

THE PREVALENCE OF DYSPNEA IN THE ADULT POLISH POPULATION

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Abstract

Objectives: Dyspnea is one of the most predominant symptom in clinical practice. There is a lack of data about incidents of dyspnea among Polish adults therefore it would be important to establish prevalence of this symptom before COVID-19 pandemic to assess the impact of this infection on the functioning of the adult Polish population in the future. The aim of the study was to establish prevalence of dyspnea in adult Polish population.

Material and Methods: It was an observational-cross-sectional study, with representative sample of adult Poles aged 18–79 years. The 2413 participants were surveyed. Responders were asked if and when dyspnea occurs and what is its severity in relation to 1 of 4 categories (A, B, C, and D) describing the impact of dyspnea on reduced exercise tolerance and daily activities. **Results:** The 67.1% of the respondents answered negatively to all question about experiencing dyspnea (females (F) 61% vs. males (M) 74%, $p < 0.05$). Dyspnea only during intense physical exertion (A), was reported by 22.8% (F 26.2% vs. M 19.2%, $p = 0.07$). Dyspnea limiting daily activities (B, C and D) was reported by 10.1% (F 13.1% vs. M 7%, $p < 0.05$). Significant differences in the severity of dyspnea were found between the age groups. People diagnosed with chronic heart failure or lung diseases significantly more often reported dyspnea than people without these conditions. **Conclusions:** Every tenth Pole reported dyspnea limiting performing activities of daily living. Additionally, about 20% of Poles experienced dyspnea considered as “gray area”, only during intense physical exertion, that requires deepening and clarifying the medical history. *Int J Occup Med Environ Health.* 2022;35(6):747–52

Key words:

epidemiology, prevalence, dyspnea, internal medicine, shortness of breath, breathlessness

INTRODUCTION

Dyspnea is a symptom commonly reported by patients. It can be described by patients in various ways; however, by definition, dyspnea is any decrease in breathing comfort perceived by the patient [1]. Dyspnea most often results from respiratory or cardiovascular disorders, but the symptom may also be neurogenic, psychogenic or metabolic in nature [2,3]. In many cases, the etiology of dyspnea is multifactorial; therefore, identifying an in-

dividual cause may be a diagnostic challenge and may require the cooperation of specialists in various fields of medicine [4,5]. In patients with heart failure or lung disease and in elderly patients, dyspnea has been identified as an independent factor associated with a worse prognosis, regardless of gender, age, history of nicotine and previous cardiovascular events [6]. Data on the incidence of dyspnea in the adult population vary widely in the literature. According to researchers, its prevalence ranges 0.9–32% [7].

Funding: this research was supported by Polish Ministry of Health (project entitled “National CVD Prevention and Treatment Programme) and by the agreement between Medical University of Gdansk and the Medical University in Warsaw.

Received: December 20, 2021. Accepted: June 23, 2022.

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Considering the significant progress over the past decades in the diagnosis and treatment of chronic diseases, and the lack of data in the literature specifying the prevalence of basic symptoms among patients, we aimed to determine the prevalence of dyspnea in the general population of adult Poles. It is worth noting that the analyzed material consisted of data collected before the COVID-19 pandemic. Due to the undoubtedly ongoing transformation of the prevalence of chronic symptoms related to the respiratory system, these analyzes can provide valuable material for comparing and assessing the impact of SARS-CoV-2 infection on the functioning of the adult Polish population.

MATERIAL AND METHODS

The study was carried out on a representative sample of adult Poles aged 18–79 years, as part of the NATPOL 2011 Survey. Briefly, the NATPOL 2011 Survey (Hypertension and other risk factors for cardiovascular disease in Poland) was an observational-cross-sectional study aimed at assessing the prevalence and control of risk factors for cardiovascular disease in Poland. A detailed description of the sampling, sample selection and research methods was presented in a previous publication [8]. The study was approved by the Bioethics Commission of the Medical University of Gdansk. The response rate was 66.5% of the invited participants, and finally 2413 participants were surveyed. The entire group corresponded in terms of gender and age distribution to the population of adult Poles in the same age range.

The examination was carried out by specially trained nurses at the place of residence of the randomly selected people. During the visit, detailed demographic data, history of dyspnea, reduced exercise tolerance, previously diagnosed chronic diseases (including heart failure and respiratory diseases), and medications were collected. Additionally, the data contained in discharge summaries of possible hospitalizations were analyzed. The diagnosis

of chronic heart failure and obstructive pulmonary diseases were established on the basis of the participant's declaration, confirmed by available medical documentation. Respondents were asked if and when dyspnea occurs and what is its severity in relation to 1 of 4 categories (A, B, C, and D) describing the impact of dyspnea on reduced exercise tolerance and daily activities (Table 1). These categories were modeled on the modified Medical Research Council (mMRC) dyspnea severity scale [9] and the New York Heart Association (NYHA) functional classification of heart failure [10].

It was assumed that dyspnea occurred in people who answered yes to questions B, C or D, i.e., in those who experienced dyspnea, breathlessness, excessive fatigue to a degree that limits everyday functioning. Dyspnea occurring only during intense physical exercise (answer A) was considered a “gray area” that requires deepening and clarifying the medical history. In order to analyze the causes of dyspnea, 3 groups of respondents were selected based on the available medical documentation and medical history:

- people with chronic heart failure;
- people with chronic lung diseases (chronic obstructive pulmonary disease, asthma, chronic bronchitis or emphysema);
- people without the above conditions.

In the statistical analysis descriptive statistical methods, Fisher's exact test, Pearson's χ^2 test, Student's t-test, Wilcoxon rank-sum test and Shapiro-Wilk test were applied. Statistical significance was determined at $p < 0.05$.

RESULTS

All participants answered questions about experiencing dyspnea according to 4 descriptive categories of its severity: A, B, C, and D (Table 1).

Table 2 presents the characteristics of the studied group. In total, 2413 people (1168 men (M) and 1245 women (F)) were examined. The age of the respondents was

Table 1. Dyspnea severity categories based on [9,10]

Category	Symptoms
A	dyspnea, heavy breathing (shortness of breath), excessive fatigue when performing activities that are more energetic than normal activities of daily living, e.g. walking quickly on flat ground, climbing stairs >2 floors
B	dyspnea, heavy breathing (shortness of breath), excessive fatigue when performing normal activities of daily living such as walking at regular pace on flat ground, slowly climbing stairs to the 2nd floor, washing, getting dressed
C	dyspnea, heavy breathing (shortness of breath), excessive fatigue when performing activities that are less energetic than normal activities of daily living (symptoms occur even with little effort, the patient needs help with washing or getting dressed, the patient cannot climb the stairs to the 2nd floor)
D	dyspnea, heavy breathing (shortness of breath) at rest, the patient is unable to make any effort without symptoms

mean \pm standard deviation (M \pm SD) 44.9 \pm 16 years for men and 46.7 \pm 17.2 years for women. The analyzes were performed in 3 age groups: 18–39 years (974 people), 40–59 years (879 people) and 60–79 years (590 people). Patients were also divided depending on the BMI category. As shown in Table 3, 67.1% (95% CI: 65.2–69.0) of the respondents answered negatively to all question about experiencing dyspnea (F 61%, 95% CI: 58.2–63.7 vs. M 74%, 95% CI: 71.4–76.5, $p < 0.05$). When asked about the occurrence of dyspnea, shortness of breath or excessive fatigue only during intense physical exertion (category A), 22.8% (95% CI: 21.1–24.5) of the respondents answered affirmatively (F 26.2%, 95% CI: 23.8–28.7 vs. M 19.2%, 95% CI: 17.0–21.6). Dyspnea limiting daily activities (B, C and D) was reported by 10.1% (95% CI: 8.9–11.4) of the respondents. It was more common among women (13.1%, 95% CI: 11.3–15.1) than among men (7%, 95% CI: 5.6–8.7), ($p < 0.05$).

Table 3 also presents the analysis of answers to the questions about dyspnea by age of the respondents. Significant differences in the severity of dyspnea were found between the age groups. The age with dyspnoea was M \pm SD 52.2 \pm 16.8 for women and 52.4 \pm 15.1 for man. There were no significant age differences among women and men experiencing dyspnea ($p = 0.86$)

Additionally in table 3 there was presented the division of the study population into 3 groups depending

Table 2. General characteristics of the NATPOL 2011 study participants in Poland

Variable	Participants	
	%	95% CI
Gender (N = 2413)		
women	51.6	49.6–53.6
men	48.4	46.4–50.4
Age (N = 2413)		
18–39 years	40.4	38.4–42.4
40–59 years	35.2	33.3–37.1
60–79 years	24.5	22.8–26.2
Body mass index (N = 2393*)		
<18.5	2.1	1.6–2.8
18.5–24.99	38.6	36.7–40.6
25–29.9	36.2	34.3–38.2
≥ 30	23.1	21.4–24.8

* The number is lower due to incorrect measurements in some participants.

on the presence of diseases most often predisposing to dyspnea. People diagnosed with congestive heart failure (CHF) or lung diseases significantly more often reported dyspnea than people without these conditions ($p < 0.05$). Dyspnea was also more severe in these people. The number of people free from any symptoms, even during intense exercise, was almost 2 times lower in this group than in those without CHF and lung diseases.

Table 3. The prevalence and severity of dyspnea in adults participating in the NATPOL 2011 Survey

Dyspnea severity category	Participants (N = 2413) [%] (95% CI)											
	gender					age						
	all	females (N = 1245)	men (N = 1168)	P	18–39 years (N = 974)	40–59 years (N = 849)	60–79 years (N = 590)	P	congestive heart failure (N = 87)	pulmonary disease (N = 131)	no chronic heart failure or pulmonary disease (N = 2178)	
A	22.8 (21.1–24.5)	26.2 (23.8–28.7)	19.2 (17.0–21.6)	0.07	17.2 (15–19.8)	24.3 (21.4–27.3)	29.8 (26.2–33.7)	<0.01	35.6 (25.9–46.7)	35.1 (27.1–44.0)	21.3 (19.7–23.1)	<0.01
B	6.6 (5.6–7.7)	8.8 (7.3–10.5)	4.3 (3.2–5.6)	0.05	2.8 (1.9–4.1)	6.8 (5.3–8.8)	12.5 (10.0–15.6)	<0.01	18.4 (11.2–28.4)	17.6 (11.7–25.4)	5.4 (4.5–6.4)	0.10
C	1.5 (1.1–2.1)	1.8 (1.1–2.7)	1.3 (0.7–2.2)	0.93	0.2 (0–0.8)	1.8 (1.0–3.0)	3.4 (2.1–5.3)	<0.01	11.5 (5.9–20.6)	3.1 (1.0–8.1)	1.0 (0.6–1.6)	<0.01
D	2.0 (1.5–2.7)	2.5 (1.7–3.6)	1.5 (0.9–2.4)	0.76	0.4 (0.1–1.1)	1.4 (0.8–2.5)	5.4 (3.8–7.7)	<0.01	6.9 (2.8–15.0)	5.3 (2.4–11.1)	1.5 (1.0–2.1)	<0.01

Dyspnea severity categories as in Table 1.

DISCUSSION

This study showed that dyspnea is a significant symptom reported by adult Poles. Over 10% of people reported experiencing dyspnea so severe that it limited performing activities of daily living, and they undoubtedly required further diagnostics and treatment. In our study, 67% of people denied experiencing any dyspnea, even during intense physical exertion. The group that should be given special attention during a visit to a doctor’s office are patients reporting shortness of breath, which occurs only during intense physical exertion. According to the authors’ analyzes, such a symptom is reported by over 1/5 of adult Poles. Some of these patients may have physiological dyspnea, occurring even in young, healthy people and depending on the type and intensity of exercise, but it may also be one of the first symptoms in the initial stages of pulmonary or cardiac disorders, which, if detected early, may improve the patient’s prognosis. This subgroup can be considered a “gray area” in which the key will be a properly conducted, in-depth and detailed medical interview. It is the medical history, as the first diagnostic tool of every doctor, that should be the decisive factor when it comes to starting diagnostics or follow-up of the patient. The physicians should focus on type and intensity of physical exertion during which shortness of breath occurs and also ask about all additional symptoms, e.g. cough, chest pain, dizziness. It is important to analyse the current patient’s lifestyle and possible breathlessness changes noticed by the patient in relation to the earlier physical effort tolerance. This type of patient may require another visit to assess the possible dynamics of the experiencing symptoms before the implementation of additional diagnostics procedures. This study conducted on a representative population of adult Poles and studies on other large populations, including the Australian population [7], confirm that the prevalence of dyspnea is mainly dependent on the age and sex of the respondents. It is worth noting that women report dyspnea more often than men, despite the fact that

the groups of men and women do not differ in terms of age distribution. The difference may indicate that there is another significant factor affecting the prevalence of dyspnea. According to the researchers, psychogenic factors may play a considerable role in the development and persistence of dyspnea [11–13]. This suggests that in women it is important to consider the psychogenic origin of dyspnea, while men are more likely to dissimulate symptoms. Again, the importance of collecting a detailed medical history should be emphasized, as the information obtained from the patient may be helpful in making further diagnostic decisions.

This study showed that the prevalence of dyspnea among people with chronic heart failure or lung disease, or with the 2 overlapping conditions, is more than twice that of the general population. This indicates insufficient control of symptoms in these groups of patients and the need to modify or intensify treatment in order to improve their quality of life. If people with cardiovascular and pulmonary disorders are excluded from this analysis, the incidence of dyspnea in the rest of the population will still be almost 10%, and about 20% will require collecting a more detailed medical history. This proves the non-specific nature of dyspnea as a subjective symptom and the need for further exploration of its etiology.

CONCLUSIONS

Every tenth Pole reported dyspnea limiting performing activities of daily living. Additionally, about 20% of Poles experienced dyspnea considered as “gray area”, only during intense physical exertion, that requires deepening and clarifying the medical history

ACKNOWLEDGMENTS

We gratefully thank: Prof. Maciej Banach; Prof. Grażyna Broda; Prof. Barbara Cybulska; Marek Guzek, Ph.D.; Agata Wojciechowska, Ph.D.; Zenon Jakubowski, Ph.D.; Hanna Jasiel-Wojculewicz, Ph.D.; Monika Kasprzyk, M.D.; Prof. Jerzy Korewicki;

Stefan Krajnik, Ph.D.; Ewa Król, Ph.D.; Ewa Książek-Bator, M.D.; Prof. Zbigniew Nowicki; Prof. Grzegorz Opolski; Grzegorz Placha, Ph.D.; Piotr Popowski, Ph.D.; Katarzyna Prusik, Ph.D.; Prof. Bolesław Rutkowski; Wojciech Sakłak, Ph.D.; Zofia Słowska, Ph.D.; Jakub Stokwizewski, Ph.D.; Prof. Krzysztof Sworczak; Prof. Małgorzata Sznitowska; Prof. Wiktor Szostak; Marta Świąch, M.D.; Łukasz Wierucki, Ph.D.; Barbara Wizner, Ph.D.; Elżbieta Wołkiewicz, M.D.; Małgorzata Wróblewska, Ph.D.; Alicja Utracka, Ph.D.; Paweł Zagożdżon, Ph.D.; Marzena Zarzeczna-Baran, Ph.D.; Łukasz Zdrojewski, Ph.D., for their contribution to the success of this study.

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