Association between panic attacks and cigarette smoking among psychiatric patients

Maryam Fargamfar¹ · Mahsa Moradnia² · Pouneh Zolfaghari² · Zahra Shariyati² · Mohammad Bagher Sohrabi^{2,3}

Received: 21 October 2018 / Accepted: 6 December 2018 / Published online: 27 December 2018
© The Author(s) 2018

Abstract

Background and aim Panic attacks are a period of intense fear that temporarily disrupts a normal person's activities. There are many factors which can influence them, one of which is cigarette smoking. This project was conducted with the aim of investigating the association between panic attacks and smoking.

Methods and materials This is a case–control study that was conducted to determine the impact of panic attacks and smoking in patients referred to the psychiatric clinic of Imam Hossein Hospital in Shahroud in 2017. Eligible patients were selected by the simple census method to complete the sample size, based on having or not having a history of panic attacks. They were divided into case and control groups and history of smoking in the past was studied.

Results In this study, 114 (39.9%) patients were male and the rest were female. The mean age of the patients was 32.68 ± 11.16 years. In terms of smoking, 100 (69.9%) were in the case group and 52 (36.4%) were in the control group, which was significant ($p = 0.001$) in the case group. Also, the results of the logistic regression model showed that smoking could significantly increase the incidence of panic attacks; therefore, smoking increases the odds ratio (OR = 2.83) of panic attacks.

Conclusion The results of this study showed that smoking can increase the risk of panic attacks and increase its OR by about 3-fold, but more definitive research is needed to confirm this finding.

Keywords Panic attacks · Psychiatric disorders · Smoking

Introduction

A panic attack is a period of intense fear or sadness that has a definite beginning and end, and at least four physical or cognitive symptoms, such as palpitations, tachycardia, shortness of breath, and choking, etc., are associated with it (Noorbala et al. 2017; Kessler et al. 2006; Kober and Deleone 2011). It usually takes place within 10 min and is self-limiting (Kessler et al. 2006). The occurrence of panic attacks is considered to be the hardest and worst life experience for a person, which will continue for hours after the stress symptoms and fears are resolved. Also, the person will become worried about the

reoccurrence of these attacks in the future (Smith et al. 2000). The frequency of attacks varies from a few times a day to just a handful of attacks per year (Shih et al. 2004). The first panic attack is often entirely on its own, but, sometimes, panic attacks are followed by turbulence, physical activity, sexual activity, or moderate emotional impairment. When the panic attack starts, its symptoms will quickly escalate within 10 min (Johnson et al. 2013; Sarisoy et al. 2008; Hoehn-Saric et al. 2004). The main symptoms of the disease are extreme anxiety and the imminence of death and destruction that the patient often cannot express as a cause of fear. It may be disturbing and the patient will find it difficult to concentrate (Moylan et al. 2012). The patient often tries to leave the place where he or she is in order to escape the attack. The attack usually lasts for 20 min and rarely lasts for more than an hour (Cosci et al. 2010). The patient may experience depersonalization or derealization during an attack. Symptoms of panic attacks may be quickly or gradually resolved (Hearld et al. 2015; Rodelli et al. 2018). Sometimes, the patient is expected to be anxious at the time of the attack, fearing that another attack will come upon him or her. Panic disorder is often associated with agoraphobia, whereby patients do not

✉ Mohammad Bagher Sohrabi
mb.sohrabi@yahoo.com

¹ Department of Psychiatric, Shahroud University of Medical Sciences, Shahroud, Iran

² Shahroud University of Medical Sciences, Shahroud, Iran

³ Medical School, Shahroud University of Medical Sciences, Shahroud, Iran

like to stay in crowded streets, crowded shops, indoor spaces (such as basements and elevators), and closed vehicles (such as subways, buses, or airplanes), and one of their friends or family members will accompany them (Hearld et al. 2015). Although there is no precise cause for panic attacks and panic disorder, the presence of this disorder in the family history can increase the likelihood of it occurring (Johnson et al. 2013). It also seems to be related to important changes in life, such as graduating from college, starting a new job, marrying, having a child, a death, divorce, or job loss, and some environmental factors such as smoking have an effect on panic attacks (Johnson et al. 2013; Palumbo et al. 2018). According to studies, smoking is clearly associated with mood disorders and increases the incidence of them by 2–3 times. Also, in a study conducted in patients with mood disorders, it has been shown that smoking is several times more common than that among normal people (Noorbala et al. 2017). Depression is twice as common in smokers than nonsmokers and, in patients with very high smoking habits, this is even higher. The prevalence of smoking in some psychiatric disorders is very high, with a prevalence as great as 61% having been reported in some studies (Hearld et al. 2015). Due to the very high prevalence of panic disorder in the community as well as the increasing consumption of cigarettes, especially in young people, this study aims to investigate the relationship between panic attacks and smoking in patients referred to the psychiatric clinic of Imam Hossein Hospital in Shahroud.

Materials and methods

This study is an intervention study on a human sample and, in order to determine the relevance of panic attacks and smoking, attendees of the neuropsychiatric clinic of Imam Hossein Hospital of Shahroud between January and December 2017 were included. In this study, eligible patients were selected by the simple census method to complete the sample size, based on having or not having a history of panic attacks. They were divided into case and control groups and entered the study. The case group included those who already have or had a history of panic attacks. To diagnose panic attacks, according to DSM5 diagnostic criteria, there are at least four physical criteria for symptoms: tremble, muscle jump, feeling chilly, headache, dizziness, weakness, cravings, dyspnea, choking feeling, fatigue, blush and pale, needle feeling, tachycardia, palpitations, chest pain or chest discomfort, sweating, cold hands, and psychological symptoms include horror, fear of being crazy, feel like they are dying, and worry and apprehension in the last month. The control group included people without panic attacks in the past year. The patients in both groups were asked about smoking history and demographic information including gender, age, marital status, and educational level was recorded on a special sheet.

Descriptive statistics including mean and standard deviation, as well as relative frequency, were used to describe the data. To examine the relationships and comparisons between the two groups, the chi-squared test and multivariate logistic regression was used to evaluate the odds of each of the variables. All analyses were performed using SPSS software version 16 and the significance level set at $p < 0.05$. Using Epi info 7.2, at a significant level of 5% and a power of 80%, the sample size needed to be equal to 143 people in each group, giving a total of 286 people.

This study has an ethics code number (IR.SHMU.REC.1396.37) from the research deputy of Shahroud University of Medical Sciences. The essential information and objectives of the study were explained to the patients, and written consent was obtained for participation in the plan.

Results

In this study, 114 (39.9%) of the participants were male and the rest were female. The mean age of the patients was 32.68 ± 11.16 years and the age group of 31–40 years had the highest frequency (43.1%) among patients in both groups. Also, 145 (50.7%) participants were married and 144 (50.3%) were unemployed. It was also found that 124 (43.4%) patients did not use cigarettes at all. There is a significant difference between the two groups regarding smoking ($p < 0.001$). The results of smoking among patients in both groups are shown in Table 1. Palpitation, with 123 cases (86.1%), was the most common clinical sign. In this study, independent variables with panic attacks were investigated in a multivariate regression model. As shown in Table 2, smoking variables were significantly associated with panic attacks and there was no significant relationship with other variables. The results of the multivariate logistic regression model are presented in Table 2.

Discussion

The results of this study showed that, among the measured variables, smoking significantly increased the risk of panic attacks in patients. This finding is consistent with the results of Goodwin et al. (2004). Of course, given the limited scope of this study, the result cannot be attributed to the entire community, but it can highlight the importance of the need for greater attention and more comprehensive research. Panic attacks involve a range of environmental and heritability factors; some of them alone and some as synergism can exacerbate panic attacks. In this study, it was found that cigarette smoking had a high prevalence among patients referred to the psychiatric clinic, which is consistent with the study conducted by the American Psychiatric Association (APA) (Adamsson and Bernhardsson 2018; Cosci and Mansueto 2018). In the study

Table 1 Frequency distribution of patients in the two groups based on smoking

Smoking	Case group, no. (%)	Control group, no. (%)	Total, no. (%)	<i>p</i> -Value
Without consuming	38 (25.6)	86 (60.1)	124 (43.4)	$p < 0.001$
Daily intake of less than 7 yars	63 (44.1)	32 (22.4)	95 (33.2)	
Daily intake of more than 7 yars	37 (25.9)	20 (13.9)	57 (19.9)	
Leaves	5 (3.5)	5 (3.5)	10 (3.5)	
Total patients	143 (100)	143 (100)	286 (100)	

of Gaudlitz et al. (2015), it was found that smoking in patients with psychiatric problems, especially anxiety disorders, is higher than that among normal people. The study by Breslau and Klein (1999) found that daily smoking increases the risk of developing the first panic attack and it is suspected that cigarette-related illnesses like lung disease can also instigate or exacerbate panic attacks. A study by Pohl et al. (1992) among individuals with panic disorder showed that the high prevalence of smoking was found to be similar to the results of this study. In this study, it was found that the effect of smoking on panic attacks in different educational groups was not significantly different, which shows that smoking is increasing among those with both higher education and lower education. The results of Minichino et al. (2013) were in perfect agreement, but the results of the studies by Isensee and Goodwin showed that there is a difference in the rate of smoking in people with higher education (Isensee et al. 2003; Goodwin et al. 2008). This study found an impact of smoking on panic

attacks in various occupational groups; although the influence in the unemployed group was higher, there was no significant difference between them. This finding is inconsistent with the research results of Shavitt et al. (1992), perhaps because of the gender distribution of patients in the two groups (in the present study, the majority of patients was female, while it was male in Shavitt et al.'s study) and also the difference in sample size. In reviewing the logistic regression model regarding factors affecting panic attacks, it was found that smoking (odds ratio, OR = 2.83) increased the chance of panic attacks, but other variables, such as gender, educational level, occupation, and marital status, did not have a significant effect on the incidence of panic attacks. These findings are consistent with the results of Patton et al. (1996) and with the results of Biber and Alkin (1999) and Thompson and Thompson (1993) to some extent. The most important reason for the incomplete outcome of these results may be the type of study designed or the sample size to be evaluated.

Table 2 Relationship between independent variables with panic attacks in a multivariate logistic regression model

Independent variables		Odds ratio	95% confidence interval	<i>p</i> -Value
Age category	Less than 30 years	1.000		
	30–50 years	1.089	1.342–0.0652	0.063
	More than 50 years	1.096	1.451–0.0712	0.052
Sex	Male	1.000		
	Female	1.098	1.183–0.825	0.069
Marital status	Single	1.000		
	Married	1.105	1.248–0.811	0.085
Degree of education	Less than diploma	1.000		
	Diploma	0.923	1.125–0.756	0.055
	Academic	0.875	1.035–0.612	0.051
Job	Unemployed	1.000		
	Free job	0.851	1.123–0.671	0.117
	Employee	0.723	0.957–0.671	0.088
History of mental illness	Negative	1.000		
	Positive	1.326	2.142–1.309	0.052
History of chronic clinical disease	Negative	1.000		
	Positive	1.089	1.263–0.916	0.063
History of alcohol consumption	Negative	1.000		
	Positive	1.028	1.282–0.857	0.059
History of smoking	Negative	1.000		
	Positive	2.831	3.754–1.956	0.001

Conclusions

The results of this study showed that the rate of smoking was relatively high among those admitted to the psychiatric clinic and was significantly higher in the panic attacks group. It was also found that smoking can increase the chance of panic attacks. Since cigarette smoking exacerbates panic attacks, by controlling and reducing cigarette consumption, the severity of panic attacks may be lowered and become less worrisome than before (Smoller et al. 1996). In this way, attention should be paid to the diagnosis and treatment of panic disorder associated with cigarette smoking. In managing panic attacks, smoking prevention is recommended among people in general and especially in psychiatric patients.

Limitation

Among the limitations of this research, patients' self-reported cigarette smoking, as well as psychiatric disorders, and especially panic attacks, may have been inadequately reported. This problem was largely overcome by justifying to patients and repeating the question.

Acknowledgements The present study was supported by Shahrood University of Medical Sciences as a Medical Doctor (MD) Thesis. We hereby acknowledge the research deputy. Also, we would like to thank all of the participating patients.

Funding This study received funding from the research deputy of Shahrood University of Medical Sciences.

Compliance with ethical standards

Ethical approval This study has an ethics code number (IR.SHMU.REC.1396.37) from the research deputy of Shahrood University of Medical Sciences.

Informed consent Informed consent was obtained from all individual participants included in the study.

Conflict of interest The authors report no conflicts of interest. The authors alone are responsible for the content and writing of the article.

Open Access This article is distributed under the terms of the Creative Commons Attribution 4.0 International License (<http://creativecommons.org/licenses/by/4.0/>), which permits unrestricted use, distribution, and reproduction in any medium, provided you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license, and indicate if changes were made.

Publisher's Note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

References

- Adamsson A, Bernhardsson S (2018) Symptoms that may be stress-related and lead to exhaustion disorder: a retrospective medical chart review in Swedish primary care. *BMC Fam Pract* 19(1):172
- Biber B, Alkin T (1999) Panic disorder subtypes: differential responses to CO₂ challenge. *Am J Psychiatry* 156(5):739–744
- Breslau N, Klein DF (1999) Smoking and panic attacks: an epidemiologic investigation. *Arch Gen Psychiatry* 56(12):1141–1147
- Cosci F, Mansueto G (2018) Biological and clinical markers in panic disorder. *Psychiatry Investig*. <https://doi.org/10.30773/pi.2018.07.26>
- Cosci F, Knuts JJ, Abrams K, Griez EJ, Schruers KR (2010) Cigarette smoking and panic: a critical review of the literature. *J Clin Psychiatry* 71(5):606–615
- Gaudlitz K, Plag J, Dimeo F, Ströhle A (2015) Aerobic exercise training facilitates the effectiveness of cognitive behavioral therapy in panic disorder. *Depress Anxiety* 32(3):221–228
- Goodwin RD, Fergusson DM, Horwood LJ (2004) Panic attacks and psychoticism. *Am J Psychiatry* 161(1):88–92
- Goodwin RD, Zvolensky MJ, Keyes KM (2008) Nicotine dependence and mental disorders among adults in the USA: evaluating the role of the mode of administration. *Psychol Med* 38(9):1277–1286
- Hearld KR, Budhwani H, Chavez-Yenter D (2015) Panic attacks in minority Americans: the effects of alcohol abuse, tobacco smoking, and discrimination. *J Affect Disord* 174:106–112
- Hoehn-Saric R, McLeod DR, Funderburk F, Kowalski P (2004) Somatic symptoms and physiologic responses in generalized anxiety disorder and panic disorder: an ambulatory monitor study. *Arch Gen Psychiatry* 61(9):913–921
- Isensee B, Wittchen HU, Stein MB, Höfler M, Lieb R (2003) Smoking increases the risk of panic: findings from a prospective community study. *Arch Gen Psychiatry* 60(7):692–700
- Johnson KA, Farris SG, Schmidt NB, Smits JA, Zvolensky MJ (2013) Panic attack history and anxiety sensitivity in relation to cognitive-based smoking processes among treatment-seeking daily smokers. *Nicotine Tob Res* 15(1):1–10
- Kessler RC, Chiu WT, Jin R, Ruscio AM, Shear K, Walters EE (2006) The epidemiology of panic attacks, panic disorder, and agoraphobia in the National Comorbidity Survey Replication. *Arch Gen Psychiatry* 63:415–424
- Kober H, Deleone CM (2011) Smoking and neuroimaging: a review. *Curr Cardiovasc Risk Rep* 5(6):484–491
- Minichino A, Bersani FS, Calò WK, Spagnoli F, Francesconi M, Vicinanza R, Delle Chiaie R, Biondi M (2013) Smoking behaviour and mental health disorders—mutual influences and implications for therapy. *Int J Environ Res Public Health* 10(10):4790–4811
- Moylan S, Jacka FN, Pasco JA, Berk M (2012) Cigarette smoking, nicotine dependence and anxiety disorders: a systematic review of population-based, epidemiological studies. *BMC Med* 10:123
- Noorbala AA, Bagheri Yazdi SA, Faghihzadeh S, Kamali K, Faghihzadeh E, Hajebi A, Akhondzadeh S, Sedighnia A, Asle Rahimi V (2017) A survey on mental health status of adult population aged 15 and above in the province of East Azarbaijan, Iran. *Arch Iran Med* 20(11 Suppl. 1):S23–S26
- Palumbo ML, Di Rosso ME, Simon EH, Gonzalez Murano MR, Genaro AM (2018) Altered interferon- γ expression in lymphocytes as a potential peripheral marker of chronic stress-induced cognitive deficit. *Cytokine* 107:26–34
- Patton GC, Hibbert M, Rosier MJ, Carlin JB, Caust J, Bowes G (1996) Is smoking associated with depression and anxiety in teenagers? *Am J Public Health* 86(2):225–230
- Pohl R, Yeragani VK, Balon R, Lycaki H, McBride R (1992) Smoking in patients with panic disorder. *Psychiatry Res* 43(3):253–262
- Rodelli M, De Bourdeaudhuij I, Dumon E, Portzky G, DeSmet A (2018) Which healthy lifestyle factors are associated with a lower risk of

- suicidal ideation among adolescents faced with cyberbullying? *Prev Med* 113:32–40
- Sarisoy G, Böke O, Arik AC, Sahin AR (2008) Panic disorder with nocturnal panic attacks: symptoms and comorbidities. *Eur Psychiatry* 23(3):195–200
- Shavitt RG, Gentil V, Mandetta R (1992) The association of panic/agoraphobia and asthma. Contributing factors and clinical implications. *Gen Hosp Psychiatry* 14(6):420–423
- Shih RA, Belmonte PL, Zandi PP (2004) A review of the evidence from family, twin and adoption studies for a genetic contribution to adult psychiatric disorders. *Int Rev Psychiatry* 16(4):260–283
- Smith SC Jr, Amsterdam E, Balady GJ, Bonow RO, Fletcher GF, Froelicher V, Heath G, Limacher MC, Maddahi J, Pryor D, Redberg RF, Roccella E, Ryan T, Smaha L, Wenger NK (2000) Prevention Conference V: beyond secondary prevention: identifying the high-risk patient for primary prevention: tests for silent and inducible ischemia: Writing Group II. *Circulation* 101(1):E12–E16
- Smoller JW, Pollack MH, Otto MW, Rosenbaum JF, Kradin RL (1996) Panic anxiety, dyspnea, and respiratory disease. Theoretical and clinical considerations. *Am J Respir Crit Care Med* 154(1):6–17
- Thompson WL, Thompson TL 2nd (1993) Psychiatric disorders complicating treatment of patients with pulmonary disease. *New Dir Ment Health Serv* 57:117–130