

POTENTIAL YEARS OF LIFE LOST AS AN INDICATOR OF PUBLIC HEALTH IN THE REPUBLIC OF SRPSKA

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Abstract: Mortality is one of the important indicators of health status of the population, especially the knowledge of causes of death that give the full picture in the analysis of certain diseases. Assessment of health status of the population is not only new ideas but also a new concept in health care. In other words, the assessment of health status should be the first step and a prerequisite for continued systematic and planned work to improve both their health and overall health care system, or work on their reform. Given these facts, this article through the data on mortality as an indicator of the health status of the population indicated the state of his health and efficiency through the use of prevention programs potential years of life lost due to premature death. The five-year period of observation in the Republic of Srpska largest number of potential years of life lost due to diseases of the circulatory system, malignant diseases, then injuries, poisoning and the influence of external factors, diseases of the digestive systems and diseases of glands with internal secretion, nutrition and metabolism.

Key words: dead, cause of death, years, potential years of life lost, public health

Introduction

The concept of health is mainly associated with positive life values, and is characterized by the following basic characteristics: the subjective experience of feeling good, balanced development of different skills and capabilities of unrestricted performing various functions, which refers to the physical and mental health. Health is achieved through balanced development of all skills and meeting basic human needs. The issue of balance is the effort of individuals and communities to establish interaction with their social, cultural and economic environment through the exchange of communications, labor, and similar decisions. If a complete adaptation of the individual to environmental factors is set up, he (the individual) will be healthy, and capable of internal dynamic equilibrium. We should not forget that the possibility of adaptation has certain limits which cannot be expanded to infinity (Jakovljević at al.; 1998). The impact of adverse factors will reduce the ability of the individual adaptability, resulting in a disturbance of balance and the emergence of the disease.

We can imagine health of an individual man as a situation which is situated between the total loss of health (i.e., death) and 100% of health (i.e., never achieved “complete physical, mental and social well-being”) (Živković, 1959). Also, the healthiest man in the world is surely ill to some degree, but the sickest man, while he is alive, carries a certain amount of health. Idealizing health is impossible, because such health does not exist, since no man can achieve complete well-being in all aspects of health.

Bearing these facts in mind the subject of this paper is that through the state of mortality as an indicator of public health, assessment of the state of its health and efficiency of public health system through the implementation of programs for prevention of potential years of life lost due to premature death.

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Materials and methods

Source of the data analyzed in this study was published (Statistical Bulletin-demographic statistics, the Republic Statistical Office of the Republic of Srpska) (Statistical Bulletin, 2004; 2005; 2006; 2007; 2008) data of routine vital statistics for all analyzed years, and that bulletin is done on the basis of statistical papers on the cases of death, which are an integral part of the certificates of death.

Potential years of life lost are an indicator of early death. This indicator represents the number of years of life lost if a person dies before 75. In calculating potential lost years of life in the Republic of Srpska all age groups up to 75 (<1, 1-4, 5-9 and 70-74) are taken into account, multiplied by the frequency number of the remaining years until the age of 75. As an upper limit in calculating the potential years of life lost, the age of 75 was adopted, since it is approximately corresponding to the life expectancy at birth of both sexes in the Republic of Srpska.

Results

The number and structure of deaths in the Republic of Srpska, 2003-2007

In the Republic of Srpska, in the period between 2003 and 2007, the total number of deaths is 69 199, of which 36,251 is the number of men's death or 52.37%, and 32 958 women or 47.63%. Viewed individually for each year the largest number of deaths for both sexes was in 2007th year: 7552 men and 6844 women. The lowest number of deaths of persons of male sex (6987) was in 2004, while the lowest number of dead females was in 2003 (6377). Regardless of varying number of deaths of both sexes in the reporting period, there is a visible increase in deaths of men by 2.48% at the end of 2007 compared to the beginning of the observed period (2003) and the number of deaths of women by 7.32% (2007 compared to 2003). Also, the greatest difference between men and women died can be seen in 2005th year and that it is 12.26%, while the smallest difference between the number of deaths of men and women is in 2007 and is only 6.69%.

The most common causes of death by gender in the Republic of Srpska, 2003-2007

During the monitoring period (2003-2007) in the Republic of Srpska, a group of ten leading diseases as causes of death in both sexes accounts for 87.27% of all deaths.

The number of deaths from the leading group of diseases, causes of death shows significant variation in both sexes. The number of deaths from diseases of the circulatory system (I00-I99) in 2003 is 7137, while the number of deaths in 2007 is 7097, indicating a negligible decline of 0.56% in 2007 compared to 2003rd, and observed separately by gender, men have perceived reduction in the number of deaths by 3.89%, (2007-2003) and women increase in the number of deaths by 2.41%.

Malignant neoplasms (C00-C96) in the Republic of Srpska (2003-2007) are the second leading group of deaths. The structure of the circulatory system disease mortality, with a share of 50.84% and malignant neoplasms with a share of 18.30% caused the death of about 70% of the population that is almost $\frac{3}{4}$ of the population died from the two leading causes. In the monitoring period malignant neoplasms show a tendency of increase in deaths of men and women. The number of deaths from malignant neoplasms in 2003 is 2404, while the number of deaths in 2007 2717, which indicates that there is an increase in the

number of deaths in 2007 compared to 2003rd by 13.02%. Viewed separately by gender there were more men's deaths in 2007 than in 2003 by 10.84%, while the women died in the same period by 16.38% more. In the observed five-year period injury, poisoning and consequences of the action of external factors take the third place among the leading causes of death in the Republic of Srpska. This group of diseases as causes of death indicates an increase from 596 in 2003rd year to 634 died in 2007 or an increase by 6.38% (male 7.73% and 2.10% in women).

TABLE 1: THE NUMBER OF DEATHS BY SEX IN THE REPUBLIC OF SRPSKA, 2003-2007

Year	Sex				In total
	Male		Female		
	Number	%	Number	%	
In total	36 241	52.37	32 958	47.63	69 199
2003	7121	52.76	6377	47.24	13 498
2004	6987	51.85	6488	48.15	13 475
2005	7552	52.89	6727	47.11	14 279
2006	7279	52.74	6522	47.26	13 801
2007	7302	51.62	6844	48.38	14 146

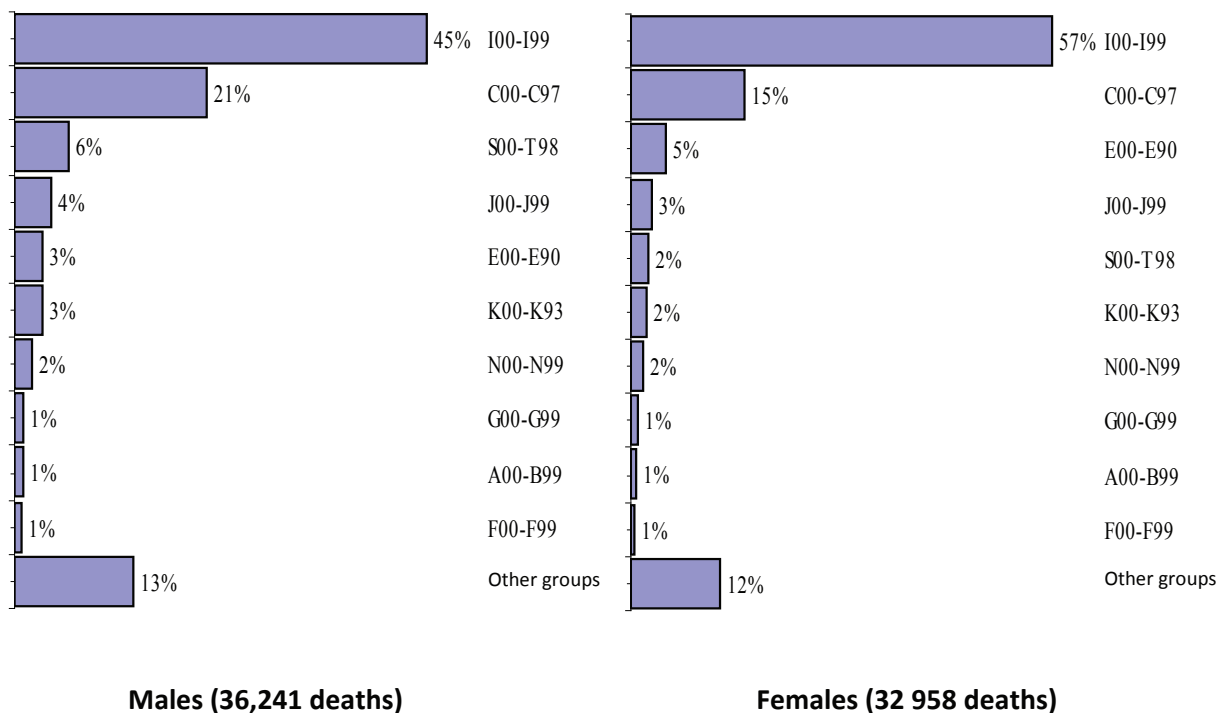


FIGURE 1: THE TEN MOST COMMON GROUP OF DISEASES AS CAUSES OF DEATH IN THE SERBIAN REPUBLIC, BY GENDER, 2003-2007

As causes of death on the fourth place are the disease of glands with internal secretion, metabolism and nutrition (group IV disease according to ICD 10), and on fifth place are respiratory diseases (X group of

diseases according to ICD 10) which in five-year period of continuous observation showed the greatest tendency to increase. The number of deaths from the group IV diseases from 181 in 2003 increased to 791 in 2007, which indicates the increase by factor of 4.37 in 2007 compared to 2003, and that the cause of death of 4.92 times increased mortality for men and 4.02 times increased mortality of women. Diseases of the respiratory system with 305 deaths in 2003 increased to 493 died in 2007. And here is also noted increase in the number of deaths to 61.64% in 2007 compared to 2003, and mortality of men from this group of diseases increased to 52.43%, while the mortality rate of women increased by 75.83%.

The other 5 major groups of diseases (diseases of the digestive tract, urinary tract diseases, diseases of the nervous system, infectious and parasitic diseases and mental disorders and behavioral disorders) as causes of death, also show a tendency of increase in 2007 compared to 2003. On average, these causes of death increased by 35.78% and the average increase in deaths of men from these groups of diseases were 41.25% and 27.33% of women. (Figure 1).

Figure 1 shows that the top five causes in men's death make up about 79% of all causes of death, only diseases of the circulatory system account for 45%, or about one of every 2 men die from this group of diseases, and malignant neoplasms account for 21%, or one in every 5 men die from malignant neoplasms. Regarding women, the first five groups of diseases as causes of death make 82% of all causes of death. Diseases of the circulatory system account for 57% of women who died, and about one of every 2 women die from this group of diseases. Malignant neoplasms account for 15% of women who died and one in every 7 women die from malignant neoplasms.

Age structure of deaths in the Republic of Srpska, 2003-2007

Figure 2 shows that the percentage of deaths in age groups (0-14, 15-24 and 34-44) in the total mortality in the five-year period of observation for men is 6.3% and 3.2% for women, from which stems that men of these age groups die about 2 times more than women. Percentage of the age group 45-64 in the total mortality of men was 25.9% and 14.2% of women. In this age group men die twice more than women. These age groups together in the overall mortality participate in men with 32.2% and 17.4% in women, which together forms 49.6%. In the Republic of Srpska in the period of observation (2003-2007), age group over 65 years accounts for a large percent in the total number of deaths (men with 67.7% and 82.6% women). In the age group of 65-74 percentages of the total deaths were 35.1% in men and 30.7% in women mortality. In the same period of observation (2003-2007) in the age group of over 75 years, women's participation in the overall mortality rate is 1.5 times (51.9%) higher than the share of men (32.6%) in total mortality.

The number and rates of potential years of life lost in the Republic of Srpska 2003-2007

In the Republic of Srpska in the five-year observation period (2003-2007) 513 588 of potential years of life is lost, or an annual average of 102 717 lost years. Observed each year there is a continuous decrease in the potential loss from 108 296 years in 2003 to 93 954 years in 2007, i.e. a decrease by 8.53%. The result of this situation is the number of deaths in younger age groups (younger than 1 and 1-4) in 2003 compared to other years. Men are in monitored period (2003-2007) had the potential loss of 335 843.5 years, respectively on average per year they lost 67 168.87 years. The potential loss of years of life in men (up to 75 years) is 69 223 years in 2003 and 62 753.5 years in 2007, which is a decrease by 9.34%. In the period of observation (2003-2007) the potential loss in women is 177 741.5 years, which on average per year is 35 548.3, i.e. the potential loss in women in 2003 is 39 073 years, and in 2007 is 31 200.5 years, which is a drop of 20.15% (Table 2).

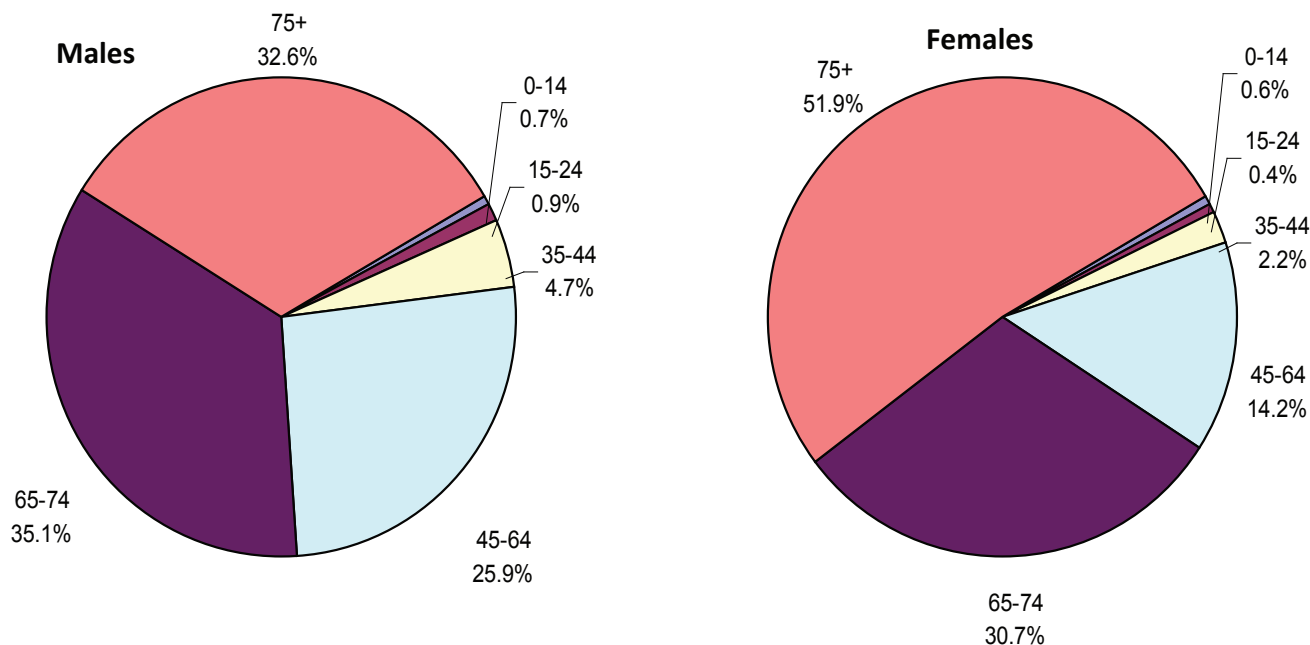


FIGURE 2: THE PERCENTAGE OF DEATHS BY AGE DISPLAY GROUPS AND GENDER IN THE REPUBLIC OF SRPSKA

TABLE 2: NUMBER AND RATES OF POTENTIAL YEARS OF LIFE LOST BY SEX IN THE REPUBLIC OF

Potential years of life lost (PYLL)	Sex	Year					
		2003	2004	2005	2006	2007	In total
Number	Male	69 223	66820.5	69 723	67323.5	62753.5	335843.5
	Female	39 073	36 626	37 086	33 756	31200.5	177741.5
	In total	108 296	103446.5	106 809	101079.5	93 954	513 585
Rate *	Male	10347.81	10005.57	10466.30	10124.11	9463.31	10081.96
	Female	5667.93	5321.96	5401.77	4925.96	4565.80	5177.82
	In total	7972.71	7628.58	7895.50	7485 .98	6977.77	7593.05

* RATE PER 100 000 POPULATION AGED UP TO 75 YEARS

Rate of potential years of life lost (per 100 000 of population up to 75 years old) declined from 7 972.71/100 000 in 2003 to 6 977.77/100 000 in 2007. Decline rates of potentially lost years of life were recorded in both men and women. The rate of potential years of life lost among men aged to 75 was 10 081.96/100 000, and decreased from 10 347.81/100 000 men in 2003, to 9 463.31.41 per 100 000 men in 2007. Women aged up to 75 years were for every 100 000 women lost 4 565.80 years of age, and rate of potential years of life lost decreased from 5 667.93 per 100 000 women in 2003 to 4 565.80/100 000 in 2007. (Table 2)

Potential years of life lost due to the most common group of diseases as causes of death in the

Republic of Srpska, 2003-2007

In the period of observation (2003-2007) circulatory diseases and malignant neoplasms (Figure 1) are the most common causes of death in the Republic of Srpska and as such contribute to the most potential years of life lost. Although the number of male deaths from circulatory diseases was 2.2 times the number of male deaths from malignant neoplasms, the potential loss of years of life in men from diseases of the circulatory system is on average a mere 1.4 times greater than the potential years of life lost from malignant neoplasms. The number of deaths of women from circulatory diseases was 3.7 times higher than deaths from malignant neoplasms, and the potential loss of deaths from circulatory diseases is 1.2 times larger than loss of malignant neoplasms. During the monitoring period (2003-2007) men to 75 years of age who died to the diseases of the circulatory system lost 102 061 potentially years of age, respectively in 2003rd potential loss of the years is 22 696.5 years, and 2007 the loss was 18 582.5 years. Potential loss in women aged up to 75 years from circulatory diseases is 58 631.5 years, respectively the potential loss of 14 562 years in 2003rd year and 8910 years in 2007. In both sexes, there is a decrease in potentially lost years of life from deaths from circulatory diseases, in men by 18.13% and 38.81% in women (Table 3). Within this group of diseases ischemic heart disease and blood vessel diseases are the leading causes of potential years of life lost for men and women. Ischemic heart disease are responsible for 48 084.5 potential life lost, or 9.81%. Diseases of blood vessels of the brain caused potential loss of 47 127.0 years of life or 9.18% (Table 3). These two causes of death are responsible for 95 221.5 potential years of life lost or 59.25% of the diseases of the circulatory system.

Of malignant neoplasms in five-year period of observation men aged up to 75 potentially lost 71 375 years, while women at the same time potentially lost 49 116 years. The potential loss of men died of malignant neoplasms in 2003 is 14 202 years, while in 2007 potential loss is 14 914.5 years of life, or an increase of 5.0%. In women aged up to 75 years of age the potential loss of malignant neoplasms ranged from 10 400 years in 2003 to 9752 years in 2007, or a decrease of 6.23%. Looking at some of the malignant neoplasms, most potential years of life lost due to cancer of trachea, bronchi and lungs (28 727.5, or 5.42%), large intestine cancer, recto-sigmoid continuing, rectum and anus (10 992.2 years or 2.14%), breast cancer (10 800 years or 2.10%), gastric cancer (8 032.5 years or 1.56%), cancer of meninges, brain and others parts of the CNS (7 222.5 years, or 1.41%), liver cancer (6 737.5 years, or 1.31%) and pancreas cancer (4 952.5 years or 0.96%). The potential loss of life for both sexes with malignant neoplasms (Table 3) was 120 491 years, while the most common single causes (Table 3) for both sexes in this group had the potential loss of life of 77 465 years or 64.29%.

Injuries, poisoning and consequences of the action of external factors are on third place by potentially lost years of life. Men in the period of observation had the potential loss of 56 981.5 years, and women 15 115 years of life, i.e. men are lost about 4 times more years of life than women.

Despite the fact that men have a greater potential life loss there is a reduction among them in the potential loss of 11 803 years in 2003 to 11 299 years in 2007th year, or fall by 4.27%. Women potentially lost 3077 years in 2003 and 2 931.5 in 2007, which is decline by 4.73%. Within this group the largest number of potential years of life loss is due to suicides (25 440.0 years or 4.95%), other accidents (25 007.0 years or 4.87%) and car accidents (17 211 years or 3.53 %) Percentage share of potential years of life lost due to the three most common external causes of illness and mortality in relation to the entire group of injuries, poisoning and consequences of external factors is 93.84% (35.29% suicide, other accidents 34.69% and 23.87% of traffic accidents).

TABLE 3: THE NUMBER OF POTENTIALLY LOST YEARS OF LIFE IN THE MOST COMMON GROUP OF DISEASES AS CAUSES OF DEATH IN REPUBLIC OF SRPSKA, 2003-2007

Groups of diseases (ICD 10)		Year					In total
		2003	2004	2005	2006	2007	
		N	N	N	N	N	
Diseases of the circulatory system (I00-I99)	Male	22696.5	22392.5	20444.5	17945.0	18582.5	102061.0
	Female	14562.0	14375.0	11449.5	9335.0	8910.0	58631.5
Malignant neoplasms (C00-C97)	Male	14202.0	13419.5	14752.5	14086.5	14914.5	71375.0
	Female	10400.0	9349.5	10144.5	9470.0	9752.0	49116.0
Injuries, poisoning and consequences of actions external factors (S00-T98)	Male	11803.0	1099.5	11846.0	11734.0	11299.0	56981.5
	Female	3077.0	2847.0	3385.0	2874.5	2931.5	15115.0
Diseases of the digestive system (K00-K93)	Male	2609.0	2287.5	2665.0	2427.5	3117.5	13106.5
	Female	1151.5	922.5	852.5	777.5	577.5	4281.5
Diseases of glands with internal secretion, nutrition and metabolism (E00-E90)	Male	600.0	605.0	2432.5	2452.5	2345.0	8435.0
	Female	585.0	572.5	2202.5	1992.5	1587.5	6940.0
Diseases of the respiratory system (J00-J99)	Male	1202.0	1092.0	1615.0	1560.0	1270.0	6739.0
	Female	649.0	607.0	599.5	712.5	754.5	3323.0
Diseases of the nervous system (G00-G99)	Male	480.0	1127.0	1226.0	1513.5	810.0	5156.5
	Female	365.0	667.0	982.5	800.0	627.0	3441.5
Diseases of urinary tract (N00-N99)	Male	1084.0	822.5	770.0	855.0	807.5	4339.0
	Female	590.0	710.0	542.5	807.5	527.5	3177.5
Infectious diseases and parasitic diseases (A00-B99)	Male	811.5	1043.5	740.5	702.5	627.5	3925.5
	Female	245.0	464.0	342.5	271.5	232.0	1555.0
Mental and Behavioural Disorders (F00-F99)	Male	325.0	777.5	1037.5	807.5	1280.5	4227.5
	Female	100.0	77.5	117.5	140.0	190.0	625.0
Other groups	Male	13410.0	12954.0	12 194	13239.5	7700.0	59497.5
	Female	7348.0	6034.0	6467.5	6575.0	5111.0	31535.5
In total	Male	69233.0	66820.5	69723.0	67323.5	62753.5	335843.5
	Female	39073.0	36626.0	37086.0	33756.0	31200.5	177741.5

Diseases of the digestive system as causes of death in the five-year period of observation are on sixth place (Figure 1), while they are located on fourth place by potentially lost years of life. From this group of diseases men up to the age of 75 years potentially lost 13 106.5 years of life, and women lost 4 281.5

potential years of life (men lost 3 times more potential years of life than women). Potential loss in men is from 2609 years (2003) to 3117.5 years (2007), which indicates that the growth of 19.49%. Women who died up to the age of 75 potentially lost 1 151.5 years of life (2003), and 577.5 years of age (2007), which indicates a significant decrease in potential years of life lost by 50.15%. Within this group the largest number of potential years of life lost due to liver disease (9 921.5 years). When compared to the entire group of digestive system, diseases of the liver are in the potential loss with 57.0 %.

Diseases of glands with internal secretion, nutrition and metabolism are located on the fifth place of the potentially lost years of life in five-year period of observation. Because this group of diseases men aged up to 75 lost 8435 years, while the women lost 6940 years. Men potentially lost 600 years of life in 2003, and 2345 years in 2007, indicating an increase of about 4 times. Women potentially lost about 3 times as many years in 2007 (1 587.5 years), compared to 2003 (585 years). Diabetes mellitus caused a potential loss of life of 14 105 years, and compared to the entire group accounts for 91.74%.

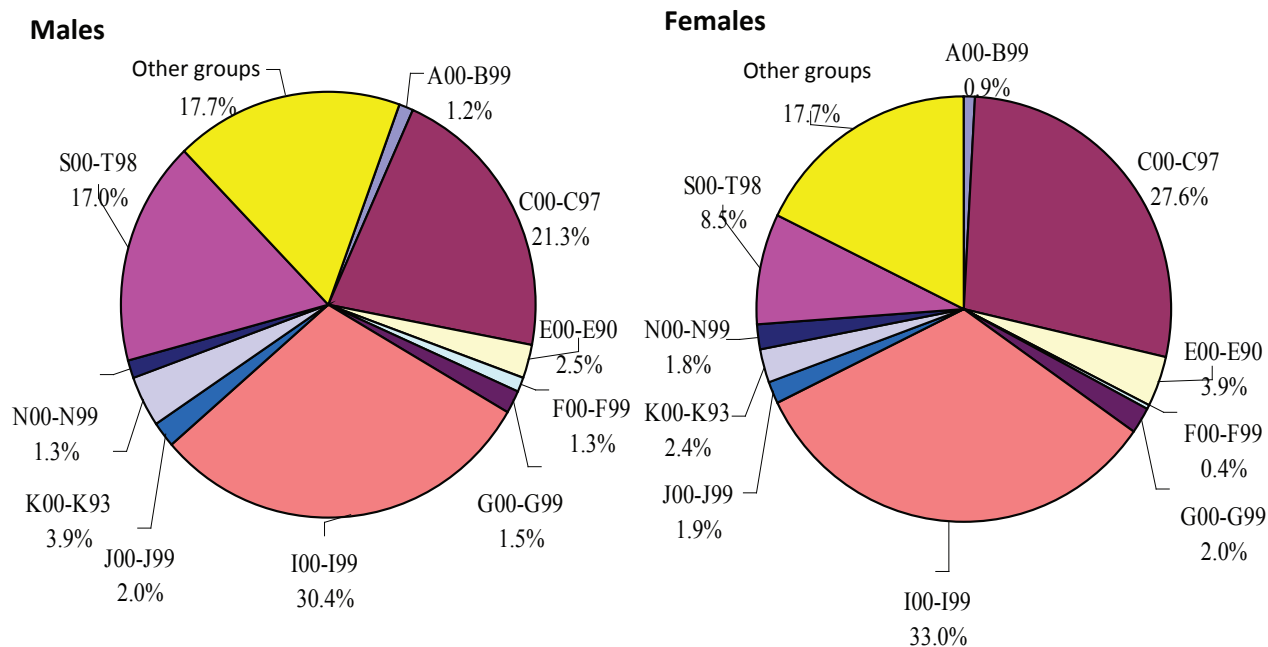


FIGURE 3: THE PERCENTAGE SHOW THE POTENTIAL YEARS OF LIFE LOST TO DISEASE AND GENDER GROUPS IN THE REPUBLIC OF SRPSKA, 2003-2007

Diseases of the nervous system, urinary tract diseases, infectious and parasitic diseases and mental and behavioral disorders participate in total loss of potential years of life with 5.26% among men, and with 5.26% among women of this group (Figure 3).

Diseases of the respiratory system, diseases of the nervous system, urinary tract diseases, infectious and parasitic diseases and mental and behavioral disorders participate in total loss of potential years of life with 9.88% among men, and with 6.82% among women. Although the disease urinary tract are on the eighth place by years of potential life lost, the disease in this group (lack of kidney function) is among the fifteen most common causes with the greatest number of potential years of life lost (7 017.0 years). The participation of potential years of life lost due to mortality from insufficient renal function in relation to the potential lost years of life in the whole group was 93.35%.

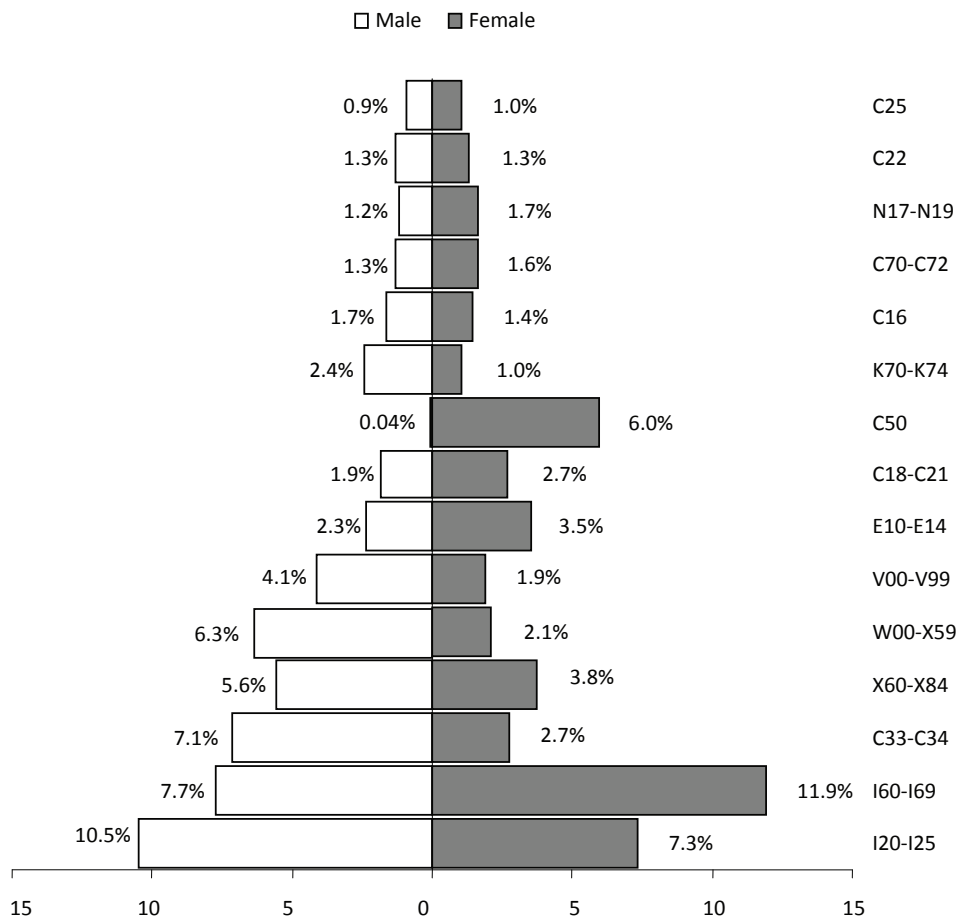


FIGURE 4: THE PERCENTAGE SHOW THE POTENTIAL YEARS OF LIFE LOST BY CAUSE OF DEATH AND SEX IN THE REPUBLIC OF SRPSKA, 2003-2007

Ranks of potentially lost years of life in men differ from the ranks of lost potential years of life in women. (Figure 4) The same chart shows that the largest percentage of lost potential years of life in the period in men are due to ischemic heart disease (10.5%), brain blood vessel disease (7.7%), lung cancer (7.1%), other accidents (6.3%), suicide (5.6%) and accidents (4.1%), while other causes have percentage participation from 0.04% (breast cancer) to 2.4% (liver disease). In women, the highest percentage of potential years of life lost due to the following causes: diseases of brain blood vessels (11.9%), ischemic heart disease (7.3%), breast cancer (6.0%), suicide (3.8%), lung cancer and large bowel cancer, recto-sigmoid continuing, rectum and anus cancer (2.7%), other causes of the percentage participation of 1.0% (cancer of the pancreas and liver) to 2.1% (other accidents).

Average years of life potentially lost to cause of death in the Republic of Srpska, 2003-2007

In the five-year period monitoring men on average had the greatest potential loss of years of life due to traffic accidents (33.67 years) and other disasters (29.28 years), while the lowest average loss of potential years of life due to brain blood vessel disease (8.97 years). The same situation is true for women, the highest average loss of years is due to traffic accidents (33.06 years) and other disasters (27.38 years), while the lowest average potential loss of years is due to diseases of blood vessels of the brain (7.64 years) (Table 4).

TABLE 4: THE AVERAGE POTENTIAL YEARS OF LIFE LOST BY CAUSE OF DEATH AND SEX IN REPUBLIC OF SRPSKA, 2003-2007

	Sex					
	Male			Female		
	Number of deaths	The number of PYLL	Average years lost	Number of deaths	The number of PYLL	Average years lost
Ischemic heart disease (I20-I25)	2852	35089.5	12:30	1527	12995.0	8:51
Diseases of the blood vessels of the brain (I60-I69)	2895	25977.5	8.97	2767	21149.5	7.64
Cancer of trachea, bronchi and lungs (C33-C34)	1986	23895.0	12:03	399	4835.5	12:11
Suicide (X60-X84)	863	18765.0	21.74	327	6675.0	20:41
Other accidents (W00-X59)	727	21284.0	29.28	136	3723.0	27.38
Road traffic accidents (V00-V99)	415	13971.5	33.67	98	3239.5	33.06
Diabetes mellitus (E10-E14)	761	7862.5	10:33	801	6242.5	7.79
Large bowel cancer, recto-sigmoid continuing, rectum and anus (C18-C21)	555	6197.5	11:17	420	4795.0	11:42
Breast cancer (C50)	11	130.0	11.82	698	10670.0	15:29
Liver Disease (K70-K74)	512	8097.0	15.81	147	1824.5	12:41
Stomach Cancer (C16)	458	5535.0	12:09	233	2497.5	10.72
Meninges and brain cancer and others. parts of the CNS (C70-C72)	255	4333.5	17:00	161	2889.5	17.95
Insufficient kidney function (N17-N19)	391	4077.5	10:43	283	2940.0	10:39
Liver cancer (C22)	393	4422.5	11:25	222	2315.0	10:43
Pancreas cancer (C25)	268	3107.5	11.60	175	1845.0	10:54
Other causes	11 068	153098.0	13.83	7423	88636.5	11.94
In total	24 410	335843.5	13.76	15 817	177741.5	11:24

Conclusion

Number of deaths of men in 2007th year increased by 2.48% and by 7.32% for women compared to 2003 year.

Regarding gender and age, men of the age 45-64 die more than women of the same age.

In the structure of deaths dominated by chronic non-communicable diseases - diseases of the circulatory system, malignant neoplasms, diseases of glands with internal secretion, metabolism and nutrition, injuries, poisoning and consequences of actions external factors.

In a five-year monitoring period of observation (2003-2007) the number of potential years of life lost to age of 75 was 513 588 years, and the average life loss was 12.77 years. Men in the same period had the potential life loss of 335 843.5 years, and the average loss of 13.76 years. In women, the potential life loss was 177 741.5 years, and the average loss was 11.24 years.

The largest number of potential years of life lost is due to circulatory diseases (160 693 years), malignant neoplasms (120 491 years), injury, poisoning, and the consequences of action of external factors (72 096.5 years), diseases of the digestive system (17 388 years), and diseases of glands with internal secretion, nutrition and metabolism (15 375).

Since the chronic non-communicable diseases are the leading health problem of Republic of Srpska population, the health service, but also the whole society is to place the request for the provision and implementation of prevention and fight against these diseases with the task of combating and preventing the risk factors of diseases and promotion of healthy lifestyles in order to improve the health of the population that requires multi-sectorial cooperation.

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