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Impact of chronic obstructive pulmonary disease (COPD) on patient's life and his family

Wpływ przewlekłej obturacyjnej choroby płuc (POChP) oraz nałogu palenia tytoniu na życie chorego i jego rodziny

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Abstract

Introduction: Chronic Obstructive Pulmonary Disease (COPD) is one of the most common chronic diseases of adults and is a major cause of chronic morbidity and mortality throughout the world. It is the cause of physical and mental suffering for the patient, significantly impairs quality of life, reduces the vital activity and affects the patient's life in its various aspects.

In 2012, the nationwide survey was conducted in COPD outpatients with a history of smoking exploring the various factors of the disease and its effects on the health and life of the patient. The purpose of the analysis presented here is to assess the impact of COPD and tobacco smoking on the patient's health and life.

Material and methods: Data were collected from patients by their physicians during routine visit with usage of specifically prepared questionnaire for this study. Patients over 35 years of age, with diagnosed COPD, current or past smokers were recruited from outpatients settings. The study involved 10,365 patients with COPD. Representative sample of 2,967 questionnaires were randomly drawn for the statistical analysis.

Results: The mean age of responders was 61.15 ± 10.25 years, 33.98% of participants were women, 56.73% were current smokers and 43.37% declared smoking in the past. The largest number of patients had COPD in a moderate degree (II — acc. to GOLD 2010) — 55.38%, sequentially mild (I) — 21.40%, and severe (III) — 19.96%, the smallest group were people with very severe degree of disease (IV) — 3.27%. Using the new classification of the COPD severity (acc. to GOLD 2013), the largest group of patients were less symptomatic (mMRC) subjects who had a low risk (A) — 52.67%, but in fact a second group of patients were subjects with severe symptoms and a high risk (D) — 20.45%, sequentially — patients with low severity of symptoms, but a high risk (C) — 16.16%, and severe symptoms and a low risk — 10.72% (B). Patients most often reported that COPD affects their activity in sport (83.45% of respondents), than in living activity (82.78%) and family life (79.3%). COPD had significant (moderate or severe) effect on sport (60.85%) and life activity (38.44%), as well as on work (34.9%), but the greatest impact, leading up to the resignation of the activity: on sport practice (21.75%), sexual intercourse (12.6%) and hobbies (11.49%). The disease severity (GOLD 2013 C/D) was the independent factor which reduced all forms of activity.

In patients' opinion smoking had negative impact on their health (52.65%) and the family budget (41.83%). The negative impact of smoking on family relations was declared by 16.38% of respondents. Among the factors which favor effective quit from addiction were: age ≥ 65 years and more severe degree of obturation (III/IV GOLD 2010).

Conclusions: The results of the study confirmed the significant impact of the disease and addiction to smoking not only on patients' life but also on their families.

Key words: COPD severity, GOLD, tobacco addiction, patients' vital activity, family

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Streszczenie

Wstęp: Przewlekła obturacyjna choroba płuc (POChP) należy do najczęstszych chorób przewlekłych osób dorosłych i jest jedną z głównych przyczyn przewlekłej chorobowości i umieralności na całym świecie. Dla chorego jest przyczyną fizycznego i psychicznego cierpienia, znacznie upośledza jakość życia, ogranicza aktywność życiową i wpływa na życie chorego w różnych jego aspektach. W 2012 roku przeprowadzono ogólnopolskie badanie ankietowe chorych na POChP z wywiadem palenia tytoniu leczonych ambulatoryjnie badające różne uwarunkowania choroby i jej skutki dla zdrowia i życia chorego. Celem przedstawionej tu analizy jest ocena wpływu POChP oraz nałogu palenia tytoniu na życie chorego i jego rodziny w Polsce.

Materiał i metody: Materiał stanowią dane zebrane od pacjentów przez ich lekarzy prowadzących, w trakcie jednej z rytunowych wizyt chorego w poradni, na podstawie jednolitego, przygotowanego specjalnie dla potrzeb tego badania kwestionariusza. Do badania obserwacyjnego włączano pacjentów powyżej 35. rż. z rozpoznąną POChP, leczonych ambulatoryjnie, aktualnie lub w przeszłości palących tytoń.

W badaniu wzięło udział 10 365 chorych na POChP. Do analizy pobrano reprezentatywną próbę 2967 ankiet.

Wyniki: Średnia wieku chorych wyniosła $61,15 \pm 10,25$ roku, kobiety stanowiły 33,98%. Aktualnych palaczy wśród uczestników badania było 56,73%, 43,37% deklarowało, że już nie pali tytoniu. W badanej grupie największą liczbę chorych stanowiły osoby ze stopniem umiarkowanym POChP (II) wg GOLD 2010 — 55,38%, kolejno łagodnym (I) — 21,40% i ciężkim (III) — 19,96%, najmniej liczną grupę stanowiły osoby ze stopniem bardzo ciężkim (IV) — 3,27%. Stosując klasyfikację ciężkości POChP według GOLD 2013, najliczniejszą grupę chorych stanowili niskoobjawowi (mMRC), o niskim stopniu ryzyka (A) — 52,67%, ale drugą w kolejności grupą byli chorzy z nasilonymi objawami i wysokim ryzykiem (D) — 20,45%, kolejno, chorzy z małym nasileniem objawów, ale wysokim ryzykiem (C) — 16,16% i z nasilonymi objawami i wysokim ryzykiem — 10,72% (B). Pacjenci najczęściej podawali, że POChP ma wpływ na uprawianie przez nich sportu (83,45% ankietowanych), codzienną aktywność życiową (82,78%) i życie rodzinne (79,3%). Istotny wpływ (znaczny lub duży) miała, prócz sportu (60,85%) i aktywności życiowej (38,44%), na życie zawodowe (34,9%), ale największy wpływ, prowadzący nawet do rezygnacji z aktywności, poza uprawianiem sportu (21,75%) miała na życie intymne (12,6%) i hobby (11,49%). Czynnikiem, który decydował o ograniczeniu wszystkich form aktywności, był stopień ciężkości w skali GOLD 2013 C/D.

Według pacjentów palenie przez nich tytoniu miało negatywny wpływ najbardziej na ich zdrowie (52,65%) i budżet rodzinny (41,83%). Negatywny wpływ palenia na relacje rodzinne deklarowało 16,38% respondentów. Wśród czynników sprzyjających skutecznemu zerwaniu z nałogiem należy wymienić wiek ≥ 65 . rż. i cięższy stopień obturacji (III/IV wg GOLD 2010).

Wnioski: Przeprowadzenie niniejszego badania obserwacyjnego potwierdziło istotny wpływ samej choroby oraz nałogu palenia tytoniu na życie pacjentów i ich rodzin.

Słowa kluczowe: ciężkość POChP, GOLD, uzależnienie od nikotyny, aktywność życiowa chorego, rodzina

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Introduction

Chronic obstructive pulmonary disease (COPD) is one of the most frequent chronic diseases that affect adults, and it is one of the main causes of morbidity and mortality in the world. According to the World Health Organisation, currently more than 210 million people suffer from COPD in the world, including 80 million afflicted by its moderate or severe form [1]. In Poland, COPD is the second chronic disease in respect of prevalence. It affects every tenth person over 30 years of age, and the total number of COPD patients is estimated at more than 2 million people [2]. The disease is the fourth cause of deaths in the world — 3 million people die from it every year; in Poland this number amounts to 15,000 people, and it is still growing.

The costs of care of COPD patients in the EU are high, amounting to 38.6 billion EUR annually, which constitutes 56% of the budget allotted to diseases of the respiratory system. This

is connected with the scale of the problem, the long-standing course of the disease and the degree of COPD severity. In the United States, the direct costs of medical care of COPD patients, including ambulatory care, drugs and particularly the costs of exacerbations and hospitalisations amount to 29.5 billion dollars per year, and indirect costs connected with reduced work output, absence due to the disease, disability or premature death stand at 20.4 billion dollars.

The disease causes physical and mental suffering, it impairs patients' quality of life, limits their functions within the family, as well as influencing the functioning of the whole family. On the other hand, a lack of support from the family results in mental disorders and worse effects of the therapy. Therefore, family problems should not be ignored in integrated therapy as they may be vital for efficacy of treatment. However, the influence of the disease on family life in Polish patients is not known due to a lack of studies concerning this issue.

The sudden increase in the incidence of the disease in recent decades has been caused by the increased number of people addicted to tobacco smoking, which together with longer life expectancy is the main cause of the disease and its progression in developed countries [3]. It is estimated that currently there are 1.1 billion smokers in the world. Available data concerning the situation in Poland come from the study conducted by Professor Nizankowska-Mogilnicka and her team [4] in 2005 in the Małopolska region. The study was a part of the international BOLD study into the epidemiology of COPD. In the general population there were 29.1% of people over 40 years of age who were current smokers, with a predominance of men (frequency of smoking among men was 36.1%, among women it was 21.9%), and nicotine dependence in the past was reported by 32.3% of respondents (42.9% of men and 21.5% of women).

The only effective way to reduce the risk of COPD and slow its progression on a global scale is smoking cessation [3]. The struggle with addiction is difficult, and its effectiveness depends on many mental, biological and social factors, including motivation, degree of nicotine addiction, mental and behavioural disorders such as depression and neuroses, as well as the attitude of the family and the social environment in which the smoker lives [5, 6]. There are many research projects into the evaluation of the efficacy of pharmacological and non-pharmacological methods of smoking cessation [3], in Poland also [7–9], but they are missing information on the role of family in the process.

In 2012, a nationwide survey was conducted in COPD outpatients with a history of smoking, exploring demographical and clinical characteristics and evaluating knowledge and attitude of the patients towards the disease, the therapy and nicotine addiction.

The objective of the present paper was to evaluate the impact of COPD and tobacco smoking on the patient's and his/her family life.

Material and methods

It was a cross-sectional, observational, non-interventional, multi-centre and nationwide study. It was conducted at the centres of outpatient primary health care (53.68% of respondents) and specialised centres of lung and allergic diseases (46.32% of respondents).

Data were collected from patients by physicians during routine visits at the centre, based on a uniform questionnaire that was prepared

specially for the study. The questions were closed-ended, but in a few cases there was the possibility of giving another answer, if the correct one was not included in the questionnaire.

The observational study included patients who met the following criteria:

- over 35 years of age,
- diagnosed COPD,
- current or past tobacco smoker,
- outpatient.

The questionnaires were completed between 02.01.2012 and 31.04.2012.

A total of 688 physicians and 10,365 COPD outpatients participated in the study. Statistical analysis was conducted on 2967 randomised questionnaires. It was calculated that the analysis of 2401 questionnaires provides data with a probability of 0.95, with a maximum standard error of estimate 2%. The collected data were statistically analysed using the statistical software STATISTICA PL 10.0 and SPSS 21. For measurable variables, basic descriptive characteristics were given, and for qualitative variables — proportions compared to the number of available observations. Normality was tested using the Shapiro-Wilk test. To compare two independent groups, on account of quantitative variables, non-parametric Mann-Whitney U test was used (due to lack of normality of distribution of the examined variables). To examine the correlation between two qualitative variables, chi-squared test was used. To analyse correlation between two variables measured on the ordinal scale, the Spearman's rank correlation coefficient was used. To identify independent risk factors of chosen events (poor evaluation of health condition, poor efficacy of drugs, the impact of the disease and tobacco smoking on the patient and his/her family life) models of logistic regression with the Wald forward selection were used. The results with $P < 0.05$ were considered as statistically significant.

Demographic data

The mean age (\pm standard deviation) in the study group was 61.15 ± 10.25 years. Women constituted 33.98% of the group and were approximately one year younger than men. Among the survey participants, there were 56.73% of current smokers, and 43.37% of respondents declared that they had stopped smoking. Generally, men smoked more cigarettes per day, and they had more pack years in their history, irrespective of smoking status. Detailed differences in demographic data between men and women are presented in Table 1.

Table 1. Demographic data of the study group with respect to gender**Tabela 1. Dane demograficzne grupy badanej z podziałem według płci**

Variable		Whole group	Men	Women	P W vs. M
Sex	n (%)	–	1947 (66.02)	1002 (33.98)	–
Age	mean ± SD	61.15 ± 10.25	61.59 ± 10.46	60.32 ± 9.80	0.0002
	Me (Q25–Q75)	61 (55–68)	62 (55–70)	60 (54–67)	
BMI	mean ± SD	26.80 ± 3.74	26.96 ± 3.51	26.47 ± 4.13	< 0.0001
	Me (Q25–Q75)	26.57 (24.49–28.73)	26.87 (24.96–28.73)	26.15 (23.53–28.84)	
Education	Primary	545 (19.4)	397 (21.56)	146 (15.27)	
N (%)	Vocational	861 (30.64)	618 (33.57)	241 (25.21)	
	Secondary	916 (32.6)	551 (29.93)	359 (37.55)	< 0.0001
	Not completed higher/higher	488 (17.37)	275 (14.94)	210 (21.97)	
Professional status	Working	1218 (42.53)	821 (43.76)	389 (39.94)	
N (%)	Not working	194 (6.77)	73 (3.89)	121 (12.42)	< 0.0001
	Pensioner/retiree	1452 (50.7)	982 (52.35)	464 (47.64)	
Current smokers	Pack years	34.16 ± 19.03	36.57 ± 19.78	29.28 ± 16.40	< 0.0001
mean ± SD					
Me (Q25–Q75)		30 (20–42)	33.75 (24–45)	28 (18–39)	
	Number of cigarettes smoked/day	19.41 ± 8.4	20.24 ± 8.58	17.71 ± 7.74	< 0.0001
		20 (15–20)	20 (15–20)	20 (10–20)	
Past smokers	Pack years	36.78 ± 22.35	40.32 ± 22.49	30.27 ± 20.69	< 0.0001
mean ± SD					
Me (Q25–Q75)		31 (22–44.5)	37.5 (26.6–47.5)	26.3 (17.3–39)	
	Had not smoked for (since the cessation)	9.26 ± 7.0	9.17 ± 6.97	9.43 ± 7.05	0.5446
		8 (5–11)	8 (5–11)	10 (5–12)	

M — men; W — women; SD — standard deviation; Me — median; BMI — body mass index; Q — quartiles

Results

History of the disease

The respondents usually declared that the disease had been diagnosed from 2 to 5 years earlier (28.71% of respondents), whereas women reported a shorter history of the disease ($P = 0.0024$). Diagnosis was usually given by specialists of lung diseases (72.18%), followed by general practitioners (24.32%) and other specialists.

Frequent (3-7 days per week) occurrence of symptoms of the disease was reported by 56.92% of the study subjects. The most commonly mentioned symptom was cough — 80.53% of respondents; fewer patients reported expectoration of the sputum — 77.90%; and 59.16% of patients suffered from having dyspnoea — this symptom was considered as the most irritating by the largest group of patients (42.40%), the second being cough (32.87%). Symptoms occurred more frequently in men than in women, irrespective of smoking status (Table 2). During the previous year, COPD exacerbations (defined as the condition in

when patients took antibiotics due to infection of the lower respiratory tract, or had to take oral glucocorticosteroids, or need emergency care, or hospitalization) were noted in 42.08% of patients, and hospitalisations caused by them — in 17.79%. Exacerbations and hospitalisations were more frequently reported by past smokers, irrespective of sex (Table 2).

The questionnaire took into account spirometric classification of COPD severity based on the 2010 GOLD guidelines, whereas in a *post hoc* analysis, the severity of the disease was determined in accordance with the 2013 GOLD guidelines using data from the questionnaire concerning the degree of obturation (acc. to the 2010 GOLD guidelines) guidelines, severity of dyspnoea (using a modified MRC scale), and data on the prevalence of exacerbations from the year before the study.

In the study group, the majority were patients with moderate degree of the airway limitation (2) — 55.38%, followed by mild degree (1) — 21.40%, then severe degree (3) — 19.96%, and the smallest group constituted the patients

Table 2. Asthma symptoms, exacerbations and hospitalizations

Tabela 2. Objawy astmy, zaostrzenia i hospitalizacje

Variable		Total	Women	Men	<i>P</i> W vs. M	Smokers	Past smokers	<i>P</i> S vs. PastS
Number of days with symptoms n (%)	0–2 days	1246 (43.08)	462 (46.71)	772 (40.91)	0.0028	685 (42.15)	546 (44.00)	0.3234
	3–7 days	1646 (56.92)	527 (53.29)	1115 (59.09)		940 (57.85)	695 (56.00)	
Exacerbations n (%)	No	1471 (49.88)	492 (49.45)	967 (49.90)	0.2002	818 (49.31)	641 (50.83)	< 0.0001
	Yes	1241 (42.08)	434 (43.62)	803 (41.43)		673 (40.57)	555 (44.01)	
	Not known	237 (8.04)	69 (6.93)	168 (8.67)		168 (10.13)	65 (5.15)	
Hospitalisations n (%)	No	2268 (77.27)	789 (79.62)	1465 (75.99)	0.0842	1300 (78.93)	947 (75.22)	< 0.0001
	Yes	522 (17.79)	159 (16.04)	361 (18.72)		236 (14.33)	280 (22.24)	
	Not known	145 (4.94)	43 (4.34)	102 (5.29)		111 (6.74)	32 (2.54)	

M — men; W — women; S — smokers; PastS — past smokers

with very severe degree (4) — 3.27%. Men compared to women ($P < 0.00001$), and past smokers compared to current smokers ($P < 0.00001$) had more severe dyspnoe (Table 3). According to a new combined classification of COPD severity that was introduced in 2011 and is still used (2013 GOLD), the largest group consisted of patients with a low symptom burden (mMRC) and a low risk (A) — 52.67%, the second group in respect of size consisted of patients with a high symptom burden and a high risk (D) — 20.45%, the third largest being patients with a low symptom burden but a high risk (C) — 16.16%, and finally those with a high symptom burden and a low risk (B) — 10.72% (Table 3).

In the study group, both classifications show considerable correlation ($r_s = 0.67$, $P < 0.001$). While comparing men and women, men have significantly more severe course of the disease assessed by GOLD 2010 classification; using the GOLD 2013 classification, the difference is also unfavourable for men but it is not statistically significant. Taking into account smoking status, in both classifications past smokers demonstrated more severe course of COPD (Table 3).

The questionnaire also included questions concerning concomitant diseases at the time of the survey. Five diseases were listed most frequently: arterial hypertension (61.10% of respondents), diabetes (27.71%), gastric reflux (25.96%), neoplastic diseases (16.33%) and upper respiratory

tract diseases (12.82%). Comparing women and men in respect of prevalence of the comorbidities, only hypertension was diagnosed significantly more frequently in men ($P = 0.0178$). Regarding smoking status, past smokers more frequently had arterial hypertension ($P < 0.0001$), diabetes ($P < 0.00001$) and neoplastic diseases ($P < 0.0442$).

Doctors' and patients' opinions about the disease

The questionnaire included questions to the patients and doctors concerning the evaluation of the patients' health condition. Most of the patients described their health condition as good (42.9%), whereas doctors more often described the health condition of their patients as moderate (46.18%). Although both evaluations are shown by a considerable and significant correlation ($r_s = 0.62$, $P < 0.01$), the evaluation made by patients is significantly overstated compared to the evaluation made by doctors ($P < 0.001$). The opinion of the patient about the health condition depended mainly on the degree of disease severity according to the 2013 GOLD classification (OR = 4.946; 95% CI 3.468 — 7.054; $P < 0.0001$) and hospitalisations due to COPD exacerbations during the previous year (OR = 3.475; 95% CI 2.568 — 4.702; $P < 0.0001$), as well as on the used oxygen therapy (OR = 3.135; 95% CI 1.866 — 5.265; $P < 0.001$) and the age of the patient (OR = 1.679; 95% CI 1.252 — 2.252; $P = 0.001$).

Table 3. The severity of COPD by gender and smoking status according to the GOLD classification of 2010 and 2013 GOLD**Tabela 3. Ciężkość POChP z uwzględnieniem płci i statusu palenia według klasyfikacji GOLD 2010 i GOLD 2013**

Degree	Total	Men	Women	P W vs. M	Smokers	Past smokers	P S vs. PastS
GOLD 2010 n (%)							
I	609 (21.40)	370 (19.92)	236 (24.25)		407 (25.47)	196 (16.08)	
II	1576 (55.38)	994 (53.53)	572 (58.79)	< 0.0001	890 (55.69)	672 (55.13)	< 0.0001
III	568 (19.96)	424 (22.83)	142 (14.59)		263 (16.46)	299 (24.53)	
IV	93 (3.27)	69 (3.72)	23 (2.36)		38 (2.38)	52 (4.27)	
GOLD 2013 n (%)							
A	1499 (52.67)	953 (51.32)	535 (54.98)	0.0692	935 (58.51)	555 (45.53)	< 0.0001
B	305 (10.72)	193 (10.39)	111 (11.41)		153 (9.57)	148 (12.14)	
C	460 (16.16)	306 (16.48)	152 (15.62)		250 (15.64)	203 (16.65)	
D	582 (20.45)	405 (21.81)	175 (17.99)		260 (16.27)	313 (25.68)	

M — men; W — women; S — smokers; PastS — past smokers; GOLD — Global Initiative for Lung Diseases

The impact of the disease on the life of patients and their family life

The respondents were asked whether COPD influenced their life activities, family and social life, professional activities, hobby, sports activities and sexual life. The majority of patients answered positively. The respondents declared that COPD limited their sport activity (83.45% of patients), everyday life activities (82.78%) and family life (79.3%); a significant impact (considerable or great) was reported, apart from in sport (60.85%) and life activities (38.44%), in their professional life (34.9%), but the greatest influence, even leading to resignation from the activity, except for sport activity (21.75%), was reported for their sexual life (12.6%) and hobbies (11.49%) (Fig. 1).

While exploring factors that limit the patient's activity in different fields, we took into consideration the following: age (≥ 65 years), sex, smoking status (past smoker), severity of the disease according to the 2013 GOLD classification (grade C/D), hospitalisations during the previous year, comorbidities (at least one chronic disease except for COPD), oxygen therapy (chronic or the necessity of its application) and the need for care from third parties.

Independent factors that significantly limit life activities (Fig. 2) were: age ≥ 65 (OR = 1.566; CI 95% 1.169–2.096; $P = 0.003$), more severe

grades of COPD with a high risk of health complications (C/D) (OR = 2.362; CI 95% 1.729–3.227; $P < 0.0001$), the occurrence of comorbidities (OR = 1.317; CI 95% 1.014–1.711; $p = 0.039$) and the necessity for care from third parties (OR = 3.350; CI 95% 2.002–5.605; $P < 0.0001$). 3.18% of respondents needed permanent care by third parties, and 17.28% needed temporary care.

The factors that negatively influence family life of COPD patients were: age ≥ 65 (OR = 1.817; CI 95% 1.372–2.407; $P < 0.0001$), COPD severity (C/D) (OR = 2.197; CI 95% 1.655–2.917; $P < 0.0001$), concomitant diseases (OR = 1.353; CI 95% 1.054–1.736; $P = 0.018$) and the necessity for care from third parties (OR = 3.886; CI 95% 2.408–6.272; $P < 0.0001$). The status of a past smoker was a positive factor (OR = 0.667; CI 95% 0.525–0.847; $P = 0.001$) (Fig. 3).

The patient usually explained the negative impact of COPD on family life in terms of financial aspects (40.05%), nuisance for the family (34.46%), the disease focusing the attention of the whole family (10.56%), and the limited role of the patient in the family (21.92%).

Independent factors that impair professional activity of COPD patients were: more severe grades of COPD (C/D) (OR = 2.045; CI 95% 1.309–3.194; $p = 0.002$) and concomitant diseases (OR = 1.507; CI 95% 1.081–2.101; $p = 0.015$).

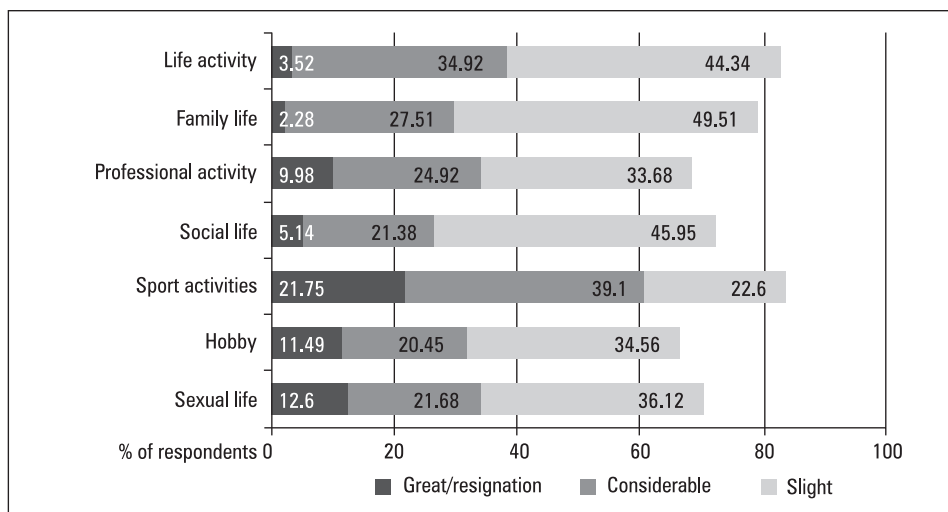


Figure 1. The impact of chronic obstructive pulmonary disease on the lives of patients and their families, in the patients opinion
Rycina 1. Wpływ przewlekłej obturacyjnej choroby płuc na życie chorego i jego rodziny w opinii pacjenta

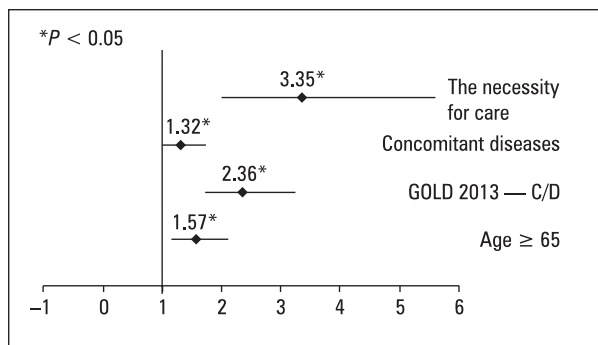


Figure 2. Factors limiting the life activity of patients suffering from chronic obstructive pulmonary disease

Rycina 2. Czynniki ograniczające aktywność życiową u chorych na przewlekłą obturacyjną chorobę płuc

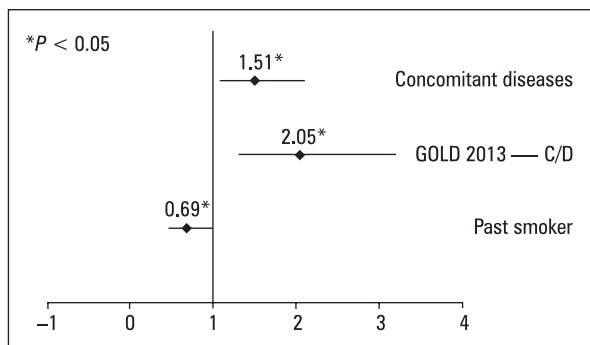


Figure 4. Factors affecting professional activity of patients suffering from chronic obstructive pulmonary disease

Rycina 4. Czynniki wpływające na aktywność zawodową u chorych na przewlekłą obturacyjną chorobę płuc

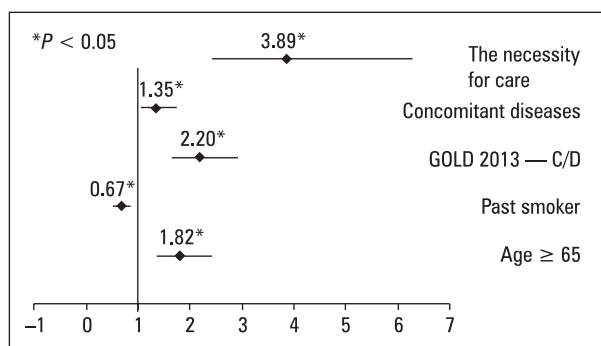


Figure 3. Factors adversely affecting the family life of patients suffering from chronic obstructive pulmonary disease

Rycina 3. Czynniki negatywnie wpływające na życie rodzinne u chorych na przewlekłą obturacyjną chorobę płuc

The status of past smoker had a positive impact (OR = 0.687; CI 95% 0.482–0.978; p = 0.037) (Fig. 4).

Due to COPD, 39.13% of patients did not work at all or just for some time during the previous year, 8.09% of them were entitled to pension due to COPD, and 31.04% of patients were on sick leave 21.34 ± 21.78 days on average.

A negative influence on the patient’s social life was due to: more severe grade of the disease (C/D) (OR = 1.807; CI 95% 1.425–2.293; P < 0.0001) and the necessity for care by third parties (OR = 2.812; CI 95% 2.009–3.936; P < 0.0001) (Fig. 5).

An independent factor that limited sports activities in COPD patients was COPD severity (C/D) (OR = 1.540; CI 95% 1.194–1.986; P = 0.001), and the status of past smoker was a positive factor (OR = 0.752; CI 95% 0.592–0.954; P = 0.019) (Fig. 6).

Independent factors that interfered with the patient’s hobbies were as follows: age ≥ 65 (OR = 1.291; CI 95% 1.027–1.623; P = 0.028),

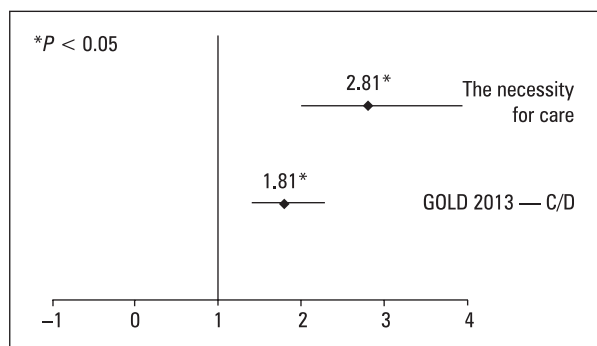


Figure 5. Factors adversely affecting the social life of patients suffering from chronic obstructive pulmonary disease

Rycina 5. Czynniki negatywnie wpływające na życie towarzyskie chorych na przewlekłą obturacyjną chorobę płuc

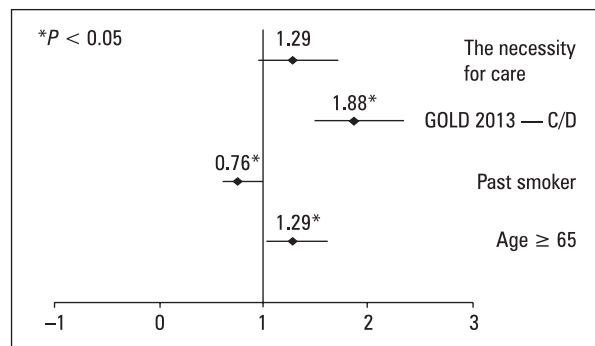


Figure 7. Factors limiting the hobbies of patients suffering from chronic obstructive pulmonary disease

Rycina 7. Czynniki ograniczające chorym na przewlekłą obturacyjną chorobę płuc zajmowanie się hobby

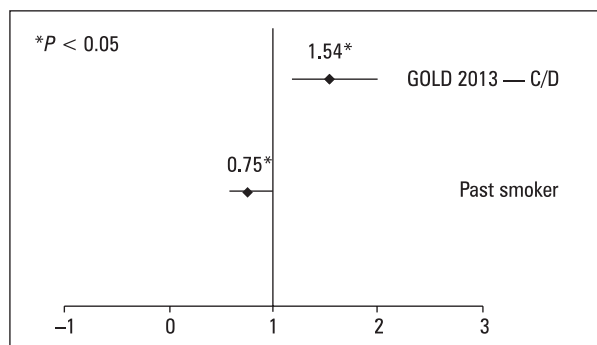


Figure 6. Factors affecting the sporting activity of patients suffering from chronic obstructive pulmonary disease

Rycina 6. Czynniki wpływające na uprawianie sportu przez chorych na przewlekłą obturacyjną chorobę płuc

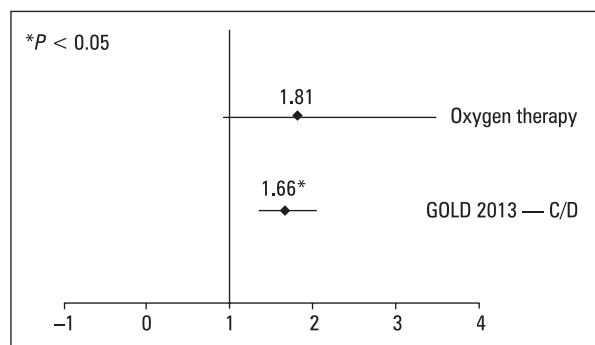


Figure 8. Factors limiting the sexual life of patients suffering from chronic obstructive pulmonary disease

Rycina 8. Czynniki ograniczające życie intymne chorych na przewlekłą obturacyjną chorobę płuc

severe stage of the disease (C/D) (OR = 1.876; CI 95% 1.494–2.356; $P < 0.0001$) and the necessity for care from third parties (OR = 1.291; CI 95% 0.971–1.717; $P = 0.079$), but the last parameter was not statistically significant. The status of past smoker had a positive effect (OR = 0.764; CI 95% 0.621–0.940; $P = 0.011$) (Fig. 7).

An independent factor that impaired sexual life in COPD patients was C/D grade of COPD (OR = 1.655; CI 95% 1.343–2.039; $P < 0.0001$). The use of, or the necessity of using, oxygen therapy also increased the risk of limitations, but it was not statistically significant, taking into account the assumed significance threshold (OR = 1.808; CI 95% 0.933–3.501; $P = 0.075$) (Fig. 8).

75.45% of respondents declared that their family supported them in their coping with the disease.

History of tobacco smoking

56.73% of the survey participants were current smokers, and 43.37% of them declared that they had stopped smoking. Most current smokers

(99.38%) smoked cigarettes, 0.65% of them smoked cigars and 1.51% smoked pipes. For nearly all of them (98.79%), doctors had previously recommended smoking cessation. 54.03% of current smokers had made attempts to quit smoking. The mean number of attempts to quit smoking in this group was 4.05 ± 3.14 , and it was significantly higher ($P < 0.00001$) compared to the group of past smokers at 3.17 ± 2.61 attempts. The mean time that passed from smoking cessation in the group of past smokers was 9.26 ± 7 years. Current smokers had a longer history of smoking ($P = 0.0179$), but they had a smaller number of cigarettes smoked daily and slightly less pack years ($P = 0.00001$ for both groups) (Table 4).

As the main reason for cigarette smoking, the respondents gave the following: addiction — 28.44%, pleasure — 23.34%, habit — 17.78%, stress relief — 13.20% and smoking friends — 2.74%. 3.03% of respondents mentioned a smoking family member as the main reason for cigarette smoking, and 1.48% said body mass control.

Table 4. Comparison of smokers and ex-smokers in terms of smoking load

Tabela 4. Porównanie palących i byłych palaczy pod względem obciążenia paleniem tytoniu

Variable	Current smokers	PastS	S vs. PastS
Smoking status n (%)	1665 (56.73)	1270 (43.27)	–
The number of attempts to quit smoking	4.05 ± 3.14 3 (2–5)	3.17 ± 2.61 3 (2–4)	< 0.00001
Duration of smoking mean ± SD Me (Q25–Q75)	34.84 ± 10.81 35 (30–40)	32.32 ± 10.76 31 (25–40)	0.0179
Duration of not smoking the time since smoking cessation mean ± SD Me (Q25–Q75)	–	9.26 ± 7 8 (5–11)	–
Average number of cigarettes/day mean ± SD Me (Q25–Q75)	19.41 ± 8.4 20 (15–20)	21.93 ± 9.56 20 (20–21)	< 0.00001
Average number of pack mean ± SD Me (Q25–Q75)	34.16 ± 19.03 30 (20–42)	36.78 ± 22.35 31 (22–44.5)	< 0.00001

SD — standard deviation; Me — median; S — smokers; PastS — past smokers; Q — quartiles

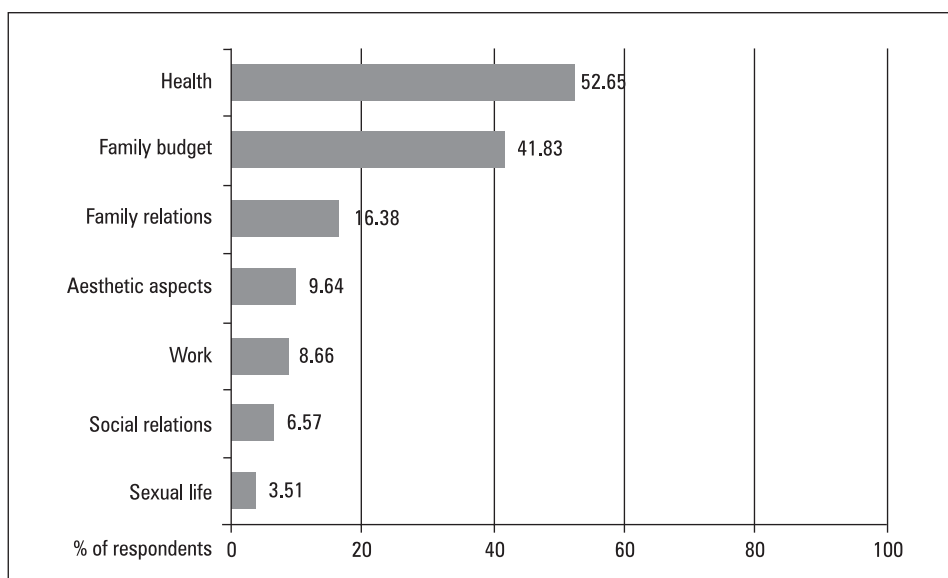


Figure 9. The effect of smoking on various aspects of the patient’s life

Rycina 9. Wpływ palenia tytoniu na różne aspekty życia pacjenta

The impact of smoking on family life and the reaction of the family to addiction

According to the patients, tobacco smoking had the most negative impact on their health (52.65%) and family budget (41.83%). 16.38% of patients declared a negative impact of tobacco smoking on relations within the family.

Among current smokers, 69.62% of respondents declared a willingness to quit smoking (definitely yes — 13.38%, I think yes — 56.24%), the motivation for their decision was health re-

asons (diagnosis of COPD — 35.06%, effect on health — 26.58%), financial reasons (19.74%) and insistence of the family (11.02%).

Simultaneously, 71.79% of patients declared that they received support from their family (definitely yes — 24.98%, I think yes — 46.81%) in their struggle with addiction. 54.03% of currently smoking patients had made attempts to quit smoking with no permanent effect. Unsuccessful attempts to quit smoking were caused mainly by the force of habit — 25.08%, but 5.78% of respondents mentioned smoking family members as the main reason

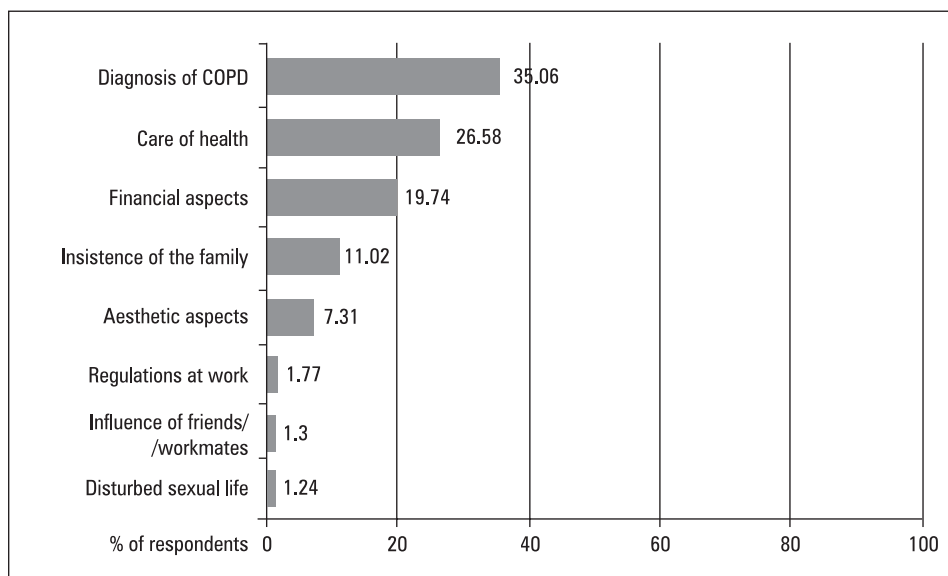


Figure 10. The declared reasons for the desire to quit smoking

Rycina 10. Deklarowane powody chęci rzucenia palenia

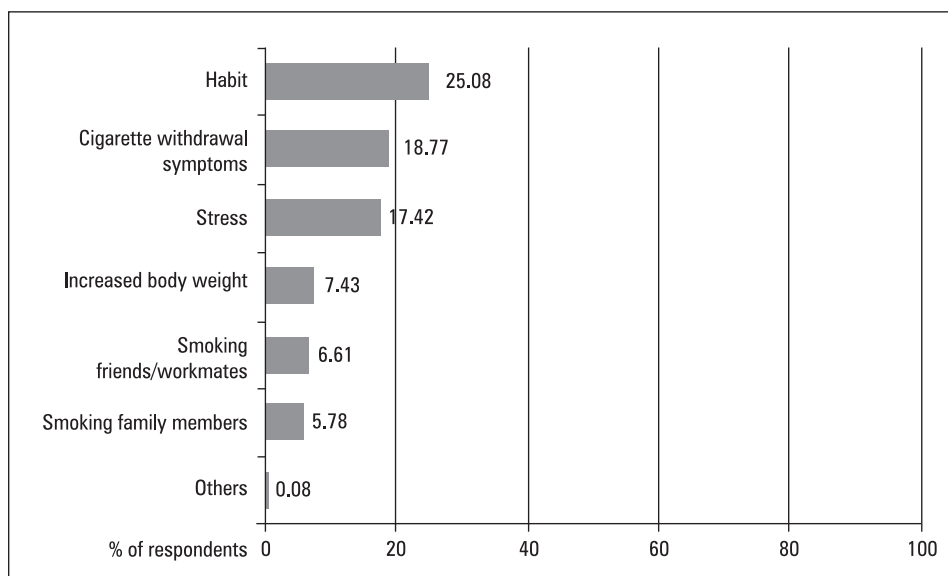


Figure 11. Reasons for unsuccessful attempts to quit smoking

Rycina 11. Powody nieudanych prób rzucenia palenia

Among the factors that favour successful smoking cessation, the most important are age ≥ 65 years and more severe obturation (2010 GOLD stage III/IV).

Discussion

Chronic obstructive pulmonary disease is a progressing disease; in the beginning it is latent, but consequently it leads to irreversible consequences, and in some patients, to respiratory disability and even to premature death [3].

More than 10,000 COPD patients treated by general practitioners and specialists participated in the present study. To the best of the authors' knowledge, it is the largest published epidemiological study apart from the National Program of Early Detection and Prevention of COPD (addressed to a different group) [10], conducted in Poland and describing this group of patients in such a detailed manner. The KOMPAS study [11] was a prospective study, but it was conducted on a smaller group of COPD patients (3315 patients).

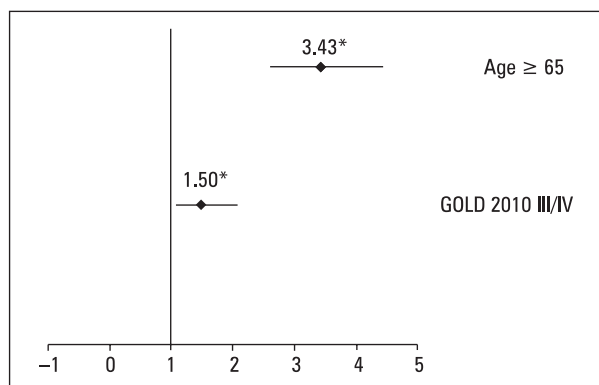


Figure 12. Risk factors for effective cessation

Rycina 12. Czynniki ryzyka skutecznego zerwania z nałogiem

Both studies showed that men more often suffer from COPD (in the present paper — 66.02%, in the KOMPAS study [11] — 69.3%), which is in accordance with the results of epidemiological studies conducted on the general population, which also showed higher morbidity rates among men in Poland [4, 12].

The mean age of patients in the present study was 61.15 years. In the most similar study in respect of cohort selection, the KOMPAS study, the age of patients was comparable (62.9 years) [11]. The disease usually affects people between 45 and 70 years of age, cases of COPD in patients under 40 years of age are relatively rare. However, it should be emphasised that advanced age is a risk factor for the disease, which, on the one hand may be connected with pathophysiological processes that are observed in an ageing organism, and on the other hand might be the result of the sum of harmful exposures to various harmful factors. It is true that the prevalence of COPD increases in ageing societies [3].

The proportion of currently smoking patients in the present paper was 56.73%, in the KOMPAS study [11] it was only 32%, but in the National Program of Early Detection and Prevention of COPD it was as much as 61.6% [10]. The last two projects also included people who declared themselves to be never smokers. In all programs, smoking status was assessed exclusively based on the declaration of the patients, without verification with objective methods, which does not ensure reliable results. In the National Program of Early Detection and Prevention of COPD [10], participants were inquired by another doctor, which could persuade more persons to confess that they still smoked cigarettes. Furthermore, this project could be entered by anyone who wanted to examine lung function, whereas the

present study and the KOMPAS study [11] included people with previous diagnosed disease (patients under the care of doctors filling the questionnaire); therefore, these values cannot be directly compared.

A significant element in management of COPD patients is the disease severity. The disease severity influences the patient's prognosis, quality of life and limitations of life activities, but it is also important for family relations and the necessity for care from third parties.

The study was designed in 2011; therefore, severity was assessed based on the airway limitation according to current 2010 GOLD classifications [3]. According to this grading, the group with the worst prognosis were men they were past smokers, who were also more exposed to tobacco (the mean number of pack years of men and of past smokers was significantly higher, compared to women and current smokers). Similar relations were obtained in the KOMPAS study [11].

In the GOLD report [3] published at the end of 2011, a new scale of the evaluation of COPD severity was proposed. Except for obturation, it took into account symptoms severity and annual prevalence of exacerbations. Using the data included in the questionnaire, the *post hoc* analysis in accordance with new guidelines was carried out. The largest group of patients constituted the patients from category A (52.67%) with a low risk and a low symptom burden, but the second category consisted of patients from group D (20.45%), with a high symptom burden and a high risk (Table 3). There are only a few international publications showing distribution of COPD severity according to new guidelines, and to the best of the authors' knowledge, this is the only Polish study conducted on such a large group of patients. Johannessen et al. conducted a classification according to new guidelines on a cohort of approximately one thousand patients from the GenKOLS study [13]. Group A included 20% of patients, B — 30%, C — 6% and D — 44%. The limitation of the cohort was the fact that it recruited patients with FEV₁ below 80% of predicted value, so it excluded patients with a mild degree of obturation, which made the proportion of patients in groups A and B smaller, and consequently made the proportion of patients in groups C and D bigger. Jones et al. [14] also classified patients according to the 2011 GOLD. The cohort from the Adelphi Respiratory Disease Specific Programme, similarly as in the previous study, consisted of approximately 1000 patients recruited during routine visits (38.5% primary

care clinic). 80% of participants of that study belonged to class 1 or 2, according to the 2010 GOLD classification, which is similar to the characteristics of the group from the presented study (in total 76%), although they were on average 3 years older (64.9 years). In the study by Jones, the distribution of severity according to the 2011 GOLD with the use of CAT test was the following: group A — 9.3% of patients, group B — 48.5%, group C — 0.7% and group D — 41.5%, but when the mMRC scale was used, the distribution changed in the following way: category A — 37.8%, category B — 20.1%, category C — 13.4% and category D — 28.8%. In the new classification, the shift of patients towards category D with a high risk in comparison to not numerous grade IV from the previous classification is caused by recurrent exacerbations (≥ 2 /year) in a significant proportion of respondents (in this way 80% patients were classified to groups D or C). But in the two quoted studies there is a higher proportion of patients from groups B or D in relation to the present study, which results from more severe symptoms (in the present study A+C/B+D — 69%/31% vs. Johannessen [13] 26%/74% vs. Jones [14] 10%/90% for CAT and 51%/49% for mMRC). It is possible that the differences also result from the intensity of treatment; the quoted studies do not contain data about the used therapy.

However, if we compare the groups with a low (A+B) and a high risk (C+D) between the studies, the differences are not so great (the present study A+B/C+D — 63%/37% vs. Johannessen [13] 50%/50% vs. Jones [14] 58%/42% for CAT and mMRC).

The data from the study were analysed paying special attention to the impact of COPD and tobacco smoking on the patient's and their family life. We lack such data for the Polish population, and those in the international literature are scarce and fragmentary.

In the present study, disease severity classified as C or D according to the 2013 GOLD [3] significantly impaired all evaluated aspects of the patient's life. At the beginning of COPD of the disease, clinical symptoms are usually latent, and the patient does not notice them or does not take them seriously because they do not limit at all or only little various aspects of life, including family life. The problem arises when clinical symptoms occur frequently and are so intensive that they impair the patient's life, personal professional activities, interests, hobbies, and sports, and when they influence the patient's family life in its various aspects: from the financial burden to

temporary or permanent disability to work, drug expenses and sexual life. The impact of the disease on so many aspects of the patient's life causes a significant burden for the patients and their families. The majority (nearly 80%) of patients report that, in their opinion, the disease impaired their family life in various ways.

Others independent factors that influence the patient's activities are age ≥ 65 years, concomitant diseases and care from third parties. It should be emphasised that the first two factors correlate positively with the severity, but the necessity for care from third parties is a consequence of severe general condition including severe degree of the disease, comorbidities and age.

Uzaslan et al. [15] also explored the impact of the disease on the patient's life among the inhabitants of the Middle East, North Africa and Pakistan. The impact of the disease on sports activities was declared by 57.1% of patients (40.9–80%) vs. 60.85% of Polish patients, the impact on family life — 31.7% (19.1–54.9%) vs. 29.79%, on sexual life 37.5% (19–54.9%) vs. 34.28% and on social life 37.5% (22.7–54%) vs. 26.52%.

In patients' everyday struggle with the disease, family is important. Lack of support is related with psychological problems, severity of dyspnoea and poor quality of life [16]. In the study group, 75.45% of patients declared that they received support from their family. On the other hand, as many as 24.55% of patients had greater risk of depression and neuroses and the risk of worse results of therapy due to lack of support [16, 17]. The occurrence of COPD in a spouse also increases the risk of depression and neurosis [17].

COPD is a tobacco dependent disease, and this correlation is very strong; therefore, smoking cessation may reduce the risk of the disease or at least slow its progression. Although tobacco smoking is generally considered to be harmful to health, it is still popular in Poland, which means an increasing number of patients suffering from tobacco dependent diseases, including COPD.

Early diagnosis of airway obturation that is the pathophysiological mechanism of COPD, together with minimal intervention, favours an successful struggle against addiction [18]. According to the epidemiological study conducted by Anna Elgalal et al. in the years 1998–2000 in the region of Łódź, between 36.4% (in the city centre) and 85.0% (in the countryside) of COPD patients were not diagnosed correctly, and consequently they were not correctly treated or educated [12].

Smoking cessation is the only known effective method of stopping COPD progression. When addition to nicotine is diagnosed, it is recommended to conduct so-called minimal intervention (5-step guidelines: ASK about tobacco use at every visit, ADVISE to quit, ASSESS willingness to attempt to quit, ASSIST with developing a quitting plan and ARRANGE a follow-up contact) [3]. Such intervention together with spirometry is effective in 10–11% per year of Polish patients with airway limitation [19, 20]. However, doctors rarely conduct a minimal intervention during routine visits.

Although it is considered that support from the family is crucial for efficacy of smoking cessation, there are no studies of the role of family in the process.

Patients admit that insistence of the family to quit smoking is a motivating factor. They are conscious that smoking may influence relations within the family, family budget and have an impact on their sexual life. It was confirmed in several studies that men with COPD very often have erectile dysfunction [21].

An independent factor that favoured successful smoking cessation in the present study was COPD severity measured by airway limitation. A similar observation was made by Bednarek et al. [22], who showed that the more severe disease, the greater the chance of permanent smoking cessation.

Negative relations in the family should also be taken into consideration. Some patients return to their addiction due to smoking family members.

The present study allowed to gather the key data concerning the impact of the disease and nicotine addiction on the patient's and his/her family life. We analysed information about factors that influence tobacco smoking and support/impair the struggle against addiction.

The results of the present study may help in preparing of an educational program that could improve patients' knowledge about the disease. Furthermore, they could prepare doctors and patients for the struggle against tobacco addiction, they could strengthen the role of the family in the management of patients with chronic diseases, and improve cooperation between the doctor and patient.

Apart from previously defined objectives of the study, its additional benefit was improvement of relation doctor-patient, based on confidence to each other, understanding of the patient's problems, willingness to join forces in order to improve the patient's health. According to the GOLD

[3], cooperation doctor-patient is a key element in COPD management. In patients with more severe stage of COPD, the role of the family is of crucial importance as the burden of care of the patient rests on its shoulders. Therefore, the program also paid attention to this aspect of management of COPD patients.

Conflict of interest

The study was designed and carried out with the cooperation of the MMS Sp. z o.o.

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