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# **KNOWLEDGE, ATTITUDE AND PRACTICE SURVEY AMONG HIGH RISK GROUPS AND GENERAL POPULATION IN GEORGIA**

## **REPORT**

**Georgian Maternal and Child Care Union (MCCU)**

**In collaboration with National Center for Disease Control and Public Health**

**2012**

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## LIST OF ACRONYMS

<b>DOT</b>	Directly observed therapy
<b>GHRN</b>	Georgian Harm Reduction Network
<b>HCW</b>	Health care worker
<b>HIV</b>	Human immunodeficiency virus
<b>IDU</b>	Injecting drug user
<b>IRB</b>	Institutional Review Board
<b>KAP</b>	Knowledge, attitudes and practice
<b>MCCU</b>	Maternal and Child Care Union
<b>MDR TB</b>	Multi drug resistant tuberculosis
<b>NCDC</b>	National Center for Diseases Control
<b>PHC</b>	Public Health Center
<b>SMS</b>	Short text message
<b>TB</b>	Tuberculosis
<b>TST</b>	Tuberculin skin test
<b>WHO</b>	World Health Organization
<b>XDR-TB</b>	Extensively drug resistant tuberculosis

## EXECUTIVE SUMMARY

The survey was conducted to assess the knowledge, attitudes and practices related to TB among high risk populations and general public in Georgia.

A cross sectional study design was used for the survey. In order to obtain nationally representative sample, the survey has been conducted in Tbilisi and different regions of Georgia: Adjara, Samegrelo, Imereti, Kvemo-Kartli and Kakheti regions. Target population for the survey included the following groups: TB patients currently on treatment, post TB patients (both cured and default), contacts of active TB cases, individuals recently released from prison, drug and alcohol users, patients with immunosuppressive diseases (including patients with HIV/AIDS, patients with diabetes mellitus and patients on dialysis), health care providers, university students and teachers (as representatives of general public).

Random sampling method with different sampling frames was used for all target groups except drug and alcohol users where snowball sampling technique was utilized. In total 1,599 study participants were surveyed including: 438 subjects from the high risk groups, 400 subjects from the general population (students and teachers), 360 subjects from TB-infected population (including 180 TB patients currently on treatment and 180 post-TB patients) and 401 health care workers. For the specific high risk-groups, the following numbers of subjects were studied: 120 contacts of active TB cases, 130 individuals recently released from prison, 128 drug and alcohol abusers and 60 patients with immunosuppressive diseases (including 20 patients with HIV/AIDS, 20 with diabetes mellitus and 20 dialysis patients).

Study participation was voluntary. Individuals willing to participate in the survey signed an informed consent form and then were enrolled in the study. Data were collected through face-to-face individual interviews by specially designed questionnaires. Data entry, management and statistical analysis were conducted using statistical package SPSS v.20.0.

### Key Findings

#### *High risk groups and general public (students/teachers)*

- Only half of the respondents knew about the availability of free access to diagnosis and treatment of TB infection in the country
- Among different target groups students were most likely to give wrong answers to TB knowledge questions than representatives of other groups. For example, 18% of students *do not consider* TB as contagious diseases versus 1.6% of drug users, 3.5% of TB contacts and 9.9% of former prisoners

- 20.7% of individuals recently released from prison and 45% of patients with immunosuppressive diseases consider that only people who have been in prison are at risk of TB infection.
- Around 20% to 50% of respondents in different target groups didn't know TB symptoms.
- About 10% to 20% of surveyed individuals in different target groups reported that they don't know how TB is treated or think that TB is cured by herbal remedies, home rest without medicines and good nutrition
- Proportion of respondents reporting that they had ever received self treatment with anti-TB medications ranged between 9% to 22% in different target groups.
- The main reason for not seeing a doctor, when symptoms potentially related to TB occur, was uncertainty regarding where to go.
- Among students/teachers only 37.2% stated that they will not try to hide their illness from others.
- Self-perceived risk of getting TB was highest among IDUs (82%) and lowest - among students (45%)
- Majority of participants wish to receive more information on TB (78%). The highest information willingness rate was observed among patients with immunosuppressive diseases (91%) and the lowest among former prisoners (60%)
- All groups of study subjects named TV as the preferred information source (52.5%) except contacts of active TB cases and individuals recently released from prison, for which health care workers were the best channel to receive detailed information on TB.

#### *Patients with active TB and post-TB patients*

- Only 79.4% of TB patients currently on treatment know that their treatment will last 6 months or more, 11.7% do not know the duration of treatment, 7.1% think that it will last from 3 to 5 months. 86% of patients plan to end the treatment after completing the treatment regimen prescribed by TB physician. 6% of patients will end the treatment straight after their symptoms go away. Another 4.4% thinks that he/she can end the treatment at any time.
- 71.1% of TB patients identified correctly DOT (Directly Observed Therapy), 2.8% thinks that it is a free of charge treatment, and 25% do not know the meaning of the DOT.

- Residence was important determinant of knowledge about the treatment among respondents with active TB. 82.7% of study population living in urban area knows the length of treatment compared to 58.3% of individuals who live in rural areas. Understanding of DOT treatment is also higher in urban areas (75.6%) rather than in rural areas (41.7%).
- 32.1% of post TB patients who did not hide their diagnosis experienced a negative change in relationship with other people.

### *Health Care Workers*

- **Only:**
  - 44% of HCWs understand that tuberculosis can affect any human organs.
  - 42% of HCWs consider special respirator as an effective prevention measure to avoid TB exposure.
  - 8% of HCWs consider negative pressure room as a measure for the Mycobacterium exposure prevention.
  - 75.8% of HCWs knew the correct duration of TB treatment.
  - 32% of HCWs recognized active contacts of TB patients, drug users and HIV positive people as the risk-groups for getting active TB.
  - 8% of HCWs consider children under 5 as TB vulnerable population. Among pediatricians, only 11% answered positively on this question.
  - 86.5% of HCWs knew that TB treatment in Georgia is free of charge.
- 38% of the HCWs did not know about the DOT method.
- More than half of HCWs did not know the definition of the MDR tuberculosis. High proportion of HCWs at surgical facilities (69%) responded that they did not know what the meaning of MDR TB was.
- 15% of HCWs don't know what does TST result means.

## I. BACKGROUND

Tuberculosis (TB) is a major public health problem and a leading cause of infectious disease-related morbidity and mortality worldwide. Approximately 2 billion individuals, which is nearly a third of the world population is infected with Mycobacterium tuberculosis, causing latent TB [1]. According to WHO estimates, in 2010 there were 8.8 million incident cases (128 cases per 100,000 population) of tuberculosis and 1.1 million deaths due to TB in the world [2].

The disease burden varies significantly among different countries and continents. The countries with high rates of TB (100 or more cases per 100,000 population) are located in Sub-Saharan Africa, South-east Asia and Former Soviet Union (FSU). Intermediate rates of TB (26 to 100 cases per 100,000 population) are seen in South America and Eastern Europe. United States and Western Europe represent countries with low rates of TB (less than 25 cases per 100,000 population).

More than 80% to 90% of TB cases occur in developing countries. Low socio-economic conditions, poor nutrition, lack of adequate health care system, poor infection control has been the traditional risk factors for the spread of TB in developing countries.

The emergence of HIV has greatly influenced and altered the TB epidemics worldwide and especially in developing world. HIV and TB co-infection increases the morbidity and mortality from both diseases and substantially enhances the TB spread. Co-infected individuals have nearly 30 times increased risk of developing active TB than persons without HIV. Out of 8.8 new cases of TB yearly, 1.1 occurs in people living with HIV. Approximately 82% of TB-HIV co-infection occurs in sub-Saharan Africa. TB represents the number one killer among HIV positive patients, causing up-to one fourth of deaths in that population [3].

Another major driving force of TB epidemics is increasing antimicrobial resistance. Emergence of the multidrug resistant (MDR) strains (resistant to the most effective anti-TB drugs: isoniazid and rifampicin) and extensively drug resistant TB (XDR-TB) strains that are resistant not only to isoniazid and rifampicin, but also to fluoroquinolones and second-line injectable drugs (amikacin, kanamycin or capreomycin) makes TB treatment very difficult, challenging and often impossible. It also significantly increases cost of treatment and requires well developed laboratory support which decreases the availability of such therapy for developing countries. A recent report on MDR TB estimated that there were 650,000 case prevalence in 2010, within 27 countries, including Georgia, which are reported as high MDR TB burden countries. The mortality rate reached 150,000 deaths per year in 2008. 69 countries had reported XDR-TB cases and estimated incidence of XDR-TB is 25,000 annually [4,5]. The fatal outcome among XDR TB patients are very high even with providing available treatment reaching in certain population 100%. The hypothesis that most of the MDR and especially XDR cases occurred in previously treated patients was challenged by the highly fatal outbreak of MDR and XDR TB in South Africa [6]. The outbreak investigation showed that MDR/XDR TB strains can be effectively transmitted in the population, especially among HIV infected individuals.

Although we have been witnessing slowly declining trend of TB incidence during last decade, after it has peaked in 2003, the emergence of MDR/XDR TB threatens with resurgence of TB epidemic.

TB has emerged as a serious public health problem in Georgia. Inadequate funding, poverty, large numbers of internally displaced persons and a collapse of public health infrastructure following the breakup of the Soviet Union have all contributed to the resurgence of TB in Georgia [7]. In 2010, there were 4,674 new cases were reported. With the incidence rate of 107 cases/100,000 persons, Georgia is among the countries with high TB rate. The overall notification rate (prevalence) is 118 cases/100,000 persons [2].

Georgia has been recognized as one of the countries with the highest incidence of MDR TB. National TB Program (NTP) indicates that more than 10% of new TB cases and 40% of re-treatment cases have MDR-TB. XDR TB accounts for 1% of new cases. It is estimated that each untreated smear positive TB patient (i.e., patients with infectious pulmonary TB) can infect about ten close contacts [8].

Many different factors are contributing to the spread of resistant TB cases in Georgia. Traditionally poor infectious control (IC) system, lack of negative pressure rooms and appropriate respirators, poor knowledge among health care providers and patients regarding the need and proper use of IC measures undoubtedly increase the transmission rate. This is especially true for the penitentiary system, where the overcrowded facilities with inadequate recourses create a perfect environment for the spread of TB, including M/XDR forms.

Early detection and appropriate management of sensitive or resistant TB cases is the mainstay of TB control. Unfortunately inadequate knowledge among some of the health care workers who are involved in TB diagnosis and treatment often delays and/or provides inadequate or suboptimal treatment, thus promoting resistance. General population often lacks enough information about TB in order to seek physicians' attention in a timely manner, thus delaying prompt laboratory and therapeutic interventions.

Insufficient resources, especially in regions causes disruptions or sometimes even absence of Directly Observed Therapy (DOT), which is vital for successful TB management and is an important tool in avoiding emergence of resistant strains.

Default from TB treatment is one of the main challenges for every country struggling with TB epidemics. The results of the routine surveillance in Georgia for 2008 X/MDR patients' cohort showed 20% of default from treatment, this means that every 5<sup>th</sup> patient interrupted TB treatment [9]. This can have deleterious effect on X/MDR TB control, since noncompliance creates new resistance mutations and promotes the spread of X/MDR strains in the community.

Advocacy, communication and social mobilization (ACSM) are three distinct sets of activities, which have common goal - behavioral change, which can lead to improved case detection and treatment. In order to achieve sustainable social and behavioral change, ACSM interventions need to be evidence-based.

A **Knowledge, attitudes and practice (KAP)** survey is a representative study of a specific population to collect information on what is known, believed and done in relation to TB. A KAP survey can identify knowledge gaps, cultural beliefs or behavioral patterns that may facilitate understanding and action, as well as pose problems or create barriers for TB control efforts and thus help to plan, implement and evaluate ACSM activities.

The most recent KAP survey in Georgia was conducted in 2004 by USAID funded TB treatment, control and prevention project. The study involved 1000 individuals residing in Tbilisi. According to 2004 survey results there was a poor knowledge and high levels of stigma about TB in Tbilisi. It is important to update data from 2004 survey and conduct more profound and nationally representative assessment of knowledge, attitudes and practices related to TB among high risk populations and general public.

## **II. GOAL AND OBJECTIVES**

The goal of the survey was to evaluate knowledge, attitudes and practices about TB disease and TB disease management in Georgia.

Specific objectives of the survey included:

- Collection of the data on awareness, knowledge, attitude and practices about TB in different target populations.
- Determination of possible barriers and favorable factors that influence knowledge, attitudes and practices related to TB.
- Revealing preferred sources of information on TB and determine the most trusted and popular channels for Ad impact.
- Evaluation of the attitudes and experience of TB related stigma and discrimination.

### III. METHODS

#### Study design and target population

A cross sectional study design was used for the survey. In order to obtain nationally representative sample, the survey has been conducted in Tbilisi and different regions of Georgia: Adjara, Samegrelo, Imereti, Kvemo-Kartli and Kakheti regions. Target population for the survey included the following groups: individuals recently released from prison, drug and alcohol users, post TB patients (both cured and default), contacts of active TB cases, TB patients currently on treatment; patients with HIV/AIDS, patients with diabetes mellitus, patients on dialysis (as immunocompromised group), health care providers and general public.

#### Sampling

Different sampling frames were used for each target group:

**General public** has been reached through the universities. A complete list of universities with the overall numbers of students and academic personnel has been obtained from the Ministry of Science and Education. The names of universities were rearranged at random in a new list. Probability Proportional to Size (PPS) sampling technique was used for the selection of universities where the study had to be conducted. By applying PPS sampling methodology larger clusters (in this case university) have bigger probability of being sampled at the first stage. By the sampling of exactly the same number of study subjects per cluster, subjects in larger cluster had smaller probability of being sampled. As a result, the second stage compensated the first stage and each study subject in the population had the same probability of being sampled. This led to the approximate equality of overall weights for each cluster.

From each university visited complete lists of students and teachers were obtained and rearranged at random in a new list. From this new list study subjects were selected by simple random sampling approach and were asked to participate in the survey. Willing potential participants were screened for eligibility criteria and were enrolled in the survey.

**TB patients currently on treatment and post TB patients** were randomly sampled from the register obtained from the National Center for Tuberculosis and Lung Diseases. Contacts of active TB cases were selected from the family members of TB patients currently on treatment enrolled in our survey. They were identified using NCDC TB surveillance data base.

The study sample of **healthcare providers** included physicians, nurses and managers from different hospitals and clinics in Tbilisi and other regional cities. A complete list of hospitals and clinics with the overall numbers of medical personnel has been obtained from the Ministry of Labor, Health and Social Affairs. Probability Proportional to Size (PPS) sampling technique was used for the selection of the medical institutions for inclusion in the study. The lists of medical personnel working at each

medical institution were obtained from the hospital/clinic authorities. In the selected medical institutions study participants were selected by simple random sampling from the list of the staff in each hospital/clinic.

**Individuals recently released from prison** were randomly selected from the complete list of individuals discharged in the period of January 2011 to April, 2012 provided by the Ministry of Corrections and Legal Assistance of Georgia.

**Drug and alcohol users** were selected using snowball sampling method by social workers at Georgian Harm Reduction Network (GHRN). Drug user was defined as an individual who had 3 or more injections during the last 30 days, while the alcohol user was defined as an individual who consumes 40g or more alcohol per day or with clinical diagnosis of an alcohol use disorder. These definitions were made based on personal communication with IDU experts in Georgia.

**Patients with HIV/AIDS** were randomly selected from the list of HIV infected individuals obtained from National Center for Disease Control and Public Health (Database of HIV screened individuals).

**Patients with diabetes mellitus** were randomly selected among Diabetes State Program Beneficiaries.

**Patients on dialysis** were randomly selected from the complete list of patients obtained from the database of the National Dialysis program conducted by Dialysis, Nephrology and Kidney Transplantation Union of Georgia.

Study participants' recruitment sites are listed in the Table A below.

**TABLE A . DATA COLLECTION SITES FOR THE TARGET POPULATIONS**

<b>Target subjects</b>	<b>Data collection sites</b>
TB patients	National TB Center
Healthcare providers	Hospitals and Clinics
Students and teachers	Universities
Individuals released from prison	Probation bureaus
Post TB patients	Household
TB contacts	National TB Center/ Household
HIV positive patients	NCDC / Household

Drug and alcohol users	Harm Reduction Network
Diabetes mellitus patients	Diabetes Center
Patients on dialysis	Dialysis, Nephrology and Kidney Transplantation Center

## Sample size

Sample size calculation was done by the methodology for descriptive studies for the expected proportion 0.50 (maximizing the sample size), degree of accuracy (margin of error)  $\pm 0.05$ , the confidence level 95% and corresponding populations sizes.

By this approach it has been estimated that at least 384 subjects should be selected from the general population, minimum 355 subjects among TB-infected population (TB patients currently on treatment and post-TB patients) and at least 378 among health care providers to have a representative samples for the corresponding populations.

The actual numbers of the recruited study participants were as follows: 438 subjects from the high risk groups, 400 subjects from the general population (students and professors), 360 subjects from TB-infected population (including 180 TB patients currently on treatment and 180 post-TB patients) and 401 health care workers.

For the specific high risk-groups, the following numbers of subjects were studied: 120 contacts of active TB cases, 130 individuals recently released from prison, 128 drug and alcohol abusers and 60 patients with immunosuppressive diseases (including 20 patients with HIV/AIDS, 20 with diabetes mellitus and 20 dialysis patients).

In total 1,599 study participants were surveyed.

## Data collection

Data were collected through face-to-face individual interviews by specially designed questionnaires. Four different questionnaires were developed for the different target groups:

- Active TB patients
- Post-TB patients
- Healthcare workers
- All other groups

Key elements of the questionnaires included the following sections:

- Socio-demographic characteristics
- Awareness, perception and knowledge about:
  - TB symptoms
  - TB transmission
  - TB risk factors
  - TB prevention
  - TB diagnosis and treatment, treatment by DOTS method
- Attitude towards the disease (TB), toward medical treatment of TB
- Attitude and experience of stigma and discrimination related to TB
- Sources of information on TB, media preferences, etc.

Epidemiologists from Maternal and Child Care Union, NCDC Central and Regional Branches and National TB Center were conducting the interviews for the survey. At the beginning of the study all interviewers responsible for administering the survey questions had the 2-day trainings consisting of classroom instruction, practice and pre-testing of all survey procedures, including recruitment, obtaining informed consent and interviewing. During the training interviewers had the opportunity to revise and discuss each question from the structured questionnaires specially designed for different target groups and the informed consent form in order to ensure clarity and cultural appropriateness. Besides, during the training they participated in role-playing interviews to ensure consistency.

### **Ethics**

Study participation was voluntary. Each study participant has been provided with the information about the purpose, methods, procedures, risks and benefits of the survey. Those individuals who agreed to participate in the survey signed an informed consent form and then were enrolled in the study.

Prior to the start of the survey the study protocol was approved by the Institutional Review Board of MCCU (IRB 00006752).

### **Data analysis**

Data entry, management and statistical analysis were conducted using statistical package SPSS v.20.0. Descriptive statistics procedures for complex samples were applied for the evaluation of the study variables in the target populations. The study variables were compared between different study groups using t-test statistic for quantitative and chi-square tests for categorized data. Multivariate models were developed to evaluate simultaneous impact of the studied factors on the outcome variables using multivariate regression methods.

## IV. RESULTS

### 1. Knowledge, attitudes and practice about TB among high risk groups and representatives of general sample

#### 1.1. Individuals recently released from prison

##### *Socio-demographic characteristics of the individuals recently released from prison*

In total 130 individuals released from prison in recent years were included in the survey. Table 1.1 summarizes demographic and socio-economic profile of respondents recently released from prison. The vast majority of former prisoners were males (93.1%). Almost half of the respondents were aged between 30 to 50 years (Figure 1). Forty percent of individuals recently released from prison were single and slightly higher proportion (46.2%) reported as currently married (Figure 2). As shown in Table 1.1 the majority of respondents (45.4%) in this target group had only 12-year education. About 40% of study subjects reported having studied up to university or post-graduate degree (Figure 2). Most of the respondents in this target group resided in Tbilisi (45.5%), while other five regions were represented equally with slightly higher proportion of individuals from Shida Kartli region. By residence, the vast majority (80.8%) of respondents lived in urban areas. Almost 60% of former prisoners had families consisting of 2 to 4 members including themselves, followed by 34% of respondents who declared that the number of their family members were more than 4. With respect to occupation, majority of respondents (56.9%) were temporarily unemployed, followed by currently employed (22.3%) and never employed (17.7%) individuals. More than 40% of respondents live in families with income between 200 and 500 GEL per month. We calculated economic status of families by dividing family income by the number of family members. As presented in Table 1.1 most of former prisoners' families have lowest economic status where family income per person is less than 100 GEL.

##### *Knowledge about TB among individuals recently released from prison*

All the respondents (N=130) were asked whether they have heard about TB. The results of the survey showed that 93% of individuals recently released from prison reported of having heard about TB (Figure 4). Respondents who provided positive response (N=121) were further asked about the sources from where they had heard about TB. Results are summarized in Table 1.7. Talking with family members, relatives, friends, colleagues or neighbors was one of the main sources of information on TB among individuals from this group as more than one third of respondents (32.2%) had heard about TB from this source. The second main source of information reported by 29.8% of former prisoners was the presence of TB in prison. TV appears to be the important source of information about TB for 16.5% of respondents, followed by presence of TB in family, relatives, friends, neighbors or colleagues (13.2%). About 15% of respondents could not identify any source of information about TB (Table 1.7).

On the question "How serious a health problem do you think is TB in Georgia?" more than half of respondents answered that TB is very serious problem for the country. TB as a very dangerous

disease was considered by 45.5% of former prisoners, followed by 43% of study subjects who thought that TB is dangerous (Table 1.7).

The fact that TB is contagious disease was known by majority (90.1%) of individuals released from prison in recent years. About 3% of respondents thought that TB is not contagious and nearly 7% did not have any answer on this question (Table 1.7) (Figure 5).

Respondents who had heard about TB were also asked about the ways of TB transmission. More than 20% of study subjects did not know that TB is transmitted through air (Figure 6). Other most frequently mentioned ways of TB transmission were parenteral route and sharing dishes with an infected person (Table 1.8).

In order to assess respondents' knowledge about people who are at higher risk of TB infection, we asked to give their opinion about the people who can be infected with TB. Table 1.8 and Figure 7 show that most of the former prisoners (68.6%) believe that anybody could be at risk of getting TB infection. However, 20.7% of them consider that only people who have been in prison are at risk of TB infection. On the question about bad habits that are risk factors of developing TB, smoking was reported by 61.7% of respondents. Drug and alcohol abuse were stated by more than one third of former prisoners (Table 1.8).

During the survey all respondents who stated that had heard about TB were asked about the main signs and symptoms of pulmonary TB. As presented in Table 1.8 and Figure 8 the level of knowledge about TB symptoms is low among individuals recently released from prison as one third of respondents incorrectly identified and more than 3% of study subjects could not report any of the TB symptoms. The most frequently stated symptoms were coughing (61.2%), followed by night sweats (53.7%), coughing blood (51.2%), weigh loss (46.3%), fever (40.5%), weakness (35.4%) and chest pain (6.6%).

A series of questions were asked to the respondents in order to assess their knowledge on the treatment of TB infection. The first question was about their opinion regarding whether TB is a curable disease. The majority of respondents (84.3%) reported that TB can be cured (Figure 9). However 5% of former prisoners thought that TB is not curable and about 11% could not answer the question (Table 1.8).

Individuals who knew that TB is a curable disease were asked about the means of curing TB. About 80% of respondents were aware that TB can be treated by anti-TB drugs provided at healthcare facilities (Figure 10). The rest of study subjects (20%) did not know or reported other ways of TB cure such as herbal remedies, home rest without medicines and good nutrition (Table 1.9).

All respondents were also asked if they were aware that TB diagnosis and treatment are free of charge in Georgia. According to survey results only half of the respondents knew about the availability of free access to diagnosis and treatment of TB infection in the country (Table 1.9) (Figure 11).

The survey questionnaire also included a couple of questions about drug resistant TB. The majority of individuals recently released from prison did not know about resistant form of the disease. Only 9.1% of respondents answered the question correctly. Those individuals who in their opinion knew about drug resistant TB were further asked about the cause of resistance. About one third of respondents believed that resistance to anti-TB medications can be caused by incorrect treatment, delayed treatment or treatment default. Another 24% declared that poor diet and 17% stated that poor immune system can induce drug resistant form of TB. Nearly 14% of respondents couldn't identify any reason of drug resistance (Table 1.9).

### *Attitude towards TB among individuals recently released from prison*

All respondents who had heard about TB were asked about self-perceived risk of getting TB infection. More than two thirds of study subjects considered themselves at the risk of TB infection (Figure12) and nearly 16% was sure that they cannot be infected with TB (Table 1.10).

Respondents were also asked a series of questions about their attitude toward TB. The first question was about their reaction in case of TB diagnosis. More than one third of respondents reported that they would be surprised if they found out about having TB. About one quarter of study subjects stated that they will feel fear. For 19% of individuals TB diagnosis will be associated with sadness and hopelessness. Shame was reported only by 5% of respondents (Table 1.10).

On the question about whom would they talk to about the illness in case of TB diagnosis, most of the respondents answered that they will disclose to their family members and relatives (78.5%), followed by healthcare workers (57.9%) and friends (33.9%). More than 70% of individuals in this target group reported that they will not try to hide TB from others and 20% will disclose only to close people (Table 1.10). Willingness of hiding TB from others was stated by 3.4% of respondents (Figure 13), but in most cases the reason of hiding their illness was unclear (62.5%). However, some of the respondents reported that the main reason for hiding TB would be the feeling that people would avoid them (20.8%) (Table 1.11).

In order to assess the attitude of respondents toward people who have TB they were asked a question if they would visit TB patient at home. The majority of study subjects (88.4%) reported that if their relative, friend or colleague has TB they would definitely visit them at home. On another question if they will visit TB patient after completion of treatment, almost all of the respondents (97.5%) answered positively (Table 1.11).

All respondents who reported of having heard about TB were asked to express their feeling about people with TB disease. Majority of study subjects (85.1%) in this target group stated that they feel compassion and desire to help. However, some of the respondents reported that they feel compassion but try to tend to stay away from TB patients (8.3%), some of them have fear to be infected (3.3%) and few (2.5%) have no particular feeling toward them (Table 1.11).

### *TB practice among individuals recently released from prison*

The respondents who had heard about TB were asked which of the selected symptoms would make them go to health care facility for TB testing. Almost half of the study subjects (48.8%) reported that blood in sputum will make them to have TB test at healthcare unit, followed by night sweating (38.8%) and periodical increases of body temperature for over 3 weeks (33.1%). Further question was regarding their behavior in case of presence of lung TB symptoms. More than 90% of respondents declared that they would see a doctor in case of lung TB symptoms (Figure 14) and only 6% of individuals take drugs themselves or by advice of family members, relatives or friends (Table 1.12).

Individuals recently released from prison were asked to recall if anyone in their families ever had any symptom(s) of lung TB. Nearly quarter of respondents reported that they or their family members experienced lung TB symptoms in the past. Those individuals who recalled the presence of lung TB symptoms in the family were asked to report if they or their family members visited a doctor. Majority of them (85.7%) answered positively on this question. Among those who didn't address to the doctor (14.3%) most frequently stated reason was feeling better (50%). Other reasons reported by 25% of respondents were lack of money to see a doctor and not being sure where to go (Table 1.12).

In order to determine behavior towards TB patients, study participants were asked to report if anybody among their acquainting has TB. More than two thirds of respondents declared that they know individuals infected with TB. The second question was about avoiding TB patients. More than half of the respondents reported that they don't keep away from TB patients (Figure 15). The rest of them declared that they try to not establish long term relationships (15.8%), not share dishes (15.8%) and not kiss (10.8%). About 10% of respondents try not to have any contact with TB patients (Table 1.13).

To assess the practice of self treatment, all respondents who had ever heard about TB were asked if they had tried any of anti-TB medicines without seeing a doctor or getting a prescription. Less than 20% of respondents declared that they don't take medicines without prescription and 62% stated that they never tried any of anti-TB drugs without seeing a doctor. However, about 14% of individuals in this target group reported that they had received self treatment with anti-TB medications, namely with Streptomycin (10.7%), Rifampicin (1.7%) and Isoniazid (0.8%). Those individuals who had tried anti-TB drugs without prescription were asked whose advice was followed during this behavior. More than 40% of respondents reported that it was their own decision, 26% followed advice from family members, relatives or friends (Table 1.13).

## 1.2. Drug and alcohol users

### *Socio-demographic characteristics of drug and alcohol users*

Of the 128 drug and alcohol users interviewed, 84.4% were males and 15.6% were females. The respondents age ranged between 18 and 60 years (mean age 34.4; SD 9.1) and the majority (49.2%) were aged between 25 and 35 years (Figure 1). By marital status, half of the respondents were married. Around 46% of study subjects completed only high school and 41% were university graduates (Figure 2). Most of the respondents (46.1%) were from Tbilisi. By residence type, vast majority (96.1%) lived in urban areas. More than two thirds of study participants had families consisting of 2-4 members with 200 to 500 GEL family incomes in 53.3% of cases. Majority of drug and alcohol users (53.1%) reported themselves as temporarily unemployed (Table 1.2).

### *Knowledge about TB among drug and alcohol users*

Almost all respondents (98.4%) knew about existence of TB (Figure 4). Information about TB was first obtained from conversation with family members, relatives, friends or colleagues for 67.5% of study participants. Other most frequent sources of information about TB were presence of TB in family or among relatives, friends or colleagues (22.2%) and TV (15.1%). Most of the respondents considered TB as a very dangerous disease (49.2%) and a very serious health problem for Georgia (50%) (Table 1.7).

Out of 126 respondents who were aware about TB almost all (98.4%) thought that the disease is infectious but respiratory way was reported only by 77% as a main route of TB transmission (Figures 5,6). Other most frequently stated routes of transmission were parenteral way and sharing dishes with TB infected individuals (Table 1.8).

About 80.8% of respondents believed that anybody can be infected with TB (Figure 7) and 16.8% stated that only people which are imprisoned can contract TB (Table 1.8). Smoking was considered as a risk factor of TB for 80% of study subjects, followed by alcohol abuse (42.2%) and drug use (27.2%) (Table 1.9).

Study participants who had heard about TB were asked to state symptoms of lung TB. Nearly half of the respondents incorrectly identified TB symptoms (Figure 8). Some of the well-known symptoms that the respondents knew were coughing blood (63.5%), cough (57.1%), weight loss (52.4%), weakness (50%) and night sweats (48.4%). Almost 2% of study subjects couldn't identify any of the lung TB symptoms (Table 1.8).

Table 1.9 presents level of knowledge about TB treatment and diagnosis among drug and alcohol users. Majority of respondents (84.3%) believe that TB is a curable disease and among them more than 90% knew that it can be treated by anti-TB drugs provided at healthcare settings (Figures 9,10). Only 56.3% of respondents knew that TB diagnosis and treatment is free of charge in Georgia (Figure 11). Drug resistant TB was not known by majority of respondents (56.4%). Among those (19%) who correctly identified resistant form of the disease only less than 40% of respondents reported correctly the cause of the development of drug resistance (Table 1.9).

### *Attitude towards TB among drug and alcohol users*

Majority of respondents (82.4%) perceive themselves under the risk of TB infection (Figure 12). Regarding the first reaction that they might have in case of TB diagnosis most of the study subjects reported that they would be surprised (46.8%) or feel fear (45.2%) (Table 1.10).

On the question about whom would they talk to about their illness in case of TB diagnosis, most of the respondents answered that they will disclose to their family members and relatives (87.3%). About two thirds of study subjects reported that they will not try to hide TB from others (Figure 13), while 19.4% will disclose their illness only to close people. Concealing TB from others was stated by 7.3% of respondents (Table 1.10). The most frequently stated reason for hiding TB from others was the fear that people will avoid them (56.3%) (Table 1.11).

Regarding the attitude of respondents towards TB infected individuals, most of them (74.4%) reported that if their relative, friend or colleague has TB they would visit them at home. Even more respondents (97.6%) declared that they would visit TB patient after completion of treatment (Table 1.11).

Respondents were asked to choose one of the selected statements closest to their feeling about people with TB disease. Most of them (74.6%) declared that they feel compassion and desire to help, followed by respondents who reported that they feel compassion but try to stay away from TB patients (20.6%) (Table 1.11).

### *TB practice among drug and alcohol users*

On the question about the symptoms that would make them to go to health facility for TB consultation most of the respondents (66.4%) answered - blood in sputum. Other most frequent reasons for going to healthcare facility to have TB test were periodical increase of body temperature lasting for more than 3 weeks (35.2%), night sweats (28%) and cough for over 3 weeks (25.6%). Regarding the practice in case of lung TB symptoms (pain in chest, continuous cough, continuous low temperature, unintentional weight loss, sputum with blood, weakness, night sweats) the vast majority of respondents (92.1%) reported that they would see a doctor (Figure 14). Only 3.2% of study subjects stated that they would take drugs by their own decision or other's advice (Table 1.12).

Most of respondents (77%) reported that neither they nor their family members ever had symptoms of lung TB. Among those (23%) who (or their family members) had TB symptoms 21.4% didn't visit a doctor. The main reason for not seeing a doctor was the uncertainty where to go (50%) and feeling better (33.6%) (Table 1.12).

On the question "Do you know anybody who has TB?" most of the respondents (82.5%) answered positively. Regarding the behavior towards TB patients, about 40% of study subjects stated that they try not to share dishes with them, 27% declared that try not to establish long term relationships and 21% reported that try not to kiss individuals with TB infection. Only 36.5% of respondents don't keep away from TB patients (Table 1.13) (Figure 15).

Regarding the practice of self-treatment with anti-TB drugs, 17.5% of respondents tried streptomycin and 3.2% received rifampicin without seeing a doctor or getting a prescription. Only 16.7% of study subjects reported that they don't take any medicine without prescription. Those individuals who had the experience of self-treatment with anti-TB drugs were asked whose consultation or advice preceded this behavior. Most of them (43.5%) answered that taking anti-TB drugs without prescription was their own decision, 26.1% stated that they followed the advice from family member, relative or friend and 13% were consulted by pharmacist (Table 1.13).

### 1.3. Patients with immunosuppressive diseases

#### *Socio-demographic characteristics of patients with immunosuppressive diseases*

The survey enrolled 60 patients with immunosuppressive diseases, namely 20 patients with HIV infection, 20 patients with diabetes mellitus and 20 patients on dialysis. As shown in Table 1.3 most of the respondents were females (56.7%). Age distribution in this target group was the following: individuals of 30-50 years and more than 50 years old were represented equally and constituted 40% each, young respondents of less than 30 years old composed 20% of study subjects (Figure 1). Majority of the respondents were married (61.7%) and achieved university/postgraduate level of education (60%) (Figure 2). Regarding occupation, most of the individuals in this target group were retired (48.3%), followed by temporarily unemployed (28.3%) and employed (20%) people. More than half of the respondents' families were composed of 2 to 4 members (including respondent). Family income in more than two thirds of cases was equal or less than 500 GEL. Similarly, most of the respondents fell in two lowest categories of income per person in family. By residence, majority of respondents (85%) were from urban areas and 71.7% resided in Tbilisi.

#### *Knowledge about TB among patients with immunosuppressive diseases*

When respondents were asked about whether they heard about TB, all of them (100%) responded in the affirmative (Figure 4). The first source of information about TB in most of cases was talking with family members, relatives, friends, colleagues or neighbors (41.7%). Other most frequently stated sources of information were the presence of TB in family or among relatives and friends (20%), printed media (20%) and TV (15%). However, 16.7% of individuals in this target group couldn't recall where they first learned about TB (Table 1.7).

More than 70% of respondents think that TB is a serious or very serious problem in Georgia and 81.6% consider TB as a dangerous or very dangerous illness (Table 1.7).

Only 86.7% of respondents knew that TB is contagious (Figure 5). They were further asked about the mode of transmission of TB from person to person. Respiratory way was reported by 75.5% of the respondents (Figure 6). Incorrect ways of transmission such as sharing dishes with an infected person (9.4%) and parenteral way (5.7%) were also mentioned (Table 1.8).

On the question "who can be infected with TB?" most of the respondents (45%) answered that only those who have been in prison can contract TB. Only 40% of study subjects knew that anybody can be infected with TB (Table 1.8) (Figure 7). Among risk factors of developing TB most of the respondents (66.7%) identified smoking. Drug and alcohol abuse was reported by 16.7% of study subjects. A quarter of respondents couldn't identify any bad habit that is risk factor of TB infection (Table 1.9).

Respondents were also asked to list symptoms characteristic of lung TB. The most frequently stated symptoms were: coughing blood (68.3%), cough (41.7%) and fever (35%). About 3% of respondents

did not know any TB symptom at all and 15% incorrectly identified TB symptoms (Table 1.8) (Figure 8).

In order to elicit information on the curability of the disease, the respondents were asked whether they consider TB as a curable disease and how can TB be cured. The majority of the respondents (81.7%) knew that TB is a curable disease (Figure 9). Among them 79% reported that TB can be cured by anti-TB drugs given by health center (Figure 10). The rest of the respondents considered that TB can be cured by herbal remedies, home rest without medicines, good nutrition etc (Table 1.9).

All respondents were also asked if they were aware that TB diagnosis and treatment are free of charge in Georgia. According to survey results only half of the respondents knew about the existence of free diagnosis and treatment of TB infection in the country (Table 1.9) (Figure 11).

Drug resistant TB was known only by 8.3% of respondents. Half of respondents who were aware of drug resistant TB identified wrong treatment as a cause of resistance. None of the respondents knew that treatment default can also cause the development of resistant form of the disease (Table 1.9).

### *Attitude towards TB among patients with immunosuppressive diseases*

Two thirds of respondents think that they can contract TB (Figure 12). Regarding the first reaction that they might have in case of TB diagnosis most of the study subjects reported that they would feel fear (35%), followed by being surprised (28.3%) and become sad or hopeless (23.2%) (Table 1.10).

A couple of questions were asked to determine respondents' attitude to disclosure and hiding of TB disease. Majority of study subjects reported that in case of TB diagnosis they will talk about their illness with healthcare workers (85%) and family members or relatives (70%). Only 44.8% of respondents stated that they will not try to hide TB from others. Others declared that they will hide TB from others (10.3%) or disclose to only close people (37.9%) (Table 1.10) (Figure 13). The main reason (78.6%) for hiding TB from others was the fear that people will avoid them (Table 1.11).

On the questions assessing the attitude towards TB infected people, only about two thirds of respondents answered that they will visit TB patients at home. A higher proportion of study subjects (81.7%) will visit TB patients after completion of treatment. However about 7% of respondents reported that they will not visit individuals with TB infection even after the termination of anti TB treatment. Regarding the feelings about people with TB disease, only 60% study participants stated that they feel compassion and desire to help. About quarter of respondents mentioned that they feel compassion towards TB patients but try to stay away. Others reported that they have no particular feeling about people with TB disease (8.3%) or have a fear to be infected (6.7%) (Table 1.11).

### *TB practice among patients with immunosuppressive diseases*

On the question regarding the symptoms that would make the study participants to go to a health care center for TB testing 80% mentioned blood in sputum. Periodical increase of body temperature lasting for more than 3 weeks was identified by 36.7% of respondents, followed by cough over 3 weeks (33.3%). In case of lung TB symptoms, the vast majority of respondents (95%) stated that they

would see a doctor (Figure 14). Only 3.4 % of study participants would take drugs themselves or by advice of family members, relatives or friends (Table 1.12).

About 22% of respondents reported that they or their family members had pulmonary TB symptoms in the past and more than 90% of them visited a doctor. All of the respondents who experienced TB symptoms and did not see a doctor stated that feeling better was the reason of not seeking medical help (Table 1.12).

On the question if anybody among their acquaintances has TB, 30% of respondents declared that they know individuals infected with TB. Regarding the practice of avoiding TB patients, one third of respondents reported that they do not keep away from them (Figure 15). The rest of study subjects in this group declared that try to not share dishes (38.3%), not to establish long term relationships (20%), and/or not to kiss (16.7%). One fifth of respondents try not to have any contact with TB patients (Table 1.13).

Assessing the practice of self-treatment with anti-TB drugs, the survey revealed that streptomycin was tried by 1.3% and rifampicin - by 1.7% of study participants without seeing a doctor or getting a prescription. About 3% of respondents stated that they do not take medicines without prescription and 75% stated that they never tried any of anti-TB drugs without seeing a doctor. Those individuals who had tried anti-TB drugs without prescription were asked whose consultation was followed during this practice. More than half of the respondents (55.6%) reported that it was their own decision and the rest of them followed advice from family members, relatives or friends (Table 1.13).

## 1.4. Contacts of active TB cases

### *Socio-demographic characteristics of contacts of active TB cases*

Out of 120 active contacts of TB cases enrolled in the survey, 77.5% were females and 22.5% were males. Most of the respondents (46.7%) were aged between 30 and 50 years (Figure 1). 77.5% of study participants were married. Around 44% of the sample had university/postgraduate level of education and 32.5% completed only high school (Figure 2). About one third of the respondents were from Tbilisi. By residence type, 78.3% of study subjects lived in urban areas. About 55% of respondents had families consisting of 2-4 members and the rest of them lived in families with more than 4 members. Family income in the range of 500 to 1000 GEL was reported by 44.4% of respondents. Income per person in family was less than 100 GEL for 44.2% of study participants and between 100 and 200 GEL for 48.1% of respondents. About one third of active contacts of TB cases (34.2%) reported themselves as temporarily unemployed, followed by employed (29.2%) and never being employed (15%) individuals (Table 1.4).

### *Knowledge about TB among contacts of active TB cases*

On the question “Have you ever heard about TB?” the vast majority of respondents (95.8%) answered positively (Figure 4). Presence of TB in a family member was the first information source for 52.2% of the study subjects. Other most frequent sources of information about TB were talking about TB with family members, relatives, friends, colleagues or neighbors (35.7%) and TV (27.8%). Most of the respondents considered TB as a dangerous disease (51.3%) and a serious health problem for Georgia (45.2%) (Table 1.7).

Out of 115 respondents who had heard about TB 96.5% considered the disease contagious (Figure 5). The respiratory mode was reported by 90.1% of the study participants as a route of TB transmission (Figure 6). Other most frequently stated mode of transmission was sharing dishes with TB infected individuals (Table 1.8).

Vast majority of respondents in this group (93.8%) believed that anybody can get TB (Figure 7). Smoking was considered as a risk factor of TB by 76.3% of study subjects, followed by alcohol abuse (42.1%) and drug use (33.3%) (Table 1.8).

Regarding the knowledge of symptoms of lung TB, one third of the respondents incorrectly identified TB symptoms (Figure 8). Among those who correctly identified the symptoms the most frequently mentioned one was cough (76.5%), followed by night sweats (70.4%), weakness (61.7%) coughing blood (60.9%) and fever (60%) (Table 1.8).

Table 1.9 presents the level of knowledge about TB treatment and diagnosis among contacts of active TB cases. 93% of respondents believed that TB is a curable disease and among them all (100%) knew that it can be treated by anti-TB drugs given at healthcare settings (Figures 9,10). The vast majority of respondents (98.2%) knew that TB diagnosis and treatment is free of charge in Georgia (Figure 11). Drug resistant TB was not known by majority of respondents (59.6%). Among those

who identified correctly the resistant form of the disease (19%) 57.4% reported wrong treatment and 48.9% stated treatment default as a cause of TB resistance (Table 1.9).

### *Attitude towards TB among contacts of active TB cases*

About two thirds of active contacts of TB cases consider themselves under the risk of TB infection (Figure 12). The rest of them either don't know (22.6%) or do not believe (8.7%) that they can get TB. Regarding the first reaction in case of TB diagnosis, one third of the study subjects reported that they will be surprised or feel fear. For 27% of respondents TB diagnosis will cause no reaction at all (Table 1.10).

On the question about whom would they talk to about their illness in case of TB diagnosis, most of the respondents answered that they will disclose to their family members and relatives (85.8%), followed by healthcare workers (78.8%) and friends (16.8%). Nearly 42% of study subjects reported that they will not try to hide TB from others, while 38.6% will disclose their illness only to close people. Concealing TB from others was stated by 8.8% of respondents (Table 1.10) (Figure 13). The most frequently stated reason for hiding TB from others was the fear that people will avoid them (67.9%) (Table 1.11).

Most of the respondents (87%) answered positively on the question regarding visiting a TB infected individual at home. Higher proportion of the respondents (96.5%) declared that they will visit a TB patient after completion of treatment (Table 1.11).

For 86.8% of respondents the closest statement expressing their feeling about people with TB disease was "I feel compassion and desire to help". However, 10.5% of the study subjects reported that they feel compassion but try to stay away from TB patients (Table 1.11).

### *TB practice among contacts of active TB cases*

Blood in sputum would make 53% of contacts of active TB cases to go to health care center for TB test. Other most frequent reasons for going to healthcare facility to have TB test were coughing for over 3 weeks (50.4%) and periodical increase of body temperature for more than 3 weeks (47%). On the question about behavior in case of lung TB symptoms the vast majority of respondents (98.2%) reported that they would see a doctor (Figure 14). Only 1.8% of study subjects reported that they would take drugs by their own decision or other's advice (Table 1.12).

Presence of lung TB symptoms among family members was reported by 96.5% of respondents. Almost all of them who experienced TB symptoms (97.3%) visited a doctor. The only reason for not seeing a doctor among those who hadn't visited health care facility was feeling better (Table 1.12).

Regarding the practice about TB patients, less than 80% of respondents stated that they don't keep away from them (Figure 15). About 14% of study subjects mentioned that they try not to establish long term relationships and 9.6% try not to share dishes with them (Table 1.13).

Regarding the practice of self-treatment with anti-TB drugs, 7% of respondents tried streptomycin without seeing a doctor or getting a prescription. Less than 15% of study subjects reported that they

don't take any medicine without prescription. Among those who tried anti-TB drugs without prescription 55.6% this behavior was directed by their own decision and 44.4% followed family member's, relative's or friend's advice (Table 1.13).

## 1.5. University students and teachers

### *Socio-demographic characteristics of university students and teachers*

A total of 400 university students and teachers were interviewed during the survey. Most of the study participants in this target group were students (N=288) and the rest were represented by teachers (N=112).

#### University students

Among 288 students 182 (63.2%) were females and 106 (36.8%) were males. Most of the respondents (76.7%) were more than 20 years old. About 12% of students reported as currently married but majority of them were single (86.5%) (Figure 3). About 42% of the respondents resided in Tbilisi (41.7%). By residence type, majority (80.1%) of the students were from urban areas. More than half of the study participants had families consisting of 2 to 4 members. The rest of the respondents lived in families consisting of more than 4 members. Regarding family income, majority of respondents' families 46.1% had income between 500 to 1000 GEL per month. Calculated economic status of families (dividing family income by the number of family members) revealed that more than half of the students (52.8%) live in families where monthly income per person is 100 to 200 GEL (Table 1.5).

#### University teachers

Out of 112 university teachers included in the survey 76.8% were females. Most of the teachers (52.7%) were 30 to 50 years old, followed by 40.2% of individuals aged more than 50 years (Figure 3). Majority of the respondents were married (73.1%) and lived in families constituting of 2 to 4 members (69.1%). Family income in 40.3% of cases is more than 1000 GEL per month but by monthly income per person in family, most of the teachers fall in two lowest categories. By residence, the vast majority of respondents (96.4%) were from urban settlements with 43.8% residing in Tbilisi (Table 1.6).

### *Knowledge about TB among university students and teachers*

The vast majority of respondents (96.8%) were aware of TB (Figure 4). As shown in Table 1.7 the main sources of information about TB among students and teachers were talking with family members, relatives, friends, colleagues or neighbors (53.7%) and TV (52.7%).

More than half of the respondents consider TB as a dangerous disease (59.9%) and a serious health problem for Georgia (51.2%) (Table 1.7).

Only 84.8% of students and teachers knew that TB is contagious (Figure 5). On the further question about the modes of TB transmission, the respiratory mode was reported only by 59.2% of the respondents (Figure 6). Incorrect modes of transmission were identified by 28% of study subjects and 12.1% did not know at all how TB can be transmitted from person to person (Table 1.8).

Most of the respondents (78.4%) considered that anybody can be infected with TB (Figure 7). However, about 16.6% thought that only those who have been in prison can contract TB (Table 1.8). Among risk factors of developing TB about two thirds of the respondents identified smoking. Drug and alcohol abuse was reported by 45.7% and 36.8% of the study subjects, respectively (Table 1.9).

Regarding the symptoms of pulmonary TB, only 58.4 % of students and teachers correctly identified them (Figure 8). The most frequently stated TB symptoms were: coughing blood (62%), cough (58.5%) and night sweats (44.7%). Around 33% of respondents incorrectly identified and 8.5% didn't know any of the lung TB symptoms (Table 1.8).

On the question whether TB is a curable disease, only 79.3% of the respondents answered positively (Figure 9). Among those who consider TB as a curable disease 81.3% reported that it can be cured by anti-TB drugs given by health center (Figure 10). Around 8% of respondents could not identify any means of TB treatment (Table 1.9).

The survey revealed that only 45.7% of students and teachers were aware that TB diagnosis and treatment are free of charge in Georgia (Table 1.9) (Figure 11).

Drug resistant TB was known by less than 20% of students and teachers. Among those who were aware of drug resistant TB less than 35% identified correctly the causes of resistance (Table 1.9).

### *Attitude towards TB among university students and teachers*

Students and teachers who were aware of TB were asked about self-perceived risk of acquiring TB infection (Figure 12). Less than 50% of respondents thought that they can get TB infection.

Regarding the first reaction that they might have in case of TB diagnosis, most of the study subjects reported that they would feel fear (49.1%), followed by being surprised (43.9%) and become embarrassed (27.1%) (Table 1.10).

Regarding the respondents' attitude towards disclosure and hiding of TB disease, only 37.2% stated that they would not try to hide their illness from others (Figure 13). The rest of the study subjects mentioned that would disclose to only close people (38%) or hide the disease from others (11.6%). The main reason (52.7%) for hiding TB from others was the fear that people will avoid them. Majority of students and teachers reported that in case of TB diagnosis they will talk about their illness with family members or relatives (84.8%), followed by healthcare workers (49.6%) and friends (32%) (Table 1.10).

On the questions determining the attitude towards TB infected people, more than half of the respondents answered that they would visit TB patients at home. Much higher percentage of the study subjects (89.1%) reported that they would visit TB patients after completion of treatment. Regarding the feelings about people with TB disease, around 65% of the students and teachers stated that they feel compassion and desire to help. Slightly less than quarter of the respondents mentioned that they feel compassion towards TB patients but try to stay away and 4.1% of them have feeling of fear towards TB infected individuals not to get infected (Table 1.11).

### *TB practice among university students and teachers*

Assessing the symptoms that would make the students and teachers to go to health care center for TB testing the survey results revealed that 59.7% of respondents will visit a doctor to have TB test because of blood in sputum and around one third of the study subjects because of coughing and periodical increase of body temperature for over 3 weeks. In case of symptoms characteristic to lung TB 94.1% of the students and teachers will see a doctor (Figure 14). Only 2.1 % of the respondents reported that they will take drugs themselves or by advice of family members, relatives or friends (Table 1.12).

Only 5.7% of students and teachers reported that they or their family members had lung TB symptoms in the past. Among those who experienced TB symptoms about 87% visited a doctor. The main reason of not seeing a doctor in case of TB symptoms were not being sure were to go (66.7%) and feeling better (33.3%) (Table 1.12).

About a quarter of students and teachers have acquaintances with TB infection. Only 25.8% of the respondents reported that they would keep away from TB infected patients (Figure 15). The rest of the study subjects declared that would try not to share dishes (42.6%), not to establish long term relationships (27.1%), and not to kiss (25.3%) person with TB. Around 13% of respondents try not to have any contact with TB patients (Table 1.13).

The survey revealed that streptomycin was tried by 12.5% and rifampicin was tried by 1.6% of students and teachers without seeing a doctor or getting a prescription. Only 20% of respondents stated that they do not take any medicine without prescription and 55.2% stated that they never tried any of anti-TB drugs without seeing a doctor. Those individuals who had tried anti-TB drugs without prescription were asked whose consultation was followed during this practice. Most of the respondents (45.7%) reported that they followed advice from family members, relatives or friends, 21.5% considered pharmacist's consultation and only 10.8% of them decided to take anti-Tb drugs on their own (Table 1.13).

## **2. TB Knowledge, attitudes and practice among TB patients currently on treatment and post TB patients**

The data were collected from patients who were on TB treatment at the study period and post TB patients who had already finished the treatment (both cured and default), but initiated their ITR on previous year in order to avoid recall bias for some sensitive questions. We used specially designed questionnaires for this two groups.

A total of 180 TB patients who were on treatment at the study period and another 180 post TB patients were enrolled in the study.

### ***Socio-demographic characteristics of TB patients currently on treatment and post TB patients***

Table 2.1 and Table 2.2 show socio-demographic characteristics of TB diseased patients currently on treatment and post TB patients. Out of the 360 patients interviewed 242 (67.2%) were males and 118 (32.8%) were females. Age distribution was similar between TB patients currently on treatment and post-TB patients. Most of the study subjects were aged 30 to 50 years in both target groups. Majority (59.7%) of the respondents were married. The highest education level completed for these two groups was a high school which equals 12-year of secondary school education in Georgia. Most of the study participants were from Tbilisi (66.4%) and the vast majority lived in the urban areas (83.3%). In terms of occupation, more than half of the patients on TB treatment were temporarily unemployed (58.9%) compared to lower unemployment rate among post TB respondents (35.0%). Employed at the time of study were 20.6% of persons with active TB and 32.8% of post TB patients. About 75% of TB patients who are currently on treatment did not respond to the question regarding their family income. Among those who responded, the majority lived in families with monthly income 200 GEL or less. Slightly more than one third of post-TB patients had families with income  $\leq$ 200 GEL and another one third with income between 200 and 500 GEL per month. As presented in Table 1.4 around half of the respondents from both target groups lived in families where income per person is less than 100 GEL (lowest economic status) (Table 2.1).

Overall in these two groups almost a quarter of the male respondents (24.8) had a history of imprisonment, while only 1.7% of female study participants had ever been in prison. More than half of male respondents (53.7%) were current smokers, of which 28.1% were excessive tobacco users (more than 1 pack daily). 34.3% had a past history of tobacco use. Nearly half of males (41.3%) had current or past history of alcohol consumption. Alcohol use was considered as drinking more than 1 drink 2-3 times per week. Past or current use of substance was affirmed by 6.1% of study population (8.7% in males and 0.8% in females) (Table 2.2).

### ***Knowledge about TB among TB patients currently on treatment and post TB patients***

Descriptive and bivariate analysis of TB awareness and knowledge was performed on the basis of socio-demographic characteristics of respondents such as age, gender, marital status, level of education, place and type of residence, occupation and family income.

These two groups were asked whether they have heard about TB prior to their diagnosis. 62.8% of TB patients on treatment and 61.1% of post TB patients answered this question positively. (Table 2.3) (Figure 22). The analysis by age showed that more individuals aged  $\leq 30$  years (72.7%) had reported having heard about TB compared to middle aged (58.2%) and older aged group (47.1%). Analysis revealed the relationship between respondents' income and TB awareness. The awareness increased along with the income. The higher proportion of individuals who had income more than 500 GEL per month (80.0%) had heard about TB compared to those who had income less than 100 GEL per month (51.7). Different TB awareness levels were also found by education level. More respondents whose highest education was a college or university stated having heard about TB (70.0%) compared to individuals with secondary school education (55.2%). (Table 2.9)

Individuals, who had heard about TB prior to their diagnosis, were asked to name the main source of information. The results were different in two groups. For the current patients, the main source was a presence of TB among family members, friends, relatives, neighbors and colleagues (50.4%). Other important source for this group was television (38.1%), talking with family members, friends, relatives, neighbors and colleagues (25.7%) and newspapers/magazines (10.6%). As for former TB patients, they mentioned TV (35.5%) as a main source of knowledge about TB. Important source was also talking with family members, friends, relatives, neighbors and colleagues (27.3%), newspapers and magazines (24.5%) and presence of TB among family members, friends, relatives and neighbors (19.1%). It should be noted that billboards, internet, radio, brochures, fliers, posters and other printed materials were named by less than 5% of respondents for each (Table 2.3).

Nearly 95% of the respondents in both groups thought that TB is contagious. Bivariate analysis indicated that the awareness about contagiousness of TB was much higher in single (97.4%) and married (92.1%) individuals rather than in divorced (84.2%) and widowed (66.7%) respondents. (Table 2.10) Patients currently on treatment revealed more knowledge about the routes of transmission than the former patients. 85% of the patients with active TB thought that TB is transmitted by air, compared to 67.3% of post TB patients with the same consideration (Table 2.3) (Figure 23).

In both groups nearly 15% of the respondents named sharing dishes with an infected person as a main source of TB transmission. In former patients, 6% thought that TB is transmitted by enteral (food) mode and another 8.9% by parenteral (blood) mode. Individuals with active TB revealed more knowledge (84.9%) about the source of transmission compared to post TB patients (67.7%) (Table 2.3)

During the survey respondents were asked about the main symptoms of lung TB. The results showed that the majority of the survey participants in both groups knew the main 4 symptoms of TB: cough (97.2% active TB, 91.7% post TB), night sweats (88.3% active TB, 73.9% post TB), fever (75.6% active TB, 75.0% post TB), and weight loss (87.8% active TB, 72.8% post TB) (Figure 24). Overall in two groups, 21.8% of the respondents named all symptoms correctly. Both target groups named (in 5-20% range) headache, nausea/vomiting and diarrhea as a symptoms of TB (Table 2.3).

98.3% of former patients considered TB as a curable disease compared to 85.6% of current patients.

Some specific questions were asked to the patients currently on anti TB treatment. They were asked whether they knew the duration of TB treatment. 79.4% was aware that their treatment will last 6 months or more, 11.7% didn't know the duration of treatment, 7.1% thought that it will last from 3 to 5 months (Figure 25). 86% of patients planned to end the treatment after completing the treatment regimen prescribed by TB physician. 6% of patients were going end the treatment straight after their symptoms go away. Another 4.4% thought that they could end the treatment at any time (Table 2.4).

On the question of what is DOT, 71.1% of respondents answered that it is a course of special treatment (Directly Observed Therapy), 2.8% thought that it is a free of charge treatment, and 25% didn't know the meaning of the DOT (Table 2.4).

By bivariate analysis the place of residence was identified as an important determinant of knowledge about the treatment among respondents with active TB (Table 2.13). 82.7% of study population living in urban area knew the length of treatment compared to 58.3% of individuals who lived in rural areas. The meaning of a DOT treatment was also more known in urban areas (75.6%) rather than in rural areas (41.7%).

#### ***Attitude towards TB among TB patients currently on treatment and post TB patients***

Respondents were asked a series of questions about their attitude towards TB infection (Table 2.5). Half of the TB patients with active disease and 58.9% of post TB patients felt that having disease is their fault. 22.2% of TB diseased and 29.4% of post TB individuals reported that they had hidden their disease from others. The main reason of hiding TB from others was stigma (56.2%) (Figure 26). Bivariate analysis showed that the 32.1% of post TB patients who did not hide their diagnosis, experienced the negative change in relationship with other people.

Almost half of post TB patients (48.9%) felt ashamed because of the disease. 53.3% in both groups preferred to live isolated while having TB. Nearly 30% of the respondents in both groups had a fear that they can't find or lose a job because of TB (Table 2.5).

#### ***TB practice among TB patients currently on treatment and post TB patients***

Table 2.6 shows that most of the respondents (68.0%) needed 30 minutes or less to get to the nearest health care facility. Half an hour or less (48.9%) or 1-3 hours (44.4%) was needed to visit the facility which provides TB services. 76.7% of respondents who are from rural areas needed 1-3 hours or more to get to TB specific facility compared to 46.0% who are from urban areas.

For most of the TB patients who were on treatment (77.8%) the first health seeking action with onset of symptoms before TB diagnosis was visiting health care facility. The first action was the same for 65.0% of post TB patients. There were higher rates of self medication (28.3%) among the post TB patients compared to 7.8% of active TB patients with same action. Then we defined the type of the health care facility they first visited (Table 2.6) (Figure 27).

We asked patients to name the main reason for visiting the above mentioned health care facility. The reasons were different within the types. For visiting the TB center the main reasons were "advised by someone" and "confidence in getting cured" (Table 2.6) (Figure 28).

For the respondents, who named general hospital, private clinic, primary health center, ambulatory or policlinic as a first facility they have visited the main reason was geographical accessibility (51.9%). For 13.6% main reason for visiting that particular facility was an advice given by someone. There were some respondents with health insurance, for them the main reason was free service (13.6%) which was offered by their providers (Figure 29).

One third of individuals with active TB disease and 69.4% of post TB respondents thought that their TB diagnosis was delayed. This opinion was self perceived, because we didn't have a chance to measure the delay precisely. The most frequently stated reasons for diagnosis delay were the lack of knowledge about TB, thought/hoped symptoms would go away and poor quality of healthcare services (Table 2.7).

Individuals currently on treatment were asked several specific questions regarding medical care. HCWs attitudes towards them were named satisfactory by almost all of the respondents (96.7%). 96.1% reported that they had enough support during the treatment. Further they were asked about the presence of any signs or symptoms of depression (listed in the questionnaire). Around 45% of respondents stated that they experienced at least one of the main signs of depression. Out of those who mentioned at least one sign of depression only 63.4% had received psychological counseling/support (Table 2.8) (Figure 30).

For the 75.0% of respondents with active TB it will be convenient to receive reminder SMSs on their cell phones about treatment regimen and visits to the doctor.

### **3. Knowledge, attitudes and practice about TB among healthcare workers**

#### ***Socio-demographic characteristics of healthcare workers***

In total 400 health care workers (HCW) were involved in the study. Among them 330 were females (82.3%) and 71 (17.7%) were males. 90 (22.5%) were 35 years and younger and 310 (77.5%) were 36 years and older. The majority (75.6%) of respondents was married (Table 3.1) (Figure 31).

Doctors represented largest part of the HCW's group: 291 (72.6%) doctors, 100 (24.6%) nurses and 10 (2.5%) other specialists working at health care facilities were included in the study (Figure 32). According to the field of their work the HCWs were grouped as follows: internal medicine (18%), surgery (15.2%), family medicine (5.2%), pediatrics (26.7%), and other (34.9%) (Table 3.1) (Figure 33).

Grouping of the respondents by the type of the health care facilities was done in the following way: private clinics (84 respondents, 20.9%), polyclinics/PHCs (92 respondents, 22.9%), general hospitals (221 respondents, 55.1%) and other (4 respondents, 1.0%) (Figure 34). Representatives of inpatient and outpatient units were almost similarly distributed. Majority of the health care workers (97.5%) was employed at the medical facilities located in urban areas (both capital and large cities in different regions of Georgia). HCWs employed in the rural facilities represented only 2.5% of the whole group of respondents (Table 3.1).

#### ***Knowledge, attitude and practice about TB among healthcare workers***

##### ***a) Causes and clinical peculiarities of TB***

About 95% health care workers reported that tuberculosis is caused by bacteria (Figure 35). The knowledge level about causative agent of tuberculosis was statistically significantly higher ( $p < 0.001$ ) among those aged over 35 years (97.1%) compared to those whose age was equal or less than 35 years (86.7%) (Table 3.2) (Figure 36). Knowledge of this component was slightly higher among males (98.6%) compared to females (93.9%) (Table 3.4) and among those who were working at rural healthcare settings (100%) compared to health care workers employed in urban health care sector (94.6%) (Table 3.6), but this difference was not statistically significant. No difference was found by the knowledge of this component by the types of the health facilities (Table 3.8). Almost all physicians (99%) have answered correctly to this question, while among nurses this knowledge was substantially lower and only 83% of them have correctly identified bacteria as a causative agent of tuberculosis (Table 3.10) (Figure 37). Knowledge of TB causative agent was high among internal medicine, family medicine specialists and pediatricians. A lower level of knowledge was demonstrated by HCWs working in surgery and other fields (Table 3.12).

Only 44% of health care workers were realizing that tuberculosis can affect any human organ. Again, knowledge of this component was higher among older health care workers (47.7% correct answers in those aged  $> 35$  years vs. 32.3% correct answers among HCWs under 35 years of age,  $p = 0.009$ ) (Table 3.2) (Figure 38). Female health care workers had higher correct answers' rate to this question ( $p = 0.028$ ) (Table 3.4). The highest knowledge level by this component was found among polyclinic/PHC personnel, while the lowest was found among private clinics' personnel ( $p < 0.001$ )

(Table 3.8). No difference was observed between representatives of urban vs. rural health care facilities (Table 3.6). This knowledge was extremely low (correctly answered only 15%) among nurses and HCWs at surgical and other departments (26% correct answers) (Table 3.10).

No significant associations were found between the knowledge of symptoms of active TB and the age groups ( $p=0.34$ ), gender ( $p = 0.28$ ), location ( $p=0.99$ ) and type ( $p = 0.70$ ) of the health care facilities (Tables 3.2; 3.4; 3.6; 3.8). In general only 20% of HCWs were able to list correctly all possible symptoms of active TB. Knowledge of the TB transmission routes (respiratory vs. other ways) was the highest at the Polyclinic/PHC level ( $p=0.006$ ), while in general hospitals the overall rate of the correct answers to this question was less than 95%. Again, older health care workers had better knowledge of the TB transmission routes than younger ones ( $p=0.093$ ). No association was found between the respondents' knowledge on TB transmission and their gender, occupation, profession or location of their institution (urban vs. rural) (Tables 3.2; 3.4; 3.6; 3.8; 3.10; 3.12).

Only minority of respondents (around 42%) were thinking that using a special respirator is the most effective preventive measure to avoid TB exposure. The proportion of health care workers who had the appropriate knowledge of the preventive measures to avoid Mycobacterium exposure were significantly higher among older health care workers (46.1%) compared to those whose age was less than 35 years (25.6%) ( $p < 0.001$ ). There were no significant differences on the knowledge of preventive measures between females and males and respondents working at urban vs. rural health care facilities (Tables 3.2; 3.4; 3.6).

The lowest knowledge level about Mycobacterium exposure prevention measures was demonstrated by HCWs at surgery departments, majority of them (69%) were considering using surgical mask as the best TB preventive measure (Table 3.13). Nurses had poorer knowledge of TB preventive measures in comparison with the physicians (Table 3.10).

Negative pressure room was considered as a measure for the Mycobacterium exposure prevention only by a small number of HCWs (not more than 8% of respondents) (Table 3.10).

### ***b) Knowledge of TB diagnostic and treatment***

Only 63% of health care workers knew that TST reveals the latent TB or exposure to TB (Figure 39). Around 17 % of health care workers think that TST reveals active TB. Furthermore, about 15% of health care workers had no idea what does TST result show. This knowledge was again significantly lower among younger respondents ( $p = 0.029$ ) (Table 3.2). The difference was not statistically significant by gender and health care facility location (Tables 3.4 and 3.6). The lowest understanding of TST result interpretation was found among health professionals working in private clinics (only 51% of correct answers) (Table 3.8). Nurses demonstrated poor understanding of the TST test meaning (only 44% of nurses could correctly interpret the TST result) (Table 3.11). The lowest knowledge of this component has been demonstrated by HCWs employed at surgical departments (only 31% of them could correctly interpret TST result) (Table 3.14).

The majority of health care workers (94.3%) knew that tuberculosis can be cured. 5% of respondents said that tuberculosis is incurable. However, only 75.8% of respondents knew the correct duration of

the treatment for TB (Figure 40). 12.5% thought duration of the treatment for tuberculosis was from 3 to 5 month and 8% responded that they did not know the duration. By the knowledge of this component there was significant difference between the age group ( $p = 0.002$ ) – older respondents (> 35 years) had a better knowledge (Table 3.3). The lowest knowledge again has been documented among health care workers employed at the private clinics, while the highest score had the professionals at polyclinics/PHCs ( $p < 0.001$ ) (Table 3.9).

Not more than 86.5% of HCWs knew that TB treatment in Georgia is free of charge (Table 3.16) (Figure 41).

The awareness of DOT method of TB treatment among respondents was generally low. Considerable proportion (almost 38%) of the HCWs did not know about the DOT method. Less than half of the health care providers (44%) at the general hospitals could properly identify DOT as the Directly Observed Therapy (Table 3.9). Only 39% of nurses knew the proper meaning of the DOT method vs. 63.2% among physicians (Table 3.11). The knowledge of this component was lower among employees of surgical and pediatric departments, less than half of the HCWs at those settings knew the meaning of the DOT method and approximately the same number of respondents answered that they were not aware at all of such therapeutic approach (Table 3.15).

A poor understanding of the multi drug resistant (MDR) form of the disease was revealed among healthcare workers. More than half of the respondents (more than 55%) did not know the definition of the MDR tuberculosis. Only 32.6 % of health care professionals working at polyclinic/PHC had an understanding that MDR tuberculosis means the presence of Mycobacterium resistant to Isoniazid and Rifampicin, while in general hospitals and private clinics the knowledge of this component was even lower (20 and 18 % correspondingly) (Table 3.9). The difference by the type of the health care facility and its location (rural vs. urban) was statistically significant (Tables 3.7 and 3.9). Alarming high proportion of HCWs at surgical facilities (69%) responded that they did not know what the meaning of MDR TB was (Table 3.15). Such an answer was even more frequent (82%) among nurses (vs. 45% among physicians) (Table 3.11).

### ***c) Risk groups for getting active TB***

Most respondents thought that the most vulnerable population for getting active TB were poor people (indicated by 77 % of HCWs) and prison inmates (indicated by 61% of HCWs). Active contacts of TB patients, drug users and HIV positive people were recognized only by the small number of HCWs (less than 32 %) as the risk-groups for getting active TB. Very small proportion (less than 8%) of HCWs were realizing that children under 5 years of age are also vulnerable to TB infection and it is remarkable that only 11 % of HCWs from pediatric settings were considering children under 5 years as a risk-group for getting active TB (Table 3.13).

### ***d) Practice of TB Treatment***

The majority of HCWs involved in the study (90.5%) had never prescribed any anti-TB medications. 3.9 % of HCWs have prescribed anti-TB drugs for suspected, 2.8% for confirmed and 1.1% in both cases (Table 3.16).

On the question “What will be your action if you find out that your patient has active TB disease?” most of the HCWs (80.5%) answered that they will continue to contact patients with preventive measures.

*e) Information source about TB*

Only minority of HCWs (36%) felt that they were well informed about TB (Figure 42) and most of respondents (as high as 95.3% of them) were willing to get more information about TB. Lectures, seminars and printed materials were acceptable means for HCWs to get more detailed information about TB (Figure 43). More than half (58%) of study participants would like to get SMS about TB on their cell phones (Table 3.16).

#### **4. Sources of information about TB among high risk groups and representatives of general population**

Overall, 30% of respondents believe that they are well informed about TB (Figure 16). The lowest perceived information on TB was reported by students/teachers (13.5%) and patients with immunosuppressive diseases (23.3%) (Table 4.1).

Majority of participants wish to receive more information on TB (78%) (Figure 16). The highest information willingness rate was observed among patients with immunosuppressive diseases (91%) and the lowest – among former prisoners (60%) (Table 4.1).

All groups of study subjects named TV as the preferred information source (52.5%) except contacts of active TB cases and individuals recently released from prison, for which health care workers were the best channel to receive detailed information on TB. Surprisingly, for 75% of patients with immunosuppressive diseases TV was the best way to get medical information, versus 25% of those trusting HCWs as being TB information source. Among TB channels, “Rustavi 2” was the most and “Mze” was the least frequently watched ones (Figure 18). This is consistent in all sub-cohorts of study group. Internet was the next best information source (according to 33.8% of surveyed individuals) (Table 4.1) (Figure 17).

More than half of study participants do not listen to radio and do not read the newspapers at all. Among those who do, radio channel “Ardaidardo” and newspaper “KvirisPalitra” were named most frequently (22.6% and 31.7%, respectively) (Table 4.2) Figures 19, 20).

Journals are read more frequently than newspapers. About 57% of study participants reported reading them with mostly read journals being “Sarke” and “Tbiliselebi” (39% and 30%, respectively) (Table 4.2) (Figure 21).

As shown in Table 4.3 and Figure 22, 56% of the respondents agree with the suggestion of receiving SMS with information on TB.

Most people use minibuses, as the mean of transportation (42%), followed by private car (21.5%) and bus (15.8%) (Table 4.3).

## 5. Knowledge, attitude and practice about TB by socio-demographic characteristics

Tables 5.1 – 5.9 summarize associations of different socio-demographic factors with TB knowledge among high risk groups and representatives of general population.

### *Age*

The majority of study subjects ever heard about TB. Younger individuals aged <25 were more likely to report that they never heard about TB (4.2%) compared to their older mates (2.3%). For almost all components of TB knowledge, study subjects of older age were more likely to have higher awareness compared to younger ones. 15.8% of individuals aged < 25 do not consider TB as a contagious disease, 25% of them do not know that TB can be cured (compared to 8% of people aged >35), 41% do not know that TB can be transmitted by air. Self-perceived risk of getting TB was significantly highest in the age group of 25-35 years (72.9% see themselves at risk of being infected vs. 49% and 65% among age groups of <25 and >35, respectively). TB free diagnostics and treatment availability was known for 46% of youngest study subjects and 65% of those > 35 years.

### *Education*

Education level was significantly associated with some components of TB knowledge: College/university graduates had 2 times more chance of knowing about TB existence. Knowledge of transmission modes, TB outcome and treatment availability was significantly associated with education level and was higher among educated participants. Self-perceived risk of TB infection, TB related stigma and readiness to seek medical care when TB symptoms occur was similar among persons with different education levels. Education was inversely associated with knowing that TB is contagious: people with college/university education consider TB *not contagious* almost two times more frequently than study subjects without graduate studies (significant association,  $p=0.01$ ).

### *Place of residence*

Place of residence was associated with several TB knowledge variables and surprisingly, Tbilisi residents were less aware about TB compared to study subjects from the regions. For example, Adjara residents were 4 times less likely of *not knowing* anything about TB existence compared to Tbilisi residents (1.2% vs 4.6%). For other knowledge variables there was no difference between Tbilisi and region representatives. People from the regions would see a doctor if symptoms occur more often than those who live in the capital. Self-perceived risk of getting TB was lower in Tbilisi compared to regions (for example, 54% in Tbilisi and 71% in Kakheti and 70% in Adjara).

The survey did not find significant difference in the knowledge of TB existence between urban and rural populations. But more representatives of urban population find TB as dangerous and contagious disease than in rural settings (91.3% vs 83.6%,  $p<0.01$  consider TB dangerous and 90.7% vs 82.8%,  $p=0.009$  think TB is contagious). The knowledge of TB transmission ways was not significantly

different between urban and rural participants. Frequency of seeking medical care if TB symptoms occur was similar among urban and rural residents. Perceived risk of TB infection was slightly higher among rural respondents (difference not significant). TB related stigma was more apparent in two regions (16% in Shidakartli and 14% in Kakheti would hide TB diagnosis from others) compared to Tbilisi (9% reported rate of hiding disease).

### ***Employment***

Employment was associated with knowing that TB is dangerous and not associated with knowing that TB is transmitted by air and that TB is curable disease. Stigma was slightly more apparent among employed participants (10.5% would hide TB diagnose among employed vs 7.8% - among unemployed). Self-perceived risk of TB infection was higher among unemployed individuals (65% vs 54%,  $p<0.001$ ). 95% of employed persons and 92% of unemployed ones would see the doctor in case of TB symptoms ( $p=0.15$ ).

### ***Income***

Income per person in the family was not the predictor of knowledge for any of TB knowledge questions. TB related stigma and perceived risk of infection was also similar among different income groups.

## **6. TB knowledge, attitudes and practice by target groups**

Among different target groups students were most likely to give wrong answers to TB knowledge questions than representatives of other groups. For example, 18% of students *do not consider* TB as contagious diseases versus 1.6% of drug users, 3.5% of TB contacts and 9.9% of former prisoners ( $p<0.001$ ). Drug users and former prisoners are more likely to believe that TB is dangerous disease compared to students and contacts of active TB.

The mode of TB transmission was correctly identified by 90% of contacts of active TB cases and only 52% of students. This question was correctly answered by 68% of former prisoners, 77% of IDUs and 75% of immunocompromised patients.

Most people consider TB as a curable disease, but again, students showed the lowest awareness on this issue (72% vs 93% of TB contacts and 85.7% of IDUs,  $p=0.012$ ).

Overall, only about half of the surveyed individuals know that TB diagnosis and treatment is free. This is a subject of concern as not knowing about free treatment availability could serve as a significant drawback of seeking medical care when needed. The sub-cohort of TB contacts is well informed about free TB treatment (98%) unlike other groups, as they already experienced receiving free diagnosis/treatment for their family members/friends. Only 40% of immunocompromised patients have this information. Considering the high risk of getting active TB among this group of people informing them on free diagnostics/ treatment availability is extremely important for timely seeking medical help.

Self-perceived risk of TB infection was significantly different among different groups: it was highest among IDUs (82%) followed by TB contacts (68%), former prisoners (65%), immunocompromised patients (60%) and students (45%).

Willingness to see a doctor in case of TB symptoms was almost similar between all sub-groups of surveyed individuals ( $P=0.27$ ).

TB related stigma was most apparent among teachers (in case of TB diagnosis 17% would hide the disease from others), immunocompromised patients (10.2%) and students (8%).

## V. DISCUSSION

This study enrolled representatives of various population groups throughout the country, which makes it more comprehensive compared to 2004 survey, including only general population of Tbilisi. Despite the fact that these two surveys were conducted among different target populations and so the results are not completely comparable, we made some comparisons of knowledge questions between student/teacher subgroup (which was representing general population for this survey) and 2004 findings. There were some improvements of TB knowledge, for example, currently more people know that TB is curable (81% vs 77% of previous survey); more study participants reported that TB treatment is free (45% vs 31%); physicians are perceived as the best source of receiving TB information by 37.4% compared to 10.5% reported by previous survey. Considering that student/teacher subgroup showed the least knowledge in the field of TB, the knowledge improvement would be more remarkable if we compare awareness among other groups with 2004 study cohort.

### **Strengths of the study**

- Strong sampling design and adequate sample sizes for different target groups, thus ensuring generalizability of obtained data for all subpopulations included in the study, except general public (for this subgroup see limitations section).
- Interviewers' strong skills and background, given their previous experiences and affiliations: all of them are epidemiologists and the majority has experience of participating in similar surveys.
- Using advanced statistical software (SPSS 20.0) and methods for data analysis.

### **Limitations of the study**

- General public was presented by university students and teachers. Even though these groups are close to general population, they do not exactly represent it, which would be presented if household survey method would be used, requiring long time and larger resources.
- Interviewer-administered questionnaire – in general, this type of survey can be listed as strength of the study, as it is considered stronger than the one using self-administered questionnaire, as interviewers complete it more accurately and the information bias related to inadequate understanding of questionnaire content is not present. On the other hand, interviewer administered questionnaire can be the limitation of our study compared to self-administered, as some questions (particularly those describing attitude to TB infected individuals) can result in social desirability bias. Study subjects could tend to try to seem nicer than they really are when they were talking to interviewers, particularly this is expected among HCWs, which could lead to underestimation of negative attitude and TB related stigma.

## VI. CONCLUSIONS/RECOMMENDATIONS

One of the most remarkable findings of the survey is the fact that overall, only about half of surveyed individuals know that TB diagnosis and treatment is free. This is a subject of concern as lack of knowledge about the available free treatment can significantly delay seeking medical care when needed. The sub-cohort of TB contacts is well informed about free TB treatment unlike other groups, as they already experienced receiving free diagnosis/treatment for their family members. The majority of immunocompromised patients, which is a major risk group of TB infection, do not have this information. Considering the high risk of getting active TB among this group of people, informing them on free diagnostics/ treatment availability is extremely important for early identification of TB and providing therapy.

The majority of immunocompromised patients want to receive more information about TB, but unfortunately, HCWs do not provide adequate information and patients usually rely on other sources.

HCWs should be trained to provide TB counseling to their patients, particularly immunocompromised individuals (including providing information about availability of free diagnostics and treatment in the country) and given the fact that considerable part of HCWs did not know that TB diagnostics and treatment is free, training should contain information on State Program of TB and services covered by the program. Providing TB counseling is very important from a public health perspective, as increased awareness among patients will facilitate seeking medical care when symptoms occur, thus resulting in early diagnosis and treatment, which is the major factor in improving patient outcome, as well as decreasing TB transmission. Nurses should be one of the target groups, as survey revealed that awareness level among nurses is not adequate.

Educational campaigns for general population should also emphasize the free availability of TB diagnostics and treatment services.

The fact that a significant number of patients with active TB currently on treatment could not correctly identify treatment duration and did not know what DOT means shows that physicians responsible for TB patient care should improve counseling to ensure adequate treatment duration and compliance and decrease the rate of treatment default.

The subgroup of students showed lowest TB awareness. This could be another important target group for educational intervention with different methods, including peer education, being considered as one of the most effective educational activities for youth.

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