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## ASSESSMENT OF THE ROLE OF PRIMARY HEALTH CARE IN TUBERCULOSIS CONTROL IN SERBIA

*PROCENA ULOGE PRIMARNE ZDRAVSTVENE ZAŠTITE U KONTROLI TUBERKULOZE U SRBIJI*

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### Summary

**Introduction.** At the onset of the 21st century, tuberculosis is still a public health problem. Due to the implementation of tuberculosis control program in Serbia, there is no fear of an epidemic. Within the reform of the health care system, the service for pulmonary diseases is being restructured, calling for strengthening the role of primary health care. This study was aimed at analyzing the current role of primary health care in tuberculosis control. **Material and Methods.** A cross-sectional study was conducted between the 12th and 30th September, 2010. For evaluating the current role of primary health care in tuberculosis control, four questionnaires were designed based on the “Performance assessment questionnaire regarding TB control for use in PHC”, *Journal Brasileiro de Pneumologia*, print version ISSN 1806-3713 (vol. 35, no 6, Sao Paulo, June 2009). The following methods were used to analyze the results: descriptive statistical analysis, Student’s T-test, Fisher’s analysis of variance. The reliability of the results was tested with Cronbach’s alpha and factor analysis. The level of significance in all the methods bordered 0.05. **Results.** Primary health care does not participate in tuberculosis control in line with the possibilities of the existing legal framework. Although the paper proves that tuberculosis notification rate is higher in the areas less covered by the pneumophysiological service, the role of primary health care does not differ from the areas fully covered. **Conclusion.** There is a need for strategic empowerment of the primary health care system to be actively involved in the diagnostics, treatment and follow up of tuberculosis in Serbia. **Key words:** Primary Health Care; Tuberculosis; Serbia; Delivery of Health Care; Questionnaires; Follow-Up Studies

### Introduction

At the onset of the 21st century, tuberculosis is still a considerable global public health problem. According to data from 2009, 9.4 million people (139/100.000) suffer from different types of tuberculosis (TB), while 1.3 million people (28/100.000 inhabitants) die of tuberculosis [1].

The most significant progress in tuberculosis control in the past decades has been made due to the development and widespread implementation of

### Sažetak

**Uvod.** Na početku 21. veka tuberkuloza je u svetu i dalje značajan javnozdravstveni problem. Zahvaljujući sprovođenju programa kontrole tuberkuloze u Srbiji, epidemološka situacija je značajno unapređena. U kontekstu reforme sistema zdravstvene zaštite, reorganizuje se služba za plućne bolesti, te je za očuvanje dobre kontrole bolesti neophodno jačati ulogu primarne zdravstvene zaštite. Cilj rada je ispitivanje aktuelne uloge primarne zdravstvene zaštite u kontroli tuberkuloze. **Materijal i metode.** Sprovedena je studija preseka u periodu 12–30.9.2010. godine. Za procenu sadašnje uloge primarne zdravstvene zaštite u kontroli tuberkuloze razvijena su 4 upitnika po uzoru na *Performance assessment questionnaire regarding TB control for use in PHC, Journal Brasileiro de Pneumologia, print version ISSN 1806-3713 (vol. 35, no 6, Sao Paulo, June 2009)* koji je prilagođen za potrebe istraživanja. U analizi rezultata istraživanja korišćene su metode deskriptivne statističke analize, Studentov t-test i Fišerova analiza varijanse. Pouzdanost upitnika je proveravana Kronbahovim koeficijentom, a primenjena je i faktorska analiza. Nivo značajnosti u svim primenjenim metodama bio je na granici od 0,05. **Rezultati.** Primarna zdravstvena zaštita ne učestvuje u kontroli tuberkuloze u skladu sa mogućnostima datim u postojećoj zakonskoj regulativi. Ovim radom je dokazano da je stopa prijavljivanja tuberkuloze veća u okruzima koji imaju slabiju pokrivenost pneumoftiziološkom službom, ali da se uloga primarne zdravstvene zaštite u kontroli tuberkuloze ne razlikuje među okruzima. **Zaključak.** Postoji potreba da se strateški planira osnaživanje primarne zdravstvene zaštite za veće učešće u dijagnostici, lečenju i praćenju tuberkuloze u Srbiji.

**Cljučne reči:** Primarna zdravstvena nega; Tuberkuloza, Srbija; Pružanje zdravstvene zaštite; Upitnici; Studije praćenja

the World Health Organization (WHO) strategies, which represent a combination of technical and organizational components that enable the functioning of the diagnostic network, and which are easily applicable in the population.

WHO STOP TB Strategy represents a framework for the implementation of the National Tuberculosis Control Program in Serbia from 2010 to 2015. Within the components of the STOP TB Strategy, primary health care (PHC) has been recognized as a factor that can contribute significantly to improve disease control [2].

### Abbreviations

WHO	– World Health Organization
TB	– tuberculosis
PHC	– primary health care
AIDS	– acquired immune deficiency syndrome
HIV	– human immunodeficiency virus

The result of the implementation of the National TB Program in Serbia, with the financial support of the Global Fund for *acquired immune deficiency syndrome* (AIDS), tuberculosis and malaria, has been a considerable decrease in the TB notification rate, from 32/100 000 in 2005 to 23/100 000 in 2009. The total number of multi-drug resistant TB patients was 20 in 2009, while 2 extremely drug resistant TB patients were registered. In the same year, 11 TB/*human immunodeficiency virus* (HIV) co-infected patients were notified. The highest TB rate in Serbia districts in 2009 was in Kolubara (53/100 000) and Mačva (46/100 000) district [3].

Primary health care is the basic health care which relies on practical, scientifically acclaimed and socially acceptable methods and technologies, widely accessible to individuals and families in the community, in which they participate to a great extent, and at a price that the society and the state are able to afford so that the principle of self-determination is preserved at all levels of development [4].

The principles contained within the Declaration from Alma-Ata still represent the basis of an efficient PHC and remain in focus in health care of TB patients:

- universal access to PHC and an efficient coverage of all populations needs;
- equity of health, as part of the society orientation on social justice;
- community participation in the development and implementation of health plans and activities;
- multi-sector access to PHC [5].

Role and tasks of primary health care in tuberculosis control

- implementation of anti TB preventive measures,
- passive TB detection based on symptoms,
- community nursing visits to patients and their families,
- involvement in direct supervision of TB treatment and detection of adverse effects of anti-tuberculosis therapy,
- referral of vulnerable groups to TB specialist examinations (cooperation of health institutions with the Red Cross of Serbia, civil society organizations, social welfare centers, etc.) [6].

The aim of this study was to assess the current role of PHC in TB control and to identify strategic activities in order to strengthen its role in TB control in Serbia.

#### Hypotheses:

There was a statistically significant association between higher TB notification rate and reduced coverage of municipal TB services.

There is no difference in the PHC role in tuberculosis control in Serbia in districts with a low coverage in municipal TB services when compared to those districts where this is not the case.

### Material and methods

A cross sectional study was performed from the 12th to 30th of September, 2010. For the assessment of the current role of the PHC in TB control, four questionnaires were developed based on the “Performance assessment questionnaire regarding TB control for use in PHC”, published in *Journal Brasileiro de Pneumologia*, in June 2009. The questionnaire was adapted for the study in terms of the overall current national legislation as well as legislation regarding PHC and TB [7–9].

The questionnaires were composed of the questions related to the organization of primary level of health care (availability and coverage of services in general practice and TB services), health activities performed in the field of TB, collaboration with health services in TB issues and compliance of health services with health needs related to TB.

The following health institutions were involved: Municipality Institutes for Pulmonary Diseases and Tuberculosis in Belgrade and Niš, all primary health centers in Belgrade and Niš, TB services in all districts in Serbia, all primary health centers in Mačva, Kolubara and Braničevo district.

The districts of Mačva, Kolubara and Braničevo were selected because of the highest TB rate in Serbia in 2009 and the weakest coverage of municipal TB services according to the data from 2009.

The results of each questionnaire (mean, variance and relative numbers) were analyzed by methods of descriptive statistical analysis. The data were described and analyzed by the type of questionnaire. Student's t-test was applied to analyze the two groups and Fisher analysis of variance (ANOVA) was used for the analysis of more than two groups. In two of the four questionnaires, the reliability analysis was performed. In the remaining two questionnaires, the number of questions was not enough for the reliability analysis. The factor analysis (step by step method) was performed in order to reduce the number of questions and to check the validity of questionnaires. The level of significance in all applied methods was 0.05.

### Results

#### *Questionnaire for TB Services in all Districts in Serbia*

The questionnaire was filled in 19 (70%) out of the 27 districts. The average age of TB specialists in Serbia was 50. A statistically significant difference was found among the districts in the number of remote places, more than 20 kilometers away from the TB outpatient services ( $\chi^2 = 8.000$ ;  $p < 0.01$ ). In Mačva, Braničevo and Kolubara district, a large number of places are far from the ambulatory service (8-13).

There was no statistically significant difference in the role of the PHC in TB control ( $\chi^2 = 1.314$ ;  $p > 0.05$ ) among the districts. PHC practitioners prescribed anti-TB drugs in 55% of cases, they were involved in treatment of comorbidities in 33.3% of cases and in early

TB detection in 14.1% of cases. TB was treated only by TB specialists. According to the respondents, the cooperation with other departments in terms of TB control in all districts was assessed as good. The compliance of health services with health care needs was evaluated as good in 73% of cases ( $p < 0.05$ ), but there was a statistically significant difference among the districts.

The Cronbach's alpha reliability analysis was applied to the questions number 3, 5, 6, 8, 10, 12, the age of TB specialists and the number of TB specialists in the district. The question 7 and 11 were not covered by the analysis since they were answered in the same way, neither were the question 6.1 and 10.1 due to a low number of answers. Cronbach's alpha was 0.453 for the whole model.

The validity of the questionnaire was analyzed by factor analysis. The same questions were analyzed as in the case of reliability analysis. Five components of factors explained 87% of the total variability of the questionnaire. The first component included the question 3 and 5, the second included the question 8, 9 and 10 (the question 10 correlated to 8 and 9 negatively). The question 6 and the number of TB specialists were covered by the third component, the fourth component covered the question 12 and the age of TB specialists, and the fifth group was on the border of factor load.

#### *Questionnaire for Municipality Institutes for Pulmonary Diseases and Tuberculosis in Belgrade and Niš*

There was a statistically significant difference in the number of employees at the Institute in Belgrade and Niš ( $\chi^2 = 9.091$ ,  $p < 0.01$ ). No statistically significant difference was found in the age structure of employees among the institutions and in relation to the average for Serbia ( $t = 0.3$ ,  $p > 0.05$ ), nor in the health service they perform.

There was a statistically significant difference in the assessment of the cooperation of the Institute in Belgrade with the primary health centers in Belgrade, in relation to the cooperation with the Institute of Niš with the primary health centers in Niš. The primary health centers in Belgrade do not transfer the authority for prescribing anti-TB drugs from the chosen general practitioner to the TB specialists working at the Institute. According to the Institute in Belgrade, it affects treatment monitoring and might cause treatment defaults. There was no statistically significant difference in the assessment of compliance of health services with the health needs.

#### *Questionnaire for Primary Health Centers in Belgrade and Niš*

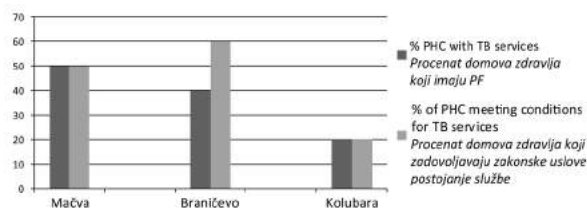
The questionnaire was filled in 14 out of 17 Primary Health Centers (82%), 13 in Belgrade and one in Niš. There was a statistically significant difference between the preventive activities provided by primary health centers in Belgrade in relation to Niš ( $\chi^2 = 9.308$ ;  $p < 0.01$ ). Primary health centers in Belgrade did not differ among themselves ( $\chi^2 = 7.167$ ;

$p > 0.05$ ), early TB detection being performed in all of them. The cooperation with the Institutes was good except in case of primary health centers in Mladenovac and Grocka ( $\chi^2 = 6.231$ ;  $p < 0.05$ ).

#### *Questionnaire for Primary Health Centers in Mačva, Kolubara and Braničevo district*

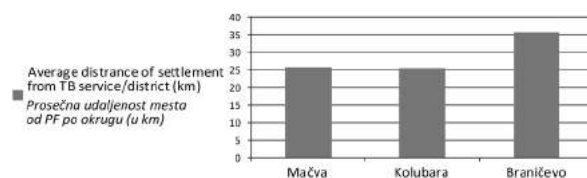
The questionnaire was filled in 18 (86%) out of 21 primary health centers. The variance analysis determined no statistically significant difference among districts in the number of settlements ( $F = 0.853$ ;  $p > 0.05$ ). The average number of out-patient departments per area was highest in Mačva (11, 1) and lowest in Kolubara district (4, 8), but this difference was not statistically significant ( $F = 0.157$ ,  $p > 0.05$ ).

**Graph 1** shows that the percentage of primary health centers with TB service in relation to the percentage of primary health centers meeting the legal requirements for the existence of the service is lowest in Braničevo, being 20%. However, the difference among districts was not statistically significant ( $\chi^2 = 0.889$ ;  $p > 0.05$ ). The number of settlements more than 20 km away from a TB service is largest in Kolubara district. The difference between districts was statistically significant ( $\chi^2 = 3.556$ ;  $p < 0.05$ ). The average distance of the settlement from the nearest outpatient department was largest in Braničevo (35.6 km), as shown in **Graph 2**.



**Graph 1.** Percentage of PHC with TB services in relation to the percentage of PHC meeting legal conditions for the existence of TB services in Mačva, Braničevo and Kolubara district

**Grafikon 1.** Procenat domova zdravlja koji imaju pneumoftiziološku službu u odnosu na procenat domova zdravlja koji zadovoljavaju zakonske uslove za postojanje službe u Mačvanskom, Braničevskom i Kolubarskom okrugu



**Graph 2.** The average distance of settlement from the TB service by district (in km) in Mačva, Kolubara and Braničevo

**Grafikon 2.** Prosečna udaljenost mesta od pneumoftiziološke ambulante po okrugu (u km) u Mačvanskom, Kolubarskom i Braničevskom okrugu



In all districts, 64.7% of the health activities in the field of TB were performed by TB specialists. In 35.3% of cases, general practitioners, pediatricians, doctors of other specialties, such as infectious disease specialist, performed these tasks. No significant differences among districts was identified ( $\chi^2 = 1.471$ ;  $p > 0.05$ ).

Health activities in the field of TB were performed by 64% of primary health centers on average in all districts (80% in Braničevo, 75% in Kolubara and 50% in Mačva) in early TB detection (82%), in prescribing anti-TB drugs (55%), in TB treatment (45.5%), whereas side effects of anti-TB drugs were not dealt with in any of these centers. The cooperation with other services related to TB control in all districts was assessed as good. The compliance of health services with the health needs was estimated as good in 58.8%. There were no statistically significant differences among districts ( $p \leq 0.05$ ).

The questionnaire reliability analysis showed that the question 2, 3 and 7 should be removed since Cronbach's alpha was low. If these questions were removed, Cronbach's alpha would be 0.394. If the question 11 was removed, Cronbach's alpha would be 0.567. The best question was 4, since its removal led to the decrease in Cronbach's alpha to 0.160. For the question 2, 3 and 7 separately, Cronbach's alpha could not be interpreted.

Factor analysis was applied to assess the validity of the questionnaire and reduction of the number of questions. The questions 8.1, 11.1 and 12 were not covered by the analysis due to insufficient availability and the same answers. The results of the analysis showed 4 components of factors that explain 80% of the variability of the questionnaire. The first component included the questions 2, 3, 7 (the question 7 was negatively related to the question 2 and 3). The second component covered the questions 4, 13 and 8, the questions 5 and 11 were in the third component and the questions 9 and 6 were in the fourth one. If the factor analysis was applied without the question 2, 3 and 7, the percentage of variability would change (81.2%) compared to the analysis including these questions.

There was a statistically significant correlation between a higher TB notification rate and a reduced coverage of municipal TB services, as proven by Spearman correlation coefficient ( $\rho = 0.445$ ;  $p < 0.05$ ).

All PHC institutions perform anti-TB preventive measures, passive TB detection based on symptoms, community nursing "patronage" visits to the TB patients, while not a single institution in any of the districts performed direct supervision of treatment and detection of adverse effects of anti-TB drugs.

## Discussion

The obtained results have shown that the average age of TB specialists in Serbia is 50 years. According to a subjective estimate of the interviewed health workers, health services in these districts satisfy the needs, with the exception of Mačva, Braničevo and

Kolubara districts, where there is the lowest coverage and accessibility to municipal TB services and where the TB notification rate is highest in Serbia. The situation should entail greater involvement of general practitioners in TB control, which is not the case according to the results.

All PHC institutions perform anti-TB preventive measures, passive TB detection based on the symptoms and community nursing visits during treatment, while not a single one is involved in direct supervision of TB treatment and detection of adverse effects of anti-TB therapy, which was not to be expected in districts less covered with TB services.

Health services in PHC are performed by 157 primary health centers in Serbia, with the network of health (first aid) stations and outpatient departments [9]; however, 84 of them perform specialized consultative health activities in the field of TB. Until several years ago, the vertical structure of specialized TB services excluded the cooperation with the general practitioners.

Within the reform of PHC system in Serbia, health institutions and services were decentralized and their status was transformed, so local municipalities took over the founding of the majority of PHC institutions [10]. General hospitals and primary health centers became organizationally independent health institutions. Former milestones of TB control in Serbia, the so-called 'anti-tuberculosis dispensaries' used to be organizationally separate units; however, they are now affiliated to the specialized consultative services at the PHC level (according to legal conditions) or to pulmonary departments in hospitals.

In order to achieve a more efficient user-oriented PHC, the 2008 healthcare reforms introduced the concept of 'chosen general practitioner', who would be responsible for the overall patient's health, including TB. According to the patients needs, the chosen doctor refers the patient to all consultative specialized examinations, including TB, thus disabling the direct access to TB services. Prescribing drugs has become the exclusive right of the chosen doctor, and when necessary, the doctor can transfer the right to prescribe anti-TB drugs to a TB specialist [11]. It can be concluded that the situation in Serbia related to anti-TB drug prescribing varies in each district.

Regulations on specialization of health workers and associates (Official Gazette of RS No. 10/13) from the 7<sup>th</sup> of February, 2013 excluded the specialization in pneumophysiology. After the natural staff outflow, the specialized consultative services in the field of TB will be provided by specialists of internal medicine at the primary (according to legal conditions) and secondary level, and pulmonary specialists at the tertiary level of health care.

The main limitation of this study is that it was not conducted on a representative sample.

Other limitations include the subjective evaluation of health workers, on which the study was

based, as well as the existence of responses to certain questions from the questionnaire whose adequate interpretation and comparison was not possible due to open-ended questions.

### Conclusion

Primary health care performs anti-tuberculosis preventive measures, passive tuberculosis detection based on symptoms and community nursing visits, while for other interventions defined as primary health care tasks, the patients are referred to specialized tuberculosis service. This study has confirmed the hypotheses and proved that the tuberculosis notification rate is higher in the districts where the cov-

erage of municipal tuberculosis services is reduced, as well as that the role of primary health care in tuberculosis control does not differ from districts where the coverage in tuberculosis services is better.

Therefore, the first medium-term task of tuberculosis program in Serbia should be strengthening of primary health care in order to perform the roles as defined by the existing regulatory framework.

In the long term, further decrease in tuberculosis rate will reduce the need for specialized tuberculosis services and need for strengthening primary health care for diagnostics, treatment and follow up of tuberculosis through continuous medical education.

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