

DOI: 10.5455/msm.2014.26.55-58

Received: 19 December 2013; Accepted: 15 February 2014

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Published online: 20/02/2014

Published print: 02/2014

PROFESSIONAL PAPER

Mater Sociomed. 2014 Feb; 26(1): 55-58

# Tuberculosis Incidence and Case Notification Rates in Kosovo and the Balkans in 2012: Cross-country Comparison

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## ABSTRACT

**Aim:** Tuberculosis (TB) continues to be a considerable burden especially for millions of young adults and disadvantaged people worldwide. The TB incidence and notification rates are good indicators of TB situation in a country. Our aim was to compare TB incidence and notification rates in Kosovo and in seven other Balkan countries. **Methods:** Retrospective epidemiologic analysis of published data on TB incidence and notification rates in eight Balkan countries in 2012. Notification rates were expressed per 100,000 inhabitants and were calculated based on the number of TB cases reported divided by the population of each country under analysis. **Results:** The TB incidence in Kosovo (47/100,000) was considerably higher compared to its four neighboring countries: Albania (16/100,000), Macedonia, Montenegro (18/100,000) and Serbia (23/100,000). The TB notification rates in Kosovo and other countries closely mimicked the incidence rates in these countries. **Conclusion:** The exceptionally high TB incidence rate in Kosovo could be due to many factors including low health and medical-seeking behaviors of the local population, poverty and low education levels. Effective interventions should be adapted to the local context in order to increase the chances of success.

**Keywords:** Kosovo, TB incidence, TB notification rates.

## 1. INTRODUCTION

Tuberculosis (TB) remains a highly fatal infectious disease worldwide, affecting mostly disadvantaged young adults (1). In 2012, there were reported 8.6 million new TB cases and 1.3 million TB deaths (2). The installment of Human Immunodeficiency Virus (HIV) has literally boosted the TB infection (1) despite the continuously decreasing trends of new HIV infections globally from 2001-2012 (3), as HIV infected people have a much higher risk of developing TB compared to HIV negative individuals (2). The TB-HIV combination is more evident in sub-Saharan African countries where more than 70% of all new 2012 TB cases occurred (3). Approximately 25% of all TB deaths in 2012 occurred among HIV positive persons (2). Because of the close links between TB and HIV, when calculating the incidence and prevalence rates of TB it is explicitly mentioned whether these rates refer to TB cases only, or TB + HIV cases.

Despite the outstanding progress in TB control (2) this health condition affecting millions of people each year, is far from being resolved. Moreover, the emerging of multi drug-resistant TB is a worrisome problem (1,2) that additionally keeps the disease high in the international health policy agenda.

An important step towards TB control is the detection of the disease followed by the appropriate treatment of the condition (2). This is one of the components of the Stop TB Partnership, which comprises international stakeholders aiming to coordinate international TB control efforts (1,2). In addition, other important indicators for the assessment of TB control are the TB case notification rates and the treatment success rates which are embedded in the Millennium Development Goals monitoring framework (2).

According to recent data, the notification of TB cases is improving across countries as two-thirds (66%) of the total 8.6 million new cases reported in 2012 were officially notified by the respective notification systems as new cases (2). About three-quarters of 2.9 million TB cases that were not captured by notification systems were in 12 countries, including India, South Africa and China (2). Globally, approximately 60 million people were successfully treated during 1995-2012 (2). In 2011, the overall treatment success rate was as high as 87% among newly diagnosed TB cases globally, but the European region showed the lowest figure with only 72% of newly diagnosed cases successfully recovered (2). One reason for this might be

because of the high levels of multi drug-resistant TB in Eastern Europe (1,2).

In Europe, which accounts for approximately 5% of all new and relapse TB cases notified in 2012 (2), the TB notification rates are not uniform being almost 8 times higher in Central/Eastern than Western member states and twice as high as the European average (4). However, the TB notification rate in Europe in 2012 (74%) (4) was considerably higher compared to the global average notification rates (66%) (2). The within European region discrepancies confirm that TB is a disease affecting those least well-off or the most disadvantaged (1,2).

Kosovo, the newest state of Europe is also the poorest country of the region. Coming out of a military conflict which caused disruptions in all areas of life (5), the country is facing considerable challenges in trying to recover itself (6,7). Obviously, such disruption has taken its toll on the health status of the local population as well. For example, one of the health indicators that has been deteriorated concerns the considerable increase in the number of TB cases (8). Because of the country's particular context and basically ruined health services, the issue of TB control and management has received much attention and resources, starting from 1999 (8) when the National Tuberculosis Control Program (NTP) started to be established, virtually from scratch (8). The intervention showed to be a success with the rate of all forms of TB falling steadily from 85.9/100,000 in 2000 to 48.5/100,000 population in 2005 and the same trend was observed regarding the rate of new sputum smear-positive TB cases from 20.2/100,000 in 2000 to 11.0/100,000 population in 2005 (8). Also, the treatment success rate showed a steady increase during this period from 35% of SS+ TB cases successfully cured in 2001 to 71% in 2004 (8). However, the information about recent TB frequency measures and treatment outcomes as well as a comparison with the countries of the region is not abundant. In this context, the aim of this study was to report on the latest figures of TB frequency and TB notification rates in Kosovo and to compare these TB indicators with those of surrounding Balkan countries.

## 2. METHODOLOGY

This is a retrospective review of data on new TB cases in 2012, incidence rate and case notification rates in eight Balkan countries for which data were available, including Kosovo, Albania, Bulgaria, Macedonia, Montenegro, Romania Serbia and Slovenia.

Incidence was calculated using the number of new and recurrent/relapse episodes of all forms of TB in a given year (2). Recurrent episode was defined as a new TB episode in a previously successfully treated TB patient (2).

The TB case notification rate refers to all new and relapse TB cases notified to WHO in a given period of time, usually one year, and expressed per 100,000 population (2).

The TB incidence rate for Kosovo, including HIV positive cases with TB, refers to the year 2010 since this was the latest figure available in the literature (9). The TB incidence rates for the other Balkan countries included in this review refer to the year 2012, as published in the WHO's Global Tuberculosis Report 2013 (2).

To obtain the notification rates of TB in these countries we used the data published in the 2013 Global Tuberculosis Report (2). Because this document reports only the number of TB cases and the respective proportions, we used this information in order to calculate the respective notification rates. Here we report on notification rates of new TB cases, subdivided into smear positive, smear negative, smear unknown or undone, extra pulmonary, total new and total new and relapse cases. Also, the following notification rates were calculated: relapse, treatment after failure, treatment after default, other, total repeated treatment and total cases notification rates. Each of these figures was divided by the respective country's population and then multiplied by 100,000 in order to generate the respective country notification rates.

## 3. RESULTS

The incidence rate of TB (including HIV+TB) in 2012 ranged from 7.5 new TB cases per 100,000 inhabitants in Slovenia to 94 new TB cases per 100,000 inhabitants in Romania (Figure 1). The TB incidence rate in Kosovo was the second highest among all countries included in the analysis with 43.7 new TB cases per 100,000 inhabitants, thus differing considerably from its neighboring countries such as Albania, Macedonia, Montenegro and Serbia where TB incidence rates fluctuated between 16-23 cases per 100,000 inhabitants. Compared to Albania, Macedonia and Montenegro the TB incidence rate in Kosovo was almost 2.5 times higher.

Table 1 presents information regarding the new TB cases notification rates as well as retreated TB cases notification rates across the eight Balkan countries included in the study.

	Kosovo	Albania	Bulgaria	Macedonia	Montenegro	Romania	Serbia	Slovenia
New cases								
Smear positive	14	6	10	7	7	32	9	2
Smear negative	23	3	8	4	5	19	8	2
Smear unknown	0	0	1	0	0	1	0	1
Extra pulmonary	0	3	8	4	2	11	1	1
Total new	36	12	27	15	15	63	18	6
Total new and relapse	39	13	29	16	16	73	19	6
Retreatment cases								
Relapse	3	1	2	1	1	10	1	0
Treatment after failure	0	0	0	0	0	3	0	0
Treatment after default	0	0	0	0	0	3	0	0
Other	0	0	2	0	1	4	0	0
Total retreatment	3	1	4	1	2	20	2	1
Total cases notified	39	13	31	17	17	83	20	7

Table 1. New and retreated TB cases notification rates (per 100,000 population) in Balkan countries, in 2012

Regarding the notification rates of new TB cases across countries it should be noted that there is a similar trend to that observed for the incidence rates: the total new TB notification rates and the total new and relapse TB notification rates are higher in Romania (63 TB cases per 100,000 and 73 TB cases per 100,000, respectively) with Kosovo displaying the second highest figures: 36 TB cases per 100,000 inhabitants and 39 TB cases per 100,000 inhabitants, respectively. Again, the notification rates for all indicators of new TB cases were higher in Kosovo compared to all its four neighboring countries mimicking the TB incidence rates in these countries.

The trends are again similar to the above ones if we look at the data about the notification rates of TB repeated treatment cases. The total TB cases notification rate was higher in Bulgaria with 83 TB cases notified per 100,000 inhabitants, the second highest rates were noticed in Kosovo with 39 TB cases notified per 100,000 inhabitants and the lowest figure was in Slovenia with only seven TB cases notified per 100,000 inhabitants. Slovenia also had the lowest new TB cases notification rate (6 TB cases per 100,000 inhabitants) and the lowest total TB cases notification rate (7 TB cases per 100,000 inhabitants) among all Balkan countries included in this study (Table 1).

#### 4. DISCUSSION

This report highlighted the new TB cases incidence rates and notification rates in Kosovo against the rates reported in the other seven Balkan countries. Interestingly, Kosovo has the highest new TB cases incidence rate compared to all its four neighboring countries and is second only to Romania. Compared to other Albanian speaking countries like Albania and Macedonia, the TB incidence in Kosovo is more than twice as high. The TB notification rates in Kosovo and other countries closely resembled the incidence rates in the respective countries.

The high TB incidence and notification rates in Romania could be explained by the higher rate of people of all ages living with HIV in this country. For example, in 2013 UNAIDS Global Report on HIV Epidemics estimated that in Romania there were between 14,000 to 21,000 persons living with HIV in 2012. Taking into account that the population of Romania in 2012 was around 22 million, there were between 64 to 96 people living with HIV in this country per 100,000 inhabitants. The corresponding figures for Bulgaria were 33 to 79 per 100,000 inhabitants, whereas for Serbia these figures were 23 to 57 per 100,000 inhabitants (3). However, Kosovo has a very high TB incidence rate among the Balkan countries in the context where it is classified among the countries with the lowest prevalence of HIV infection (10). Therefore, the prevalence and incidence of HIV infection does not seem to explain why the TB incidence is so high in the post-conflict Kosovo. Therefore, the reasons of this exceptionally high TB incidence might be found in the recent past of Kosovo. Numerous sources have documented the difficult situation in Kosovo during the '90s and afterwards (5-8). Before 1999, the government had suppressed a range of rights for the local population and generally overlooked all aspects of life in this part of ex-Yugoslavia, a situation which was followed by a general deterioration of almost all health indicators, ranging from lack of trained doctors and number of doctors per capita to high rates of morbidity and mortality (5-7). With special at-

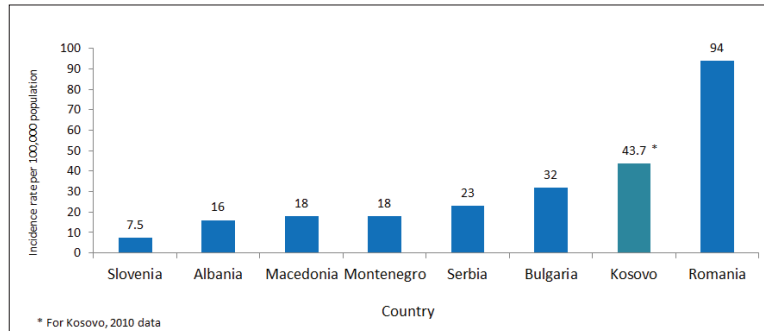


Figure 1. TB (including HIV+TB) incidence rate (per 100,00 population) in Balkan countries in 2012

tention to tuberculosis, the health authorities before 1999 did not implement the DOTS strategy (8,11). This fact combined with other factors, such as poor infrastructure and limited access to health care and especially to quality health care, led to a dramatic increase in the number of new TB reported cases: from 413 TB cases in 1990 to 1290 TB cases in 1996, yielding an incidence rate of 77 TB cases per 100,000 inhabitants in 1996, a figure that was three times higher than the TB incidence rate in the whole Yugoslavia (25 TB cases per 100,000 inhabitants) (11). Almost 14 years after this moment, which is in 2010, the incidence rate of TB in Kosovo was considerably lower with almost 44 new TB cases per 100,000 inhabitants. However, it is still high compared to the ex-Yugoslav republics such as Serbia, Montenegro and Macedonia which kept their TB incidence on the same levels as that showed during 1990 (Serbia, for example) or even decreased it even more (for instance, Montenegro and Macedonia). Whereas this is a sign of progress for Kosovo, we consider that the decline of TB incidence is smaller than it should have been done taking into account the low HIV prevalence and all the international efforts and resources invested to control and manage tuberculosis in this country (8,11).


To shed light into the puzzle, we have to consider that Kosovo is still the poorest country of Europe (11). In 2011, over one third of Kosovo population was living below the national poverty line and more than one in ten people were living in extreme poverty (11,12). As we explored in the introduction of this paper, TB and poverty are very much linked with each other. On the other hand, a recent paper has documented poor health-seeking behaviors among Kosovo TB patients, especially among women, urban residents and those with lower income (13). Furthermore, other sources have documented the exceptionally low formal education levels of people in Kosovo, which might be another factor hindering medical care seeking behavior and therefore contributing towards keeping TB rates high in this population group (14,15). On the other hand, the fact that notification rates closely mimic the TB incidence rate in Kosovo (and other countries) shows that the efforts to control TB have been successful (8,11).

Despite the formidable progress, the outcomes could have been better, in our opinion. Our conclusion is that the firm investing and commitment in a certain direction bring improvements, but do not guarantee success. Because the situation is complex and many factors contribute to the success, it is important for all interventions to take into account and dedicate more resources towards understanding of the local context.


CONFLICT OF INTEREST: NONE DECLARED.

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