All-Cause Mortality Trends in Federation of Bosnia and Herzegovina in Period 2011 – 2020 with Focus on the Leading Causes of Death in 2020

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Background. Mortality data provides the most important indicators for the evaluation and comparison of health status at the local, national, and international level. Objective: The aim of this study is to analyze mortality indicators for the period 2011 – 2020 by monitoring trends for ten years to determine the changes. Methods. The basis for mortality indicators are data from the Institute for Statistics of the Federation of Bosnia and Herzegovina. Mortality is also shown through general mortality rates, Standardized Death Rate (SDR) and leading causes of death for 2020. We calculated Standardized Death Rate per 100,000 for each study year (2011 – 2020) using the direct method, based on the 1976 ESP and age – specific crude rates. Microsoft Excel 2010 was used. Results. In Federation of Bosnia and Herzegovina in 2020, the general mortality rate per 100,000 populations was 1,191.3 and it is recorded an increase compared to 2019, when it had a value of 1,005.6, while in 2011 the value was 897.3. The standardized death rate (SDR) for all causes and age groups per 100,000 inhabitants in 2020 for Federation of Bosnia and Herzegovina (FB&H) was 818.0 and it is slightly higher compared to the EU average. The standardized mortality rate for males is 1,002.1 in 2020, while for females it is 664.2 for 2020. COVID-19 is currently the 1th leading cause of death in the Federation of Bosnia and Herzegovina in 2020. Conclusion: The number of leading diseases that were the cause of death is increasing accordingly. These increases of leading disease may reflected distuptions in health care in Fedrations BiH in 2020, underreporting of COVID-19, or other reason which should be researched in the future. The goal is to reduce the number of deaths from non-communicable diseases in the Federation of Bosnia and Herzegovina through clear guidelines and recommendations.

Keywords: trend in mortality, crude mortality rate, standardized mortality rates.

1. BACKGROUND
Federation Federation of Bosnia and Herzegovina (FB&H) is one of the two entities that compose the State of Bosnia and Herzegovina, with 2 184, 680 inhabitants according to estimates from 2020 (1), and consists of ten cantons with their own governments and legislatures. According to the BiH Constitution Law Health Care System in our country is regulated on the entity level. Federation of BiH has decentralized system organized on canton’s level (2).

The FB&H mortality register was established in 1999. FB&H and Republika Srpska (the second entity within B&H) have separate public health systems, including statistics. Information for the Republika...
Srpska is not included in this study.

Mortality data are a mandatory part of health statistics. They are essential for the development of the population health status indicators. These indicators set out priority measures and actions for improving the population health (1). Report of death is the source of mortality statistics data, which is the oldest system of collecting health data and still the most reliable source of health statistics and indicators for public health surveillance. Mortality data provides the most important indicators for the evaluation and comparison of health status at the local, national, and international level (3-12).

2. OBJECTIVE

The objective was to analyze the trend of all-cause mortality in FB&H for the period 2011-2020 and present the leading causes of death in 2020.

3. MATERIAL AND METHODS

The mortality indicators were analyzed for the period 2011 – 2020 by monitoring trends to determine the changes.

Data were collected from the Institute for Statistics of the FB&H and death certificates. Mortality is also shown through general mortality rates, standardized mortality rate (SDR) and by the leading causes of death for the 2020.

Standardized rates per 100,000 inhabitants for each study year (2011 – 2020) were calculated using the direct method based on the 1976 Old European Standard Population and crude rates. Microsoft Excel 2010 was used to calculate standardized rate.

4. RESULTS

In FB&H in 2020, the general mortality rate per 100,000 inhabitants was 1,191.3 and it is recorded an increase compared to 2019, when it had a value of 1,005.6, while in 2011 the value was 897.3.

The standardized mortality rate (SDR) for all causes (A00-T98) all age groups per 100,000 inhabitants for 2020 for FB&H was 818.0. The standardized mortality rate for males is 1,002.1 for 2020, while for females it is 664.2 for 2020 (Tables 1), the SDR rate of men is higher than that of women. For 2020, there is an excess mortality of males of 51% over females (1002.1/664.2=51%) while in previous years, the excess mortality of males was 42 to 43%. The COVID-19 mortality is supposed to affect males more. The death rate from 2019 to 2020 increased by 15.6%, going up from 1,005.6 to 1,191.3 deaths per 100,000 people, according to the report.

The leading groups of diseases that caused the death of the population of the FB&H are diseases of the circulatory system (I00–I99), with a proportion of 44.6%, which decreased compared to 2019 when the proportion of diseases of the circulatory system in the mortality of the population of the FB&H was 48%. The second group of diseases that is most often cause of death of the FB&H residents are malignant neoplasms (C00–C97) with the proportion of 18.6% in the mortality of the population of the FB&H for 2020.

The standardized death rate (SDR) for cardiovascular diseases for 2020 is 348.0, which is a slight increase compared to 2019, when the value of SDR for cardiovascular diseases was 332.3 and respectively in 2011 it was 444.8. The SDR for cardiovascular diseases in males is 398.5, while in females it is 302.7 for 2020 (Table 2).

The leading disease as cause of death of the Federation of Bosnia and Herzegovina population in 2020 is COVID-19 with SDR 85.8, crude rate 123.1. Overall, death rates were highest among males with SDR 126.1 and for female it was 53.7 (Table 3).

The second leading cause of death in 2020 is acute myocardial infarction (I21) with a rate of 119.7 per 100,000 inhabitants and SDR was 82.4. SDR for acute myocardial infarction in 2020 for male was 113.8, while for the females it was 55.5. The fourth leading cause of death in 2020 is essential hypertension (I10) with a rate of 78.7 per 100,000 inhabitants and SDR
was 50.2. In 2020, the fifth most common cause of death was malignant neoplasms of the bronchi and lungs (C34) with a rate of 50.2 per 100,000 inhabitants and SDR rate 36. SDR for malignant neoplasms C34 in 2020 for male was 60.3, and for female 16.4 (Table 3).

Comparing the number of deaths for leading causes of death 2020–2019, increases were noted in all leading causes of deaths for 2020, such as acute myocardial infarction (I21), stroke (I63). These increases may reflect disruptions in health care in Federations BiH in 2020, when the most of the health care services were temporarily suspended due to the pandemic or may reflect underreporting of COVID-19 (Table 4).

5. DISCUSSION

According to crude rate mortality, it can be concluded that the number of leading diseases that were the cause of death is increasing accordingly. Disregard for healthy lifestyles, insufficient physical activity, obesity, etc. are the factors that contribute to the above-mentioned groups of diseases being the most common causes of death in the FB&H population (12). The standardized mortality rates exclude the aging population, and there should be further research why there is an increase of standardized mortality rates in 2020 in FB&H.

The standardized mortality rate (SDR) for all causes per 100,000 inhabitants for 2020 for FB&H was 818.0 and it is slightly higher compared to the EU average where it is 718 (13), while at the same time lower than in Hungary 811, Romania 849 and Bulgaria 915 (12, 13).

With the changes in environmental, medical technique, population structure and national health projects, human mortality rates have undergone great changes all over the world (14). Significant inequality still persists within and among countries. In China, the mortality rates of men and women have decreased significantly during 2004–2016, the crude mortality rate in all causes of death were 658.50 and 490.28 per 100,000 population per year, respectively. The five leading causes of death were malignant neoplasm, cerebrovascular disease, heart disease, COPD, and accidental injury. The mortality rates of men were higher than of women in all age groups (14).

Wilson et al in 2017 aimed to study the time trends underlying a change from cardiovascular diseases

<table>
<thead>
<tr>
<th>Year</th>
<th>Crude rate death – Total</th>
<th>SDR rate – Total</th>
<th>Crude rate death – Male</th>
<th>SDR rate – Male</th>
<th>Crude rate death – Female</th>
<th>SDR rate – Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011</td>
<td>470.1</td>
<td>444.8</td>
<td>449.5</td>
<td>508.3</td>
<td>489.9</td>
<td>394.2</td>
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<td>474.9</td>
<td>511.5</td>
<td>506.4</td>
<td>392.3</td>
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<tr>
<td>2013</td>
<td>487.4</td>
<td>424.9</td>
<td>463.7</td>
<td>479.7</td>
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<td>2014</td>
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<tr>
<td>2015</td>
<td>522.8</td>
<td>420.1</td>
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<tr>
<td>2020</td>
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<td>509.6</td>
<td>398.5</td>
<td>552.0</td>
<td>302.7</td>
</tr>
</tbody>
</table>

Table 2. Crude and SDR mortality of diseases of circulatory system (I00–I99) in FB&H

<table>
<thead>
<tr>
<th>Year</th>
<th>Total Male</th>
<th>SDR rate</th>
<th>Crude rate</th>
<th>SDR rate</th>
<th>Crude rate</th>
<th>SDR rate</th>
<th>Crude rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011</td>
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<td>123.1</td>
<td>149.5</td>
<td>159.5</td>
<td>83.7</td>
<td>90.0</td>
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<td>143.6</td>
<td>143.6</td>
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<td>99</td>
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<td>91.9</td>
<td>23.8</td>
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<td>2015</td>
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<tr>
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<td>34.7</td>
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<td>31.0</td>
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Table 3. Leading causes of death for 2020 by sex, crude rate and SDR

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(CVD) to cancer as the most common cause of mortality in the UK between 1983 and 2013. The difference in mortality rate between total CVD and cancer narrowed over the study period. Mortality from CVD decreased more steeply than cancer in both sexes. It was observed higher overall rates for both diseases in men compared to women, with high mortality rates from ischemic heart disease and lung cancer in men. The lowest improvements in mortality rates were for cancer in those over 75 years of age and lung cancer in women. These changing trends in mortality may support evidence for changes in policy and resource allocation (15, 16).

The level of mortality in Serbia is the result of long-term changes in its trends. Mortality rates, primarily of the elderly, are not sufficiently reduced, which puts Serbia in the position of lagging behind the European countries. Preventing the development of serious chronic diseases through control and elimination of the risk factors is the way to reduce mortality (17).

From 2016 to 2017, the age-adjusted death rate for the total population increased in USA. Age-adjusted death rates increased for age groups 25-34, 35-44, and 85 and over, and decreased for age group 45-54. There were no changes in the order of 10 leading causes of death in 2016 and 2017 (18).

In Europe, according to Galo et al., total mortality among men and women with the highest education level is reduced compared to men and women with the lowest education level. Social inequalities were highly statistically significant for all causes of death examined in men (13).

There was a large increase in the number of deaths in the winters of 2014/15, 2016/17 and 2017/18 in England. These increases were also seen across other European countries and coincided with circulation of influenza A (H3N2 subtype), known to predominantly affect older people. Analysis of 2015 data also shows that hospital admissions for influenza increased at the time of the mortality increase (19).

In Russia, between 2003 and 2014, the length of life rose among males and females. With respect to causes of death, the convergence is largely determined by cardiovascular diseases (20).

The Federal Ministry of Health, in cooperation with the World Health Organization and Institutions of public health Federations of Bosnia and Herzegovina, developed an Action plan for the prevention and control of chronic non-communicable diseases for the period 2019-2025. The goal is to reduce the number of deaths from non-communicable diseases in the FB&H through clear guidelines and recommendations (21).

According to a leading cause-of-death rankings for 2020 in the United States COVID-19 was the third leading cause of death behind heart disease and cancer (22).

In the Federation of Bosnia and Herzegovina the leading disease as cause of death in 2020 was COVID-19, death rates were highest among males.

6. CONCLUSION

The standardized death rate for all causes and age groups per 100,000 inhabitants is slightly higher compared to the EU average. The chronic non-communicable diseases are the cause of over two thirds of the Federation's death. It can be concluded that the number of leading diseases that were the cause of death is increasing accordingly, especially number of Cardiovascular diseases (CVDs) (23, 24).

These increases of leading disease may reflect disturbances in health care in Federations BiH in 2020, or underreporting of COVID-19, or other reason which should be researched in the future.

- Authors contribution: All authors were involved in the preparation this article. Final proofreading was made by the first author.
- Conflict of interest: None declared.
- Financial support and sponsorship: No specific funding was received for this study.

REFERENCES


