

Association between Tobacco Smoke Exposure (Environmental and Direct) and Incidence and Control of Bronchial Asthma

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Abstract

Background: Asthma is a chronic multifactorial disease with high prevalence. Among asthma risk factors, the effect of tobacco smoke exposure on bronchial asthma is still debated. **Aim:** The aim of this study was to determine the association between environmental and direct tobacco smoke (cigarette and hookah) exposure and incidence and control of bronchial asthma. **Materials & Methods:** This descriptive study was conducted on 109 patients with asthma referring to Imam Khomeini Hospital in Ardabil city. Asthma Control Questionnaire was used for evaluating of asthma control. Patients' asthma control was individually evaluated and compared with together with particular attention to history of tobacco smoke exposure. Chi square and Tav-Kendal were used to analyze the data in SPSS15 software. **Results:** The history of tobacco smoke exposure was found in 31.2% of the 109 patients. Patients with uncontrolled asthma with 60.6% constituted the largest volume of all samples. There was no significant correlation between tobacco smoke exposure and asthma occurrence ($P > 0.05$), also there was not found significant correlation between tobacco smoke exposure and asthma control (Error coefficient > 0.10). **Conclusion:** According to the results, history of tobacco (cigarette and hookah) smoke exposure (environmental and direct) has no effect on the asthma occurs and control status.

Keywords

Asthma, Tobacco Smoke Pollution, Exposure

1. Introduction

Bronchial asthma is a high-prevalence inflammatory chronic disease. According

to World Health Organization (WHO) estimation, about 20,000 deaths caused by asthma would occur in Middle-East in 2015 [1]. Asthma prevalence in Iran is much higher than international estimation [2]. Bronchial asthma sufferers experience symptoms like wheezing, coughing and shortness of breaths such that it disturbs daily work, repeated awakening at night and boredom in morning [3]. Identification of prevention methods in asthma and providing required trainings for patients, especially by nurses who have the highest contact with patients and community, is a great success in reduction and control of this disease. Asthma is a multifactorial disease *i.e.* different factors have the role in developing symptoms and attacks of asthma. One risk factor in asthma is exposure to tobacco [4]. Smoking tobacco is one of the problems which threaten human health [5]. Since 1980 up to now, there is discussion about environmental tobacco smoke (ETS) exposure [6]. High percent of people is in environmental tobacco risk exposure [7]. In every 10s, one person dies by diseases caused by tobacco [8]. Studies showed that if one smokes cigarettes (direct exposure) or other person smokes in home (environmental exposure), risk of asthma increases [9]. Exposure to tobacco increases the risk of asthma and worsens its symptoms in patients [10] [11] [12]. Despite studies which consider tobacco smoke as the effective factor in developing asthma, there are studies that their results show no significant association between tobacco smoke and asthma [13] [14]. Whether exposure to tobacco smoke is a risk factor in asthma occurrence is disputed by medical sciences' researchers. Especially, because reviewing literature showed no study about changing asthma control with exposure to tobacco smoke. Increasing community awareness about effects of exposure to environments contaminated with tobacco smoke will help better control of asthma among asthma patients and its prevention among other people. Regarding importance of this issue and inefficiency of studies and contradictory results about effect of tobacco smoke on asthma, this study was conducted which is a descriptive study in order to investigate the association between environmental exposure (smoking by individual) or direct exposure to tobacco smoke with prevalence and control of asthma.

2. Materials & Methods

This is descriptive study which is conducted on 109 adult patients (higher than 12 years) referring to Imam Khomeini hospital in Ardabil. This study was conducted after obtaining certificate from nursing-midwifery faculty of Tabriz University and ethical code number 192 from Tabriz Medical Sciences University ethic committee and coordination of Imam Khomeini hospital authorities in Ardabil for accepting patients referring to this hospital. Statistical society of this study is all asthma patients higher than 12 years old in Ardabil. Inclusion criteria was all patients that their asthma was diagnosed and confirmed by lung disease professional who referred to the Imam Khomeini hospital during study. Exclusion criteria were all patients who were not consented to cooperate with study.

Asthma disease was diagnosed by expert doctor and based on spirometry para-clinical tests' results and clinical symptoms.

Samples were selected as available and purpose of study was explained for patients. Informed consent form was signed by samples and questionnaires including demographic information and direct and environmental exposure to tobacco smoke and asthma control questionnaire (ACQ) was completed by samples. ACQ was used to determine asthma control condition in patients. Adequacy of asthma control in patients was studied separately and then, they compared in terms of exposure to tobacco smoke. Samples that smoke tobacco or were exposed to tobacco smoke were positive variable. In order to analyze data, SPSS16 statistical data was used. In order to study significance of correlation between tobacco smoke exposure and asthma control, Takendal correlation statistical test was used and Chi-square was used to study the association of exposure to tobacco smoke history with asthma. In this research, confidence level is 95%. In other words, error level 5% was predicted in calculation of results.

Condition of asthma control in samples was classified by using mean score of 6 questions of ACQ questionnaire. Samples with mean score 0.75 to 1.5 were in controlled and uncontrolled border; below this threshold was controlled and above it was uncontrolled. Validity and reliability of questionnaire was confirmed by these studies [15].

3. Results

During study, 109 adult asthma patients entered in the study. Mean age of samples was 40.91 (14.78). Among study samples, 31.2% have history of exposure to tobacco smoke. Patients with uncontrolled asthma were the largest volume of sample by 60.6%. 37.9% of samples with uncontrolled asthma, has tobacco exposure history. **Table 1** shows asthma condition of study samples.

In order to study significance of correlation between two variables, Takendal statistical test was used. Following hypotheses were tested in order to study that correlation between two variables is statistically significant or not.

P indicates correlation coefficient between two study variables. Regarding **Table 2**, by comparing significance level obtained by error factor higher than 0.10, we can conclude that there is no significant association between tobacco smoke exposure variable and asthma control.

Table 1. Sample asthma, Imam Khomeini Hospital, 2012-2013.

	Frequency	% percent
Uncontrolled	66	60.6
Border	17	15.6
Controlled	26	23.9
Total	109	100.0

Table 2. Takendal correlation between variables, Imam Khomeini, 2012-2013.

		Asthma control	Tobacco smoke
Asthma control condition	Correlation coefficient	1.000	
	Significance level		
Tobacco smoke	Correlation coefficient	-0.018	1.000
	Significance level	0.842	-

In order to study tobacco smoke exposure history association with asthma, Chi-square test was used.

And in order to study this test, agreed table was used. Output of this test included to **Table 3**. **Table 3** is an agreed table which shows expected values and observed values. Chi-square test was used in order to study the association between them. Regarding significance level of test between history of tobacco smoke exposure with asthma ($p\text{-value} < 0.05$), we can say that there is no significant association between tobacco smoke exposure variable and asthma. Therefore, null hypothesis was confirmed (>0.05). Therefore, positive history of tobacco smoke exposure on asthma has no significant difference.

4. Discussion

Regarding results of **Table 2** which are obtained Takendal correlation test, there was no association between tobacco smoke exposure and asthma control. Therefore, results of this study show that history of tobacco smoke exposure in asthma suffering patients has no significant effect on controlling their asthma (error factor > 0.10). Statistical results using Chi-square test results show that there was no significant association between tobacco smoke exposure and asthma occurrence ($p\text{-value} < 0.05$). Therefore, we can say that although 31.2% of study samples have exposed to tobacco smoke, but there was no significant association between this variable and asthma. Our study results were consistent with results of some researchers. Eagan *et al.* (2002) studied the asthma occurrence of asthma between smokers but they found no association between smoking and asthma occurrence [13]. Basagana *et al.* (2001) stated in a study that there is no significant association between cigarettes smoke and asthma and increase in Immune-globulin E caused by this disease [14]. Bazazi *et al.*, in a cross-sectional study on students in Gorgan concluded that parents' smoking is not factor causing and increasing asthma, although it creates wheezing [16]. However, we cannot deny effect of tobacco smoke exposure in developing asthma. In this regard, we can refer to Piipari *et al.* study that showed asthma risk increases in adults by number of daily cigarettes [17]. According to some researchers, evidences related to adverse effects of cigarettes smoke and asthma are so stable that there is a causal association between these two variables [18]. Results of Karimi *et al.* study showed that exposure to smoke of cigarettes during childhood increases the risk of Atopic diseases, especially asthma [19]. According to WHO, almost half of world children breathe the tobacco-polluted air which intensifies

Table 3. Tobacco smoke exposure association with different asthma conditions, Imam Khomeini Hospital, 2012-2013 ($p < 0.05$).

		Tobacco smoke exposure history			
Asthma condition	Uncontrolled	Observed number	41	25	66
		Expected number	45.4	20.6	66.0
		% within asthma	62.1%	37.9%	100.0%
		% whiting tobacco	62.1%	37.9%	100.0%
		Observed	14	3	17
		Expected	11.7	5.3	17.0
	Border	% within asthma	82.4%	17.6%	100.0%
		% tobacco	37.6%	22.9%	60.6%
		Observed	75	34	109
	Total	Expected	75.0	34.0	109.0
		% whiting asthma	68.8%	31.2%	100.0%
		% within tobacco	100.0%	100.0%	100.0%

problems like asthma among them [20]. Brook *et al.* and Sharifi *et al.*, in separate studies have pointed that exposure of children to smoke of parents' cigarette causes health disorders including asthma [9]-[21]. Results of Abdolmohammadian cross-sectional study showed that there is significant association between asthma symptoms and smoking [22]. Regarding literature review, except Abdolmohammadian and Karimi study, in other studies, exposure by tobacco smoke was studied not by hookah but in our study, cigarette and hookah were considered. Most research studied the association between direct and environmental exposure to tobacco smoke by one exposure type but this research studied both of them.

5. Conclusion

Final conclusion: in this study, asthma patients were compared in terms of environmental or direct (smoking) exposure or non-exposure with tobacco smoke and effect of this variable on asthma control and occurrence was studied. Regarding result, asthma occurrence and control are not related to tobacco consumption history or exposure with smoke in environment. However, considering the importance of issue and conflicted results of studies, there is need for further studies in order to clarify the accurate association between environmental or direct exposure to tobacco smoke with asthma occurrence and control.

Therefore, it is suggested that future research studies the asthma occurrence in population exposed to tobacco smoke.

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Ethical Approval Code

The Ethics Committee of Tabriz University of Medical Sciences approved the study.

Conflict of Interest

None declared.

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