

The course of the chronic obstructive pulmonary disease in active and former smokers.

Part II: Changes after cessation of smoking

Przebieg przewlekłej obturacyjnej choroby płuc u czynnych i byłych palaczy. Część II – zmiany po zaprzestaniu palenia tytoniu

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D – writing the article; E – critical revision of the article; F – final approval of the article

Pielęgniarstwo i Zdrowie Publiczne, ISSN 2082-9876 (print), ISSN 2451-1870 (online)

Piel Zdr Publ. 2020;10(3):159–164

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Funding sources

None declared

Conflict of interest

None declared

Received on October 12, 2017

Reviewed on June 18, 2018

Accepted on January 16, 2020

This is a translated article.

Please cite the original

Polish-language version as

Klar A, Krupińska B, Marcisz C. Przebieg przewlekłej obturacyjnej choroby płuc u czynnych i byłych palaczy. Część II – zmiany po zaprzestaniu palenia tytoniu.

Piel Zdr Publ. 2020;10(3):159–164. doi:10.17219/pzp/116650

DOI

10.17219/pzp/116650

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Abstract

Background. Chronic obstructive pulmonary disease (COPD) is a growing health problem associated with smoking.

Objectives. The aim of the study was to determine the scope of changes in the clinical picture of the disease as well as in the treatment applied and the frequency of hospitalization in COPD patients following the cessation of smoking, and to assess the occurrence of the exacerbations of the disease related to performing daily activities, both in patients currently smoking tobacco and in former smokers.

Material and methods. The study was conducted on 104 patients hospitalized due to COPD, out of whom 2 groups were identified for further analysis, namely: active smokers ($n = 49$); and former smokers ($n = 55$). The technique of diagnostic survey using the authors' own questionnaire was applied.

Results. In patients with COPD, after smoking cessation, the occurrence of dyspnea and coughing fits, the dosage of inhaled medications, the frequency of applying oxygen therapy, and the number of hospital stays were reduced. In the examined patients, the potentiation of the symptoms of COPD was observed most frequently after intensive physical exercises, and to a lesser extent after self-care activities, a walk or a minor effort. These activities led to a significantly higher exacerbation of COPD in active smokers than in former smokers. An irregular intake of prescribed medicines was declared by 48 former smokers and 28 active smokers, with poor access to the doctor and a high cost of medications being the most common reasons for such a situation.

Conclusions. In patients with COPD, the cessation of smoking results in the alleviation of the symptoms of the disease (90%) as well as in a reduction in the use of oxygen therapy (69%), the dosage of inhaled medications (40%) and the number of hospitalizations (56%). The exacerbation of the COPD symptoms following the effort associated with daily activities is greater in active smokers than in former smokers.

Key words: clinical symptoms, tobacco smoking, chronic obstructive pulmonary disease, use of drugs

Streszczenie

Wprowadzenie. Przewlekła obturacyjna choroba płuc (POChP) jest coraz ważniejszym problemem zdrowotnym, przyczynowo związanym z paleniem.

Cel pracy. Określenie zakresu zmian w obrazie klinicznym, stosowanym leczeniu i częstości hospitalizacji chorych na POChP w następstwie zaprzestania palenia tytoniu oraz występowania zaostrzeń tej choroby w powiązaniu z wykonywanymi codziennymi czynnościami u chorych czynnie palących papierosy i u byłych palaczy tytoniu.

Materiał i metody. Badania przeprowadzono u 104 pacjentów hospitalizowanych z powodu POChP, spośród których do dalszej analizy wyłoniono 2 grupy: pacjentów aktywnie palących ($n = 49$) i byłych palaczy ($n = 55$). Zastosowano technikę sondażu diagnostycznego z użyciem autorskiego kwestionariusza ankiety.

Wyniki. U chorych na POChP po zaprzestaniu palenia tytoniu doszło do zmniejszenia występowania duszności, częstości napadów kaszlowych, dawkowania leków wziewnych, częstości stosowania tlenoterapii i liczby pobyków w szpitalu. U badanych chorych objawy POChP nasilały się najczęściej po intensywnym wysiłku fizycznym, w mniejszym odsetku po czynnościach pielęgnacyjnych, spacerze oraz mniejszym wysiłku. Czynności te prowadziły do istotnie częstszego nasilenia objawów POChP u chorych czynnie palących papierosy niż u byłych palaczy. Nieregularne przyjmowanie zaleconych leków deklarowało 48 byłych i 28 czynnych palaczy, najczęściej z powodu utrudnionego dostępu do lekarza i zbyt wysokiej ceny.

Wnioski. U chorych na POChP w następstwie zaprzestania palenia tytoniu dochodzi do zmniejszenia intensywności objawów choroby (90%), częstości stosowania tlenoterapii (69%), dawkowania leków wziewnych (40%) i liczby hospitalizacji (56%). Nasilenie objawów POChP w następstwie wysiłku związanego z czynnościami dnia codziennego jest większe u czynnych niż u byłych palaczy.

Słowa kluczowe: objawy kliniczne, palenie tytoniu, przewlekła obturacyjna choroba płuc, stosowanie leków

Introduction

The course of chronic obstructive pulmonary disease (COPD) is largely determined by a person's lifestyle, primarily smoking and exposure to tobacco smoke, as well as the regular use of the prescribed drugs. The effects of smoking on health include the development of smoking-related diseases, premature death from cancer, cardiovascular disease, and COPD. The most effective way to prevent COPD is the cessation of smoking as well protection against passive smoking and exposure to tobacco smoke.¹

Despite a decline in the popularity of smoking in Poland in recent years, the past social burden of the addiction is considered to have a significant impact on the continuing high prevalence of COPD. Recently, a decrease in the proportion of male smokers has been observed, while the number of female smokers remains almost unchanged.² Smoking rates have been shown to be higher in women aged 40–60 years than in older age groups, which may lead to a further increase in the prevalence of COPD in women.² A previous article by the authors of this paper on the link between COPD and smoking showed that COPD patients who were active smokers experienced a more severe course of the disease than former smokers, which took the form of more frequent exacerbations, hospitalization and sleep disorders, and required more frequent use of bronchodilators and oxygen therapy.³

The aim of this study was to determine the extent of changes in the clinical picture as well as in the treatment administered and the frequency of hospitalization in COPD patients following the cessation of smoking. Moreover, the occurrence of the exacerbations of the dis-

ease was assessed in connection with everyday activities in patients who were active smokers and former smokers.

Material and methods

The study was conducted on 150 patients with COPD during their stay at the Department of Internal Medicine of the Voivodeship Specialist Hospital No. 1 in Tychy, Poland, in 2012. After applying the inclusion criteria (obtaining the patient's informed consent to take part in the study and the correct completion of the author's questionnaire), 104 patients were qualified for further study. The subjects were divided into 2 groups: the 1st group consisted of active cigarette smokers; the 2nd group consisted of former smokers, i.e., patients who have not smoked for at least a year.

The 1st group consisted of 49 patients, including 10 women and 39 men, aged 45–87 years ($M \pm SD$: 68.5 ± 7.5 years). Members of this group smoked 10–60 cigarettes a day (17.6 ± 8.2 cigarettes); the smoking period was 17–65 years (44.8 ± 9.6 years). The 2nd group consisted of 55 patients, including 24 women and 31 men, aged 53–88 years (69.4 ± 7.6 years). The average non-smoking period was 17.2 ± 10.8 years. The groups were comparable in terms of age.

All the subjects were interviewed according to the questionnaire prepared by one of the authors of this article³; the presented results come from the first application of the questionnaire in the study. The study determined changes in the frequency of the occurrence of dyspnea and coughing, and in the frequency of drug administration, oxygen use and hospitalization following the cessation of smoking. All the subjects were also assessed with

respect to the exacerbation of COPD symptoms following physical effort related to everyday activities, hygienic activities and walking, lasting at least 20 min, with the specification of degree of the effort – considerable or minimal. The causes of irregular drug administration and motivations for smoking cessation were also established.

The results of the survey research were subjected to quantitative and qualitative analysis. The Microsoft Excel spreadsheet was used for calculations. In some cases, the value of the expected number of responses was also indicated; it was the intermediate result of the χ^2 test calculations and was the effect of an attempt to match empirical data (while maintaining boundary distributions) with a form in which there would be no differences between the selected groups of people. The χ^2 test was applied by indicating the expected values, showing what should be the number of subsequent response variants for the case where the studied community was not diversified with respect to the opinion expressed on a given issue ($\chi^2 = 0$). The statistical significance was assumed at $p \leq 0.05$.

Results

A number of beneficial changes in the course of COPD were observed following smoking cessation, namely, a decrease in the value of the following features was found: the occurrence of dyspnea (approx. 87%), the frequency of coughing fits (more than 90%), the dosage of inhalants (40%), the frequency of oxygen therapy (almost 70%), and the number of hospital stays (approx. 56%) (Table 1). The changes in the surveyed men were comparable with those in women.

In the surveyed patients, the COPD symptoms most often exacerbated following activities requiring greater physical effort, such as climbing stairs, carrying more shopping (92.3%); and to a lesser extent, after care activities (46.2%), walking (31.7%) and after smaller effort

connected with performing everyday activities (26.9%). The abovementioned activities led to an exacerbation of COPD symptoms substantially more frequently in patients who were active smokers than in former smokers ($p < 0.001$) (Table 2).

Irregular administration of the recommended drugs was declared by 48 former smokers and 28 active smokers, representing 87.3% and 57.1% of the respondents, respectively. The most frequent reason for irregular drug administration provided by the respondents was the lack of a prescription due to the impeded access to the doctor (72.9% of non-smokers and 75% of smokers), followed by the unduly high a price of the drug (54.2% of non-smokers and 28.6% of smokers), and rarely the lack of skills in using an inhaler (8.3% of non-smokers and 7.1% of smokers) (Table 3).

The unduly high price of drugs was cited as the reason for irregular drug administration, despite the doctor's recommendations, substantially more frequently by former smokers than patients who were active smokers ($p < 0.05$).

Failure to take prescribed drugs was the cause of the exacerbation of the disease symptoms. In the group of 76 subjects who took the recommended drugs irregularly, 96.1% confirmed the exacerbation of the disease symptoms when they did not take the drugs. The exacerbation of COPD symptoms in non-smokers during the time when drugs were not taken was comparable to that in active smokers (95.8% and 96.4%, respectively). In the group of women who took drugs irregularly, the exacerbation of symptoms was observed in all former smokers and in 80% of active smokers; the difference proved statistically significant ($p < 0.05$). In men, the exacerbation of symptoms appeared in 91.7% of former smokers and in 100% of active smokers ($p > 0.05$).

In a self-evaluation study, the respondents arbitrarily identified reasons for stopping smoking. They included a diagnosed disease, an unprompted decision, the awareness of the harmfulness of smoking, and the price of cigarettes.

Table 1. Changes in the course of COPD after the cessation of smoking

Tabela 1. Zmiany w przebiegu POChP po zaprzestaniu palenia tytoniu

Subjects	Decrease in dyspnea		Reduction in the frequency of coughing fits		Reduction in the dosage of inhalants		Reduction of the frequency of oxygen therapy		Reduction in the number of hospital stays	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Former smokers – women (<i>n</i> = 24)	22	91.7	23	95.8	9	37.5	18	75.0	16	66.7
Former smokers – men (<i>n</i> = 31)	26	83.9	28	90.3	13	41.9	20	64.5	15	48.4
Total (<i>n</i> = 55)	48	87.3	51	92.7	22	40.0	38	69.1	31	56.4

n – quantity of the analyzed feature in the sample.

Table 2. Potentiation of the symptoms in COPD patients (dyspnea, cough, fatigue) following performing daily activities

Tabela 2. Nasilenie objawów chorobowych u chorych na POChP (duszność, kaszel, zmęczenie itd.) w następstwie wykonywanych czynności dnia codziennego

Subjects	After greater physical effort		After care activities		After a walk		After smaller physical effort	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Non-smokers (<i>n</i> = 55)	48	87.3	19	34.6	14	25.5	7	12.7
Smokers (<i>n</i> = 49)	48 ^a	98.0 ^a	29 ^a	59.2 ^a	19 ^a	38.8 ^a	21 ^b	42.9 ^b
Total (<i>n</i> = 104)	96	92.3	48	46.2	33	31.7	28	26.9

^a $p < 0.05$; ^b $p < 0.001$; compared to non-smokers (Pearson's χ^2 nonparametric test).

Table 3. Reasons for the irregular intake of the prescribed drugs by the examined COPD patients

Tabela 3. Przyczyny nieregularnego przyjmowania leków przez badanych chorych na POChP

Subjects	Excessive price of the drug		Poor access to the doctor		Lack of skills in using the inhaler	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Non-smokers (<i>n</i> = 55)	26	54.2	35	72.9	4	8.3
Smokers (<i>n</i> = 49)	8 ^a	28.6 ^a	21	75.0	2	7.1
Total (<i>n</i> = 104)	34	44.7	56	73.7	6	7.9

^a $p < 0.05$; compared to non-smokers

Table 4. Factors motivating COPD patients to cease smoking

Tabela 4. Czynniki motywujące chorych na POChP do zaprzestania palenia

Subjects	Diagnosed disease		Unprompted decision		Cigarette price		Gaining knowledge on the harmful effects of cigarette smoking	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Former smokers – women (<i>n</i> = 24)	22	91.7	3	12.5	0	0.0	4	16.7
Former smokers – men (<i>n</i> = 31)	23	74.2	11	35.5	3	9.7	4	12.9
Total (<i>n</i> = 55)	45	81.8	14	25.5	3	5.5	8	4.5

The reasons for the cessation of smoking identified by the authors of the study corresponded with the factors cited by COPD sufferers as motivators for smoking cessation. Among the factors that motivated COPD sufferers to stop smoking, the diagnosis of a disease was mentioned most often (81.8%), which was followed by making an unprompted decision (25.5%), the awareness of the harmfulness of smoking (14.5%), and the price of cigarettes (5.5%). The results in women were statistically comparable to those in men (Table 4).

Discussion

The study conducted using a questionnaire survey showed that in former smokers suffering from COPD, the rate of occurrence of disease-related dyspnea and coughing fits, the frequency of applying oxygen therapy, the dosage of inhalants, and the number of hospital stays were reduced. It also turned out that in these patients, the exacerbation of dyspnea, coughing and fatigue following greater and smaller physical effort, walking and hygiene

activities occurred substantially less frequently than in active smokers. This finding is confirmed by the fact that active smokers experience a greater increase in the severity of COPD symptoms in various everyday situations than persons who have stopped using this addictive substance. Tamini et al. showed that cigarette smoking was associated with a precipitation of lung dysfunction caused by the exacerbation of COPD symptoms and with an increased mortality rate.⁴ In another work by us, we showed that active smoking by patients with COPD led to a less favourable course of the disease in comparison to that in former smokers, which took the form of disease exacerbation, hospitalization and sleep disorders, and required more frequent use of bronchodilators and oxygen therapy.³

Authors' own study revealed that active smokers accounted for approx. 1/2 of the subjects with COPD. The BOLD study showed that in Poland, smoking addiction occurred in 51.5% of COPD sufferers.⁵ The study by Iwanicka-Michałowicz and Grzelewska-Rzymowska, conducted in 2005–2007, found that in the general population of Poland, the prevalence of smoking amounted to 36.4% for men and 15.1% for women.⁶

A meta-analysis of the prevalence of COPD in 28 countries between 1990 and 2004 showed that the disease occurred more frequently in active and former smokers than in persons who had never smoked; more frequently in people above the age of 40 as compared to younger people; more frequently in men than in women.⁷ Halbert et al., in their analysis of the research conducted in several dozen countries of the world, estimated that COPD afflicts 10% people above the age of 40.⁸ In authors' own study, all persons were above the age of 50.

The role of gender in assessing the risk of COPD is unclear. Previously conducted studies showed that COPD morbidity and mortality rates were higher in men than in women. Recent studies conducted in developed countries demonstrate that the prevalence rate of the disease in men is comparable to that in women, which may be associated with a similar smoking frequency in both genders.^{7,9}

In the 1980s, the popularity of cigarettes declined noticeably. In the UK, 25% of men and 23% of women smoked, so smokers accounted for approx. a 1/4 of the population. The prevalence of smoking in this country has fallen by half since the 1970s, when almost half of the adults were habitual smokers (51% of men and 41% of women). In our country, tobacco consumption was reduced much later. In Poland, men abandoned the addiction more often than women; 27% of former smokers are men, while 16.6% are women. A similar phenomenon was observed in the UK (27% of male former smokers and 21% of female former smokers).⁷ The own research covered 29.8% of male former smokers and 23.1% of female former smokers. The study conducted confirms a well-known regularity according to which women find it harder to stop smoking and do so less frequently, hence former smokers are more often men than women.

Experience shows that despite the declarations of the desire to quit smoking, and thus to take measures to improve the course of COPD, few people manage to do so. This was shown in the study by Wójtowicz-Chomicz et al., in which 70% of smokers declaring their desire to give up smoking continued the addiction.¹⁰ Targowski et al. found that as many as 100% of the COPD sufferers participating in the study had made attempts to quit smoking.¹¹ In authors' own studies, all active smokers with COPD also declared past attempts to quit smoking. The readiness to give up smoking reported by the majority of respondents may indicate a fairly high level of awareness among patients of the health risks caused by this addiction. Our own study shows that a significant proportion of the tested former smokers gave up smoking only because of COPD. In view of the above, it seems important that medical personnel engage in motivating patients to quit the addiction. It should be noted, however, that in our research, the patients' awareness of the harmfulness of smoking was of rather little importance in quitting smoking. Targowski et al. showed that due to the multitude of environmental and individual factors influencing the development of COPD, the patients' awareness of the harmfulness of smoking does not play a leading role in the disease mechanism.¹¹

In authors' own study, the regularity of the use of the recommended inhalants in the treatment of COPD was considered. It was shown that in the group of former smokers, as many as approx. 87% of the subjects did not take inhalants regularly, while in the group of active smokers, the percentage of those not taking drugs regularly was 57%. The most common reasons for the irregular use of drugs provided by the respondents were a poor access to the doctor and an excessive price of the drugs. It can be assumed that such a significant variation in irregular drug use could be related to the course of the disease and to the occurrence of the disease symptoms, which were more severe and persistent in patients who were active smokers.

Conclusions

In COPD patients, smoking cessation results in a reduction in the disease symptoms (90%), the use of oxygen therapy (69%), the dosage of inhalants (40%), and the number of hospitalizations (56%).

The increase in the severity of COPD symptoms caused by effort connected with everyday activities is higher in active smokers than in former smokers.

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References

1. Kałucka S. Pozytywne efekty programów profilaktycznych antynikotynowych w okresie transformacji w Polsce. *Probl Hig Epidemiol.* 2015;96(1):31–36. <http://www.phie.pl/pdf/phe-2015/phe-2015-1-031.pdf>. Accessed on April 14, 2020.
2. Nizankowska-Mogilnicka E, Mejza F, Buist AS, et al. Częstość występowania POChP i rozpowszechnienie palenia w Małopolsce – wyniki badania BOLD w Polsce. *Pol Arch Med Wewn.* 2007;117(9):402–409.
3. Klar A, Krupińska B, Marcisz C. Przebieg przewlekłej obturacyjnej choroby płuc u czynnych i byłych palaczy. Część I – występowanie zaostrzeń choroby i leczenie. *Piel Zdr Publ.* 2020;10(2):107–114. doi: 10.17219/pzp/123898
4. Tamini A, Serdarevic D, Hanania NA. The effects of cigarette smoke on airway inflammation in asthma and COPD: Therapeutic implications. *Respir Med.* 2012;106(3):319–328. doi:10.1016/j.rmed.2011.11.003
5. Maciejewski J. Częstość występowania POChP w praktyce lekarza rodzinnego. *Probl Med Rodz.* 2008;10(3):7–14.
6. Iwanicka-Michałowicz M, Grzelewska-Rzymowska I. Czynniki ryzyka przewlekłej obturacyjnej choroby płuc u pacjentów leczonych szpitalnie. *Med Rodz.* 2009;5(1):27–32. <http://www.pimr.pl/index.php/wydawnictwa/2009-vol-5-no-1/czynniki-ryzyka-przewlekłej-obturacyjnej-choroby-pluc-u-pacjentow-leczonych-szpitalnie?aid=514>. Accessed on April 14, 2020.
7. Mp.pl – pulmonologia. Światowa strategia rozpoznawania, leczenia i prewencji przewlekłej obturacyjnej choroby płuc – aktualizacja 2011. <https://www.mp.pl/pulmonologia/artykuly-wytyczne/pochp/66617/swiatowa-strategia-rozpoznawania-leczenia-i-prewencji-przewlekłej-obturacyjnej-choroby-pluc-aktualizacja-2011>. Accessed on June 1, 2020.
8. Halbert RJ, Natoli JL, Gano A, Badamgarav E, Buist AS, Mannino DM. Global burden of COPD: Systematic review and meta-analysis. *Eur Respir J.* 2006;28(3):523–532. doi:10.1183/09031936.06.00124605
9. Han MK, Postma D, Mannino DM, et al. Gender and chronic obstructive pulmonary disease. *Am J Respir Crit Care Med.* 2007;176(12):1179–1184. doi:10.1164/rccm.200704-553CC
10. Wójtowicz-Chomicz K, Kowal M, Borzęcki A. Problem nikotynizmu wśród pacjentów hospitalizowanych w SPSK 4 w Lublinie. *Przegl Lek.* 2008;65(10):609.
11. Jahnz-Różyk K, Targowski T, From S, Faluta T, Borowiec L. Koszty przewlekłej obturacyjnej choroby płuc u pacjentów leczonych w ramach specjalistycznej opieki ambulatoryjnej w Polsce. *Pneumonol Alergol Pol.* 2011;79:333–342.