STUDY OF DEPRESSION AND ANXIETY IN PATIENTS WITH ASTHMA AND CHRONIC OBSTRUCTIVE PULMONARY DISEASE

Kristina Galić[1,2], Arta Dodaj[3], Vesna Ćorluka-Čerkez[4], Valentina Lasic[5,8], Renato Pejić[6], Josip Šimić[7] & Mladenka Vukojević[8,9]

[1]*Department of Internal Medicine, University of Mostar, Mostar, Bosnia and Herzegovina*
[2]*Department of Lung Disease, Clinical Hospital Mostar, Mostar, Bosnia and Herzegovina*
[3]*Department of Psychology, University of Mostar, Mostar, Bosnia and Herzegovina*
[4]*Department of Psychology, University Dzemal Bijedic, Mostar, Mostar, Bosnia and Herzegovina*
[5]*Department of Surgery, University Clinical Hospital Mostar, Mostar, Bosnia and Herzegovina*
[6]*Department of Ophtalmology, University of Mostar, Mostar, Bosnia and Herzegovina*
[7]*Faculty of Health Studies, University of Mostar, Mostar, Bosnia and Herzegovina*
[8]*Department of Pediatrics, University of Mostar, Mostar, Bosnia and Herzegovina*
[9]*Department of Pediatrics, University Clinical Hospital Mostar, Mostar, Bosnia and Herzegovina*

SUMMARY

Background: Suggested treatment of patients with COPD and astma requires promotion and psychological dimensions of patients.

Aim: Primary objective of this study was to determine frequency of developing anxiety and depression in patients with asthma and chronic obstructive pulmonary disease (COPD) in relation to gender, age and socioeconomic status and to evaluate possible differences between patients with and without high level of anxiety and depression and to find correlation between psychological aspects and disease itself.

Subjects and methods: This study included a total of 120 subjects: 60 patients with asthma and 60 patients with COPD. Data were collected using a socio-demographic questionnaire for general information on subjects, standardized Beck Anxiety Inventory (BAI) and Beck Depression Inventory (BDI).

Results: Significant difference was found in the anxiety level in these two groups. Average value for the patients with COPD was 43 (15) and for the patients with asthma 37.5 (15.7). Statistically significant difference was also reported for the depression level among females. In female patients with COPD that level was 13.5 (14.7) and in female patients with asthma 7.5 (11). There is a correlation between anxiety and depression in patients with COPD and asthma, especially among women.

Conclusion: This study suggests that asthma and COPD are a significant stressor with a risk of developing anxiety and depression.

Key words: *anxiety - depression - asthma - chronic obstructive pulmonary disease*

* * * * *

INTRODUCTION

Depression and anxiety are the most common mental illnesses that occur in patients with asthma and usually lead in frequent deterioration and poor control of the disease with repeated hospitalizations. Representative studies of adults with asthma indicate the level of depression of 20 to 30%, and among 45% of them depression symptoms reduce their quality of life. Studies have shown that people with asthma express many neurotic symptoms such as anxiety, dependence, sensitivity, nitpicking, perfectionism and obsessions. Some experts believe that psychological factors such as anxiety, tension caused by frustration, anger and depression may be possible causes of the pulmonary function disorders. It is believed that some changes in personality features and emotional functioning may be caused by different types of asthma. Beside extrinsic asthma, which is immune-mediated and most often caused by allergies, there is also an intrinsic type of asthma which is psycho-neurologically mediated (increased parasympathetic or vagal activity which can through feelings, expectations and thinking affect the appearance of bronchial contraction) (Bloomberg & Chen 2005). According to recent research, children with allergic asthma show fewer differences in psychological features than children with non-allergic asthma (Moranduzzo & Vulić-Prtorić 2002). Asthma symptomatology with three specific symptoms: dyspnoea, waking up at night with asthma symptoms and morning symptoms are closely related to depression and have an important influence on the patients' quality of life and their cognitive functions. Severe forms of asthma are associated with greater and more serious symptoms of depression. Depressed mood is present in 47% of patients who respond badly to pharmacotherapy and suffer from severe forms of asthma. The use of corticosteroids is also considered to be a link between asthma and depression. The use of high doses of corticosteroids has a beneficial effect on lung function, but it also has a negative effect on the patient's mental health,

it stimulates depressed mood and anxiety (Filipčić 2008). Experts emphasize that patients suffering from severe forms of bronchial asthma, accompanied by psychiatric comorbid diseases, very often visit primary care physicians and have a need for more specialized interventions and hospitalizations (Brinke et al. 2001).

Patients with chronic obstructive pulmonary disease (COPD) have higher risk of developing depression and anxiety, especially if they are young, female, highly educated, former smokers and members of the lower socioeconomic status (Peian et al. 2001).

The prevalence of depression in patients with COPD is between 25 and 50%, and 16-74% of patients have expressed symptoms of depression (Felker et al. 2001, Light et al. 1985). It is very difficult to distinguish depression and COPD because their symptoms are interrelated. A large number of psychological and physical symptoms refer to both disorders: increased fatigue, sleep and appetite disorder, difficulty concentrating, reduced mobility and difficulties with slowing down (Seemungal et al. 1998). Anxiety symptoms and panic attacks often occur in acute exacerbations of COPD. Among patients with COPD, depression significantly decreases their quality of life, reduces ability to work, disables and jeopardizes family relations and marriage. It is significantly associated with mortality, large number of hospitalizations, longer stay in hospitals and poor physical and social functioning (Gudmundsson et al. 2006, Ashmore et al. 2005). Primary objective of this study was to determine frequency of developing anxiety and depression in patients with asthma and COPD in relation to gender, age and socioeconomic status. Secondary objective was to evaluate possible differences between patients with and without high level of anxiety and depression and to find correlation between psychological aspects and disease itself.

SUBJECTS AND METHODS

This study included a total of 120 subjects: 60 patients with asthma and 60 patients with COPD who were hospitalized in the Pulmonology Department of the University Clinical Hospital in Mostar. This study included 60 subjects with COPD and 60 subjects with asthma. Among 60 subjects with COPD, 38 (63.3%) patients were men and 22 (36.7%) patients were women. Majority of them or 56 (93.3%) subjects had children, and most of them lived in the countryside. 35 (58.3%) patients with COPD and 45 (75%) patients with asthma belonged to the middle socioeconomic class. Equal number of patients with COPD and asthma lived in the countryside (27 subjects or 45%) and in the city (14 subjects or 23.3%). Regarding age of the subjects. Average age of the patients with COPD was 64.0 (21) and among patients with asthma 50.0 (25).

Data collection methods

General information about patients (age, gender, environment, socioeconomic status) was obtained by socio-demographic questionnaire. Standardized Beck's anxiety inventory (BAI) and Beck's depression inventtory (BDI) contained 21 item which included a wide range of anxiety and depression symptoms that aimed to determine how often patients experienced a particular symptom. Each item contained four statements (almost never, sometimes, often, permanent) which were scored from 0 to 3. Higher score represented higher degree of symptoms. According to the score on the BAI scale, anxiety can be estimated as: very mild level of anxiety (0-21), moderate level of anxiety (22-35) and very high level of anxiety (more than 36 points). According to the score on the BDI scale, depression can be estimated as: there are no indications of depression (0-9), mild level of depression (10-18), moderate level of depression (19-29) and very high level of depression (more than 30 points).

Statistical data analysis

Kolmogorow-Smirnow test was used to examine symmetry of the continuous variables in the statistical data analysis. Since the distribution significantly deviated from normal, interquartile range (IQR) was used to show average value and degree of dispersion of the continuous variables.

χ^2 test was used to compare nominal and ordinal data. Statistical significance was set at $p<0.05$. Software system SPSS for Windows (version 17.0, SPSS Inc, Chicago, Illinois, USA) and Microsoft Excell (version 11.Microsoft Corporation, Redmond, WA, USA) were used for the statistical analysis of the obtained data.

Data collection methods

General information about patients (age, gender, environment, socioeconomic status) was obtained by socio-demographic questionnaire. Standardized Beck's anxiety inventory (BAI) and Beck's depression inventtory (BDI) contained 21 item which included a wide range of anxiety and depression symptoms that aimed to determine how often patients experienced a particular symptom. Each item contained four statements (almost never, sometimes, often, permanent) which were scored from 0 to 3. Higher score represented higher degree of symptoms. According to the score on the BAI scale, anxiety can be estimated as: very mild level of anxiety (0-21), moderate level of anxiety (22-35) and very high level of anxiety (more than 36 points). According to the score on the BDI scale, depression can be estimated as: there are no indications of depression (0-9), mild level of depression (10-18), moderate level of depression (19-29) and very high level of depression (more than 30 points).

Table 1. Differences by gender, family status, environment, socioeconomic status, in both groups

Variables	N (%) patients		χ^2 test
	COPD	Asthma	
Gender			3.36
Female	22 (36.7%)	32 (53.3)	
Male	38 (63.3)	28 (46.7)	
Family status			8.64*
With children	56 (93.3)	44 (73.3)	
Without children	4 (6.7)	16 (26.7)	
Environment			0.00
In the countryside	27 (45.0)	27 (45.0)	
In a small town	19 (31.7)	19 (31.7)	
In a big town	14 (23.3)	14 (23.3)	
Socioeconomic status			3.78
Low	19 (31.7)	11 (18.3)	
Middle	35 (58.3)	45 (75.0)	
High	6 (10.0)	4 (6.7)	

Abbreviation: COPD - chronic obstructive pulmonary disease;　N (%) - number of participants expressed in percentage; χ^2 - chi-square test;　P - statistical significance;　* - significance level of 1% (P<0.01)

Table 2. Average age, anxiety level and depression in both groups

Variables	C (Q) values		Mann-Whitney U
	COPD	Asthma	
Age	64.0 (21)	50.0 (25)	1030.000**
Anxiety scale	43.0 (15)	37.5 (15.7)	1249.000*
Beck's depression inventory (M)	15.0 (14.7)	15.0 (15.5)	1449.000
Beck's depression inventory (F)	13.5 (14.7)	7.5 (11)	1148.500*

Abbreviations: C(Q) - COPD - chronic obstructive pulmonary disease;　P- statistical significance;
* - significance level of 1% (P<0.01);　** - significance level of 0.1% (P<0.001)

Statistical data analysis

Kolmogorow-Smirnow test was used to examine symmetry of the continuous variables in the statistical data analysis. Since the distribution significantly deviated from normal, interquartile range (IQR) was used to show average value and degree of dispersion of the continuous variables.

χ^2 test was used to compare nominal and ordinal data. Statistical significance was set at p<0.05. Software system SPSS for Windows (version 17.0, SPSS Inc, Chicago, Illinois, USA) and Microsoft Excell (version 11. Microsoft Corporation, Redmond, WA, USA) were used for the statistical analysis of the obtained data.

RESULTS

This sample included 22 (36.7%) female subjects and 38 (63.3%) male subjects with COPD, as well as 32 (53.3%) female subjects and 28 (46.7%) male subjects with asthma (χ^2 test=3.36; P=0.067). Most of the subjects with COPD had children (n=56; 93.3%) (χ^2 test=8.64; P=0.003), as well as most of the patients with asthma (n=44; 73.3%) (χ^2 test=8.64; P=0.003) (Table 1).

Middle socioeconomic status dominated in both groups, but the number of subjects with asthma was higher (n=45; 75%) (χ^2 test=3.78; P=0.151) than the number of subjects with COPD (n=35; 58.3%) (χ^2 test=3.78; P=0.151) (Table 1).

Significant difference was found in the anxiety level in these two groups. Average value for the patients with COPD was 43 (15) and for the patients with asthma 37.5 (15.7) (Table 2). Statistically significant difference was also reported for the depression level among females. In female patients with COPD that level was 13.5 (14.7) and in female patients with asthma 7.5 (11) (Table 2).

This studied sample showed statistically significant difference in the level of anxiety between these two groups. Significantly higher number of patients with asthma (n=27; 45.0%) (χ^2 test=4.38; P=0.036) had higher degree of moderate anxiety than patients with COPD (n=16; 26.7%) (χ^2 test=4.38; P=0.036), whereas higher number of patients with COPD (n=44; 73.3%) (χ^2 test=4.38; P=0.036) had a very high level of anxiety compared to the patients with asthma (n=33; 55%) (χ^2 test=4.38; P=0.036) (Table 3).

Among females, divided in groups, 23 (38.3%) patients with COPD and 36 (60%) patients with asthma had no indications of depression. Mild level of depression was equally represented in both groups of subjects, while moderate depression was observed in 16 (26%) patients with COPD and 7 (11.7%) patients with asthma. Five patients (8.3%) with COPD and 2 patients (2.3%) with asthma had a very high level of depression (Table 4).

Table 3. Anxiety level in both groups of subjects

Variables	N (%) patients		χ^2 test
	COPD	Asthma	
Anxiety by groups			4.38*
Moderate anxiety	16 (26.7)	27 (45.0)	
Very high level of anxiety	44 (73.3)	33 (55.0)	

Abbreviation: COPD - chronic obstructive pulmonary disease; N (%) - number of participants expressed in percentage; χ^2 - chi-square test; P - statistical significance; * - significance level of 5% (P<0.05)

Table 4. Level of depression among females in both groups of subjects

Variables	N (%) patients		χ^2 test
	COPD	Asthma	
Beck's groups (F)			
No indications	23 (38.3)	36 (60.0)	
Mild level of depression	16 (26.7)	15 (25.0)	
Moderate level of depression	16 (26.0)	7 (11.7)	
Very high level of depression	5 (8.3)	2 (3.3)	

Abbreviation: COPD - chronic obstructive pulmonary disease; N (%) - number of participants expressed in percentage; χ^2 - chi-square test

Table 5. Level of depression among males in both groups of patients

Variables	N (%) patients		χ^2 test
	COPD	Asthma	
Beck's groups (M)			4.40
No indications	11 (18.3)	21 (35.0)	
Mild level of depression	22 (36.7)	17 (28.3)	
Moderate level of depression	22 (36.7)	17 (28.3)	
Very high level of depression	5 (8.3)	5 (8.3)	

Abbreviation: COPD - chronic obstructive pulmonary disease; N (%) - number of participants expressed in percentage; χ^2 - chi-square test

Among males, mild and moderate depression were equally represented in both groups – 22 (36.7%) patients with COPD and 17 (28.3%) patients with asthma. Five (8.3%) patients in both groups had a very high level of depression, whereas 11 (18.3%) patients with COPD and 21 (35%) patients with asthma had no indications of depression (Table 5).

DISCUSSION

Chronic somatic diseases, such as asthma and COPD, are often associated with various psychiatric comorbidities. Patients with asthma they had degree of moderate anxiety than patients with COPD whereas higher number of patients with COPD had a very high level of anxiety compared to the patients with asthma. Mild depression was equally present in both groups of patients, moderate depression was observed in two more patients with COPD and asthma patients

The most important conclusions of the research were:
- The highest number of respondents living in the countryside.
- The results obtained showed a statistically significant difference in the mean value of anxiety levels between COPD patients, which were higher in levels and asthma patients.
- The average value of depression is higher in a woman who has COPD than in a woman with asthma.

There were more men with asthma and COPD in our study, and no statistically significant difference between subjects who lived in the countryside and those who lived in the city was found. The results showed a statistically significant difference in the average value of the anxiety level between patients with COPD and patients with asthma. Level of anxiety among patients with COPD was higher. Our data is well agree with the previous results. Symptoms of anxiety and panic attacks also often occur in acute exacerbations of COPD (Grigsby et al. 2016, Badway et al. 2016), and one of the symptoms, dyspnoea, is associated with symptoms of anxiety, such as fear, hearth palpitations, trembling and feeling of loss of control (Katon et al. 2007). Most of the patients with asthma had moderate level of anxiety. Increasing number of patients suffering from asthma has moderate anxiety than people with COPD, we have similar results in studies. In a survey conducted by Moranduzzo and Vulić-Prtorić (2002), the results showed that people with asthma have a very high level

of anxiety and show many neurotic symptoms such as dependence, sensitivity, nitpicking, perfectionism and obsession (Filipčić 2008). According to Wang (2010), 70% of asthmatic patients have developed some level of anxiety. The reasons why patients with asthma were more likely to have moderate level of anxiety were the symptoms of their illness and fear of suffocation (Gotlib 1989). High level of anxiety was found in a number of patients with COPD. According to Richard and associates (1985), anxiety and depression tend to appear together in patients with COPD, but the level of depression is always higher (Light 1985).

Level of depression in both women with COPD and woman with asthma is mild. Women are more likely to suffer from depression than men and have a higher risk of developing at least one depressive episode during life (Murray and Lopez 1997). According to a survey conducted by Asnaashari (2011), in which he conducted evaluation of the psychological status of the patients with asthma and COPD, no significant difference between these two groups of patients was found (Asnaashari et al. 2012). In our research we observed a slight degree of depression in both groups of respondents in accordance with research by Filipčić (2008), 25.6% of patients with asthma and 26.6%, patients with COPD were suffering from depression.

According to the literature, prevalence of depression in patients with lung diseases (asthma and COPD) is 25-35% (5), according to our research. According to Beck's charts, among females, divided in groups, more patients with asthma than patients with COPD had no indications of depression, while people with COPD had higher level of moderate depression. Among males, more patients with asthma had no indications of depression, whereas moderate level of anxiety was equally represented in both groups of patients. According to Filipčić (2008), 57% of patients with asthma had mild, 30% moderate and 13% sever depressive episode. Among patients with COPD, 52.5% of them had mild, 35% moderate and 12.5% sever depressive episode (4).

Connection between anxiety and depression is the subject of many studies. There is division among authors according to their views. Some of them believe that anxiety and depression are different and separate entities, while others think that anxiety and depression are different manifestations of the same disorder. COPD causes a lot of changes related to body, including sleeping and eating problems, loss of breath, low energy levels, etc. It is known that depression is common in patients with COPD, and even 40% of them are affected by that difficulty (Stage et al. 2006). Meta-analysis of 25 studies showed that depression may be a cause or a consequence of COPD, which means this relationship may be bi-directional (Atlantis et al. 2013). Depression is also being investigated with different scales. Many of them include items related to some somatic symptoms (Stage et al. 2006), which means that, in a way, we do not investigate depression only, but physical states related to COPD.

There is a fair chance that moderator variable between COPD and anxiety is cigarette smoking. The common problem of anxious people as well as those with COPD is history of cigarette smoking and nicotine dependence (Goodwin et al. 2012). Anxiety and COPD have a common feature, and this is a loss of breath. This feeling can often lead to panic which is one of the lead features of anxiety.

CONCLUSION

This research confirmed primary and secondary objective of the study. As side-effects in patients with asthma and COPD, anxiety and depression are in varying proportions present among them. Patients with asthma had higher average value of anxiety than patients with COPD, whereas women had higher level of depression in both groups, which is consistent with the results of Global initiative for chronic obstructive lung disease (GOLD 2013). Psychological aspects of patients with asthma and COPD should be carefully assessed, especially among women. In the treatment of a disease, psychological status of a person should also be considered. That would contribute to the overall better control of the disease and thus affect its prognosis. This study suggests that asthma and COPD are a significant stressor with a risk of developing anxiety and depression. It also emphasizes two-way aspect of COPD and asthma and psychological stress.

References

1. *Ashmore JA, Emery CF, Hauck ER & MacIntyre NR: Marital adjustment among patients with chronic obstructive pulmonary disease who are participating in pulmonary rehabilitation. Heart Lung 2005; 34:270–278*

2. *Asnaashari A, Talael A & Haghighi MB: Evaluatuon of psychological status in patients with asthma and COPD. Iran J Allergy Asthma Imunolol 2012; 11:65-71*

3. *Atlantis E, Fahey P, Belinda Cochrane B & Smith S: Bidirectional associations between clinically relevant depression or anxiety and chronic obstructive pulmonary disease (COPD): a systematic review and meta-analysis. Chest 2013; 144:766–777*

4. *Badway MSh, Hamed, AF & Yousef F: Prevalence of chronic obstructive pulmonary disease (COPD) in Qena Governorate. Egyptian Journal of Chest Diseases and Tuberculosis, 2016; 65:29–34*

5. *Bloomberg RG & Chen E: The relationship of psychologic stress with childhood asthma. Immunol Allergy Clin N Am 2005; 25:83–105*

6. *Brinke T, Ouwerkerk M & Zwinderman AH: Psychopathology in patients with severe asthma is associated with increased health care utilization. A J Respir Crit Care Med 2001; 163:1093-1906*

7. *Chavira DA, Stein MB, Bailey K & Stein MT: Comorbidity of Generalized Social Anxiety Disorder and Depression in a Pediatric Primary Care Sample. J Affect Disord 2004; 80:163-171*

8. *Felker B, Katon WJ, Hedrick SC, Rasmussen J, McKnight K, McDonnell MB & Fihn SD: The association between depressive symptoms and health status in patients with chronic pulmonary disease. Gen Hosp Psychiatry 2001; 23:56–61*

9. *Filipčić I: Depression frequency and impact of depression treatment on quality of life in patients with chronic somatic diseases (Doctoral dissertation, University of Zagreb), 2008. Retrieved from http://www.medlib.mef.hr/563/1/ Filipcic I disertacija rep 563. pdf*

10. *Global Initiative for Chronic Obstructive Lung Disease: Global Strategy for the Diagnosis, Management and Prevention of Chronic Obstructive Lung Disease. Edgewater, 2013*

11. *Goodwin RD, Lavoie KL, Lemeshow AR, Jenkins E, Brown S & Fedoronko DA: Depression, anxiety, and COPD: The unexamined role of nicotine dependence. Nicotine & Tobacco Research 2012; 14:176–183*

12. *Grigsby M, Siddharthan T, Chowdhury MAH, Siddiquee A, Rubinstein A, Sobrino E, Miranda JJ, Bernabe-Ortiz A, Alam D & Checkley W: Socioeconomic status and COPD among low- and middle-income countries. Int J Chron Obstruct Pulmon Dis 2016; 11:2497-2507*

13. *Gudmundsson G, Gislason T, Janson C, Lindberg E, Suppli Ulrik C, Brøndum E, Nieminen MM, Aine T, Hallin R & Bakke P: Depression, anxiety and health status after hospitalisation for COPD. Respir Med 2006; 100:87-93*

14. *Katon WJ, Lozano P, Russo J, McCauley E, Richardson L & Bush T: The prevalence of DSM-IV anxiety and depressive disorders in youth with asthma compared with controls. J Adolesc Health 2007: 41:455-63*

15. *Kurt B Stage, Thomas M, Tore B Stage & Claus H Sørensen: Depression in COPD – management and quality of life considerations Int J Chron Obstruct Pulmon Dis 2006; 1:315–320*

16. *Light RW, Merrill EJ, Despars JA, Gordon GH & Mutalipassi LR: Prevalence of depression and anxiety in patients with COPD. Chest 1985; 87:35-38*

17. *Moranduzzo I & Vulić-Prtorić A: Strategies of coping, self-esteem and anxiety in children with asthma. Works of philosophy, psychology, sociology and pedagogy 2002; 41:143-159*

18. *Murray CJL & Lopez AD: Alternative projections of mortality and disability by cause 1990-2020. Global Burden of Disease Study. Lancet 1997; 349:1498-1504*

19. *MCR Vision Inc. Retrieved from: http://www.goldcopd.org/ uploads/users/files/GOLD_Report_2013_Feb20.pdf*

20. *Peian L, Yanan Z, Peipei C, Pan C, Jiaxi Y, Ning Z & Na C: Prevalence and correlations with depression, anxiety, and other features in outpatients with chronic obstructive pulmonary disease in China: a cross-sectional case control study. Int J Chron Obstruct Pulmon Dis 2012; 7:825–832*

21. *Seemungal TAR, Donaldson GC, Paul EA, Bestall JC, Jeffries DJ & Wedzicha JA: Effect of exacerbation on quality of life in patients with chronic obstructive pulmonary disease. Am J Respir Crit Care Med 1998; 157:1418-1422*

22. *Wang G, Wang L, Xiong ZY & Zhou T: Psychological status in uncontrolled asthma is not related to airway-hiperresponsivness. J Asthma 2010; 47:93-9*

Correspondence:

MladenkaVukojević, MD
Department of Pediatrics, University of Mostar
Petra Kresimira bb, 88000 Mostar, Bosnia and Herzegovina
E-mail: mladenka.vukojević@gmail.com