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ASTHMA, ALLERGY, AND RESPIRATORY SYMPTOMS IN CENTENARIANS LIVING IN POLAND

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According to National Census, there were 1541 people over the age of 100 years (centenarians) in Poland, in 2002, including 1215 females and 326 males. The aim of the present study was to assess the prevalence of asthma, allergy, and respiratory symptoms in centenarians included in the Polish Centenarians Program, POLSTU 2001, conducted between 2001 and 2004. The study group consisted of 301 subjects including 258 females and 43 males. Research data were gathered in a questionnaire designed exclusively for the study, completed by the interviewer during meetings with the subjects and their families. According to the medical history reported by the subjects, 10 persons (3.3%) suffered from asthma and 41 (13.6%) from allergy. There were no subjects with childhood onset asthma. Allergy to food and medicinal products was the most prevalent. One in four centenarians reported dyspnea and one in eight complained of cough. When analyzed in relation to gender, cough was more prevalent in males, which might have been related to cigarette smoking. Respiratory disorders are frequent in elderly populations, but symptoms may be underreported, especially in the situation of coexisting medical problems. Moreover, it might be difficult to perform full diagnostic procedures in the very elderly due to disability, cognitive impairment, and technical problems. Thus, medical care for the aged should be based on thorough medical evaluation supported by the medical history and reliable information on physician-diagnosed diseases.

Key words: *aging, allergy, asthma, centenarians, longevity, respiratory symptoms*

INTRODUCTION

Aging of the respiratory system includes various anatomic and functional changes in the upper and lower respiratory tract as well as deformation of the

chest structure (1). People who achieve extreme longevity are examples of successful aging, but they do not escape the physiological and pathophysiological effects of aging. Studies of extremely old subjects have been conducted in many countries (2-9). However, to the authors' knowledge, no studies assessing respiratory function in the aged have been published apart from a Polish study (10). Asthma and allergy are usually associated with early age onset, but may also affect elderly subjects, and the diagnosis of these diseases is challenging due to coexisting disorders and underreporting of symptoms (11, 12). The aim of the present work was to assess the prevalence of respiratory symptoms and also that of self-reported asthma and allergy among people over the age of 100 years living in Poland. In the paper, the term centenarian refers to all studied subjects, irrespectively of their exact age at the time of examination.

MATERIAL AND METHODS

The study conformed to the Declaration of Helsinki for Human Research and all subjects and their caregivers gave written informed consent for participation in the study. The project obtained an approval of a local Ethics Committee.

Study group

The study group consisted of 301 subjects over the age of 100 years, including 258 females and 43 males (male/female ratio: 1/6). The oldest female was 108.2 years old, and the oldest male 104.3 years old. The median age for females and males was 101.1 and 101.0 years, respectively.

Methodology

The centenarians were visited at their place of living in the framework of the scientific project: 'Polish Centenarians Program', PolStu2001 in the period between 2002 and 2004. The methodology of the project, including a questionnaire developed by the project leaders and medical geriatric assessment has been described in detail elsewhere (13, 14). For the purpose of the present study, parts of the questionnaire concerning previous diagnosis of allergy, asthma, as well as respiratory symptoms and smoking status were analyzed. The questionnaire was performed by an experienced interviewer with centenarians and/or with their family members and caregivers in case of subjects' cognitive disorders.

Statistical analysis

For the statistical analysis of data, Chi² test was applied, and in case of groups smaller than five subjects, Yates' correction was used. The statistically significant difference was accepted when $P < 0.05$.

RESULTS

Asthma

Diagnosis of asthma was reported by 10 (3.3%) centenarians including seven (2.7%) females and three (7.0%) males. Gender difference did not reach

the level of statistical significance. Asthma was diagnosed in centenarians between the ages of 70 and 99 years, and the mean age at diagnosis was 89.6 ± 10.7 years. There were no reported cases of childhood-onset asthma among centenarians.

Allergy

Past or current allergy was reported by 41 (13.6%) subjects including 34 (13.2%) females and 7 (16.3%) males; gender difference was not significant ($P > 0.05$). Allergy presented mostly as skin reactions, and two responders reported itching without other skin changes. Twenty six subjects remembered the age of diagnosis of allergic symptoms which varied between 40 and 108 years (mean age 85 ± 19.7 years). Suspected allergens reported by 28 subjects included food, plants, and medicinal products as listed in *Table 1*.

Table 1. Causative factors of allergy reported by 28 centenarians.

Cause of allergy	Number of subjects	Percent of the total number of subjects with allergy
Medicinal products	9	32.1
Antibiotics	3	10.7
Iron	1	3.6
Iodine	2	7.1
Vitamin B1	1	3.6
Others	2	7.1
Food	10	35.7
Strawberries	3	10.7
Bananas	1	3.6
Oranges	1	3.6
Eggs	1	3.6
Pepper	1	3.6
Garlic	1	3.6
Chamomile	1	3.6
Ice cream	1	3.6
Plants	5	17.9
Fresh tobacco	1	3.6
Flowers	3	10.7
Trees	1	3.6
House dust	1	3.6
Washing powder, skin lotion	2	7.1
Spider's web	1	3.6

Dyspnea

Prevalence of dyspnea and cough are presented in *Table 2*. A positive answer to the question: 'Do you feel breathless?' was given by 25.6% centenarians including 24.8% females and 30.2% males ($P>0.05$). Breathlessness was divided into three subtypes related to activity and body position: breathlessness on exertion; difficulty breathing in standing position, and in horizontal position. Dyspnea on exertion was reported by 56 (18.6%) centenarians including 47 (18.2%) females and nine (20.9%) males. Difficulty in breathing while in standing position was reported by 26 (8.5%) subjects including 22 (8.5%) females and four (9.3%) males, and dyspnea in horizontal position was found in 38 (12.6%) subjects including 31 (12.0%) females and seven (16.3%) males. The above groups of dyspnea were partially overlapping. In none of these subgroups were gender differences significant ($P>0.05$).

Cough

Chronic cough was reported by 39 (13.0%) centenarians. This symptom was significantly more frequent among males than females (25.6% vs. 10.9%; $P<0.05$). Two thirds of the subjects reported productive cough and one third non-productive (dry) cough.

Respiratory disorders and symptoms in relation to smoking status

In the study group, past or current cigarette smoking was reported by 29 (9.6%) centenarians, including nine (3.5%) females and 20 (46.5%) males. Nobody in the smoking group reported having the diagnosis of asthma. Approximately one third of smokers of both sexes had chronic cough. There were

Table 2. Respiratory symptoms: dyspnea and cough reported by centenarians.

SYMPTOM	Females		Males	
	Number of subjects	%	Number of subjects	%
Dyspnea	64	24.8	13	30.2
On exertion	47	18.2	9	20.9
Standing position	22	8.5	4	9.3
Horizontal position	31	12.0	7	16.3
Cough	28	10.9	11	25.6
Productive	19	7.4	6	14.0
Non-productive	9	3.5	3	7.0

When added, numbers of subjects in subtypes of dyspnea and cough are not equal to the total numbers of subjects experiencing these symptoms. In case of dyspnea, this is because the subtypes of breathlessness are overlapping, and in case of cough, several centenarians were unable to describe their type of cough.

several cases of COPD among smokers. However, the analysis of COPD prevalence was not included in the scope of the present work, as it will be covered by a separate paper.

DISCUSSION

To the authors' knowledge, the present work is the first paper reporting in detail respiratory symptoms and diagnoses in extremely long-lived individuals. Available research data in studies of centenarians in other countries (2-9) provide general description of their health status without specific data on the respiratory system. In the present study, the prevalence of self-reported asthma diagnosis among centenarians was 3.3%, lower than that estimated in elderly populations (15). The subjects' age at asthma diagnosis was surprisingly high, and there were no cases of childhood-onset asthma reported. This may indicate low reliability of self-reported life-long medical history in centenarians. Based on epidemiological data, it is probable that there had been some early-onset asthma cases among centenarians; however, the symptoms might have resolved in childhood or adolescence, and had been forgotten by the subjects. The results presented in this study were based on self-reported information, and it might be suspected that an analysis of individual medical records would shed new light on the issue of life-long asthma and allergic diseases in centenarians. It is worth noting, however, that asthma and allergic diseases are greatly under-recognized in the elderly due to difficulties in diagnostic procedures and physicians simply not considering these illnesses in the differential diagnosis (16, 17).

Interestingly, one third of allergy cases reported by centenarians were due to adverse drug reactions. This may indicate the importance of this phenomenon in elderly patients. Skin itching reported by two centenarians might have been due to age-associated skin changes and not to allergic reaction.

Higher prevalence of dyspnea in the horizontal position as compared to the standing position was most probably due to the fact that the study included also bed-ridden subjects, who could experience difficulty breathing only in the horizontal position. Among those with dyspnea in the horizontal position, there were 15 bed-ridden subjects. Large number of dyspnea in the horizontal position might also indicate cardiac causes of disordered breathing. Coexistence of respiratory diseases and heart failure is believed to be common in elderly subjects (18). However, a study analyzing cardiovascular risk factors among Polish centenarians suggested that the risk is low in this age group (19).

Centenarian men reported cough more than twice as often as women. Almost half of male subjects used to be smokers, while only 3.5% of female centenarians had a life-long history of smoking. Since cough was present in about one third of patients of both sexes with a history of smoking, the prevalence of cough was higher in men, who were more frequently smokers than female subjects. The

prevalence of cough reported in epidemiological studies differs from 9% to 33% and is significantly associated with the smoking status (20). There are literature data indicating that cough reflex may weaken with age due to degeneration of afferent and central nervous pathways for cough (21).

The results of the Polish Centenarians Study presented in this paper were based on self-reported data and medical records were not taken into account. In practice, to provide a comprehensive and complex model of care for the very elderly, it would be advisable to compare self-reported data with life-long medical records and thorough medical examination.

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