

Perception of Ecological Factors in Asthmatic and Coronary Patients

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ABSTRACT

The aim of the study was to determine whether an examined group of asthmatic patients differ significantly from a control group of coronary patients with regard to perception of two groups of etiological factors and their interaction: a) ecological factors, and b) habits and behavior of the patients. The study included 100 patients with bronchial asthma and 102 with coronary disease. A questionnaire was used to obtain data on ecological factors in the living environment of the patients and information on habits and behavior. The questionnaire was structured according to the specific needs of the study, and as a starting point known, calibrated, psychometric scales were used. Asthmatic and coronary patients did not differ with regard to their place of residence, i.e. the same number lived in the town and village, in similar ecological environments, and they also did not differ with regard to life style and habits. The study indicated statistically significant differences between asthmatic and coronary patients in their perception of several ecological and other risk factors. The asthmatic patients significantly more frequently perceived harmful ecological factors in their environment and regarded them significant for the occurrence of their disease. The coronary patients perceived their unhealthy habits and behavior as the causal factors of their disease.

Introduction

Asthma is a multifactorial disease, in which genetic, environmental, biological, psychological and social factors play a role¹⁻³. Epidemiological studies show that, apart from one exception, asthma is an acquired disease, determined by the environment⁴⁻⁶. The one exception is atopy,

for which the majority of studies indicate that it is a genetically determined risk factor for asthma^{7,8}.

Asthma has become a significant public health problem in the world because of its increased prevalence, morbidity and mortality over the last ten years^{9,10}, par-

ticularly in highly industrialized countries. However, the cause of this »epidemic« occurrence of asthma is still not clear^{11–13}. The effect of various ecological pollutants has been examined, both outside »outdoor pollution«, and inside »indoor pollution«, on the increased incidence of bronchial asthma^{14,15}. Recent studies show the increased effect of pollutant induced bronchoconstrictive agents, such as histamine and methacholine, and also the influence of air pollutants on increased symptoms in atopics after exposure to allergens, i.e. increased bronchial reactivity to inhaled allergens in patients with bronchial asthma^{16,17}. Many studies have indicated that air pollutants, particularly NO₂, O₃ and SO₂ and volatile organic materials, are among the main causal agents of asthma exacerbation. A consequence is work incapacity, increased medical costs and reduced quality of life^{18–21}.

Apart from the direct harmful influence of ecological pollution, the indirect effects of increased environmental pollution on the increased incidence of tension and stress has also been studied, which together result in a harmful effect on health^{22–24}.

Coronary disease, a clinical syndrome caused by narrowing or occlusion of the coronary arteries, also represents a significant public health problem because of its high prevalence and leading cause of death in developed countries of the world^{25,26}. It is considered that coronary disease occurs through the complex interaction of genetic and environment factors^{27,28}. Numerous investigations have been performed in which behavior and characteristics have been studied, including stress factors preceding the occurrence of asthma and coronary disease^{29–34}. It was found that the incidence of coronary diseases was significantly higher in persons with A type behavior, and that this risk factor is significant, similar to other known risk factors (hypertension,

hypercholesterolemia, obesity and diabetes).

Although correlation between bronchial asthma and certain psychological characteristics of patients has been described^{35–39} a specific type of behavior and personality, characteristic for asthmatic patients, has still not been determined.

The aim of the present study was to investigate whether patients suffering from bronchial asthma differ from coronary patients with regard to their perception of two groups of possible etiological factors of disease and their specific interaction: a) ecological factors (exogenous factors); b) habits and behavior in certain conditions of everyday life and work, as a separate group of risk factors, known as »behavioral pathogens«.

Subjects and Methods

Two groups of subjects were included in the study. The first group consisted of 100 patients, treated in the University Hospital for Lung Diseases »Jordanovac«, with a diagnosis of asthma, and the second group consisted of 102 patients, treated at the same time in the Department for Cardiovascular Diseases, University Hospital Center »Zagreb«, with a diagnosis of coronary disease. All the patients satisfied diagnostic criteria for their disease and were not suffering from any other chronic diseases. The questionnaire was completed after acute symptoms had subsided, i.e. during a stable phase of the disease.

The first group comprised 60 females and 40 males, mean age 41.7 years, and the second group 17 females and 85 males, mean age 55.3 years. The group of asthmatic patients included 8% pupils and students, 31% workers, 32% white-collar workers, 14% farm workers and housewives, 15% pensioners. The group of coronary patients included 1.0% pupils and students, 43.1% workers, 19.6%

white-collar workers, 3.9% farm workers and 32.4% pensioners. With regard to the level of education, 12% of the asthmatic patients had finished only 4 classes of primary school, and 3.9% of the coronary patients. Only 3% of the asthmatic patients and 17.6% of the coronary patients had higher education, and the difference is statistically significant. With regard to other levels of education (primary, middle and high school) no significant differences were found between the groups of patients.

Although direct measurement of environmental factors (pollution of air, drinking water, food, noise, forest dieback, accumulation of industrial and other waste, humidity in the home) was not performed during the study, data on their possible existence in the patient's environment were obtained by means of a questionnaire. In the same way the examinee's subjective opinion of harmful environmental factors and the effect of ecological factors on their personal health was analyzed. The questionnaire was structured according to the specific requirements of this study, and as a starting point, known, calibrated scales were used^{40,41}.

The questionnaire consisted of several parts:

1. Questions on the patient's perception of exposure and risk to personal health due to ecological factors in childhood and during the last five years (air pollution, noise, restricted living area, accumulation of refuse, harmful industrial waste, pollution of drinking water, pollution of food products, forest dieback, humidity of the living area).
2. Questions on the risk for particular organs and organic systems due to ecological factors (respiratory system, heart and blood vessels, skin and mucous membrane, sensory organs, digestive organs, musculoskeletal system, urogenital system).

3. Questions on the patient's own assessment of the role of his behavior and life style (smoking, physical inactivity, unhealthy diet...) in the occurrence of his disease.

Statistical analysis of data was performed by means of the SPSS statistical package.

Significance of the differences in levels of qualitative measures (variables) was tested by χ^2 , with the desired level of risk of 5%. The quantitative variable – age of subject – was tested by parametric t-test. Multivariate discriminative analysis⁴² was used to test the discriminative validity of differences in perception of ecological factors between the groups of subjects.

Results

In the present study the asthmatic patients significantly more frequently perceived air pollution in their living environment than the coronary patients did. Namely, 7% of the asthmatic patients reported extremely polluted environment, compared to only 0.9% of the coronary patients (Table 1). Asthmatic patients considered that dampness in their present home and that of their childhood has greater importance in the etiology of their disease than coronary patients (Table 1).

The influence of ecological factors on their health was considered very important by the asthmatic patients, i.e. as many as 44% considered that their respiratory system is significantly damaged by the effect of harmful ecological factors, compared to only 15.6% of the coronary patients. Considerable difference was also found in the perception of the influence of ecological factors on the skin and mucous membrane between asthmatic and coronary patients. Fifteen per cent of the asthmatic patients perceived the harmful effects of ecological factors on the skin and mucous membrane, compared to only 0.9% of the coronary patients.

TABLE 1
PERCEPTION OF PRESENCE AND INFLUENCE OF ECOLOGICAL FACTORS ON HEALTH
(IN CHILDHOOD AND NOWADAYS)

Ecological factor	Group	Degree of presence				Statistical significance
		Very small	Small	Moderate	Great	
Air pollution	I	69	16	8	7	0.000
	II	95	5	1	1	
Damp dwelling	I	61	16	13	10	0.01
	II	82	4	8	8	

Group I = patients with bronchial asthma

Group II = patients with coronary disease

TABLE 2
PERCEPTION OF ENDANGERMENT OF THE ORGANS AND BODY SYSTEMS
BY ECOLOGICAL FACTORS

Body system	Group	Degree of influence			Statistical significance
		None	To a certain degree	Significant	
Respiratory System	I	21	35	44	0.000
	II	58	28	16	
Skin and mucous Membranes	I	68	17	15	0.000
	II	78	23	1	
Skeletal System	I	81	10	9	0.01
	II	82	19	1	

Group I = patients with bronchial asthma

Group II = patients with coronary disease

The asthmatic patients attached great importance to the effect of ecological factors on their musculoskeletal system, and 9% considered that this system is endangered by the harmful effects of their physical surroundings, compared to only 0.9% of the coronary patients (Table 2).

There were no statistically significant differences between the examined groups of patients with regard to their perception of other examined ecological factors, such as noise, pollution of food and drinking water, forest dieback, accumulation of solid and industrial waste, dampness and restricted space in the home, nor with regard to their perception of the harmful ecological effect on other organs and or-

gan systems (heart and blood vessels, skin and mucous membrane, sensory organs, digestive organs, musculoskeletal system, urogenital system).

Asthmatic patients attached less significance to the effect of stress and strain of life on the occurrence of their disease. Namely, 29% of the asthmatic patients considered that stress is significant in the etiology of their disease, while as many as 61.7% of the coronary patients considered stress important for the occurrence of their disease. A similar opinion was found with regard to the effect of bad habits and behavior (smoking, physical inactivity, unhealthy diet...) on the occurrence of their disease.

TABLE 3
PERCEPTION OF THE INFLUENCE OF OTHER RISK FACTORS

Risk factor	Group	Degree of influence			Statistical significance
		None	To a certain degree	Significant	
Stress	I	29	42	29	0.000
	II	10	29	63	
Bad life habits	I	63	29	8	0.04
	II	30	39	33	

Group I = patients with bronchial asthma

Group II = patients with coronary disease

In the present study only 8% of the asthmatic patients considered that bad habits and behavior were important for the occurrence of their disease, compared to 32.3% of the coronary patients (Table 3).

The groups of asthmatic and coronary patients did not differ objectively with regard to life style and habits (smoking, diet, alcohol consumption, sleep, and physical activity). Differences in perception of several environmental and other risk factors and their consequences on the health of the subjects were confirmed by multivariate discriminative analysis (Table 4), which shows that the asthmatic patients considered that their respiratory and digestive system, skin and mucous membrane are endangered by harmful environmental factors. Asthmatic patients also reported a greater number of harmful environmental factors in their environment. They considered the following significant in their living environment: restricted space and dampness in the home during childhood and over the last five years, air pollution during childhood, noise in childhood, pollution of drinking water and foodstuffs during the last five years, and industrial waste during childhood.

A multivariate discriminate analysis confirmed that the coronary patients attached greater importance to other risk factors, such as bad habits and behavior, and excessive stress and strain of life.

The asthmatic and coronary patients did not differ according to their place of residence. Namely, 58% of the asthmatic patients live in the town and 32% in the village; 52% of the coronary patients live in town and 38% in the village.

Discussion

The study was carried out in keeping with current understanding of the etiopathogenesis of asthma as a disease which occurs as a consequence of the complex interaction of biological factors and predisposed characteristic traits on the one hand, and environmental factors and stresses and specific adaptive reactions of the patient, on the other^{43,44} and in accordance with the knowledge that coronary disease also occurs by the interaction of predisposed characteristic traits and numerous genetic-environmental factors^{45–47}.

As the world registers an increasing incidence of bronchial asthma increased pollution of the living environment is taking place. Numerous investigations have examined the possibility of correlation between the increased incidence of bronchial asthma and increased ecological pollution. However, no comprehensive investigations have been performed on psychological factors in the etiology of bronchial asthma, which could be used for preventive and therapeutic purposes, as in the case of coronary patients. In-

TABLE 4
DIFFERENCES IN ENVIRONMENTAL AND OTHER RISK FACTORS AND THEIR
CONSEQUENCES ONTO HEALTH OF ASTHMATIC AND CORONARY PATIENTS
RESULTS OF MULTIVARIATE DISCRIMINATIVE ANALYSIS

Analyzed variable	Coefficient of discr. validity	Significance of difference
1. Risk for respiratory system	0.402	0.000
2. Bad life habits and behavior	-0.385	0.000
3. Too strenuous and stressful life	-0.345	0.000
4. Damp dwelling (over the last 5 years)	0.312	0.000
5. Various nonspecific factors	0.300	0.000
6. Air pollution (in childhood)	0.257	0.000
7. Noise (influence in childhood)	0.243	0.000
8. Dying of forests	0.212	0.000
9. Insufficient housing space (in childhood)	0.201	0.000
10. Risk for skin and mucous membranes	0.175	0.000
11. Noise	-0.155	0.000
12. Drinking water (over the last 5 years)	0.143	0.000
13. Risk for heart and blood vessels	-0.095	ns
14. Air pollution (over the last 5 years)	0.095	ns
15. Dying of forests (over the last 5 years)	-0.089	ns
16. Accumulation of garbage – solid waste (over the last 5 years)	-0.081	ns
17. Risk for skeletal and muscular systems	0.066	ns

Centroids of the studied groups: asthmatic patients = 1.056; coronary patients = -1.036.

creased attention is also being paid to an increase in ecological factors as risk factors for the occurrence of coronary disease.

As unadapted respiratory reactions, such as for example bronchoconstriction, represents specific stress-reaction of psychological origin in many asthmatic patients⁴⁸, and as harmful ecological factors may lead to attacks of both asthma and coronary disease, the object of this study was to examine perception of ecological and behavioral factors in the living environment of asthmatic and coronary patients, and to determine how much significance patients attach to the effect of these factors on their organs and organic systems.

The groups of asthmatic and coronary patients did not differ statistically according to their place of residence, i.e. the

same percentage live in towns and villages. However, although they live in similar ecological surroundings they have different perceptions of the existence of harmful ecological factors in their living environment and also different perceptions of the harmful effect of ecological factors on their health. In the present study asthmatic patients attached far more importance to the effect of different ecological factors on their health, and comprehend their harmful effect on the respiratory system, skin, mucous membrane and musculoskeletal system. In contrast to asthmatic patients coronary patients are much less perceptive of the harmful ecological factors in their surroundings, and considered that their bad habits and behavior have greater significance for the occurrence of their disease, although no differences were determined

in this study between the examined groups with regard to habits and behavior (smoking, alcohol consumption, excessive consumption of fatty and sweet food, daily rest, sleep, recreation and sport and reaction to stress).

Difference in perception of ecological factors may be conditioned by the fact that the harmful effects of air pollution lead to rapid, immediate consequential respiratory symptoms, of which asthmatic patients primarily suffer. Hence, the very high perception of these harmful ecological factors and their harmful effect on the respiratory system on the part of asthmatic patients. Information and education plays an important role in the formation of attitudes and perception of certain factors. The coronary patients perceived their bad habits and behavior as etiological factors of their disease, because they probably considered that ecological factors are irrelevant for their disease. The asthmatic patients in this study were considerably younger and included more pupils and students than the group of coronary patients (8% : 1%). Thus they were possibly more ecologically aware, both because of their age and because of the educational system, in which more attention is paid today to the development of ecological awareness. This agrees with earlier investigations, which indicated that age could have an effect on the formation of attitudes, i.e. increased awareness and criticism of younger subjects⁴⁹. It is also possible that differences in perception of potential etiological factors are condi-

tioned by the information which patients receive from their physicians, and also from the mass media. Differences in perception may also be a result of the different psychological and social characteristics of the subjects in the present study⁵⁰.

Perception of ecological factors and degree of anxiety because of certain ecological problems, and also perception of personal danger by the potential harmful effect of ecological factors in eco-psychological analysis is considered an indicator of the sensibility of the population to ecological problems⁴⁰. Success of preventive and therapeutic procedures cannot be anticipated without improved awareness of the potentially harmful effects of ecological factors. Various educational measures should therefore be carried out with the object of better information of the population on ecological problems and increased ecological awareness.

The presented differences in perception of potential etiological factors may be a result of the different psychological characteristics of the subjects in this study, i.e. the result of different beliefs about internal and external factors (internal and external sources of control) which have an effect on the health of the individual⁵¹. Thus, further investigations of psychological characteristics are necessary, both of asthmatic and coronary patients, as the behavior of the individual, i.e. undertaking preventive and therapeutic action, can be important under the influence of the perceived source of health control.

REFERENCES

1. FARNHAM, J. E., *Tex. Med.*, 95 (1999) 60. — 2. ADER, R., D. L. FELTEN, N. C. COHEN: *Psychoneuroimmunology*. (Academic Press, London, 1991). — 3. PAVIČEVIĆ, R., J. MILIČIĆ, M. PAVLOVIĆ, I. HITREC, A. PAVIČEVIĆ, Z. TUĐMAN, Z. RADOŠEVIĆ, P. RUDAN, *Coll. Antropol.*, 18 (1994) 125. — 4. GOODFREY, R. C., *Clin. Allergy*, 5 (1975) 201. — 5. ANDERSON, H. R., *Int. J. Epidemiol.*, 7 (1978) 63. — 6. WAITE, D. A., E. F. EYLES, S. L. TARKIN, T. V. O'DONELL, *Clin. Allergy*, 10 (1980) 71. — 7. SHIRIKAWA, T., A. LI, M. DUBOWITZ, J. W. DELKER, A. E. SHAW, *Nat. Genet.*, 7 (1994) 125. — 8. MOFFAT, M. F., M. R. HILL, F. CORNELLS, C. SCHON, J. A. FAUX, R. P. YOUNG, *Lancet*, 343 (1994) 1597. — 9.

- BURNEY, P., S. CHINN, Eur. Respir. J., 9 (1996) 687. — 10. MACKAY, T. W., C. G. WATHEN, M. F. SUDLOW, R. A. ELTON, E. CAULTON, Scott. Med. J., 37 (1992) 5. — 11. SUNDELL, J., Indoor Air- International Journal of Indoor Air Quality & Climate., Suppl (1994) 1. — 12. HIJAZI, N., B. ABALKHAIL, A. SEATON, Thorax, 55 (2000) 775. — 13. GRANT, E. N., H. ALP, K. B. WEISS, Curr. Opin. Pulm. Med., 5 (1999) 27. — 14. LINN, W. S., H. JR. GONG, D. A. SHAMOO, K. R. ANDERSON, E. L. AVOL, Arch. Environ. Health, 52 (1997) 179. — 15. FINN, P. W., J. O. BOUDREAU, H. HE, Y. WANG, Y., M. D. CHAMPMAN, C. VINCENT, H. A. BURGE, S. T. WEISS, D. L. PERKINS, D. R. GOLD, J. Allergy. Clin. Immunol., 105 (2000) 933. — 16. FAUROUX, B., M. SAMPIL, P. QUENEL, Y. LEMOUILLEC, Ped. Pulmonol., 30 (2000) 41. — 17. DEWALIA, J. L., J. H. WANG, C. RUSZNAK, M. CALDERON, M. R. J. DAVIES, ACI News, 6 (1994) — 18. BYLIN, G., T. HEDENSTIERNA, T. LINDVALL, B. SUNDIN, Eur. Respir. J., 1 (1988) 606. — 19. GORSKI, P., A. KRAKOWIAK, Med. Pr., 43 (1992) 187. — 20. MOSEHOLM, L., E. TAUDORF, A. FROSIG, Allergy, 48 (1993) 334. — 21. ROEMER, W., G. HOEK, B. BRUNEKREEF, Am. Rev. Respir. Dis., 147 (1993) 118. — 22. DUNNE, M. P., P. BURNETT, J. LAWTON, B. RAPHAEL, Med. J. Aust., 152 (1990) 592. — 23. DAVIDSON, J. R., D. HUGES, D. G. BLAZER, L. K. GEOGE, Psychol. Med., 21 (1991) 713. — 24. KAPLAN, B. A., C. G. MASCIE TAYLOR, J. Biosoc. Sci., 21 (1989) 475. — 25. BRAUNWALD, E.: Heart disease: A textbook of cardiovascular medicine. (WB Saunders, Philadelphia, 1984) — 26. SOKOLOW, M., M. B. MCILROY: Clinical cardiology. (Lange, Los Altos, 1986). — 27. ELLSWORTH, D. L., P. SHOLINSKY, C. JAQUISH, R. R. FABSITZ, T. A. MANOLIO, Am. J. Prev. Med., 16 (1999) 122. — 28. DREXLER, H., K. ULM, M. HUBMAN, T. GOEN, W. MONDORF, E. LANG, J. ANGERER, G. LEHNERT, Int. Arch. Ocup. Environ. Health., 67 (1995) 243. — 29. JENKINS, C. D., R. H. ROSENMAN, S. J. ZYSANSKI, N. Engl. J. Med., 290 (1974) 1271. — 30. LIGNY, C., I. WITMOTTE, Rev. Med. Brux., 11 (1990) 21. — 31. REES, L., J. Psycho., 7 (1964) 253. — 32. ROSENMAN, R. H., R. J. BRAND, R. I. SHOLTZ, M. FRIDMAN, Am. J. Cardiol., 37 (1976) 903. — 33. ADAMOVIĆ, V., S. SAVIĆ, Psihijatrija danas, 4 (1982) 2. — 34. BOŽIČEVIĆ, I., S. OREŠKOVIĆ, Coll. Antropol., 24 (2000) 325. — 35. BARON, C., P. WEILLEUX, A. LAMARRE, Can. J. Psychiatry, 37 (1992) 12. — 36. CIESIELSKA-KOPACZ, N., E. KOSINSKA, J. JARSOB, Wiad. Lek., 43 (1990) 199. — 37. PRIEL, B., A. HENIK, A. DEKEL, A. TAL, J. Pediatr. Psychol., 15 (1990) 197. — 38. WEIL, C. M., S. L. WADE, L. J. BAUMAN, H. LYNN, H. MICHELL, J. LAVIGNE, Pediatrics, 104 (1999) 1274. — 39. MANCUSO, C. A., M. G. PETERSON, M. E. CHARLSON, J. Gen. Intern. Med., 15 (2000) 301. — 40. WALLSTON, K. A., B. S. WALSTON, R. DEVELLIS, Health Education Monographs, 6 (1978) 160. — 41. RATZ, A., Magistrarski rad. (Medicinski fakultet, Zagreb, 1990). — 42. KOPJAR, B., D. IVANKOVIĆ, G. LUKOVIĆ: Osnove statističke analize za medicinare. (Medicinski fakultet, Zagreb, 1988). — 43. KAGAN, J., N. SINDMAN, M. JULIA-SELLERS, M. O. JOHNSON, Intern. J. Psychosom., 53 (1991) 332. — 44. BENEDITO-MONLEON, C., A. LOPEZ, J. ALONSO, Cogn. Behav. Ther., 22 (1994) 153. — 45. ČUBRILLO-TUREK, M., A. STAVLJENIĆ-RUKAVINA, J. SERTIĆ, R. ZRINSKI, S. TUREK, G. GRGAC, N. LJUBOJEVIĆ, Coll. Antropol., 22 (1998) 149. — 46. BIOČINA, B., I. HUSEDŽINOVIĆ, Z. SUTLIĆ, V. PRESEČKI, J. WALLWORK, Coll. Antropol., 23 (1999) 673. — 47. BOS, A. J., L.J. BRANT, C. H. MORRELL, J. L. FLEG, Coll. Antropol., 22 (1998) 333. — 48. ISENBERG, S. A., P. M. LEHRER, S. HOCHORN, Intern. J. Psychosom., 54 (1992) 192. — 49. CIFRIĆ, I., B. ČULIG: Ekološka svijest mladih. (RZRK SSOH, Zagreb, 1978). — 50. KUKULJ, S., Z. IVANOVI-HERCEG, M. SAMARŽIJA, B. SEVER, A. BARATH, Coll. Antropol., 24 (2000) 347. — 51. KRIZMANIĆ, M., S. SZABO: Manual for health related locus of control. (Slap, Jastrebarsko, 1994).

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PERCEPCIJA ČIMBENIKA OKOLIŠA U ASTMATIČNIH I KORONARNIH BOLESNIKA

S A Ž E T A K

Cilj ovog istraživanja bio je odrediti je li se osobe koje boluju od astme značajno razlikuju od bolesnika koji boluju od koronarne bolesti srca u odnosu na percepciju dva tipa etioloških čimbenika: a) čimbenike okoliša, i b) osobne navike i zdravstveno-rizično ponašanje. Studija je uključila 100 bolesnika s bronhijalnom astmom i 102 koronarna bolesnika. Korišten je upitnik kojim su dobivene informacije o čimbenicima okoliša u životnom prostoru bolesnika te informacije o zdravstveno štetnim navikama i ponašanju samih bolesnika. Upitnik je bio strukturiran u skladu s specifičnim potrebama ove studije, te su korištene psihometrijske skale pri čemu je početna točka bila poznata i kalibrirana. Skupina astmatičnih i skupina koronarnih bolesnika nisu se razlikovale u odnosu na mjesto stanovanja tj. isti broj bolesnika je živio u gradu, odnosno selu, u ekološki sličnom okolišu, nisu se razlikovali u odnosu na stil života i dnevne navike. Studija je uputila na statistički značajnu razliku između astmatičara i koronarnih bolesnika u njihovoj percepciji nekoliko rizičnih čimbenika. Astmatični bolesnici su značajno češće zamjećivali zdravstveno štetne ekološke čimbenike u svom okolišu i doživljavali ih značajnim za pojavu njihove bolesti. Koronarni bolesnici su doživljavali svoje zdravstveno-rizične osobne navike i ponašanja kao uzročne čimbenike razvoja njihove bolesti.