The health of the Western Balkan countries

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Abstract

Aim: The world has faced a major transition in causes of death from communicable to non-communicable diseases as well as lifestyle risk factors. However, quantifying these challenges for health policymakers is a difficult but necessary task in order to tackle specific health problems. Regional health profiles may facilitate the identification of certain patterns and enable policymakers and researchers to generate further hypotheses and pathways of investigation. The aim of this study was to develop a regional health profile of the Western Balkan countries using Disability-Adjusted Life Years (DALYs).
Methods: DALYs provide a uniform tool to measure the health gaps of countries. DALYs quantify the number of years lost for each individual due to premature death and years lived with a health limiting condition. In this analysis, DALYs of seven indicators were used to assess the health of the Western Balkan countries and to identify regional patterns.
Results: Only nutritional deficiencies show decreasing DALYs for the whole region. Ischemic heart diseases, high blood pressure and tobacco consumption are decreasing, but not for all countries equally. Years lost due to alcohol use is slightly increasing but constitutes a major challenge for Bosnia and Herzegovina, while diabetes and road injuries show diverse increasing and decreasing trends throughout the region.
Conclusion: Applying DALYs to generate a quick health profile of the Western Balkan region has proved effective. Major similar trends have been identified, as was the case for nutritional deficiencies. Furthermore, this cross-country comparison may be used to generate additional research questions that might investigate the huge gap in DALYs attributed to alcohol in most of the Western Balkan countries.

***Keywords**:* Disability-Adjusted Life Years, (DALYs), health status, Western Balkans.

Introduction

Identifying health problems and vulnerable groups already constitutes a major obstacle for decision-makers to specifically tackle these problems and find adequate solutions. Here, the collection of data of all kinds either on individual or population level plays a crucial role (1). All sorts of problems are aligned to collecting useful health data ranging from definition issues to more complex measurement and indicator issues (2).

The world has experienced a major change of health threats from infectious diseases to more lifestyle related and non-communicable diseases (3). Ischemic heart disease, for instance, is the number one killer in the world (4). In order to identify problematic regions and countries most often a quick overview of the population health is an adequate tool to generate hypothesis and to investigate specific problems in further detail. In such a case, cross-country comparisons may help to identify good practices which may help other countries to solve their problems as well. Again, uniform data collection may facilitate these comparisons, but is difficult to obtain due to the issues mentioned earlier.

One of the few health indicators that are collected uniformly for a wide range of countries is the concept of Disability-Adjusted Life Years (DALYs). This indicator captures the overall burden of disease of a country and allows for cross-country comparisons on different relevant lifestyle factors that alter the state of health (5).

The Western Balkan countries, the closest neighbors to the European Union (EU), often lack general attention when it comes to health matters. Although the EU is constantly expanding as well into the Balkan region, health is often substituted with plainly economic factors. Taking the Balkan region into account as a health region can have great beneficial potential for both the EU and the Balkan region. It would expand the natural laboratory and by the extended collaboration similar health problems can be tackled. However, a general overview of the health status in the Balkan region is missing.

This paper will use DALYs for seven lifestyle-related indicators in order to generate a health profile for the Western Balkan countries. In doing so, the paper tries to identify possible patterns and trends of disease burden which ultimately may guide further detailed investigation of health problems and facilitate the process of exchanging good practices.

Methods

DALYs are the concept applied to conduct the cross-country comparisons among the Western Balkan region. This summary measure of population health is one of the two categories that have been developed by the Global Burden of Disease Study in 1990 (6). While one category is concerned with health expectancies that is, the years of life gained, the category of DALYs reflects health gaps understood as the years of life lost compared to a life of ideal health status or an accepted gold standard (7). DALYs is the sum of two different dimensions. One dimension quantifies the years lost due to premature mortality or years of life lost (YLL). That is, the number of years lost if an individual dies before he reached the maximum expected life years as defined by life expectancy at birth, which is around 80 for most of the countries. Thus, for each death the numbers of years are counted up to the maximum possible life span. The other dimension takes into account the years lived with disability (YLD). In other words, it measures the number of years lived in poor health or disability due to disease or injuries in length and severity. For this purpose, health experts appointed associated severity values between 0 and 1 to each health limiting condition. DALYs can be obtained for a variety of diseases and disabilities and are used to display the burden of a disease for specific populations. Since DALYs measure the years lost due to premature death and or disability the overall aim is to minimize the total number of DALYs for each population (8).

As indicated in the introduction, the world's major causes of death derive from non-communicable

diseases. Consequently, this study will focus on causes of death and risk factors that mirror these challenges in order to provide an overview. The DALYs attributed to different causes and risk factors are defined with the International Disease Classification tool (9). Table 1 show all indicators used with their respective ICD codes. The data used for these indicators is derived from the Institute of Health Metrics and Evaluation which developed country profiles in order to facilitate the comparison among countries and regions. The data ranges from 1990 to 2010, is displayed in a five-year interval and reported per 100,000 people. Age-standardization has been applied in order to account for the different age structures of the countries.

Table 1. Summary of DALYs in the countries of the Western Balkans

		1990	1995	2000	2005	2010
Albania	Diabetes	300,751	336,196	377,511	409,44	402,433
	Ischemic heart disease	2359,25	2486,14	2907,42	3053,9	2774,9
	Tobacco smoking	2567,86	2648,01	2956,27	3009,11	2803,57
	Nutritional deficiencies	761,012	744,86	712,49	649,145	608,495
	Road injuries	823,145	683,407	705,271	857,937	861,256
	Alcohol use	540,377	631,688	783,417	904,675	898,956
	High blood pressure	3792,86	3792,16	4092,08	4071,74	3773,85
Bosnia and Herzegovina	Diabetes	815,716	868,458	801,298	770,607	724,541
	Ischemic heart disease	3387,7	3637,3	2943,93	2650,58	2364,98
	Tobacco smoking	4302,87	4746,08	3741,3	3362,6	2920,1
	Nutritional deficiencies	553,798	530,178	460,871	421,939	408,542
	Road injuries	339,404	361,449	377,677	395,817	378,778
	Alcohol use	3000,39	34111,93	2509,54	2274,92	2148,85
	High blood pressure	5228,59	5658,6	4519,16	4039,03	3594,46
Macedonia	Diabetes	765,244	819,458	872,392	889,945	834,623
	Ischemic heart disease	3315,94	3326,84	3129,41	3001,63	2737,5
	Tobacco smoking	3870,32	3868,91	3683,61	3527,74	3119,49
	Nutritional deficiencies	335,554	319,401	308,904	303,437	297,399
	Road injuries	669,533	613,304	601,602	624,594	590,385
	Alcohol use	191,358	398,768	655,911	1006,51	919,123
	High blood pressure	6069,14	6010,1	5573,57	5285,99	4766,27
Montenegro	Diabetes	790,275	762,955	772,511	778,995	724,541
	Ischemic heart disease	2873,41	3003,03	3195,19	2847,65	2590,14
	Tobacco smoking	3299,96	3478,48	3669,96	3294,27	2943,09
	Nutritional deficiencies	432,253	437,415	447,46	444,681	429,998
	Road injuries	771,526	772,364	816,286	866,247	863,92
	Alcohol use	196,158	266,162	324,942	369,416	366,195
	High blood pressure	4956,7	5176,5	5444,26	4768,16	4274,88
Serbia	Diabetes	724,335	762,955	772,511	778,995	723,196
	Ischemic heart disease	2774,3	2932,89	2870,33	2719,21	2218,86
	Tobacco smoking	3548,67	3716,92	3549,76	3389,46	2799,28
	Nutritional deficiencies	325,259	327,4	321,566	323,314	318,83
	Road injuries	945,657	772,364	764,728	757,571	786,165
	Alcohol use	363,305	429,407	432,618	457,623	429,163
	High blood pressure	4897,88	5118,21	4931,8	4476,01	3591,25

The countries compared in this study are grouped as the Western Balkan states, namely Albania, Bosnia and Herzegovina, The Former Yugoslav Republic of Macedonia (hereafter, Macedonia),

Montenegro and Serbia. Technically, Kosovo would complement the list of western Balkan countries. However, due to the politically sensitive discussion on its sovereignty, Kosovo has been excluded from the current analysis.

Limitations

Although DALY is a useful measure to facilitate cross-country comparisons and comparisons between different points in time, it is not free of criticism. Mainly four arguments need to be taken into account when applying DALY for comparison purposes. DALY weights life years lost differently for men and women which caused an urge for more equality weights among sexes, although the difference is very small. Two additional camps of criticism argue that all years lost should be weighted equally and not differ for different age groups and for different point in times. The latter, discounting, represents the preference that a healthy year now weighs more compared to one lived in the future. A last argument of criticism is concerned with weighting the severity of disability and is closely related to the rather vague concept of quality of life. The perception of this concept might vary for each individual and therefore assigning a uniform number to each disability is highly debated and constitutes a major problem of DALY (10). All this criticism relies on different societal preferences and should be recognized when interpreting disability adjusted life years. Furthermore, a more tremendous limitation to this study is the lack of precision of these aggregate data. Most data for the Balkan region rely on estimates, with the problem that the situation may not be adequately represented. Nonetheless, DALYs is probably the only readily available tool that enables such cross-country comparisons allowing to identify especially important problems in a certain region over time.

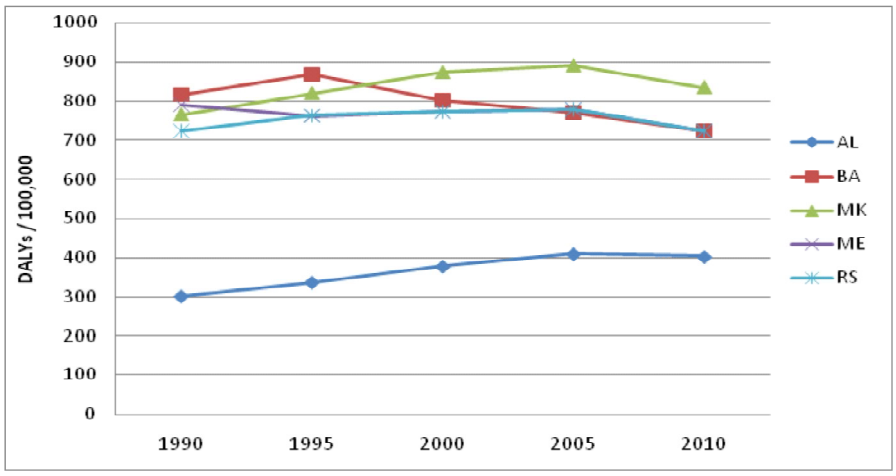
Results

In the following section, findings for each indicator are described separately, as well as a country-specific summary table is provided.

Diabetes

When considering the years lost due to death from diabetes or years lived with diabetes as a severe health limiting factor, it is notable that, three out of five countries experienced a decrease in DALYs attributed to diabetes for both sexes over time, namely Bosnia and Herzegovina, Montenegro and Serbia, whereas Albania and Macedonia are facing increased years lost due to death and/or disability associated with diabetes. As indicated in Figure 1, DALYs range from 402/100,000 in Albania to 834/100,000 in Macedonia. It is interesting to note that, although Albania has experienced a steady increase in DALYs for diabetes, it still has substantially lower values compared to the rest of the region.

Figure 1. DALYs attributable to diabetes in both sexes



Ischemic heart disease

Regarding ischemic heart disease, all countries except Albania could reduce the overall number of DALYs from 1990 to 2010. The decrease started between the years of 2000 and 2005 for all countries as indicated in Table 1. Furthermore, compared to 1990, the range of DALYs among the countries decreased from 2777/100,000 in Serbia and 3387/100,000 in Bosnia and Herzegovina to 2218/100,000 in Serbia and 2774/100,000 in Albania as well. Given the rather small range within the western Balkan countries, there cannot be a clear pattern or gradient identified.

Nutritional deficiencies

Taking into account nutritional deficiencies in the Western Balkan countries, a steady decrease can be identified for all countries. However, the data suggests that this decrease does not occur with the same pace for all countries. Yet, a wide gap exists between the countries with Albania having the highest DALYs related to nutritional deficiencies, namely 608.495/100,000. Macedonia has the lowest with a value of 297.399/100,000. There seems to be a West-East gradient within the region where the countries in the east, namely Serbia and Macedonia experience less nutritional deficiencies than the countries at the Adriatic coast side.

Road injuries

Another major cause of premature mortality is road injuries (11). For Albania, Bosnia and Herzegovina and Montenegro, DALYs for road injuries have increased over time. Only Macedonia and Serbia faced a decrease in these conditions. The data shows a great difference between Bosnia and Herzegovina and the Southern Eastern States of the Western Balkan. Road injuries are far less common in Bosnia and Herzegovina compared to the rest of the Western Balkan countries. There is a difference of 214/100,000 DALYs between the lowest in Macedonia and the highest in Bosnia and Herzegovina.

High blood pressure

An overall decrease in high blood pressure can be observed for all countries except for Bosnia and Herzegovina. Although Macedonia has the highest DALYs attributed to high blood pressure, it is the only country that experienced a steady decrease from 1990 onwards. Similar to diabetes, the overall range has narrowed down. While in 1990 the difference from the lowest to the highest DALYs was 2277/100,000, in 2010 it was only 1172/100,000 years lost due to disability. The overall range narrowed by more than 50% in only two decades.

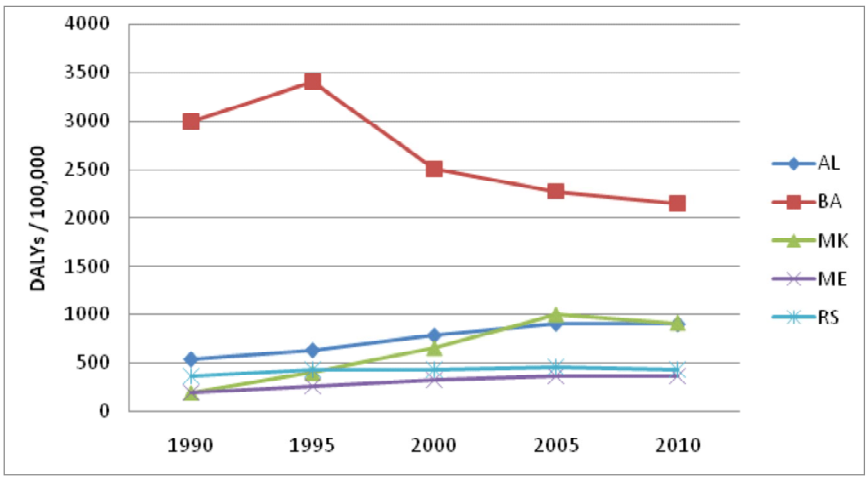
Tobacco smoking

Smoking is the major risk factor for lung cancer (12). Within the Balkan countries only Albania, despite the decrease in recent years and the overall lowest value (2803.53/100,000), faces an increased burden related to tobacco consumption compared to 1990. Macedonia, on the contrary, still experiences the highest DALYs attributed to tobacco consumption, but it was able to steadily reduce the burden from 3870/100,000 to 3119/100,000, respectively. Again, no specific gradient may be identified, but the range of DALYs decreased tremendously from 1990 to 2010.

Alcohol use

The case is different with respect to the alcohol consumption. From 2005 onwards, all countries faced a decrease in the burden of disease related to alcohol consumption except for Bosnia and Herzegovina, where the decrease started already in 2000. However, alcohol-related DALYs vary greatly in the Western Balkan countries. In 2010, the burden ranged from 366/100,000 in Montenegro to 2148/100,000 in Bosnia and Herzegovina. Although the variation is great, Bosnia and Herzegovina (2148/100,000) seems to have an even greater problem of alcohol-attributed DALYs since its rate is almost 2.3 times higher than the second highest country namely Macedonia (919/100,000), as presented in Figure 2.

Figure 2. DALYs attributable to alcohol use in both sexes



Discussion

Only nutritional deficiencies decreased for all countries in the Western Balkan region. However, interestingly to note is the East-West gradient. Although Albania, Montenegro and Bosnia and Herzegovina follow a Mediterranean dietary pattern, these countries face more nutritional deficiencies than Serbia and Macedonia (13). A possible explanation may be found by taking into account the dietary risk factors developed by the Global Burden of Disease study in 2010, according to which the lack of vegetables and fruits can lead to major health problems (14). Furthermore, the increase in the consumption of processed food which is high in salt, sugar and trans-acid fats constitutes a major problem and contributes to the high number of nutritional deficiencies in Albania, aside the Mediterranean diet (15). It would be interesting to provide a more detailed explanation for this gradient.

All the other indicators show major trends either increasing or decreasing with little exceptions. With regard to ischemic heart disease, high blood pressure and tobacco consumption, a decreasing trend can be identified for most of the countries. Albania faces a worrying increase in DALYs related to ischemic heart disease and tobacco consumption. However, it should be noted that Albania has still the lowest DALYs attributed to tobacco consumption in the whole region. Nevertheless, the recognized trends should not be left without attention and further investigation might explore this inverse pattern of the Western Balkan countries.

On the contrary, although alcohol use displays a decreasing trend from 2005 to 2010, the overall burden of disease attributed to alcohol has increased for all countries except Bosnia and Herzegovina, which could reduce the overall burden, but still suffers from an exceptional high burden compared to the rest of the region. The increase in DALYs related to alcohol is a worrying fact that needs to be investigated in greater detail. Generally, the central eastern countries of the European region have higher alcohol consumption than Member States of the European Union (9). However, evidence-based policies, among which increasing taxation (16) have been proved to be very effective, do exist.

Thus, when investigating the health gap between the Western Balkan countries, special attention should be directed towards the effectiveness of existing alcohol policies in Bosnia and Herzegovina.

Diabetes and road injuries, however, show a more diverse picture. Here, some countries continue to reduce the overall burden while others experience an increase. A north-south gradient where the south suffers of more years lost due to diabetes can be noted. Despite the slight increase, Albania can still

be seen as a good practice example. Therefore, a detailed research exploring the differences among the region should pay attention to the Albanian approach of reducing the burden of diabetes.

No clear pattern can be observed for the burden of road injuries. However, the varying trends need further attention in order to identify country-specific reasons. An age-group specific investigation will help to identify more vulnerable groups and to explain the underlying causes for the increasing trends in Albania, Bosnia and Herzegovina and Montenegro.

Conclusion

The underlying cross-country comparison employed the concept of DALYs in order to identify gaps in the burden of disease among the western Balkan region. The seven indicators used facilitate the cross-country comparisons and allow generating further hypotheses for the creation of a detailed research agenda for the region, as can be shown with the example of increasing alcohol consumption in all countries. In addition, the quick and easily accessible DALYs are a suitable tool to illustrate trends over time and identify gradients among a specific region. Nevertheless, a more complete health picture of the region might include more indicators that explore even further the number of years lost due to mortality and disability attributed to lifestyle and non-communicable diseases such as cancer and liver cirrhosis.

Conflicts of interest: None declared.

References

1. Wilkinson J, Berghmans L, Imbert F, Ledésert B, Ochoa A. Health indicators in the European regions—ISARE II. Eur J Pub Health 2008;18:178-83.
2. Atsou K, Chouaid C, Hejblum G. Variability of the chronic obstructive pulmonary disease key epidemiological data in Europe: systematic review. BMC Med 2011;9:7.
3. Michaud P, Ambresin A. The health of adolescents around a world in transition. Georgian Med News 2014;230:54-9.
4. World Health Organization. The 10 leading causes of death in the world, 2000 and 2012. http://www.who.int/mediacentre/factsheets/ fs310/ en/ (Accessed: January 12, 2015).
5. Murray CJ, Frenk J. Health metrics and evaluation: strengthening the science. Lancet 2008;371:1191-9.
6. Lopez AD, Mathers CD, Ezzati M, Jamison DT, Murray CJ. Global and regional burden of disease and risk factors, 2001: systematic analysis of population health data. Lancet 2006;367:1747-57.
7. Burazeri G, Zaletel-Kragelj L (eds). Health Investigations: Analysis - Planning - Education. A Handbook for Teachers, Researchers and Health Professionals Lage: Jacobs Verlag; 2013.
8. Donev D, Zaletel-Kragelj L, Bjegovic V, Burazeri G. Measuring the Burden of Disease: Disability Adjusted Life Year (DALY). In: Burazeri G, Zaletel-Kragelj L (eds). Health Investigations: Analysis - Planning - Education A Handbook for Teachers, Researchers and Health Professionals 2nd Edition. Lage: Jacobs Verlag; 2013.
9. Mathers C, Fat DM, Boerma J. The global burden of disease: 2004 update: World Health Organization; 2008.
10. Grosse SD, Lollar DJ, Campbell VA, Chamie M. Disability and disability-adjusted life years: not the same. Public Health Rep 2009;124:197.
11. Murray CJ, Vos T, Lozano R, Naghavi M, Flaxman AD, Michaud C, et al. Disability-adjusted life years (DALYs) for 291 diseases and injuries in 21 regions, 1990–2010: a systematic analysis for the Global Burden of Disease Study 2010. Lancet 2013;380:2197-223.
12. Simonato L, Agudo A, Ahrens W, Benhamou E, Benhamou S, Boffetta P, et al. Lung cancer and cigarette smoking in Europe: an update of risk estimates and an assessment of inter country heterogeneity. Int J Cancer 2001;91:876-87.
13. Castro-Quezada I, Román-Viñas B, Serra-Majem L. The Mediterranean diet and nutritional adequacy: A review. Nutrients 2014;6:231-48.
14. Lim SS, Vos T, Flaxman AD, Danaei G, Shibuya K, Adair-Rohani H, et al. A comparative risk assessment of burden of disease and injury attributable to 67 risk factors and risk factor clusters in 21 regions, 1990–2010: a systematic analysis for the Global Burden of Disease Study 2010. Lancet 2013;380:2224-60.

15. Mone I, Bulo A. Total Fats, Saturated Fatty Acids, Processed Foods and Acute Coronary Syndrome in Transitional Albania. Mater Sociomed 2012;24:91.

16. Anderson P. Global alcohol policy and the alcohol industry. Curr Opin Psychiatry 2009;22:253-7.