Analiza zgonów z powodu obturacyjnych chorób płuc w województwie pomorskim w latach 2001-2008

Analysis of mortality caused by obstructive pulmonary diseases in Pomerania province in 2001-2008

Jan Romantowski[1], Agnieszka Machut[1], Ewa Jassem[2], Marta Chełmińska[2], Marek Niedoszytko[2]

[1] Studenckie Koło Naukowe przy Klinice Alergologii Gdańskiego Uniwersytetu Medycznego
[2] Klinika Alergologii Gdańskiego Uniwersytetu Medycznego

Streszczenie

Wprowadzenie. Obturacyjne choroby płuc stają się poważnym problem zdrowotnym w większości krajów rozwiniętych. Niniejsze badanie analizuje umieralność z powodu astmy i POChP w województwie pomorskim w latach 2001-2008.

Cel. Ocena struktury i zmian umieralności z powodu obturacyjnych chorób płucnych w latach 2001-2008.

Materiał i metody. Do obliczeń wykorzystano dane uzyskane z Głównego Urzędu Statystycznego.

Wyniki. Średnia umieralność w latach 2001-2008 wyniosła dla POChP 15,35/100 000, dla astmy 1,92/1000 000. Większość zgonów z powodu POChP miała miejsce w szpitalu (74%). Dla astmy proporcje były odwrotne (82% zgonów miało miejsce poza szpitalem) ($p<0.001$). Umieralność z powodu POChP wzrosła z 12,5/100 000 do 17,57/100 000 ($p=0,0004$), podczas gdy umieralność z powodu astmy spadła (z 2,5/100 000 do 1,67/100 000) ($p=0,02$) w analizowanym okresie.

Wnioski. Umieralność z powodu POChP staje się istotnym problemem zdrowotnym w województwie Pomorskim.

Słowa kluczowe: *astma, POChP, umieralność, Pomorze, zgony*

Summary

Introduction. Pulmonary obstructive diseases are considered as an increasing public health issue in the majority of developed countries. The research is an analysis of deaths caused by COPD and asthma in Pomerania region in 2001-2008.

Aim. Assessment of structure and changes in deaths caused by pulmonary obstructive diseases in 2001-2008.

Methods. Data obtained in the Central Statistical Office regarding COPD and asthma were analyzed.

Results. The average mortality rate in 2001-2008 for COPD was 15.35/100000 and for asthma 1.92/100000. Patients suffering from COPD in most cases (74%) died in hospitals. In contrast, deaths caused by asthma (82%) usually occurred outside health care institutions ($p<0.001$). The mortality rate of COPD increased (from 12.5/100000 to 17.57/100000) ($p=0.0004$), whereas the mortality caused by asthma decreased in the analyzed period of time from 2.5/100 000 to 1.67/100 000 ($p=0,02$).

Conclusions. The mortality caused by chronic obstructive pulmonary diseases has become a significant public health problem in the Pomeranian population.

Keywords: *asthma, COPD, mortality, Pomerania, death*

www.alergia-astma-immunologia.eu

Przyjęto do druku:

Adres do korespondencji / Address for correspondence
Jan Romantowski
al. Jana Pawła II 4e/12
80-462 Gdańsk
tel: 668 150 047
e-mail: 34461@gumed.edu.pl lub j.romantowski@gmail.com

INTRODUCTION

Obstructive pulmonary diseases including COPD and asthma have become a serious burden to developed societies during past several decades. The prevalence of both diseases has risen and it is considered that their frequency may be underestimated. The mortality for asthma has decreased worldwide [1] while the mortality of COPD is still rising [2]. This trend is typical for developed countries, as their populations are more exposed to the risk factors. The aim of the study was to analyze the prevalence of death from COPD and asthma in Pomerania province from 2001 to 2008 based on death certificates.

MATERIAL AND METHODS

The data containing death certificates of patients who died from obstructive pulmonary diseases in Pomerania province in 2001-2008 was provided by Central Statistical Office (CSO) in Poland. COPD and asthma were described by ICD-10 symbols: I27, J41, J42, J43, J44 and J45, J46 respectively. The data was adjusted according to sex, age and place of death. Mortality was calculated per 100.000 inhabitants of the Pomeranian province during each year (provided by CSO and Eurostat). Statistical test $\chi 2$ was used for comparison. The calculations were carried out using computer program: Statistica 9.

RESULTS

In the analyzed period of time (2001-2008) 3030 deaths caused by pulmonary obstructive diseases occurred in Pomeranian province. Among these 1051 (65%) were men and 565 (35%) women. The average mortality rate were 15,35 and 1,92 for COPD and asthma respectively.

COPD caused 2712 deaths, including 918 among women and 1794 among men. The mortality rate has risen significantly in the analyzed period of time from 12.5/100 000 in 2001 to 17.57/100 000 in 2008 ($p=0.0004$). Average mortality rate was 10.8/100 000 and 21.11/100 000 for women and men respectively ($p<0001$). In the year 2001 the percentage of women in analyzed group was 30% ($n=67$), whereas in 2008 - 36% ($n=219$), the difference was not statistically significant.

Asthma caused 318 deaths. Among them 142 (45%) were women and 176 (55%) were men ($p>0.05$). The change in mortality rate has decreased for asthma from 2.5/100 000 to 1.67/100 000 ($p=0.02$). Average mortality rate was 1.67/100 000 and 2.07/100 000 for women and men respectively.

The average death age were 74.18 and 69.4 for COPD and asthma respectively. The peak death number for both diseases was represented by 75-79 age compartment. The number of deaths in age under 35 for asthma and COPD was ten and zero respectively.

DISCUSSION

The mortality rates from COPD were difficult to obtain when the previous version of ICD was used. However, the estimated data showed the same trend in the XX and XXI century: rising for COPD and lowering for asthma mortality [1,2]. The changes on both diseases in 2001-2008 in Pomeranian province are presented in Figure 1 and Table I.

These trends are similar to the observations reported in other parts of Poland. Data from recent studies however differed slightly even if they were related to the same region. National Sanitary Inspection in Poznan calculated mortality for COPD in 2008 as 20.1/100 000. Eurostat showed COPD mortality for Poland 17.1/100 000 [3]. The rate is usually higher for western countries and the States than for the Central Europe. American Lung Association (ALA) calculated mortality for COPD at. 40/100 000 in years 2005-2007 [1]. The simple explanation for such discrepancies includes better data gathering in these regions, however other factors may also contribute to the phenomenon. The rise of average life expectancy may be the main reason of highest mortality in developed countries [4].

The data from Eurostat has shown the decrease in mortality rates for asthma both in Poland (1.3/100 000 in 2008) and 27 European Union countries (1.0/100 000) [5]. Similar results were obtained in USA (ALA: 1.3/100 000 in 2005 to 1.1/100 000 in 2008) [1].

In contrast to asthma the mortality rate for COPD is still increasing. This clear rise in COPD mortality worldwide is usually explained as a result of heavy smoking and migration to cities and rising average life expectancy [2,6]. According to Swedish research in 2003 smoking may be greater risk factor than it was considered before as currently data prove that 50% of elderly smokers developed COPD [7]. The average 30% of the population smoke tobacco and the number is increasing in developing countries and dropping in developed countries [8]. However, cumulative worldwide trend shows increasing prevalence of smoking among females who are considered to be more susceptible to negative effects of smoking cigarettes [9,10]. In Poland the number of smokers decreased between 2004-2009 both for males and females [8]. The reason for the rise in COPD mortality would be rather due to the increasing air pollution and aging of the society. The lowering amount of tobacco smokers may not have had an impact on mortality yet, as usually a time lag is observed when risk factor for chronic disease starts to change [11].

According to World Health Organization (WHO) there are usually two reasons of death in asthma: insufficient treatment and delay in getting help during the fatal attack. Authors of the WHO report suggested in 2007 that access to essential drugs has the biggest impact on asthma mortality. It is estimated that in Poland between 80% and 90% of patients diagnosed with asthma have the sufficient access to proper treatment [4]. However significant problem in the Polish population is the under diagnosis of asthma [12]. Finally the delay in getting the rescue treatment in asthma exacerbation is a sign of poor education of asthmatic patient and insufficient health care system. Most authors suggest that the main reason of lowering asthma mortality was popularization of inhaled corticosteroids in therapy and the prevention of exacerbations rather than acute treatment [13].

Another interesting result was the relation between mortality and gender. The mortality rates are higher for men during 2001-2008 in Pomerania. For asthma the difference is minimal (1.67 vs. 2.07) while for COPD men died 2 times more often than women (22.6 vs. 11.18). This trend for COPD was also observed worldwide. The authors usually suggest that men more frequently smoke and have greater exposure on pollution during work [2]. Although the

Table I. The mortality rate of COPD and Asthma per 100 000 for each year in Pomeranian province divided into Females (F) and Males (M)

Disease	2001	2002	2003	2004	2005	2006	2007	2008
COPD F	7.43	10.2	9.82	9.79	10.3	9.3	12.27	12.4
COPD M	18.19	16.49	20.12	22.06	24.92	20.38	22.78	23.18
Asthma F	2.24	1.88	1.96	0.89	1.24	1.33	1.5	1.58
Asthma M	2.73	2.83	2.44	1.6	1.78	1.96	1.4	1.77

number of smokers lowered recently, still more men than women smoke in Poland (30.9% vs. 17.9% in 2009) [7]. The data from USA and Canada showed under diagnosis of COPD especially among females [14]. This may lead to misdiagnosis stated on death certificate. The authors suggest that approach to the patient should be individual and knowing the prevalence statistics should not lead to wrong diagnosis.

However, for asthma the other studies show that mortality is higher for women than men. American Lung Association assessed the mortality rates as 2.173 and 1.274 for women and men in the year 2007 respectively [1]. This higher mortality is connected with nearly two times higher morbidity for adult females [14]. Some authors suggested that different hormone levels may be the cause of this phenomenon, however the main explanation remains unclear. In Pomeranian province in 2005-2008 mortality is not different for women and men – 1.43 and 1.71 respectively. However, the number of deaths for each gender in each year were low (mostly under 20) and each year represented different proportion so the comparison is difficult.

In most of diseases high mortality coexists with high morbidity and long term trends are similar for both values. While this statement is correct for COPD, asthma has an opposite relationship. During last 20 years the prevalence for asthma has risen from approximately 2% to 10% in Poland [15-17]. Similar trend was shown in the USA in 1980-1996 period of time. In 1997-2008 no significant change was observed. Other resources showed similar trends in morbidity [15]. In the same period of time (2000-2008) we noticed decrease in mortality (as mentioned above). The reason of this might be better diagnostic processes (affecting both morbidity and mortality) and significant improvement in therapy.

Our database also contained information on the place of death. For asthma 74% deaths in 2001-2008 occurred outside health care institution. The proportion is invariable in presented period of time and was also observed in studies from Israel and South Africa in 1980-1997 – 52% and 72% respectively [18,19]. Most authors suggested that the cause of this is lack of patient's education, when to call for help, when fatal attack of asthma appears [20]. The difference in proportions in some countries may suggest that mortality rates for asthma are underestimated [21].

The age structure of asthma and COPD mortality is presented on Figure 2. As asthma is considered a disease of young population, still average death age is similar to COPD (the exact calculation was impossible with data provided in compartments for our study). In 2001-2008 the average death age was 74.18 and 69.4 for COPD and asthma respectively.

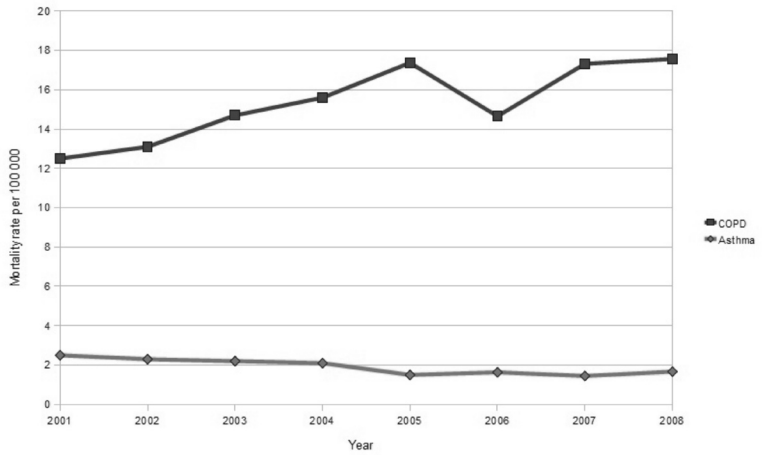

Fig. 1. Mortality rates per 100 000 for COPD and Asthma

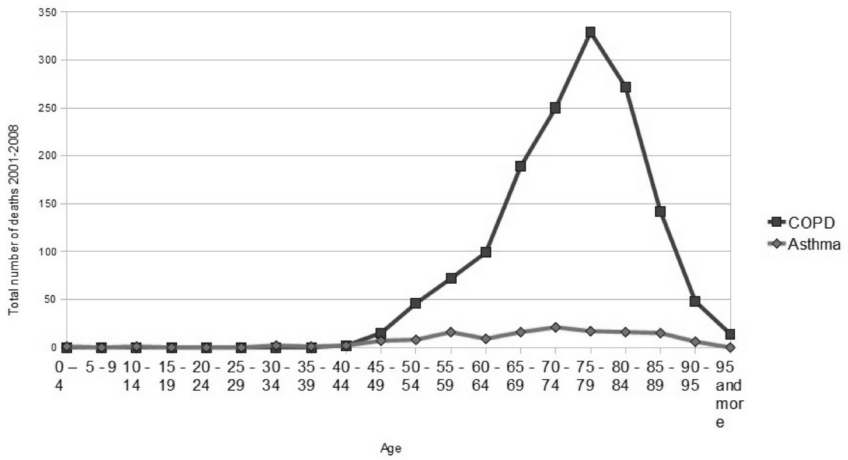

Fig. 2. Total number of deaths caused by COPD and Asthma in 2001-2008 by age

The mortality rate in children and young adults under 35 years old is estimated as a sign of insufficient treatment of asthma in population. Four deaths in presented group and time 2005-2008 mark slight improvement than six in 2001-2004. These results do not differ much from those acquired by Eurostat for other European regions [4]. No deaths caused by COPD in current research before 40 years old are typical to that disease.

The analysis of deaths caused by pulmonary obstructive diseases is difficult not only because of wrong or different (among countries) symbols on death certificate. It was shown that in case of patient who suffered from several coexisting diseases other diagnosis rather than COPD is chosen as a cause of death mentioned in the death certificate [22]. This statement applies especially to COPD with late onset. Malignant neoplasia, cardiovascular diseases, which frequently occur in older population share similar risk factor – smoking. Also COPD exacerbation leads to higher risk of stroke and myocardial infarction within several weeks since incident [23].

Finally, according to WHO fact sheet (2008) COPD is the fourth cause of death worldwide (5.8%). Many authors suggest that it will replace lower respiratory infections on third place as more countries will develop and become aging populations [10].

Our study demonstrated that in spite of rising prevalence of asthma, better treatment, efficient diagnostic processes and society education enabled to lower the mortality rate over past ten years. On the other hand mortality rate for COPD is rising over last years and must be noted as significant threat to patients, especially those exposed to tobacco smoke.

ACKNOWLEDGMENT

The authors would like to thank Agnieszka Wobolewicz and Marek Morze (CSO in Olsztyn) for providing statistical data.

References

1. American Lung Association Epidemiology and Statistics Unit Research and Program Services Division; Trends in Asthma Morbidity and Mortality, July 2011; http://www.lung.org/finding-cures/our-research/trend-reports/asthma-trend-report.pdf
2. Chapman KR, Mannino DM, Soriano JB et al. Epidemiology and costs of chronic obstructive pulmonary disease. Eur Respir J 2006; 27:188-207.
3. Wojewódzka stacja sanitarno-epidemiologiczna w Poznaniu; http://wsse-poznan.pl/wp-content/uploads/2011/05/plik.pdf
4. Global surveillance, prevention and control of chronic respiratory diseases: a comprehensive approach; World Health Organization 2007; http://www.who.int/gard/publications/GARD%20Book%202007.pdf
5. Eurostat database; epp.eurostat.ec.europa.eu
6. European Lung White Book November 2003; http://dev.ersnet.org/268-white-book.htm
7. Lundbäck B, Lindberg A, Lindström M et al. Obstructive Lung Disease in Northern Sweden Studies. Not 15 but 50% of smokers develop COPD? Report from the Obstructive Lung Disease in Northern Sweden Studies. Respir Med 2003; 97(2): 115-22.
8. Główny Urząd Statystyczny. Stan zdrowia ludności Polski w 2009r. Warszawa 2011; http://www.stat.gov.pl/cps/rde/xbcr/gus/PUBL_ZO_stan_zdrowia_2009.pdf
9. Xu X, Weiss ST, Rijcken B et al. Smoking, changes in smoking habits, and rate of decline in FEV1: new insight into gender differences. Eur Respir J 1994; 7: 1056-61.
10. Szymborski J. Public health and population policy. Rządowa Rada Ludnościowa; Warszawa 2012, tom II; http://www.stat.gov.pl/cps/rde/xbcr/bip/BIP_POZ_Zdrowie_publiczne_i_polityka_ludnosciowa_2012.pdf
11. Mannino DM, Buist AS. Global burden of COPD: risk factors, prevalance, and future trends. Lancet 2007; 370(9589): 765-73.
12. Epidemiologia Chorób Alergicznych w Polsce; http://ecap.pl/material.html
13. Braman SS. The Global Burden of Asthma. Chest J 2006; 130(1 suppl): 4S-12S.
14. Chapman KR, Tashkin DP, Pye DJ. Gender Bias in the Diagnosis of COPD. Chest J 2001; 119: 1691-5.
15. Pawłowicz R, Fal AM. Epidemiologia astmy. Alergologia Info 2008; 3(1): 1-5.
16. Pisiewicz K, Doniec Z, Wanat-Krzak M. Epidemiology of Childhood Allergic Diseases in Poland. Standardy medyczne 2003; 7.
17. Samel-Kowalik P, Lipiec A, Tomaszewska A et al. Występowanie alergii i astmy w Polsce – badanie ECAP. Gazeta Farmaceutyczna 2009; 3: 32-34.
18. Picard E, Barmeir M, Schwartz S, Villa Y. Rate and Place of Death From Asthma Among Different Ethnic Groups in Israel National Trends 1980 to 1997. Chest J 2002; 122(4): 1222-7.
19. Zar HJ, Stickells D, Toerien A, Wilson D. Changes in fatal and near-fatal asthma in an urban area of South Africa from 1980-1997. Eur Respir J 2001; 18(1): 33-7.
20. Niedoszytko M, Porzezińska M, Chełmińska M et al. Analysis of deaths caused by obstructive pulmonary diseases in Pomerania province in 2001-2004. Pneumonol Alergol Pol 2007; 75: 40-5.
21. Beasley R. The burden of asthma with specific reference to the United States. J Allergy Clin Immunol 2002; 109(5): 482-9.
22. Jensen HH, Godtfredsen NS, Lange P, Vestbo J. Potential misclassification of causes of death from COPD. Eur Respir J 2006; 28(4): 781-5.
23. Donaldson GC, Hurst JR, Smith CJ et al. Increased Risk of Myocardial Infarction and Stroke Following Exacerbation of COPD. Chest J 2010; 137(5): 1091-7.