

# Differences in the knowledge about tuberculosis among general urban population and student population in Zagreb

## Razlike u znanju o tuberkulozi među općom urbanom i studentskom populacijom u Zagrebu

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**Abstract. Aim of study:** The aim of this study is to find out the population knowledge, the most common misconceptions about tuberculosis (TB) and target groups for educational programs. **Methods:** Through a questionnaire (13 questions about the extent of the disease, symptoms, modes of transmission, risk factors and the curability of tuberculosis) respondents were pre-tested in the Croatian capital city Zagreb. Respondents (N = 328) were divided into groups ranked by two city locations: the Student Centre location, with the expected predominance of the younger student population (N = 157) and the main square area, with the expected predominance of people of different ages and professions (general urban population) (N = 171). **Results:** The general urban population group showed better knowledge in questions considering droplet transmission, smoking and excessive alcohol use as a risk factor for TB and description of TB as a primary infectious disease and curable disease. Many of the respondents (almost 20%) did not know the symptoms of manifest TB. Some respondents had misconceptions and perhaps the most important is that TB happens to someone else. **Conclusion:** Misconceptions about TB need to be eliminated through focused health education. Improvement in knowledge about TB can be achieved especially among student (young) population.

**Key words:** Croatia; knowledge; tuberculosis

**Sažetak. Cilj:** Cilj istraživanja bio je upoznati znanje stanovništva o tuberkulozi i najčešće zablude o njoj i otkriti ciljne skupine za provedbu potencijalnih edukativnih programa. **Ispitanici i metode:** Upitnik koji se sastoji od 13 pitanja o proširenosti bolesti, simptomima, načinima prijenosa, čimbenicima rizika i izlječivosti tuberkuloze; ispitanici su testirani u Zagrebu. Ispitivanje je provedeno među 328 ispitanika na dvije gradske lokacije: u Studentskom centru (N = 157), kao mjestu na kojem se očekuje da će predominantno prevladavati mlađa studentska populacija, i glavnom zagrebačkom trgu, gdje se očekuje da će biti ljudi različite dobi i zanimanja, tj. uzorak opće urbane populacije (N = 171). **Rezultati:** Uzorak opće urbane populacije pokazao je bolje znanje o kapljičnom prijenosu bolesti, rizičnim čimbenicima za tuberkulozu kao što su pušenje cigareta i alkohol, te definiranju tuberkuloze kao primarno zarazne i izlječive bolesti. Mnogi od ispitanika (gotovo 20 %) nisu znali što su simptomi tuberkuloze, a kao možda najvažnija zablude istiće se kako se tuberkuloza događa nekome drugome. **Zaključak:** Kroz ciljane edukativne programe trebalo bi raditi na uklanjanju zablude o tuberkulozi i poboljšanju znanja, posebice među studentskom populacijom.

**Ključne riječi:** Hrvatska; tuberkuloza; znanje

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## INTRODUCTION

Tuberculosis (TB) is still an important public health problem worldwide. Croatia is an EU central European country of nearly five million citizens. Considering the number of new cases of TB, Croatia is a middle TB incidence country. In the year 2005 (when this study was conducted) and in 2006 the incidence of TB was 26:100.000, 22:100.000 in 2007, 23:100.000 in 2008, 20:100.000 in 2009 and 17:100.000 in 2010<sup>1</sup>.

The population of Croatia has several positive factors associated with the low incidence of tuberculosis, including a small number of HIV-positive individuals, a low rate of resistant strains of *Mycobacterium Tuberculosis*<sup>1</sup>, and a health care system available to everyone.

Unlike the countries with the high incidence of TB, awareness about the disease in the countries with the middle incidence might be dormant. We are witnessing media reporting TB cases as an extraordinary surprise and unexpected in the modern world<sup>2</sup>.

Informing the population about TB leads to prevention and early detection of patients. In order to better inform, it is necessary to recognize the current knowledge about TB in the population. Only in this way can we act on misconceptions about TB, and point educational programs to target groups<sup>3</sup>.

The aim of this study was to investigate the awareness of population, the most common misconceptions about tuberculosis and target groups for educational programs.

## PARTICIPANTS AND METHODS

### Participants

The student population (Student Centre group) included 157 respondents and we expected them to be younger than the second group. The urban general population (Flower Square group) included 171 respondents and we expected them to be older than the student population. A survey was conducted during March 2005, at the time when a TB Project was conducted: "Improvement of tuberculosis control in Croatia – education programme for chest physicians, general practitioners and community health providers" by Institute

Open Society Croatia, Ministry of Health of Republic of Croatia and University Hospital for Lung Diseases "Jordanovac", Zagreb, Croatia).

### Methods

We designed a questionnaire consisting of 13 questions, which was pretested on respondents. The occasion was the "World Day Against Tuberculosis", on the 24<sup>th</sup> March 2005. The respondents were random passers pretested: in front of the

Misconceptions about TB are still present: "it is a disease of poor people"; "it happens because of supercooled blood", "dirt, poverty", "bad food, standard, lack of information", "those who have it can only blame themselves".

Student Centre (where is expected to be predominantly younger student population) and main centre square – Flower Square (where are expected to be people of different ages and professions).

We compared knowledge among the groups.

Written surveys (questionnaires) were distributed by students of medicine who also recorded the descriptive answers. Surveys were anonymous and respondents themselves circled simple answers.

For questions about the extent of the disease, symptoms, modes of transmission, risk factors and the curability of tuberculosis at the 4 questions, 4 or 5 answers were offered in which was necessary to focus on one answer in addition to other, less valuable answers; whereas on the other questions offered answers were "Yes/No/I do not know." The answer to the thirteenth question ("How do you see tuberculosis?") was purely descriptive and medical students recorded the answers.

Survey questions were designed based on experience of the first author, taking into account the importance and common public misconceptions about tuberculosis.

### Data analysis

The thirteenth question descriptive answers about perception of TB were excluded from scoring and were processed separately because of the importance of descriptive responses.

Respondents were divided into groups ranked by gender and location at which they completed the questionnaires. We also observed age of respondents in both groups because we assumed that the student population will be younger than the general urban population pretested on Flower Square. A score of one was given to correct responses, and zero for incorrect responses. Based on the mean score of correct answers (mean=8), the respondents were categorised into sufficient informed ones (score above mean value, TB score  $\geq 9$ ). Statistical evaluation of the data was carried out using STATISTICA, ver. 7.1 (StatSoft Inc., OK, USA). The Pearson chi-square test was used to detect statistically significant differences between these groups.

## RESULTS

Of the 328 respondents, 144 (44 %) were male, median age  $26.7 \pm 15$  years and 182 (56 %) were female, median age  $26.9 \pm 15$  years. Sufficient knowledge showed 170 (51.8 %) respondents who answered correctly at least on 9 questions. There were no statistically significant differences in general knowledge between sex and location groups, as shown in Table 1, but we found statistical significance among individual questions. Student Centre group included 157 respondents of who youngest respondent had 18 years, oldest one 32 years and median age was 21.57 years.

The Flower Square group included 171 respondents with median age of 31.72 years of who oldest respondent had 82 years. In that group 45 respondents were younger than 20 years of age. 76.83% of the respondents placed Croatia in the middle incidence TB country, with statistical significant within female group ( $p = 0.019$ ) and those pretested on Flower Square ( $p = 0.004$ ) (Question 2).

In the affirmative form that TB is an infectious disease responded majority of respondents (83.23 %) (Questions 1 and 4) and to describe tuberculosis as a primary infectious disease chose only 18.6 % of respondents (61 persons) of who those pretested on Flower Square answered more correctly.

Pearson Chi-square for the Flower Square group of respondents who known that TB is an infectious disease was 9.19,  $p = 0.027$ . What is tuberculosis did not know 10 participants (3.06 %). Droplet transmission selected as an answer 238 participants (72.56 %), of who better were informed urban general population ( $p = 0.004$ ) than student population (Question 6).

That TB is not spread by contact knew 290 respondents (88.41 %) (Question 5).

Contact as a mode of transmission chose only six respondents (0.02 % of total respondents), while seven (0.02 %) respondents chose sexual intercourse as a way of transmitting tuberculosis (Question 6).

**Table 1** Differences in TB knowledge among respondents according to survey location and sex.

	No (%)			P-value
	total	Uninformed	Informed	
Location				$p = 0,746$
Flower Square	171 (52,1)	81 (51,3)	90 (52,9)	
Student Centre	157 (47,9)	77 (48,7)	80 (47,1)	
Sex				$p = 0,319$
Female	182 (55,8)	89 (56,7)	93 (55,0)	
Male	144 (44,2)	68 (43,3)	76 (45,0)	

**Table 2** What is the most common symptom of tuberculosis?

	Flower Square	Student Centre	Total
Cough	57 (33,33)	58 (37,18)	115
Fever+Cough	20 (11,70)	24 (15,38)	44
Weakness+weight loss	32 (18,71)	9 (5,77)	41
Bloody sputum	30 (17,54)	33 (21,15)	63
I do not know	32 (18,71)	32 (20,51)	64

271 respondents (82.62 %) knew that TB is not inherited disease, but 23 respondents thought it was a hereditary disease (0.07 %) (Question 3). Among of the offered common symptoms -cough, fever, weakness (Question 12); answer "I do not know" chose almost 20 % (64) of respondents (Table 2). That TB is curable answered 290 (88.41 %) participants. The general urban population was certainly better informed ( $p = 0.03$ ), because 90.08 % of them answered correctly and only 8 respondents from that group incorrectly answered on that question.

84 % of student population knew that tuberculosis is a curable disease (Question 7).

311 (94.81 %) of respondents were aware that untreated tuberculosis can be fatal. This was a question with the highest percentage of correct answers (Question 8).

Correct answer about smoking as a risk factor was given by 68 % of respondents. Of them only 59.12 % young people knew that, unlike older ones who showed better knowledge, (76.79 % answered correctly,  $p = 0.001$ ) (Question 10).

The fact that excessive alcohol use can facilitate the occurrence of tuberculosis knew only 50.6% of respondents (166/328), with the significant statistical difference between young people (only 37.33 % of correct responses – 28/75) and older ones (54.58 % for the correct answer – 137/251,  $p = 0.001$ ) (Question 11).

That the diseases such as diabetes and chronic kidney disease are going with the higher risk for TB knew 62 % of respondents, with no statistically significant differences between groups (Question 9). In Table 3 are visible all 13 questions on which respondents answered by taking into account the group they belong to. On 13<sup>th</sup> question respondents gave descriptive answers and perhaps the most important misconception about tuberculosis is that it happens to someone else. Therefore 29 respondents stated that it is a disease of poor people, 110 respondents perceived it like a "a terribly serious disease," and 97 respondents claimed that it is a "disease like any other." Interesting are some poetic expressions of tuberculosis like: "it happens because of super-cooled blood", "as something passed, but in the contact with people from the ghetto, I see that it

did not pass," "dirt, poverty", "bad food, standard, lack of information", "poor man", "those who have it can only blame themselves".

## DISCUSSION

This study demonstrated TB knowledge among urban general population in Zagreb, capital city of Croatia. Several previous studies investigated TB knowledge among general population – in the USA<sup>4</sup>, China<sup>5</sup>, Vietnam<sup>6</sup>; among specific popula-

Sample of student population did not show sufficient knowledge about the importance of droplet transmission, smoking and alcohol consumption as a high risk for tuberculosis. Chronic diseases, such as diabetes and chronic renal insufficiency, should be highlighted to the older age group as risk factors for developing tuberculosis.

tion groups – Roma in Serbia<sup>7</sup>, pastoral communities in Ethiopia<sup>8</sup>, rural Vietnamese adults with a cough for at least three weeks<sup>9</sup>; among TB patients and their families<sup>10,11</sup> and among medical staff<sup>12-15</sup>. These studies were mostly performed in high TB incidence countries<sup>5,6,8-10,12,14-16</sup>.

Poor knowledge, attitudes and necessary in improvement were described in many studies<sup>4,5,8-11,13,14,16</sup>, whereas some other studies described sufficient awareness on TB despite of some misconceptions<sup>7</sup>. Final year medical students from Canada, India and Uganda<sup>12</sup> showed a satisfactory knowledge and the majority of patients in Nepal had satisfactory knowledge about signs and symptoms of TB, but low about cause and prevention<sup>17</sup>.

There is minimal information about the public knowledge in Croatia, because until now only one study about TB knowledge was conducted in Croatia (town Split)<sup>3</sup>. This investigation was created after the authors provided education through the TB Project: „Improvement of tuberculosis control in Croatia – education programme for chest physicians, general practitioners and community health providers“ lead by Sanja Popović-Grle. The Project was designed and conducted in cooperation with the World Health Or-

**Table 3** Answers on survey questions among respondents according to in which survey location group they belong

Survey	Student Centre N (%)	Flower square N (%)
* = correct answer		
<b>1. "What is tuberculosis?"</b>		
disease	60 (47,62)	66 (52,38)
infectious disease*	39 (63,93)	22 (36,07)
pulmonary disease	53 (40,77)	77 (59,23)
I do not know	4 (40,00)	6 (60,00)
<b>2. "Does tuberculosis exist in Croatia?"</b>		
Yes, it is widely spread	15 (35,71)	27 (64,29)
Yes, but not a common disease in our country*	132 (52,17)	121 (47,83)
No	8 (61,54)	5 (38,46)
I do not know	2 (10,00)	18 (90,00)
<b>3. "Is tuberculosis a hereditary disease?"</b>		
Yes	4 (17,39)	19 (82,61)
No*	131 (48,16)	141 (51,84)
I do not know	21 (65,63)	11 (34,38)
<b>4. "Is tuberculosis contagious disease?"</b>		
Yes*	131 (47,81)	143 (52,19)
No	16 (42,11)	22 (57,89)
I do not know	9 (60,00)	6 (40,00)
<b>5. "Can tuberculosis be transmitted by touching?"</b>		
Yes	5 (25,00)	15 (75,00)
No*	141 (48,45)	150 (51,55)
I do not know	11 (64,71)	6 (35,29)
<b>6. "How does tuberculosis transmit?"</b>		
Cough, droplet, air*	109 (45,99)	128 (54,01)
Contact (by touching)	1 (16,67)	5 (83,33)
Blood transmission	2 (50,00)	2 (50,00)
Sexual intercourse	2 (28,57)	5 (71,43)
I do not know	43 (58,11)	31 (41,89)
<b>7. "Is tuberculosis curable?"</b>		
Yes*	135 (46,55)	155 (53,45)
No	3 (27,27)	8 (72,73)
I do not know	18 (69,23)	8 (30,77)
<b>8. "Can untreated tuberculosis be fatal?"</b>		
Yes*	151 (48,40)	161 (51,60)
No	2 (28,57)	5 (71,43)
I do not know	4 (44,44)	5 (55,56)
<b>9. "Can other chronic diseases (diabetes, renal failure) contribute to risk for getting tuberculosis?"</b>		
Yes *	101 (49,75)	102 (50,25)
No	15 (38,46)	24 (61,54)
I do know	41 (48,24)	44 (51,76)
<b>10. "Can smoking cigarettes contribute to risk for getting tuberculosis?"</b>		
Yes*	103 (46,19)	120 (53,81)
No	23 (48,94)	24 (51,06)
I do not know	31 (53,45)	27 (46,55)
<b>11. "Does excessive alcohol consumption contribute to risk for getting tuberculosis?"</b>		
Yes*	70 (42,17)	96 (57,83)
No	47 (51,65)	44 (48,35)
I do not know	39 (55,71)	31 (44,29)
<b>12. "What is the most common symptom of tuberculosis?"</b>		
Cough*	58 (50,43)	57 (49,57)
Fever and cough*	24 (54,55)	20 (45,45)
Weakness and weight loss*	9 (21,95)	32 (78,05)
Bloody sputum*	33 (52,38)	30 (47,62)
I do not know	32 (50,00)	32 (50,00)
<b>13. "How do you see tuberculosis?"</b>		
A descriptive answer		

ganization, Regional Office WHO European Region, with Lucica Ditiu mostly involved and very helpful, from years 2002 to 2006.

A total of 76,83 % of our respondents knew that Croatia is a TB middle incidence country. Comparing our study with the previous mentioned study done in Croatia, there are no major differences in knowledge among participants in Split and Zagreb. Both studies showed satisfactory knowledge of general population, especially the older ones.

Knowledge about the fact that TB is contagious disease was 83,23 % in Zagreb and 86 % in Split. Considering the modes of transmission, 72,56 % of participants in Zagreb responded it was drop-let transmission and 83,4 % participants in Split responded it was coughing.

Zagreb population showed some better knowledge in risk factors for TB:

- Diabetes mellitus Zagreb – 62 %, Split – 32,4 %
- Excessive alcohol use Zagreb – 50,6 %, Split – 41,5 %
- Smoking Zagreb – 68 %, Split – 61,7 %

The knowledge about TB is still not adequate in both Croatian cities, especially among the student (young) population. A study in the USA also showed that older people are more likely to answer correctly to the questions about tuberculosis<sup>4</sup>.

An alarming fact that emerged from our study is that only 37 % of young respondents knew that alcohol is a risk factor. They showed limited knowledge about the spread of TB, risk factors (smoking, alcohol) and understanding the disease (curability of TB).

Many other studies also determined low level of TB knowledge and attitudes among non-medical students in different countries, such as Serbia<sup>18</sup>, Nigeria<sup>19</sup>, Trinidad and Tobago<sup>20</sup> and India<sup>21</sup>. Comparable to students from our study, they showed inadequate knowledge about the cause and way of transmission, risk factors and main symptoms. It is important that the urban general population, especially young people, become aware of the seriousness of TB, considering the lower age limit at which they start to consume alcohol and cigarettes<sup>22</sup>. Educational programmes should be focused on risk factors and prevention. Appropriate

knowledge about TB will encourage people in making life changing decisions about predisposing factors for TB (e.g. smoking, drinking etc.).

Chronic diseases, such as diabetes and chronic renal insufficiency, should be mentioned as risk factors for TB, especially among elderly people, who are more likely to suffer from these diseases. Although we did not find statistically significant differences among respondents of different age groups, there is a general lack of familiarity in this issue.

Education of target groups will lead to the formation of proper attitudes about tuberculosis.

Currently, there are no media-based health education programmes on TB in Croatia<sup>23</sup>.

Health education in Croatia was on high level in the period between the two World Wars. The “School of Public Health” in Zagreb and “The League Against Tuberculosis” in Zagreb organised various activities (printed books, posters, lectures, film showings, anti-tuberculosis exhibitions, publication of health education materials and public manifestations) to improve the knowledge of general population, because at that time TB was a major issue in Croatia<sup>24</sup>.

Additionally, no other disease has had as much impact on world literature as TB, either through descriptions of characters who suffered from it, either through diseases of the writers. Many famous Croatian writers also died from TB. This is one of the reasons why older participants knew more about TB than the young population. Therefore, it is possible they are more aware about the *historical events*.

Cough was the most commonly stated symptom in many previous studies<sup>7,8,10</sup>, but almost 20% of our participants did not know that. Also, some misconceptions about transmission were noticed. Six respondents claimed it can be transmitted after touching a TB patient, seven of them mentioned sexual intercourse, *twenty-three* respondents claimed that it is a hereditary disease. Several studies have also reported misconceptions similar to ours in their results<sup>4,6-9</sup>. One patient claimed that tuberculosis is a disease which can be caused by patients themselves.

Unlike other studies; mystical traditional beliefs in Vietnam of four types of TB (mental – caused

by too much thinking, physical – caused by hard work, lung – caused by germs, and congenital)<sup>6,9</sup>, or beliefs like praying, closing windows at home mentioned in study in Pakistan<sup>10</sup>, insect bites mentioned in study from USA<sup>4</sup>, shaking hands<sup>7,10</sup>, misconceptions that TB is spread by sharing eating utensils<sup>11</sup> were not noticed in answers of our participants.

Perhaps the most important misconception in our study about TB is that it happens to someone else, because some respondents said it is a disease of the poor people – something that happens if you are in contact with people who live in the ghetto.

Several *misconceptions* often prevent the acceptance of TB patients and these misconceptions *should be corrected*. Misconceptions lead to limited knowledge, which in turn leads to *the* creation of a *stigma* for TB *patients*. After receiving proper information about the modes of transmission and risk factors, anyone can come to the conclusion that TB can happen to everybody.

*Even though the stigma* and discrimination associated with TB was described in one previous Croatian study, which showed that almost 40 % of respondents would not feel comfortable being close to TB patients and 10 % of them would be ashamed and keep it from society if they were TB patients<sup>23</sup>; we do not believe that the above recorded impressions of TB in our study burden and isolate TB patients from society. We also assume that they would not delay seeking medical help. Very high awareness among participants about TB as a curable disease and the potential mortality of untreated TB seems to be a good enough reason for not *delaying* to seek *medical* care. Further studies are recommended to develop awareness about the disease.

Our study does have some limitations, because we did not use a standardised questionnaire. We wanted to give our participants a simple questionnaire that takes little time to fill, because we believed we would get better feedback. We also believe *that our questionnaire includes questions* that are relevant, important and interesting for participants, and also for us to find out about misconceptions and TB knowledge among the general population.

## CONCLUSION

Several misconceptions were highlighted regarding our study groups. The knowledge about TB transmission is not satisfactory. Additionally, too few participants knew TB is a contagious disease that can be spread through droplet transmission. Additionally, many of the respondents (almost 20 %) did not know or were uncertain about the symptoms of manifest TB.

The student population group did not know sufficiently about the importance of droplet transmission, smoking and alcohol consumption as high risk factors for TB. Considering the lower age limit at which the young start to consume cigarettes and alcohol, they should be informed and educated about it<sup>22</sup>. The information that chronic diseases are a risk factor for TB, such as diabetes and chronic renal insufficiency, should be highlighted to the older age group, because these diseases are common in this population.

It is unlikely that the recorded TB impressions burden and isolate TB patients from society or that they would delay seeking medical help. The very high awareness that untreated TB is associated with potential mortality is satisfactory and seems to be a good motivating factor for not delaying seeking for medical help. The awareness that tuberculosis is a curable disease could also contribute this. However, what could delay seeking for medical help, could be the low level of recognition of the most common symptoms of TB.

In conclusion, education of target groups will lead to the formation of proper attitudes about TB.

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