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*Prevalence of obstructive ventilation disorders
among rural population in the Lublin region*

Obstructive ventilation disorders are basic symptoms of numerous lung diseases, primarily of chronic obstructive pulmonary disease (COPD) and bronchial asthma. Spirometric examination is currently a fundamental standard for making COPD diagnosis, and comprehensive studies of cigarette smokers undertaken several years ago confirmed the usefulness of this diagnostic method also in mass prophylaxis (9,12).

The imprecise definitions of diseases contributing to COPD and bronchial asthma cause that researchers apply various diagnostic criteria in epidemiology. Moreover, the studies concern mainly the groups at risk (smokers, occupational exposure), hence the actual prevalence of this disease among entire adult Polish population may only be assessed approximately. It is especially difficult to make estimations with respect to rural areas, where the profile of risk factors is different, e.g. lower air pollution, diverse prevalence of tobacco smoking. These areas are not covered by up-to-date population studies.

During the period 1999–2001, field studies were undertaken in 4 communes of the Lublin Region within a comprehensive research programme conducted by the Institute of Agricultural Medicine in Lublin concerning the evaluation of prevalence of selected respiratory system disorders. The studies covered measurements of spirometric parameters, X-ray, medical history and physical examination as well as studies of risk factors from the aspect of respiratory system disorders. In the present study we analyzed the material obtained with respect to spirometric changes. We were interested in the following issues:

1. How frequently do obstructive ventilation disorders (typical especially of COPD) occur among the population in the study, and what is the progression of disorders?
2. What other symptoms of chronic bronchitis and pulmonary emphysema occur in people with obstructive ventilation disorders?
3. What percentage of these disorders are diagnosed and treated by the health care system in population under research?

MATERIAL AND METHODS

Two-stage sampling method was applied. At the first stage, 4 typically rural communes in the eastern part of the Lublin Region were selected (Ruda Huta near Chełm, Hanna near Włodawa, Krasnobród and Tarnogród) - located at a distance of at least 15 kilometers from the urban agglomeration and 70 kilometers from - Lublin the only large city in this area. The total number of adult (over 18 years) population of all communes examined is near 10,000 inhabitants (Register of Medical Services, Lublin Regional Health Insurance Agency, Divisions in Zamość and Chełm) - 49.8% females and 50.2% males, mean age - 46.9 years (males - 43.9,

females – 50.1), employed mainly in agriculture, fishery or forestry. At the second stage, the group for the study was randomly selected based on the lists of adult inhabitants who were provided health care by local primary health care centers – to eliminate people who did not permanently live in the area examined (e.g. schoolchildren and students).

Finally, out of the 1,300 people who received personal invitations, 660 reported for the study 293 males (44.4%) and 367 females (55.6%), their mean age being 49.7 (males – 48.3, females – 50.7). The lack of response was not correlated with age, but primarily with sex – females reported more eagerly (approximately 5% more).

The basic measurement was forced expiration maneuver performed by means of a portable “Cosmed Pony” turbine spirometer (American Thoracic Society 1987 standard) according to the ATS guidelines (minimum 3, maximum 8 correct spirometry which would fulfil the criteria of repeatability)(2). The studies were conducted within 3–5 days in each individual center within 3 5 days. Predicted values were calculated automatically based on 1983 CECA standards and extrapolation of these formulae (4). The necessary anthropometrical parameters (body mass, height) were measured directly before the spirometric.

The spirometry obtained were interpreted by means of algorithm, also based on ATS recommendations (1) in order to diagnose obstructive ventilation disorders. This algorithm defines obstruction for $FEV_1 < 80\%$ of the predicted value, similar to the World Initiative for Chronic Obstructive Lung Disease (GOLD) (10). The severity of obstructive disorders was classified based on the decrease in $FEV_1\%$ value: up to 70% – mild, up to 50% – moderate, under 50% – severe airways obstruction (see recommendations by Polish Phthisiopulmonologic Society – PTF) (7). On the same day, medical history was taken and physical examination was performed biased towards COPD clinical symptoms. While taking the medical history, the patients were asked, among others, the following questions (in connection with obstruction of lower airways and its treatment): • Did doctors make in their case a diagnosis of chronic bronchitis, pulmonary emphysema, chronic obstructive pulmonary disease or bronchial asthma? • Were they treated by inhalants administered by personal inhalers? • Did they perceive selected symptoms, which might have been connected with chronic obstructive pulmonary disease (cough, dyspnea, etc.)?

The results were interpreted, statistically analyzed and presented using STATISTICA 5.1 statistical package. Pearson’s χ^2 test was applied for the analysis of category data compiled in the tables. The differences between mean values for 2 groups were analyzed using t-Student test (according to the principles of mentioned statistics).

RESULTS

In 17 people in the study (3%) no reliable results of spirometric examination were obtained, primarily due to bad cooperation while performing forced expiration maneuver. The figure below presents ventilation disorders detected among the patients examined (%). In general, the ventila-

Table 1. Occurrence of obstructive disorders among people in the study by sex and age

	Healthy objects		Obstruction		Total	
	No.	%	No.	%	No.	%
Males	245	85.9	40	14.1	285	46.0
Females	327	91.3	31	8.7	358	54.0
In general	572	89.0	71	11.0	643	100
	healthy objects		obstruction		total	
	mean value	standard deviation	mean value	standard deviation	mean value	standard deviation
Age	48.4	17.0	59.8	14.8	49.6	17.2

tion disorders of obstructive type were noted in 10.8% of the population examined (the observed changes of restrictive character were not subject to further verification, hence the data presented are only indicative). As anticipated, obstructive changes were significantly more often diagnosed among males (p for χ^2 test < 0.05) and older age groups (p for t-Student test < 0.001) – patients with airways obstruction being 10 years older on average, compared to the healthy population (Tab. 1).

The numbers of patients with moderate category of obstruction severity and mild obstructive disorders were greater, compared to the severe changes category (Tab. 2).

Table 2. Degree of intensity of obstructive changes observed-diagnosis and inhalatory treatment of obstructive disorders according to medical history taken

Category of intensity	No.	% Examined subjecys	Obstructive disorders diagnosed		Usage of personal inhalers	
			No.	%	No.	%
I) Small bronchical changes	28	4.2	1	3.6	---	---
II) Mild	24	3.6	2	8.3	1	4.2
III) Moderate	30	4.5	12	40.0	5	16.7
IV) Severe	17	2.5	9	52.9	5	29.4
Obstruction in general. II+III+IV	71	10.8	23	32.4	11	15.5

Table 3. Occurrence of typical COPD symptoms in medical history and physical examination in people with obstructive changes, compared to total population in the study

Symptoms	People with obstructive changes		Total population examined	
	No.	%	No.	%
Cough, irrespective of its character	35	49,3	130	20,2
Dyspnea (minimum twice a week)	34	47,9	87	13,8
Cough according to chronic bronchitis criteria	18	25.4	57	8.9
Cyanosis of mucous membranes/skin	17	23.9	29	4.6
Emphysematous structure of the chest	14	19.7	22	3.4
Auscultatory whistling and dry rates	9	12.7	14	2.2
Excessive vesicular percussion sound	7	9.9	12	1.9
Forced respiratory effort	6	8.5	7	1.1
Oedema of the crura	4	5.6	24	3.7
Reduced chest mobility	3	4.2	4	0.6
Swollen jugular veins	2	2.8	2	0.3
Filling of supraclavicular fossa	1	1.4	1	0.2
Drum-sticks fingers	1	1.4	2	0.3

Table 3 presents symptoms perceived by patients and those confirmed by medical examination, which may be associated with COPD. All the symptoms compiled in the table were more frequently noted among people with airways obstruction diagnosed, compared to the total sample; however, the number of symptoms of advanced pulmonary disorders such as: drum-stick fingers, filling of superclavicular fossae and swollen jugular veins, reduced chest mobility and oedema of the crura was insufficient for statistical analysis. In the remaining cases, for χ^2 test each time was $p < 0.001$. Even in the case of cough, which was the symptom most frequently observed, over 50% of patients did not mention this during medical history taking.

As may be seen in Table 2, the large majority of people with diagnosed obstructive changes (over 75%) did not admit that they had ever had any of the diseases causing this type of ventilation disorder diagnosed. Patients with more advanced forms of airways obstruction were more often conscious of their disorders; however, the percentage of people with the diagnosis of even severe disorders was only slightly over 50%. A still smaller percentage of people in the study mentioned that they took inhalants typical of bronchial asthma and COPD (only 15%).

DISCUSSION

Population studies previously performed in Poland evaluated the incidence of COPD to be: 8.5% in males and 4.9% in females, while the world rates ranged from 8–15% in males and 3–5% in females according to individual countries (7). The fact that COPD occupies the fourth position among the causes of death (preceded by cardiovascular diseases, cancer, injuries and poisonings), as well as an increasing prevalence of cigarette smoking in our country, suggests that the data for Poland may be underestimated. The incidence observed in our study (11%) is more consistent with WHO estimations for the regions of high prevalence of tobacco smoking habit (10). It should be remembered that although the diagnosis of considerable obstruction is not equivalent to COPD diagnosis (possibility of COPD overestimation), a greater percentage of females than males participating in the study in turn might have resulted in an underestimation of the determined morbidity rates. Similar results were obtained based on the current data obtained in the studies of 144 workers of a refinery in Płock (11% of spirometric changes) (3), while much higher values were noted in 238 employees of the port in Gdańsk – 23% of COPD diagnosed (11). Research among people with risk factors and symptoms (tobacco smokers, people with chronic cough, people over 40, occupationally exposed, etc.) for obvious reasons presents an even higher incidence of the disorders; however, they are not representative for entire population (9). It may be presumed that a greater frequency of obstructive disorders,

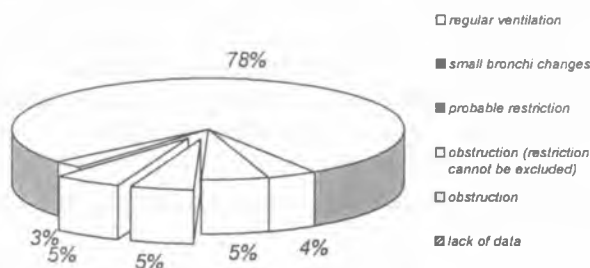


Fig. 1. Distribution of ventilation disorders observed among the population examined. Obstructive changes were distinguished

which is observed despite the lack of serious air pollution, may be due mainly to the high prevalence of tobacco smoking (40%) – the main risk factor in COPD pathology. Environmental exposure of other type, such as usage of coal stoves cannot be excluded (8).

The results obtained in our studies cannot be compared to other evaluations concerning ventilation disorders (or COPD) for similar Polish rural populations. There are no such reports except the not current study conducted in the 70s by Durda and Szafranski (5). In this context, comparison with international studies seems to be interesting. For instance, in rural regions of India, the incidence of COPD exceeded 4%, but the number of smokers in this population was generally low, and the spirometric verification was conducted based only on the peak expiratory flow (PEFR) (8). Studies conducted among older inhabitants of Greek villages showed that COPD features were observed in 9.6% of the population (clinical symptoms confirm by spirometry) (6). The above-mentioned studies generally confirm that spirometric symptoms precede clinical manifestation. The studies conducted in Plock showed that the symptoms occurred in only 31% people with obstructive disorders, and the same study results were obtained in Greece. These percentages were respectively higher in selective studies, and reached even 70% in recent pilot studies of The Programme of Early COPD Diagnosis and Prophylaxis (9,12). The results of the present study show that at least 50% of people with obstruction of the airways either do not have alarming symptoms for a long time or ignore these symptoms and do not inform their doctor about them.

The lack of symptoms or their non-specific character (cough, dyspnea) may, in turn, be the reason for the especially alarming phenomenon that 75% of patients are not conscious of their illness, because their contacts with health services did not result in any diagnosis, whereas in the study conducted in Greece quoted above, this percentage was 50%. This lack of diagnosis may be explained, to some extent, by poor availability of spirometric examination in rural health centers; however, only physicians may be burdened with responsibility for the lack of proper inhalatory treatment in the few patients diagnosed, even with severe or moderate obstructive ventilation disorders. This may generally be evidence of ignoring COPD as a severe and progressing disease, and of the lack of proper therapeutic habits. The results of the study confirm that COPD is a serious problem also in rural areas, especially that in this case the health care system seems to be insufficient for diagnostics, prophylaxis and treatment.

CONCLUSIONS

1. Among the rural population in the study, obstructive ventilation disorders were frequently noted, their frequency being typical of the regions where risk factors are highly prevalent, with the greatest percentage of moderate and mild degree of obstructive disorders observed.
2. At least 50% of the people with obstructive disorders diagnosed do not show any clinical symptoms, or these symptoms are slight.
3. The great majority of people with serious obstructive ventilation disorders have never been diagnosed, and only a few are being properly treated.

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SUMMARY

The subject of the study was to analyze spirometric data provided by comprehensive research programme of Institute of Agricultural Medicine in Lublin. Field research was conducted in the years 1999–2001 to evaluate the prevalence of selected respiratory system diseases. The basic measurements were forced expiration maneuver performed and interpreted on the strength of ATS recommendations, physical examination and medical history (especially lower respiratory airways obstruction symptoms). The two-stage random sample of population of 4 eastern part of Lublin region communes was the studied material (660 people). The aim was to evaluate the incidence of airways obstruction and then chronic obstructive pulmonary disease. Next, we wanted to assess – the main clinical symptoms of disease and what percentage of disease cases are diagnosed/treated by the health care system. Based on our results the incidence of airways obstruction in the population examined is excessive (11%), typical of populations exposed to respiratory risk factors. There were no clinical manifestations in the 50% of cases with spirometric diagnosed obstruction and incidence of severe, symptomatic forms of obstructive diseases was low. 75% of obstructive patients have never been diagnosed by health care system and a very low percent has been properly treated with personal drug inhalers. Our study confirms that chronic obstructive lung disease is an essential problem also

in the Polish rural population. Patients belittle early symptoms of COPD and health care system is insufficient in detection and treatment of this disease.

Rozpowszechnienie obturacyjnych zaburzeń oddychania w wiejskiej populacji regionu lubelskiego

Praca dotyczy analizy danych spirometrycznych wykonanych w ramach badania rozpoznania wybranych schorzeń układu oddechowego, przeprowadzonego przez Klinikę Chorób Wewnętrznych i Zawodowych Instytutu Medycyny Wsi w latach 1999-2001. W analizie uwzględniono wynik próby nasilonego wydechu, przeprowadzonej i interpretowanej według zaleceń ATS, badanie fizykalne i wywiad w kierunku objawów schorzeń obturacyjnych układu oddechowego. Materiał stanowiła próba reprezentatywna 660 osób z populacji 4 gmin wschodniej części województwa lubelskiego. Celami były: ocena częstości obturacji (i pośrednio częstości przewlekłej obturacyjnej choroby płuc) w tej populacji, ustalenie obecności lub braku manifestacji klinicznej schorzenia u osób z obturacją oraz ustalenie, w jakim procencie zmiany obturacyjne były dotąd zdiagnozowane i leczone. Na podstawie wyników częstość występowania obturacji dróg oddechowych w badanej populacji można oceniać jako znaczną (11%), typową dla populacji o dużym rozpowszechnieniu czynników ryzyka. Przynajmniej w połowie przypadków zaburzenia wentylacyjne typu obturacji przebiegały zupełnie bez objawów uchwytnych w badaniu fizykalnym lub wywiadzie; częstość ciężkich, objawowych postaci była niewielka. U 2/3 chorych nigdy dotąd nie zdiagnozowano przewlekłej obturacyjnej choroby płuc, rozedmy ani też astmy oskrzelowej, a tylko kilkanaście procent było kiedykolwiek leczonych za pomocą leków wziewnych z inhalatorów osobistych. Badanie potwierdza, że przewlekła choroba obturacyjna stanowi istotny problem także w polskiej populacji wiejskiej, tym bardziej, że jej wczesne objawy są bagatelizowane przez pacjentów, a system ochrony zdrowia wykazuje duże braki w wykrywaniu i leczeniu tego schorzenia.