demographic information of these individuals.

In this study, 230 (26.9%) patients had a history of smoking and did not consume the rest. Of the 225 (26.3%) patients with Alzheimer's family history, 144 (34.8%) had a history of diabetes. Also, 25.5% of the family history of diabetes, 99 (11.5%) had a history of mental illness. There was a significant relationship between the history of smoking and the history of diabetes with all variables of history of psychiatric diseases, Alzheimer's history and family history of diabetes ( $P < 0.05$ ) (Table 2). There was a significant relationship between the history of diabetes and sex ( $P = 0.004$ ), but there was no significant correlation between the history of smoking and sex in Alzheimer's patients ( $P = 0.19$ ), (Figure 1). In this study, the frequency of men with history of Alzheimer's disease and psychiatric disease was higher than of women (Figure 2).

## DISCUSSION

The most common form of dementia, which is the progressive loss of cognitive function and often occurs in old age, is Alzheimer's disease. Alzheimer's disease is a chronic progressive and debilitating brain disorder that has been associated with profound effects on memory, intelligence and self-care (1-4). This epidemiological study was conducted to investigate patients with Alzheimer's and some of its risk factors with the aim of determining the Epidemiological and clinical study of patients with Alzheimer's in Five Cities of Khuzestan Province in 2016-2018.

In this study, the mean age of patients with Alzheimer's disease was 63 years. In the study of Madmoli et al., (1), the age of Alzheimer's patients who were also afflicted with diabetes It was almost all over the age of 60 years, which is in line with the current study.

In one study, the prevalence of Alzheimer's disease was calculated. Of those over 65, 10.3% had Alzheimer's disease. Of those aged 65-74, 3% of the patients had Alzheimer's, 18.7% of those aged 75-84 and 47.2% of those over 85 years of age (18). Alzheimer's disease is more prevalent with increasing age. Age is the largest AD risk factor, and many epigenetic changes occur with natural aging. These changes are seen in AD, although these changes may occur at an earlier age in patients with Alzheimer's and AD can be confused with premature aging. Because these epigenetic changes contribute to the pathology and development of Alzheimer's disease, it is now very important. The main cause of this disease is the destruction of neurons (neurons in the brain) which results in the formation of aging plates that ultimately lead to the death of neurons (19). In this study, 26.9% had a history of smoking. And the relationship between smoking history and history of Alzheimer's disease was significant ( $< 0.0001$ ). The results of the study, Ott A et al., Showed that smokers were at increased risk of dementia and Alzheimer's disease compared to those who never smoked. Smoking is a strong risk factor for Alzheimer's disease in people without the allele of APOE  $\epsilon 4$ , but the participants in this allele had no effect. This study also showed that smoking was associated with doubling the risk of dementia and Alzheimer's disease (20). The results of study Lee PN et al showed Based on the overall evidence from 19 case studies; it showed that there is a very significant negative relationship between Alzheimer's disease and smoking (21). The results of the Brenner DE study on Alzheimer's patients showed that the "dose response" pattern had the highest risk reduction among those who consume the lowest cigarette and a dose-dependent biological mechanism regulator, showed a Nicotine Magnetic Receptors (cholinergic) (22). The authors of the study examined the hypothesis that smoking has a protective effect on Alzheimer's disease or dementia in a population of 668 people aged 75 to 101 years (Sweden), The results showed that smoking had a negative

**Table 1** Demographic characteristics of patients with Alzheimer's and its relation with smoking and history of diabetes by Chi-square and Chi-square Pearson Test

Variable	Classification	Number	Percentage	Relationship with the history of smoking P value	Relationship with the history of diabetes P value
sex	Male	571	66.8	0.19	0.004
	Female	283	33.2		
Education	Illiterate	322	37.7	0.003	0.009
	Illiterate-middle school	223	26.1		
	Diploma	158	18.5		
	Bachelor's degree and higher	149	17.4		
occupation	Free	366	42.8	0.27	0.02
	Unemployed	203	23.7		
	Employee	182	21.3		
	housewife	103	12.0		
The economic situation (Monthly-To mans)	Up to 1.5 million	354	41.4	0.03	0.007
	Above 1.5 million	500	58.5		

\* A significant level below 0.05 is considered.

**Table 2** Frequency and Frequency percentage of diabetes history and smoking and its association with the history of psychiatric diseases, Alzheimer's history and family history of diabetes in patients with Alzheimer's disease

Variable	Frequency	Frequency percent	Relationship with a history of psychiatric diseases	Relationship with a history of Alzheimer's	Relationship with a family history of diabetes
history of diabetes	Yes 144	15.6	<0.0001	0.006	<0.0001
	No 782	84.4			
history of smoking	Yes 230	26.9	0.005	<0.0001	0.009
	No 624	73.1			

\* A significant level below 0.05 is considered.

relationship with the prevalence of Alzheimer's disease and dementia. Also, smokers are not protected against Alzheimer's disease or dementia, and cross-sectional association may be due to the difference in mortality (23).

Diabetes and Alzheimer's disease are two age-related diseases, both of which are increasing in prevalence and numerous studies have shown that diabetes patients increase the risk of developing AD compared with healthy people. The basic biological mechanisms that cause diabetes or AD are not fully understood. Abnormal protein processing, insulin signaling abnormalities, glucose concentration metabolism, oxidative stress, the formation of advanced glycation products and the activation of inflammatory pathways are common features of both diseases. Hypercholesterolemia is another factor that has shown its relevance due to its potential association with diabetes and AD (24).

In this study, 34.8% of Alzheimer's patients had a history of diabetes, 26.3% had Alzheimer's family history and 25.5% had a family

history of diabetes. And the association between the history of diabetes and the history of Alzheimer's disease was significant (0.006). The results of Madmoli et al., (1) showed that there was no significant relationship between Alzheimer's disease and diabetes. However, there was a significant correlation between the suffering of Alzheimer's disease and insulin consumption, which was not consistent with the present study. The reason for this inconsistency can be due to different sample sizes, the study is conducted in different cities and different lifestyles in the people two studies.

In the Janson J et al., study, 81 percent of Alzheimer's cases had type 2 diabetes or IFG (25). The prevalence of diabetes in Alzheimer's patients was higher than this study. The reason for this inconsistency can be due to differences in lifestyle and nutrition between two types of subjects in two studies.

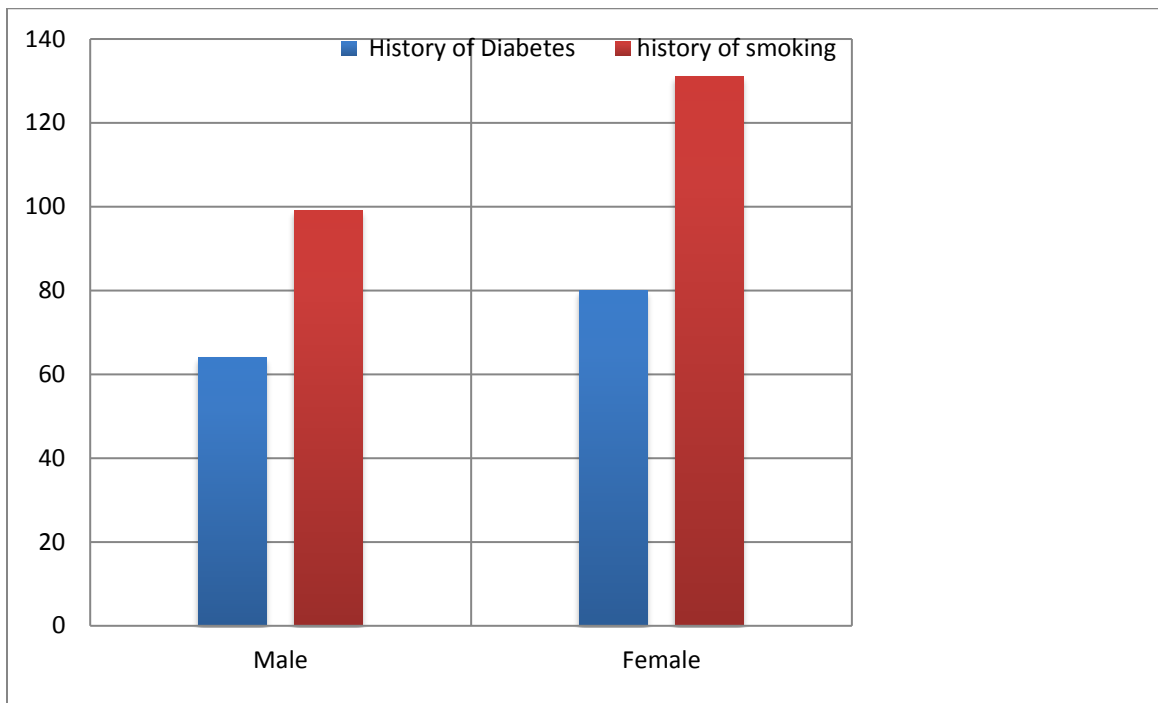


Figure 1 Frequency of Diabetes history and smoking history in Alzheimer's patients According to gender

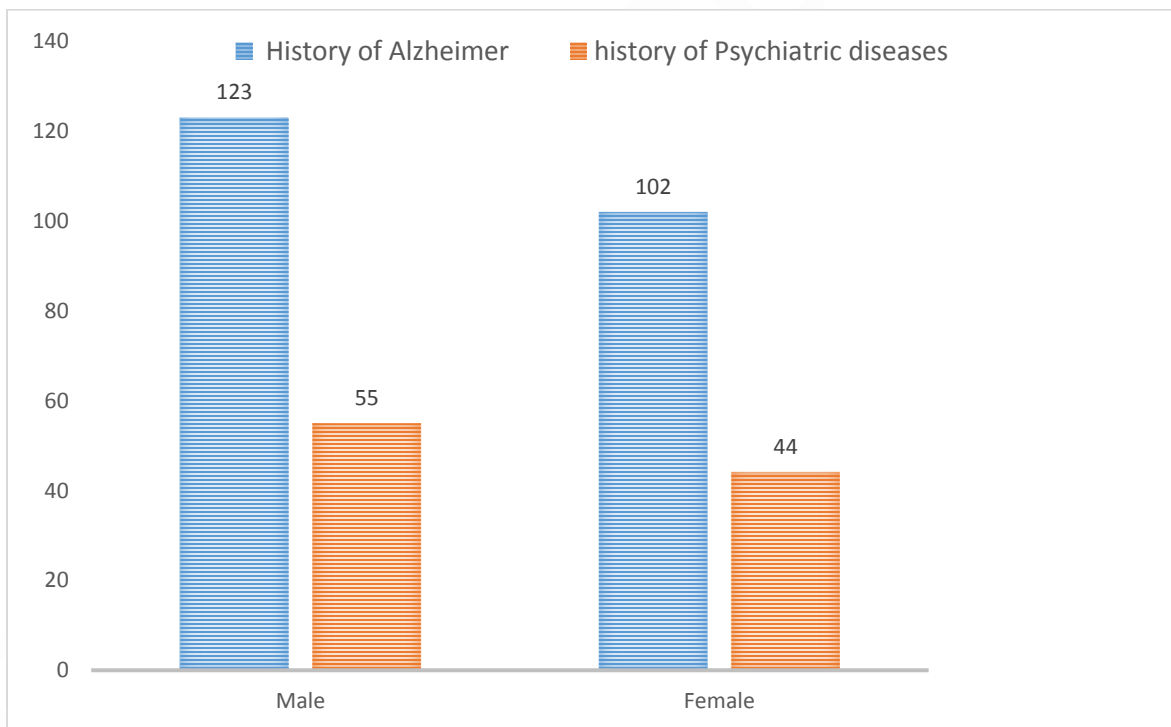


Figure 2 Frequency of Alzheimer history and history of Psychiatric diseases in Alzheimer's patients According to gender

**CONCLUSION**

In this study, there was a significant relationship between the history of smoking and Alzheimer's history. And also was significant Relationship between the history of diabetes and the history of Alzheimer's disease, so it can be said that diabetes and smoking are two risk factors for Alzheimer's disease. It is necessary to identify other important risk factors by conducting epidemiological studies such as the current study and even the larger sample size. It is also better to take the necessary measures to prevent the risk of a new factor for the disease.

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This article has no conflicts of interest.

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