

THE IMPACT OF SOCIAL AND MORAL CHANGES ON THE INCIDENCE TRENDS AS ILLUSTRATED BY THE LARYNGEAL CANCER IN FEMALES IN PODKARPACKIE VOIVODSHIP AND PREŠOV REGION

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ABSTRACT

Differentiation of the incidence of civilization diseases trends both in the world and in European countries is a well-known phenomenon. Monitoring of these trends shows that cancer has been the leading cause of death in Western European countries.

It is difficult not to notice the connection of these phenomena with the economic situation of individual countries and the accompanying social and moral trends. Against this background, changes in the pattern of the incidence of cancer are a particularly clear example of linking the incidence of civilization diseases to socio-cultural factors. In Poland, the number of lung cancer deaths, a typical tobacco-dependent cancer, has been higher than the number of breast cancer deaths for the first time. In the head and neck cancer, the incidence of laryngeal cancer in males decreased, whereas in females the incidence of the disease increased in the country.

There are similarities and differences between Podkarpackie Voivodship and Prešov Region, which are largely due to geographical and natural conditions, legal and socio-political, and historical conditions. These differences are also clearly seen in the laryngeal cancer in females, which is lower in Prešov Region. The aim of the study is to evaluate the influence of social and moral changes on the incidence trends as illustrated by the laryngeal cancer in females in Podkarpackie Voivodship and Prešov Region. A retrospective analysis of socio-economic phenomena and economic activity of the population and the incidence of laryngeal cancer in females was conducted. A similar level of socio-economic indicators in both regions was observed for GDP per capita, equally lower average

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wages compared to the averages in both countries, the employment rate and net migration. The differences in the two regions concerned mainly the unemployment rate, which is lower in Podkarpackie Voivodship than in Prešov Region, and average gross wage and salary, which is higher in Podkarpackie Voivodship than in Prešov Region. In the years 2003-2009, the incidence rates of laryngeal cancer in females including the absolute number of cases, the crude rate, the standardized rate and the percentage in Podkarpackie showed a decreasing trend, while in Prešov Region the trend was increasing.

Key words: socio-economic phenomena, laryngeal cancer in females, Podkarpackie Voivodship, Prešov Region

1. Material and methods

A retrospective analysis of the incidence of laryngeal cancer in females between 2003 and 2009 in Podkarpackie Voivodship and Prešov Region was conducted.

Data on the incidence were obtained from the publication of the Department of Epidemiology PCO in Rzeszow and the Centre of the Maria Skłodowska-Curie Institute of Oncology in Warsaw, the Regional Statistical Offices in Rzeszow and Prešov, and the publication “Cancer incidence in Slovak Republic-Narodny onkologický register SR”.

Until 1993 Slovakia was a union state within the Czech and Slovak Federative Republic. The current division of Slovakia into 8 regions and 79 districts has been in operation since 1996. In Poland, the administrative reform of the division of Poland in 1999 also resulted in major organizational changes - including the affiliation and subordination of both administration and health care units, as well as changes in the organization of oncological registers.

The above conditions cause that while obtaining epidemiological data concerning Poland and Slovakia as countries is possible even from before 1990, obtaining data from Slovakian regional authorities is seriously impeded. Therefore, the data cover the period 2003-2009, for which high accuracy material was collected.

Data on countries and regions of Europe were obtained from the IARC European Cancer Observatory.

2. Results

Between 2003 and 2009, 68 cases of laryngeal cancer in females were recorded in Podkarpackie Voivodship. During this period, the absolute number of cases per year in females decreased from 16 cases in 2003 to 5 in 2009. Crude rates of the incidence decreased from 1.5/100 thousand in 2003 to 0.5 in 2009.

The standardized values for laryngeal cancer observed between 2003 and 2009 in females decreased from 1.0 to 0.3. The percentage of laryngeal cancer among all malignant neoplasms in females between 2003 and 2009 decreased from 0.6% to 0.1% (Gawełko, 2016). These changes are shown in Figures 1, 2, 3, 4.

At the country level, data for the years 2003-2009 do not show such far-reaching changes. Between 2003 and 2009, a total of 2104 cases of laryngeal cancer in females were recorded, with crude rates of the incidence in females in Poland decreasing from 1.7/100 thousand to 1.5/100 thousand. The value of standardized coefficients decreased from 1.1/100 thousand to 0.9/100 thousand, and the percentage value from 0.6% to 0.4% (Didkowska et al., 2007, 2009, 2011, 2013, 2015; Wojciechowska et al., 2005, 2006, 2008, 2010, 2012, 2014). These changes are shown in Figures 5, 6, 7, 8.

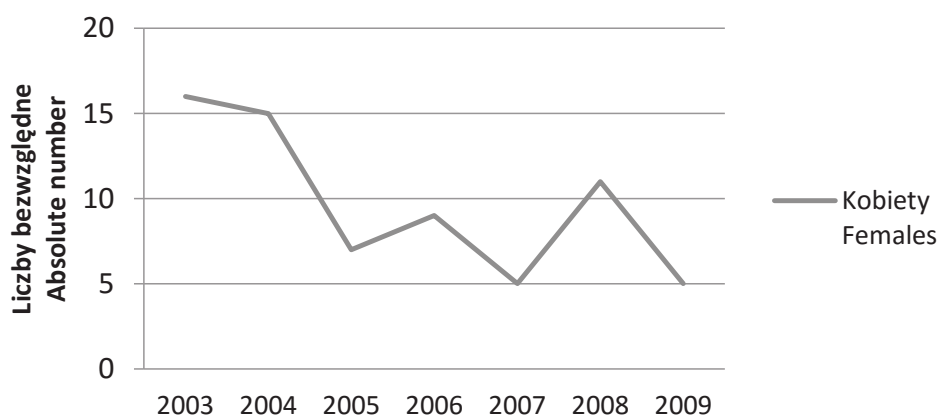


Figure 1. The incidence of laryngeal cancer in females in Podkarpackie Voivodship in the years 2003-2009 (absolute number)

Source: Own work.

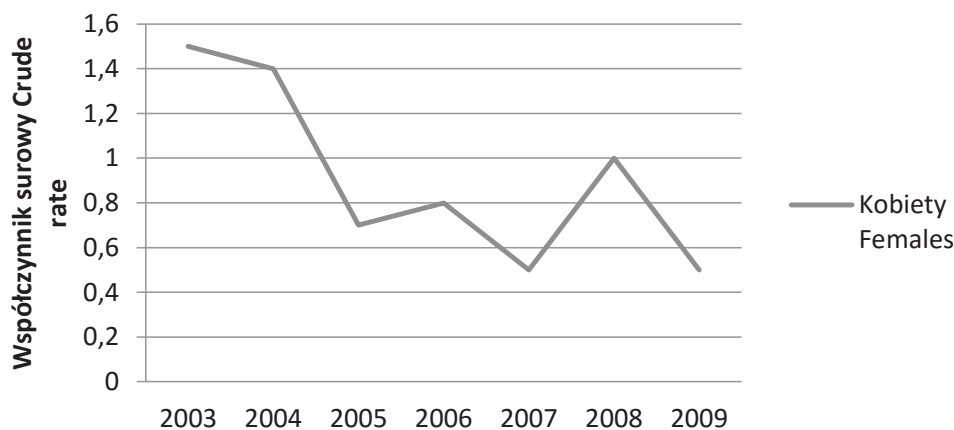


Figure 2. The incidence of laryngeal cancer in females in Podkarpackie Voivodship in the years 2003-2009 (crude rate)

Source: Own work.

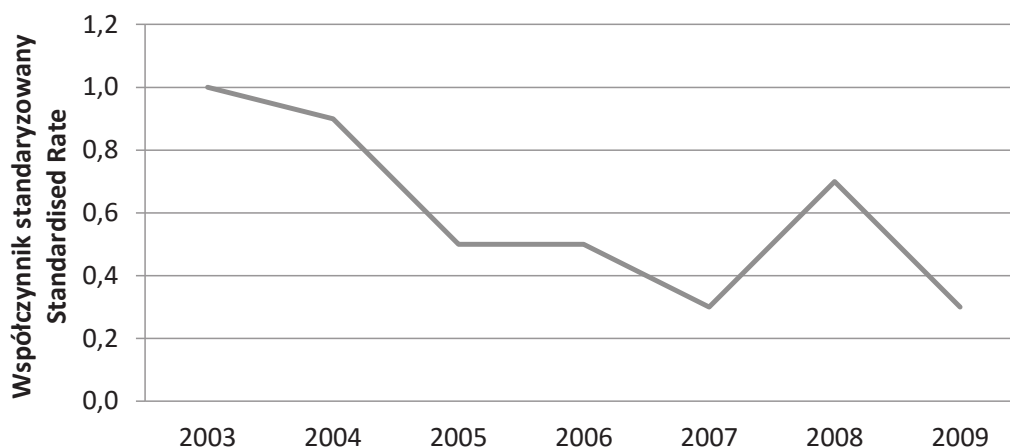


Figure 3. The incidence of laryngeal cancer in females in Podkarpackie Voivodship in the years 2003-2009 (standardized rate)

Source: Own work.

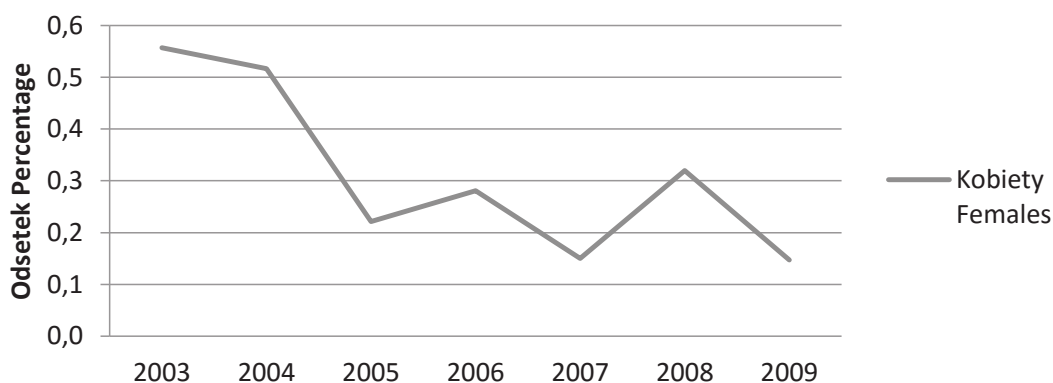


Figure 4. Percentage share of the incidence of laryngeal cancer in females in Podkarpackie Voivodship in the years 2003-2009

Source: Own work.

In Prešov Region, 13 cases of laryngeal cancer in females were recorded in the years 2003-2009. The absolute number of cases in females increased from 3 cases in 2003 to 4 in 2009. Crude rates of the incidence increased from 0.7/100 thousand in 2003 to 1.0 in 2009.

The value of standardized coefficients in 2003-2009 in females increased from 0.7 to 1.0/100 thousand. Between 2003 and 2009 the percentage of laryngeal cancer among all malignant neoplasms in females remained unchanged at 0.2%. These changes are shown in Figures 5, 6, 7, 8.

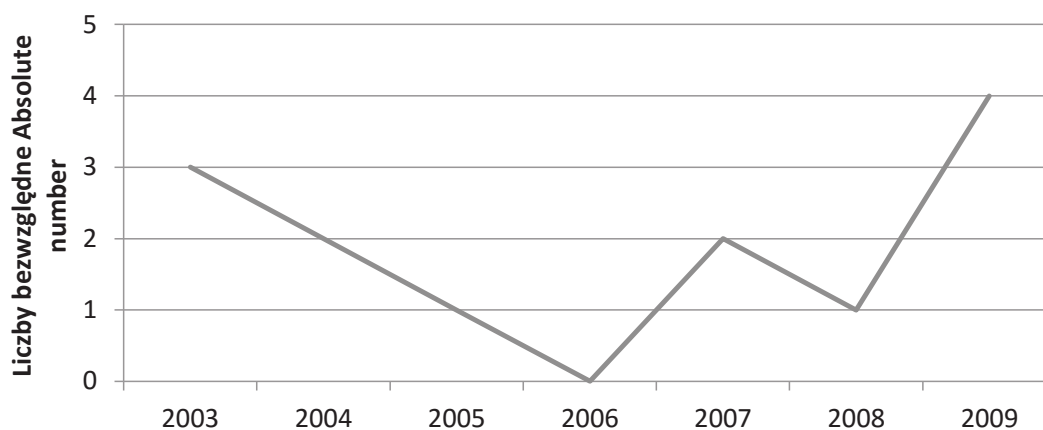


Figure 5. The incidence of laryngeal cancer in females in Prešov Region in the years 2003-2009 (absolute number)

Source: Own work.

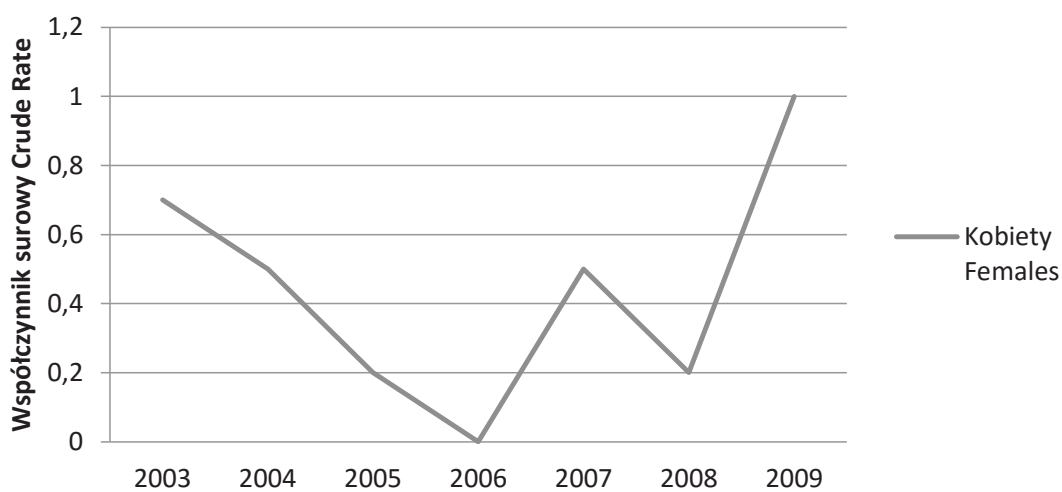


Figure 6. The incidence of laryngeal cancer in females in Prešov Region in the years 2003-2009 (crude rate)

Source: Own work.

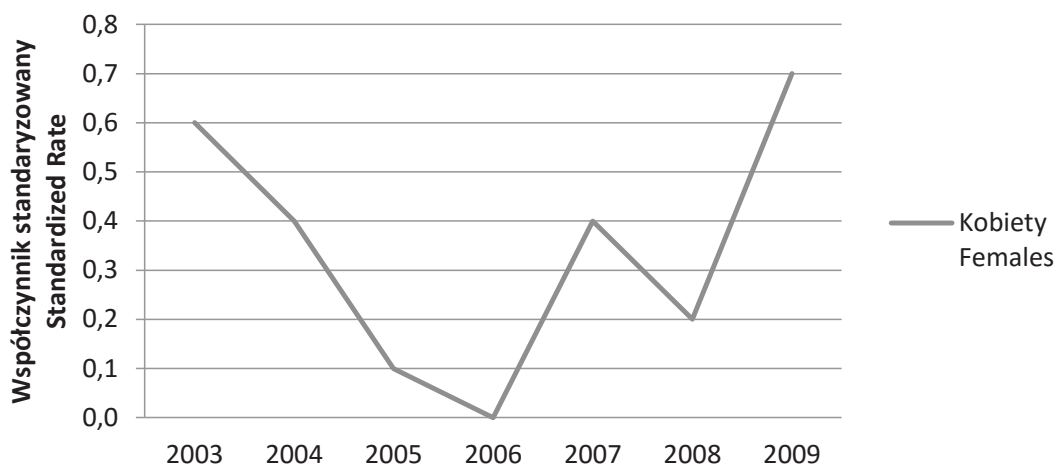


Figure 7. The incidence of laryngeal cancer in females in Prešov Region in the years 2003-2009 (standardized rate)

Source: Own work.

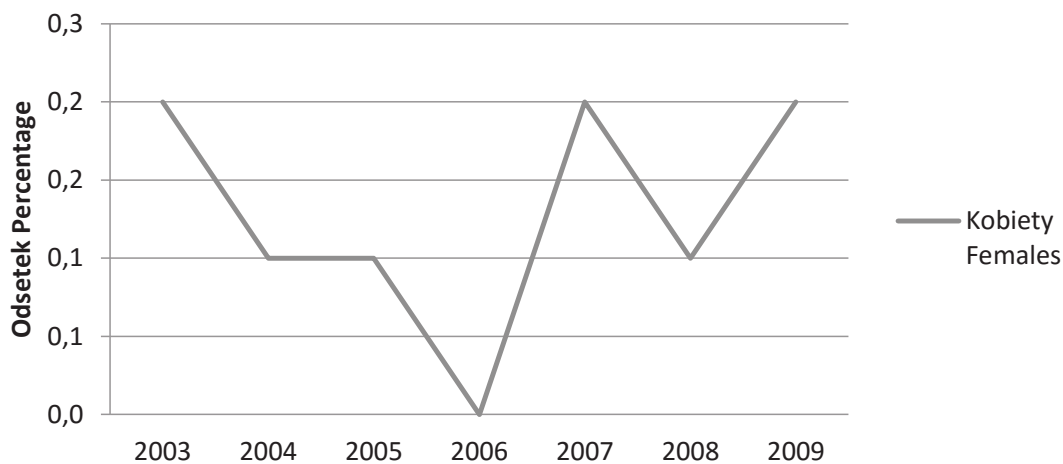


Figure 8. Percentage share of the incidence of laryngeal cancer in females in Prešov Region in the years 2003-2009

Source: Own work.

In Slovakia, in the years 2003-2009, a total of 134 cases of laryngeal cancer were recorded in females. The crude rate of the incidence in females in Slovakia increased from 0.7/100 thousand to 0.8/100 thousand. The value of standardized coefficients increased from 0.4/100 thousand to 0.5/100 thousand, and the percentage value decreased from 0.2% to 0.1% (Ondrušová, 2007; Safaei Diba et al., 2008, 2009, 2010, 2011, 2012, 2014, 2015).

3. Discussion

Differences in the incidence of civilization diseases are a well-known phenomenon both in the world and in European countries. The monitoring of these trends shows that cancer is the leading cause of death in western European countries. These are complex processes, but first of all the cause of this condition is more and more effective prevention and early start of treatment of cardiovascular diseases, which have been ranked first in this statistics for decades. It is difficult not to notice the connection of these phenomena with the economic situation of the "old Union" countries, and the accompanying social and moral trends. There is also a trend to reduce this difference in the "new EU" countries. Against this background, a particularly clear example of the link between the incidence of civilization diseases and socioeconomic factors is the change in the pattern of cancer incidence. In Poland, the number of lung cancer deaths, a typical tobacco-dependent cancer, was higher than the number of breast cancer deaths for the first time. In the head and neck cancer, the incidence of laryngeal cancer in males has decreased, whereas in females the incidence of the disease is higher in the country. In this context, it should be emphasized that the data concerning the country do not reflect the actual scale of the incidence in individual regions. In Poland, an increase in the incidence of laryngeal cancer has been recorded in females in half of the voivodships in recent years (Didkowska et al., 2013, 2015; Wojciechowska et al., 2014, 2016). In geographic terms, this increase is not recorded in the voivodships of "eastern wall", except for Warmińsko-Mazurskie voivodship (Didkowska et al., 2011, 2013, 2015; Wojciechowska et al., 2008, 2010, 2016). This trend suggests referring to the same phenomena in other countries.

In Europe, in countries as large as France and Germany, as well as in smaller countries like Switzerland, Austria and Slovakia, there are significant regional differences which are not reflected by data averaged for the country. In Switzerland, in the canton of Geneva, the incidence of laryngeal cancer in females increased between 1998 and 2007 from 2.42/100 thousand to 2.64/100 thousand, while in the canton of Ticino it decreased from 1.16/100 thousand to 0.59/100 thousand. In Germany, out of 16 federal states the incidence in 1998-2007 increased in the following federal states: Saxony from 0.43 to 0.74/100 thousand, Saxony Anhalt from 0.43 to 0.64/100 thousand, Thuringia from 0.39 to 0.86/100 thousand, Hamburg from 1.68 to 1.77/100 thousand, and Lower Saxony to 1.38/100 thousand. In Slovakia, in the years 2003-2009, the incidence in the country increased from 0.7/100 thousand to 0.8/100 thousand.

Significant changes in the geography and scale of the incidence was also recorded. In Slovakia, out of 8 regions a fall in the incidence was recorded in 3 regions (Bratislava, Trnava, Trencin), an increase was recorded in 4 regions (Košice, Prešov, B. Bystrzyca, Zilina), and no changes were recorded in 1 region

(Nitra). The most striking is the decrease in the incidence, in the relatively short time of observation, in Bratislava from 4.1/100 thousand to 0.6/100 thousand, and an increase in the incidence in Kosice Region from 0.8/100 thousand to 1.3/100 thousand.

As shown in Fig. 5 and 6, in Prešov Region, which was fifth in this respect, along with the increase in the incidence a shift to the 3rd place in the country was observed, following the Kosice and Zilinsky Region (Ondrušová, 2007; Safaei Diba et al., 2008, 2009, 2010, 2011, 2012, 2014, 2015).

Referring these considerations to Podkarpacie and Prešov Region, one should take into consideration the basic conditions in which both regions operate.

Podkarpacie Voivodship and Prešov Region differ in population and area. Podkarpacie Voivodship has a population of 2.1 million people, whereas Prešov Region 0.8 million people. Therefore, crude and standardized rates as well as percentages are a more clear criterion for assessing the incidence in cancer than the absolute numbers.

Comparing GDP per capita, which is widely considered to be one of the most important and most commonly used synthetic measures of economic development, and which shows the standard of living of the population, Eastern Slovakia (i.e. Košice and Prešov Region) compares favourably with Podkarpacie Voivodship. In Eastern Slovakia, this indicator (including purchasing power) is 1/5 higher than in Podkarpacie. On the other hand, comparing the values of the indicators of the regions considered to the values for the country, it can be seen that they were similarly low. As far as the economic activity of the population aged 15 and over is concerned, it was slightly lower in Podkarpacie Voivodship than in Prešov Region. The unemployment rate is also lower in Podkarpacie Voivodship, but it is important to emphasize that there is a downward trend in both regions in this respect. The average gross wage and salary was slightly higher in Podkarpacie Voivodship than in Prešov Region, but it was characterized by lower dynamics. In both regions, average wages were much lower in comparison with national averages [Statistical Bulletin, Podkarpacie Voivodship, Regions: Kosice and Prešov, Kosice-Prešov-Rzeszów 2008.]

As already mentioned, in addition to habitual smoking and abusing high percentage alcohol, the predisposing factors of laryngeal cancer include also exposure to professional and non-professional factors as exposure to dusts and gases and, indirectly, low socioeconomic status (Jurkiewicz et al., 2006; Majszyk et al., 2014; Franceschi et al., 1990; Castellsague et al., 2004; Mashberg et al., 1993).

Danish studies on the impact of socioeconomic, demographic and health indicators on the incidence of oral, pharyngeal, and laryngeal cancer and their survival have shown that the incidence of these cancers has increased along with the decline in socioeconomic status, measured as disposable income in terms of professional and family status and living environment (Jovanovic-Andersen et

al., 2008). The frequency of laryngeal, pharyngeal and oesophageal cancer is 20 times higher in the population of smokers than in non-smokers (Kaleta, 2013). As long as 50 years ago epidemiological observations proved unquestionably that apart from laryngeal cancer smoking is also the cause of lung cancer [k].

Taking into account the frequency of smoking, the proportion of smoking males and females and the observed changes in the proportion of smokers in recent years, three groups of countries can be distinguished. In the Scandinavian countries, the proportion of males and females smoking cigarettes is close and relatively low. In the countries of Central and Southern Europe the percentage of male smokers is higher than female smokers, but the frequency of smoking in females is very high.

The reason for this can be socio-cultural changes and an increase in the acceptance of smoking by females, emancipation of females and the promotion of smoking (often by tobacco companies) as an integral element of "western lifestyle", as well as increased availability of tobacco products in packages addressed to females. In Eastern Europe the percentage of female smokers has been decreasing very slowly, while in Western Europe, USA, Canada and Australia there has been a significant reduction in the proportion of smoking females and mortality due to smoking related diseases (Kaleta, 2013; Kowalewska, 2013).

Females are also less dependent on nicotine than males, but it is significantly more difficult for them to quit the addiction.

An alarming phenomenon is the high level of exposure to tobacco smoke in passive exposure, which is why not only smokers but also people who inhale tobacco smoke are ill, and the risk of laryngeal cancer for the latter is even greater (Szczęch, 2014).

There is a great regional diversity among female smokers in Poland, with more than 25% of females regularly smoking cigarettes in 10 voivodships. The highest numbers are in Warmińsko-Mazurskie, Lubuskie and Dolnośląskie voivodships - 32-34%, and in Lubelskie and Świętokrzyskie voivodships – 23% and 22%. The habit of smoking is the least frequent in Podkarpackie voivodship – 10% and Małopolskie voivodship – 12%. Females who never smoked represent the highest percentage in Podkarpackie voivodship – 80%, and the lowest in Warmińsko-Mazurskie voivodship – 58%. The highest number of females who report a willingness to quit smoking is observed in Podkarpackie Voivodship – 92%, Świętokrzyskie and Zachodniopomorskie voivodships – 90%, and the lowest number in the voivodships: Małopolskie – 78%, Pomorskie – 77% and Warmińsko-Mazurskie – 79% (Polakowska, 2005).

Other studies also point to significant differences in Podkarpackie Voivodship itself, where there is a very high variation in living standards (the coefficient of variation is 24.945%) [c], which translates into the lifestyle and economic status of the population. In Lodzkie Voivodship, the risk of smoking among males and

females was higher for the inhabitants of a small and medium gmina compared to those living in a large gmina, which may be due to differences in cultural and health patterns [a]. The urban environment (62%) is more conducive to the development of smoking habit than the rural environment (32%) (Kaleta et al., 2008; Migala-Warchoł, 2010; Cekiera et al., 2001).

Drinking alcohol, similarly to smoking, is the factor increasing the risk of developing oral cavity, laryngeal and pharyngeal cancers (Bury, 2000; Anderson, 2007; Franceschi et al., 1990). It is estimated that approximately 40% of patients with head and neck cancer are alcoholics. In the USA, France and Italy alcohol and/or tobacco are responsible for about 75% of these tumours. In Nordic countries that percentage amounted to 35% for males and to 27% for females. Alcohol increases the risk of cancer approximately 2-3 times, and abusing it along with tobacco increases that risk approximately 15 times (Jurkiewicz, 2006; Bernacka et al., 2012).

The meaning of clinical infection with human papilloma virus (HPV) in laryngeal cancer is not quite clear. Despite detecting the presence of this virus in patients with laryngeal cancer, its etio-pathological role has not been clearly verified, but this infection was associated with a shorter survival time of patients. Józefowicz-Korczyńska's studies demonstrated that infection with HPV was present in about 25% of the surveyed patients with laryngeal cancer in stages T3 and T4, and was more common in patients without typical risk factors such as smoking and drinking alcohol (Józefowicz-Korczyńska, 2014).

Exposure to harmful factors in the workplace also has the impact on the occurrence of laryngeal cancer (Jurkiewicz, 2006). In the years 1995-2003, in Poland, laryngeal cancer was the second most common type of occupation-related cancers following lung cancer. The number of cases in these years amounted to 204 (20.1%) in males and 8 (7.5%) in females (Wilczyńska, 2005). Coke, petrochemical, tanning, dye, automotive and medicine (X-rays, medicines for treating cancer, volatile anaesthetics) industries are industries which affect the development of this cancer the most. What was also shown was the effect of exposure to environmental pollution, which was associated with differences in the incidence of laryngeal cancer depending on the geographic area. In Poland the highest number of cases of laryngeal cancer was recorded in industrialized areas in the western and central parts of the country, and the lowest ones in the eastern part (Jurkiewicz, 2006).

In this respect, it is worth emphasizing that in the field of industrial dusts and gases the situation in Podkarpacie was significantly better in the period analysed.

In terms of emissions expressed in tonnes per km², the dust emission in Podkarpacie was 0.2 t/km², whereas in Prešov Region 1.5 t/km²; sulphur dioxide emission was 0.8 t/km² vs. 1.5 t/km²; carbon monoxide emission was 0.2t/km² vs 8.2 t/km² and nitrogen oxide emission was 0.4 t/km² vs. 0.6 t/km².

4. Conclusions

1. In the years 2003-2006, in Poland, the incidence of laryngeal cancer in females shows an upward trend both in absolute numbers and crude rates, standardized rates and dynamics while in the same period the incidence in Podkarpackie Voivodship shows a downward trend for the same parameters.
2. During the period considered, the incidence of laryngeal cancer in females in Slovakia shows an upward trend, similar to that in Prešov Region.
3. Both in Poland and Slovakia a large regional differentiation and changes in the geography of the incidence is observed, with an increase in the eastern part of the country.
4. Both Podkarpackie Voivodship and Prešov Region were among the voivodships with GDP income lower than the national average and with unemployment also below the average, in the analysed period.
5. In addition to moral determinants, industrialization, which is lower than in other regions, and constant reduction of emission of gases and dust in Podkarpackie Voivodship may be related to the laryngeal cancer incidence trend - the opposite than in Prešov Region.
6. The percentage of female smokers and alcohol abusers, which was recorded in Podkarpackie Voivodship and which is the lowest in the country, may indicate a correlation between morals factors and laryngeal cancer incidence trends in this region.

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