

EFFECT OF PSYCHOLOGICAL STATUS ON RESPIRATORY SYMPTOMS

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Objective: To investigate whether psychological status affects respiratory symptom reporting and objective measures of the respiratory system.

Materials and Methods: This study was performed in 1090 male gun factory workers and in 420 women exposed to biomass. The subjects were questioned using a Respiratory questionnaire. Respiratory functions were measured by portable spirometer. Psychological status was measured by HAD scale. Groups with high HAD total scores and low HAD total scores were classified by the median value.

Results: In males: Chronic cough (17.6% vs. 10.7% $p=0.001$), chronic phlegm (13.2% vs. 8.9%, $p=0.02$), and probable asthma (39.5% vs. 25.5%, $p=0.0001$) were significantly more frequent in the group with high HAD total scores than in the group with low HAD total scores but definite asthma was not (6.2% vs. 4.6%, $p=0.2$).

In women: Chronic cough (34.8% vs. 23.5% $p=0.009$), chronic phlegm (23.9% vs. 15.4%, $p=0.02$), and probable asthma (53.5% vs. 35.3%, $p=0.0001$) were significantly more frequent in the group with high HAD total scores than in the group with low HAD total scores but definite asthma was not (7.0% vs. 9.0%, $p=0.4$).

Conclusion: Psychological status might affect the frequency of symptom reporting in respiratory questionnaires. The questionnaires and psychological status indices should be interpreted simultaneously.

Key Words: Psychological status, respiratory symptom reporting

RESPIRATUAR SEMPTOMLAR ÜZERİNE PSİKOLOJİK DURUMUN ETKİSİ

Amaç: Psikolojik durumun solunum semptomu bildirmeye ve solunum sisteminin objektif ölçümlerine etkisinin olup olmadığını araştırdık.

Materyal ve Metotlar: Çalışmaya silah fabrikasında çalışan 1090 erkek işçi ve biomasse maruz kalan 420 kadın alındı. Olgular respiratuar sorgulama formu ile sorgulanarak portable spirometre cihazı ile solunum fonksiyonları ölçüldü. Psikolojik durum HAD skalası ile ölçülerek ;median değere göre yüksek ve düşük HAD total skorlu gruplar olarak sınıflandırıldılar.

Bulgular: Erkeklerde: Kronik öksürük (%17,6 vs %10,7 $p=0,001$), Kronik balgam (13,2% vs.8,9%, $p=0,02$) ve muhtemel astım (%39,5 vs %25,5, $p=0,0001$) yüksek HAD total skorlu grupta düşük HAD total skorlu gruba göre önemli olarak daha sık bulunurken kesin astım (%6,2 vs %4,6, $p=0,2$) için gruplar arasında fark yoktu.

Kadınlarda: Kronik öksürük (%34,8 vs %23,5 $p=0,009$), kronik balgam (%23,9 vs. %15,4, $p=0,02$) ve muhtemel astım (%53,5 vs %35,3, $p=0,0001$) yüksek HAD total skorlu grupta düşük HAD total skorlu gruba göre önemli olarak daha sık bulunurken kesin astım (%7,0 vs %9,0, $p=0,4$) için gruplar arasında fark yoktu.

Sonuç: Respiratuar sorgulamada semptom bildirme sıklığı psikolojik durumdan etkilenebilir. Respiratuar sorgulama ve psikolojik durum göstergeleri eşzamanlı olarak yorumlanmalıdır.

Anahtar Kelimeler: Psikolojik durum, respiratuar semptom bildirme.

Respiratory distress or airway diseases can be mimicked by psychiatric disorders. It was reported that psychogenic upper airway obstruction was an unusual but often unrecognized cause of wheezing, dyspnea or stridor (1). The physician may not find a medical explanation for every respiratory symptom in clinical practice (2). Simon et al. reported that multiple unexplained respiratory symptoms were more common in depressive patients (3,4). Negative results from asthma tests have been identified in most of these patients, who reported asthma-like symptoms such as heavy breathing, increased sputum production, hoarseness, cough, and subjective hyper-reactivity among patients referred to asthma clinics for investigation of asthma. These patients were found to be significantly more depressed, less hedonic and more hypochondriac than asthmatics (5). Laviertes et al. have shown that, with the addition of small inspiratory loads to breathing, high intensity of dyspnea was perceived in the patient with a high depression score compared to the control group (6). According to these studies, respirator symptoms may reflect an increased awareness of physical symptoms in individuals with psychological problems. In this study, our aim was to investigate whether psychological status has an effect on the data of a respiratory questionnaire and spirometer.

MATERIALS AND METHODS

We only evaluated the effect of psychological status on the reporting of respiratory symptoms. The other characteristics of the present study have been published in different journals. In a gun factory, there were 2350 male workers in different sections. This study was performed with a total of 1090 workers split into two groups: those exposed to only solvents and those not exposed (control group), who work in support sections such as security, the office and departments related to engineering. We excluded workers such as welders, carpenters, and lathe operators. In this factory gun parts are produced from raw materials in workshops. These parts are cleaned with solvents and the workers are exposed to toluene, acetone, butanol, xylene, benzene and trichlorethylene during their shift (continually 8 h/day, 5 days a week).

The women included in the study were from ten villages situated about 5-20 km from the city of Kırıkkale, Turkey. Women aged >40 years were invited to attend the health center for screening via an announcement, and 420 responded.

In both studies, chronic respiratory symptoms were recorded using a modified British Medical Research Council questionnaire. Chronic nonproductive cough was defined as answering yes to the

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following question: "Do you usually cough during the day or at night in the winter for a minimum of 3 months a year?" and additionally a negative answer to the question concerning phlegm (Do you usually bring up any phlegm from your chest during the day or at night in the winter). Chronic phlegm was defined as phlegm for a minimum of three months a year (7).

Asthma definitions: For the purposes of this study, "definite asthma" was defined as positive responses to all three of these questions (ATS questions 20A, 20B, and 20C3): (1) "Have you ever had asthma?" (2) "Do you still have it?"; and (3) "Was it confirmed by a doctor?"

"Probable asthma" was defined as positive responses to both of the following questions (1): "Have you had wheezing or whistling in your chest at any time during the last 12 months?"; (2) "Have you felt chest tightness or been breathless when the wheezing noise was present?" (8).

Then the participants were asked to fill in the self-reported HAD questionnaire. The questionnaire consists of 14 questions in which the overall severity of anxiety and depression is rated on a four-point scale (0 to 3). Seven questions are related to anxiety and seven to depression (9). Groups with a high HAD total score and a low HAD total score were classified by median value (median value: for males=13; for females=19).

Lung-function testing was performed in all participants with a portable spirometer (MIR spirometer, Italy) according to the recommendation of the American Thoracic Society (10).

Forced expiratory volume in one second (FEV1), forced vital capacity (FVC), peak expiratory flow (PEF) and 25%–75% forced expiratory flow (FEF25-75) were measured with the best value of three forced expiratory maneuvers in the standing position. All variables were then converted into percentage predicted.

Analysis of contingency tables was performed with the chi-square or Fischer exact test when any table's cell had expected values of less than five. The influence of combined variables on respiratory symptoms was analyzed by logistic regression analysis. A value of $p < 0.05$ was regarded as statistically significant.

RESULTS

This study was performed in 1090 male gun factory workers and in 420 women exposed to biomass.

Mean age was 40.8 ± 7.5 (range: 17-60) in males and 54.3 ± 10.4 (range: 40-85) in females.

The prevalence of respiratory symptoms in the high HAD total score and low HAD total score groups in males is seen in Table 1.

Table 1: Respiratory symptoms according to HAD total score in males

Symptom	High HAD total score		Low HAD total score		P value
	n	(%)	n	(%)	
Chronic cough	80	34.8	52	23.5	0.009
Chronic phlegm	55	23.9	34	15.4	0.02
Definite asthma	16	7.0	20	9.0	0.4

Table 2 shows the prevalence of respiratory symptoms in the high HAD total score and low HAD total score groups in females. Subjects with high HAD total scores in both groups reported respiratory symptoms more often than those with low HAD total scores.

Table 2: Respiratory symptoms according to HAD total score in females

Symptom	High HAD total score		Low HAD total score		P value
	n	(%)	n	(%)	
Probable asthma	123	53.5	78	35.3	0.0001

However, there is no difference between the high HAD total score and low HAD total score groups in respiratory function tests in either gender (Tables 3, 4).

Table 3: Pulmonary functions according to HAD total score in males

	High HAD total score	Low HAD total score	P value
FEV1%	98.08 ± 15.8	99.1 ± 14.4	0.2
FEV1/FVC	82.56 ± 7.27	83.06 ± 7.18	0.2
MMF%	95.98 ± 29.9	98.51 ± 29.0	0.1

Table 4: Pulmonary functions according to HAD total score in females

	High HAD total score	Low HAD total score	P value
FEV1%	87.14 ± 7.51	86.77 ± 8.52	0.6
FEV1/FVC	95.33 ± 21.1	93.47 ± 20.9	0.3
MMF%	82.21 ± 28.8	77.46 ± 28.8	0.08

Logistic regression analysis indicated that a high HAD total score $\pm$ OR in male: 1.9 (1.4 to 2.5), $p=0.0001$; OR in female: 2.0 (1.3 to 2.9), $p=0.0001$ was an important predictor for respiratory symptom reporting after adjusting for age, smoking and exposure in both genders.

DISCUSSION

In this study, respiratory symptom reporting was significantly more frequent in the group with high HAD total scores than in the group with low HAD total score in both genders.

Self-reports, which are dependent on the respondent's perception of physical sensations, may be importantly influenced by psychological factors. If so, variation in psychological status could potentially reduce precision and bias results (11). According to our data, psychological status might change respiratory symptoms reporting significantly. Burns et al. investigated why one group of patients with a depressive illness had symptoms localized to the chest, while another group with a depressive illness did not. They concluded that factors determining the presence of localized symptoms in the chest were previous and current organic respiratory disease; a pre-existing excessively health-conscious obsessive personality; a high frequency of severe lower respiratory tract disease in the family, including recollection of prolonged breathlessness in a parent; and recent separation from or death of a family member (12). In another study conducted by Burns et al., they found that in those with depression breathlessness occurred at rest; the main difficulty was on inspiration and this was frequently associated with a sensation of heaviness, or pressure on the chest. They also reported that somatic symptoms related to the chest disappeared with psychiatric treatment and during follow-up (13).

In the literature, there are many reports investigating the association between psychological status and respiratory symptoms. Janson reported that individuals with more psychological symptoms might be more likely to report respiratory symptoms (14). Dales et al. found a strong positive association between respiratory symptoms and psychological status indicators (11). In a random study, anxiety and depression had a positive significant correlation with habitual coughing and productive coughing, which may reflect an increased awareness of physical symptoms in anxious individuals (15). A study of 100 patients with panic disorder found that a life-long prevalence of respiratory disease (asthma, chronic bronchitis, emphysema, and allergy) was 16% versus 5% among patients with no psychiatric diagnosis (16). Persistent cough and throat clearing were more frequent in patients with obsessive-compulsive disorder or with neurological "tics" (1). Oswald et al. reported in a hospital-based study that personality scores appeared to be more closely related to breathlessness than to the diagnostic categories such as bronchitis and asthma based on cough, phlegm, and wheezing (17). Burns and Howell showed that depression, anxiety, and hysterical reactions were more common among the group with disproportionate breathlessness, comparing subjects (patients without lung disease) with more breathlessness than predicted from clinical and physiologic cardio-respiratory examination to subjects (a group of patients with lung disease) with breathlessness thought to be consistent with their degree of physical impairment (18). Hutchings et al. found an association between psychological factors and coughing, indicating that obsessive personalities had greater difficulties in maintaining voluntary cough suppression (19). In our study, respiratory symptom reporting was

higher in high scored workers and women. In conclusion, the results of our study were similar to those reported previously.

Smoking and exposure to irritants might affect the association between depression and respiratory symptom reporting (14). After eliminating the effects of smoking and exposure to respiratory irritants, there was an important association between psychological status and respiratory symptom reporting. The present study suggests that psychological status affected the frequency of symptoms reporting in the respiratory questionnaire. Thus, the respiratory questionnaire should be interpreted with psychological status indices simultaneously.

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REFERENCES

1. Gordon GH, Bernstein MJ. Psychiatric mimics of allergic airways disease. *Immunology and Allergy Clinics of North America*.1996; 16: 199-214.
2. Speckens AEM, van Hemert AM, Spinhoven P, Hawton KE, Bolk JH, Rooijmans HGM. Cognitive behavioural therapy for medically unexplained physical symptoms: a randomised controlled trial. *BMJ* 1995; 311: 1328-1332.
3. Simon GE, VonKorff M. Somatization and psychiatric disorder in the NIMH Epidemiologic Catchment Area study. *Am J Psychiatry* 1991; 148(11): 1494-500.
4. Simon GE, VonKorff M, Piccinelli M, Fullerton C, Ormel J. An international study of the relation between somatic symptoms and depression. *N Engl J Med* 1999; 341: 1329-35.
5. Ringsberg KC, Lowhagen O, Sivik T. Psychological differences between asthmatics and patients suffering from an asthma-like condition, functional breathing disorder: a comparison between the two groups concerning personality, psychosocial and somatic parameters. *Integr Physiol Behav Sci* 1993; 28(4): 358-67.
6. Laviates MH, Sanchez CW, Tiersky LA, Cherniack NS, Natelson BH. Psychological profile and ventilatory response to inspiratory resistive loading. *Am J Respir Crit Care Med* 2000; 161(3 pt 1): 737-44.
7. Medical Research Council Committee on the Aetiology of Chronic Bronchitis. Standardized questionnaire on respiratory symptoms *Br Med J*.1960;11:1665.
8. Enright PL, McClelland RL, Newman AB, Gottlieb DJ, Lebowitz MD. Underdiagnosis and undertreatment of asthma in the elderly. *Cardiovascular Healthy Study Research Group. Chest* 1999; 116(3): 603-13.
9. Zigmond AS, Snaith RP. The hospital anxiety and depression scale. *Acta Psychiatr Scand*. 1983; 67: 361-70.
10. American Thoracic Society. Lung function testing: selection of reference values and other interpretative strategies. *Am Rev Respir Dis*. 1991; 144: 1202-1218.
11. Dales RE, Spitzer WO, Schechter MT, Suissa S. The influence of psychological status on respiratory symptom reporting. *Am Rev Respir Dis* 1989; 139: 1459-1463.
12. Burns BH, Nichols MA. Factors related to the location of symptoms to the chest in depression. *Brit. J. Psychiat*. 1972; 121: 405-9.
13. Burns BH. Breathlessness in depression. *Brit. J. Psychiat*. 1971; 119: 39-45.

14. Janson C, Björnsson E, Hetta J, Boman G. Anxiety and depression in relation to respiratory symptoms and asthma. *Am J Respir. Crit Care Med* 1994; 149: 930-4.
15. Ludviksdottir D, Björnsson E, Janson C, Boman G. Habitual coughing and its associations with asthma, anxiety, and gastroesophageal reflux. *Chest* 1996; 109(5): 1262-8.
16. Spinhoven P, Ros M, Westgeest A, et al: The prevalence of respiratory disorders in panic disorder, major depressive disorder, and V-code patients. *Behav Res Ther* 1994 Jul; 32(6): 647-9.
17. Oswald NC, Waller RE, Drinkwater J. Relationship between breathlessness and anxiety in asthma and bronchitis. *BMJ* 1970; 2: 14-17.
18. Burns BH, Howell JB. Disproportionately severe breathlessness in chronic bronchitis. *Q J Med* 1969; 38: 277-94.
19. Hutchings HA, Eccles R, Smith AP, Jawad MS. Voluntary cough suppression as an indication of symptom severity in upper respiratory tract infections. *Eur Respir J* 1993; 6(10): 1449-54.