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TUBERCULOSIS
PREVENTION
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REPORT

**SURVEY OF RISK FACTORS ASSOCIATED WITH DEFAULT FROM TREATMENT AND LONG TERM
OUTCOMES OF DEFAULT IN PATIENTS WITH MULTIDRUG-RESISTANT TUBERCULOSIS**

TBILISI

2013

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The objectives of the study were identification of risk factors associated with M/XDR TB treatment lost to follow up and determination of long-term outcomes of treatment default in order to improve TB control in Georgia. The results of the survey can be used for promoting effective implementation of DOTS and DOTS Plus strategies and reducing public health risks related to M/XDR TB infection spread throughout society (mainly as a result of treatment default).

In order to meet study objectives the survey team utilized qualitative (desk research, focus groups) and quantitative (survey) methods of social research. Before the quantitative survey, the researchers conducted Focus Groups in order to receive valid survey indicators and get materials for the analytical report. The quantitative survey consisted of several stages: sampling, survey tool design, pre-testing of the questionnaire, field staff training, fieldwork, and data entry/analysis.

Survey results demonstrated the following: 1. Respondents are not adequately informed about some aspects of M/XDR TB treatment; 2. The main reason for treatment lost to follow-up is related to medication side effects and the treatment regimen; 3. The existence of systemic problems including inefficient management, deficiencies in the voucher system, poor medication quality, an unsatisfactory relationship between the health care staff and the patient, and the inaccessibility/lack of some M/XDR TB treatment components (such as adequate numbers of social workers, psychologists, consultants for compliance with treatment, etc). 4. Stigmatization of the patient by community, family members and even medical personnel.

2 INTRODUCTION

Tuberculosis remains one of the most rampant infectious diseases in the world, although the establishment of DOTs strategy in Georgia (1995) allowed to somewhat mitigate the spread of the epidemic. In spite of this fact, the burden of TB remains high in the country. According to the National Statistics DR TB prevalence in Georgia is 10.9% among new cases and 31.7% among previously treated cases (2011). The prevalence of M/XDR TB significantly increased in 2008. This can be explained by unavailability of second line drugs for DR TB treatment within the National Tuberculosis Program until 2008.

Furthermore, as DR TB treatment requires following certain regimen, medications are often accompanied by side effects and hard to tolerate. These conditions can cause patients to drop out of TB treatment, resulting in lost to follow up and the consequent spread of the disease, especially of DR forms, as well as account for high mortality rates. In addition, M/XDR TB is more difficult and expensive to treat than drug-susceptible TB, and results in significantly higher mortality rates.

International experience^{1,2,3,4,5,6,7,8,9,10} shows that reasons for M/XDR TB treatment default tend to differ from country to country, but generally they can be grouped into two, interdependent factors: the individual and the systemic (specifically the health care system). Individual factors are those related to a high level of stigma coupled with poor TB awareness among general public and medical society; the influence of side effects, substance abuse, social status, employment issues, lack of family support, etc. Systemic factors refer to institutional problems such as ineffective communication between the patient and health care providers, weakness of TB treatment strategy, side effects management, etc.

The reasons contributing to M/XDR-TB patient treatment loss to follow-up in Georgia have not been adequately explored, thus remained poorly understood. Earlier study conducted in 2011 aimed at determining risk factors for poor outcomes among patients with pulmonary multidrug-or extensively

drug-resistant tuberculosis reported 22% of lost to follow-up in the patients' cohort having unlimited access to appropriate medical and psychological services, including DOTS.⁸

This survey was designed to identify and address factors contributing to DR TB treatment interruption. The following objectives were set: 1) Identify patient-level factors associated with default in Georgia, for the patients initiating treatment between 2008 and 2013; 2) Identify provider-level factors associated with default in Georgia, for the patients initiating treatment between 2008 and 2013; 3) Assess risk of different factors identified in the interviews between those permanently defaulted and those who resumed the treatment after default. 4) Identify the motivator to continue the treatment.

3 RESEARCH METHODOLOGY

The researchers conducted retrospective review of the medical records to obtain information on respondent health and TB status. In addition to this, trained surveyors interviewed DR TB patients who met the inclusion criteria to assess the TB awareness, reasons for lost to follow-up, and motivation to continue the treatment.

The first phase of the research was the qualitative: Two group discussions were conducted in Tbilisi, which had the following purposes: a) expert evaluation of the M/XDR TB care issue in Georgia; b) identification of valid survey indicators, to be taken as the basis for the questionnaire design; c) identification of findings for the analytical report. The ISSA analyst elaborated the survey tools and guidelines. Group discussions were audio/video taped and the recorded material was analyzed.

Both qualitatively and then quantitative methods were applied for analyzing the interview results: factor analysis, univariate analysis, logistic regression. The study group then was divided into those who defaulted permanently and those who resumed the treatment after default. The logistic regression was applied after the grouping.

Ethical considerations: This research was discussed and approved by the URC ethics committee and by the ethics committee from the National Center for TB and Lung Diseases.

Target group: M/XDR TB defaulters (those who had completely stopped treatment for two consecutive months or more) with laboratory-confirmed M/XDR-TB who initiated a first individualized treatment regimen (ITR) from 2008 to 2013.

Inclusion Criteria:

- M/XDR TB defaulters (those who had completely stopped treatment for two consecutive months or more) with laboratory-confirmed M/XDR-TB who initiated a first individualized treatment regimen (ITR) from 2008 to 2013
- **Age: ≥ 18**
- **Residency: Georgia (Tbilisi and different regions from rural as well as urban area)**

Exclusion Criteria:

- **Caregivers of patients, who died after they were officially registered at national TB centers**
- **those palliative patients who are not able to communicate with the interviewers**
- **Disabled persons**
- **Children**
- **Recent prisoners**

Sample size: As accessibility to M/XDR TB defaulters was limited, all the patients' records meeting inclusion criteria were screened. Official data were retrieved from the National Centre of

Tuberculosis and Lung Diseases. The patient data were derived from the medical records of all MDR/XDR patients with laboratory-confirmed M/XDR-TB who initiated an individualized treatment regimen (ITR) at a Two hundred and fifty eight eligible M/XDR TB defaulters' records were derived. Out of those, only 163 respondents participated in the interviews: 28 were dead at the time of the survey, with the 55 no contact was possible to establish with the data provided by the NCTLD, 8 refused to cooperate, and 4 were not in the country at the time of interview. ISSA used the informed consent to get the respondents' candor to participate in the survey. **Moreover**, after negotiations with National Centre of Tuberculosis and Lung Diseases administration, ISSA together with the Tuberculosis Center elaborated a plan of involving patients in the research.

Survey Method: Face to face interviews were conducted for 108 respondents: 73 at patients' homes and 35 hospital visits. For the 55 respondents telephone interviews were organized.

Sample design: Multi-Stage Cluster Sampling (MSCS). The multistage sampling strategy demands that representative geographic units for sampling be selected. These geographic sampling units are known as Primary Sampling Units (PSUs). The surveys' PSUs corresponded to the geographic divisions in Georgia. The Final Sampling Unit was the respondent.

	Region	No. of respondents
1	Tbilisi	49
2	Imereti	27
3	Guria	8
4	Samegrelo	21
5	Adjara	8
6	Kakheti	16
7	Shida Kartli	12
8	Kvemo Kartli	5
9	Samtskhe-Javakheti	8
10	Mtskheta-Mtianeti	9
	Total	163

Pre-testing: After developing the questionnaire, the Institute of Social Studies and Analysis pre-tested the questionnaires with five respondents.

Field work: The field work was conducted by trained interviewers. An authorized representative of the National Center for Tuberculosis and Lung Diseases (NCTBLD) directly contacted eligible patients. After obtaining the patients' consent to be included in the survey the NCTBLD representative disclosed his/her contact information to ISSA interviewers. The duration of the fieldwork was 3 weeks (because of difficulties regarding patients' availability).

Data coding and entry into a computer program: The respondents' answers to open questionnaire questions have been classified and formalized by providing them with codes (quantitative indices). The encrypted responses were entered into the computer network of variables description, which was created for each specific survey.

Data processing and analysis: The survey data have been processed by the statistical package for the social sciences (SPSS), providing statistical data in the form of tables and diagrams. Statistical

data analysis has been conducted by different methods of univariate (frequency distribution, indicator of central tendency) and bivariate (cross tabulation, correlation) analysis.

4 RESULTS

4.1 DEMOGRAPHY

According to the results of the study, the respondents' demographic data regarding sex, age, marital status, education level, and occupation and material conditions is the following (figures #5-10):

- ✓ **Sex:** the majority (85.3%) of the respondents were male. Twenty four respondents(14.7% out of 163) respondents were female;
- ✓ **Age:** age categories of the respondents were distributed in the following way: there were 97 respondents (59.5%) in the 25-44 age range. The fewest number of respondents were either under 25 (8.6%) or over 55 (10.5%). No children or youth under age 18 were included;
- ✓ **Marital status/size of the respondents' households:** more than half of the respondents (57.7%) were married; in addition, almost a third (29.4%) were from a large household (5 or more family members), which highlights issues of potential health risks to the respondents' family members;
- ✓ **Education level:** 73% of the respondents have secondary/secondary technical education;
- ✓ **Employment status:** 64.4% of the respondents are temporary unemployed and 42 (or 25.8%) of the respondents are employed (including self-employed). The remaining are retired, students, or housewives
- ✓ **Economic Status:** most of the respondents describe themselves as "being poor." 60.7% of the households reported a maximum monthly income of GEL 300 compared to the average

national monthly household cash income of Gel583 in 2012¹, while 21 respondents (12.9%) reported a maximum monthly income of less than GEL 100.

4.2 RESPONDENT TB PROFILES

The survey examined the medical records of respondents sampled to determine their basic TB status; though due to complications in acquiring information about the respondents, some of the data is incomplete (some information was missing in the records).

TB Status: Out of 163 respondents, 25 (15.3%) are infected with XDR tuberculosis, while the rest were confirmed MDR TB patients. Relatively more patients were diagnosed with M/XDR tuberculosis in 2011 (39 respondents, 23.9%); A total of 8 patients (4.9%) were diagnosed with M/XDR tuberculosis before 2008, the year when the DOTS Plus program was implemented in Georgia, and so initiated treatment outside the country Georgia.

Default history: 55 respondents (33.7% overall) defaulted from the treatment process once or several times and resumed it over a period of less than 2 months (*See Figure 11*).

Residence/prisoners: Most of the respondents reside in the city. 9 (5.5%) of the respondents have been internally relocated, 40 of them are former prisoners (24.5%). (*Figure 13*).

Smoking status/IDU: By the time of M/XDR TB treatment initiation 80 (49.1%) of them are smokers, 41 (25.2%) of them consume alcohol, and 15 (9.2%) of them are injection drug users.

Co-morbidities: 118 (72.4%) of the respondents do not experience any co-morbidities with M/XDR tuberculosis, while 39 indicated that they suffered at least one co-morbidity: 13 (8%) indicated diabetes, 24 (14.7%) indicated Hepatitis C, 2 (1.2%) indicated HIV /AIDS, and 16 (9.8%) of the

1. Retrieved from <http://www.geostat.ge/> in August 2013

respondents indicated mental health issues (*See Figure 14*). The respondents experience the following severe side effects, while undergoing M/XDR TB treatment: (*See table 1*)

TABLE 1. TB TREATMENT SIDE EFFECTS REPORTED BY RESPONDENTS

	Yes	%	No	%
Hepatitis	18	11	133	81.6
Neurological event (seizure)	16	9.8	136	83.4
Psychological condition	32	19.6	120	73.6
Renal abnormality	17	10.4	133	81.6

Previous treatment: 47.2% of the respondents were previously treated with the first line medications. Obviously, the initial treatment was not successfully completed. These patients defaulted from treatment with second line medications as well (*See Figure 15*).

TB Disease: Cavitory disease in 75 (46%) patients was detected using X-ray, while Bilateral Cavitory disease was found in 33 cases (20.2%) at the time of diagnosis. 8 (4.9%) patients needed additional surgical intervention.

Nutritional status: The body mass index (BMI) of 19 (11.7%) patients is below the normal standard (18.5).

Some respondents defaulted from treatment several times. The survey cohort re-initiated the treatment in 2008-2013. The heists treatment re-initiation rate is observed in 2013. (*See Figure 16*)

At the treatment initiation stage, 71 of the patients (46.3%) were in hospital. Seven of them (4.35%) defaulted from treatment while in hospital. (*See table 2*). During the treatment initiation a last sputum AFB smear test was positive in 25 patients (15.3%). A positive sputum culture results were reported in 33 patients (20.2%). (*See table 3*)

TABLE 2. TREATMENT REGIMEN AT A TIME OF TREATMENT INITIATION AND DEFAULT

	Inpatient		Outpatient		Total	
	%	No	%	No	%	No
Default	4.3	7	87.7	143	92	150
M/XDR TB treatment initiation	43.6	71	17.8	29	61.3	100

TABLE 3. SPUTUM MICROCOPY AND CULTURE RESULTS

	Positive	Negative	Total	Positive	Negative	Total
	No	%	No	%	No	%
Last sputum AFB smears Result	25	15.3	135	82.8	160	98.2
Last sputum AFB smears Result	33	20.2	126	77.3	159	97.5

Drug susceptibility testing (DST found that 7 of the respondents (4.3%) had no sensitivity to the listed medications required for the treatment. The sensitivity of patients to 1, 2 and more medications is evenly distributed. (*See Figure 17*)

4.3 TREATMENT OF PATIENTS SUFFERING FROM M/XDR TB

An absolute majority of respondents suffered from pulmonary tuberculosis. Only 8 (4.9%) patients had other extra pulmonary TB disease.

The majority (130 respondents – 79.8%) stated that during the first phase of the disease they were treated in hospital. Only 33 patients (20.2%) refused to be hospitalized and started intensive phase at outpatient settings. As they describe, their condition was not serious enough and did not require in-patient care. (*See Figure 18*)

4.4 AWARENESS LEVEL OF PATIENTS INFECTED WITH M/XDR TUBERCULOSIS

As the survey showed, the majority of respondents (82.8%) received information about M/XDR tuberculosis from the medical staff of the National Center of Tuberculosis. (*See Figure 19*)

Furthermore, the respondents had to rate: 1. Their own awareness level about M/XDR tuberculosis; 2. Whether they and their family members were informed at the early stages of treatment of how the treatment was supposed to proceed.

1. Patient self-evaluation regarding their own awareness level is high: M/XDR tuberculosis characteristics, treatment, lifestyle etc. indicators fell under the high assessment field. The demographic context showed that respondents in the 25-34 age brackets express the highest level of self-evaluation in terms of their awareness.
2. The rate of awareness of patients and their family members (according to information provided by medical staff of the tuberculosis center) at early stages of treatment is also high, although patients themselves are better informed than their family members. There were 57 patients (35%) overall who stated that the medical staff was not able to provide good information (to the patient him/herself, or to his/her family members) regarding how the treatment was going to proceed. Many patients who stated that medical staff did not provide adequate information believed negligence was the cause (21 respondents – 12.9% from Sampling. (*See Figures 20,20, 22*))

One contradiction has been identified: On one hand the majority of respondents did receive information from the medical staff at the National Center of Tuberculosis regarding M/XDR tuberculosis and confirmed that they had been informed in detail. On the other hand, having information about the services at the National Center of Tuberculosis approaches the neutral field of evaluation, this can indicate certain shortcomings in the system of disseminating information. The results of the test-questions which respondents were given to evaluate their real awareness levels about M/XDR tuberculosis support this idea. There is a disparity between the self-evaluation of respondents and their real awareness levels. As it appears, the absolute majority of respondents are well-informed only about the following three provisions: 1. The necessity of hospitalization at the

initial stage of the disease (it should be noted that 129 respondents (79.1%) were hospitalized at this stage of the M/XDR tuberculosis treatment process); 2. The necessity of maintaining a specific regime of nutrition, hygiene and treatment, and; 3. The risk of developing resistant tuberculosis if the treatment of regular tuberculosis is disrupted.

As for other provisions, a kind of a “failure” (incorrect answers and a high share of those respondents who found it hard to answer) is present, which threatens the health of not only patients but of their family members and the entire society as well. For example:

- ✓ According to approximately a third of the respondents an AFB (+) patient infected with M/XDR tuberculosis is not dangerous for surrounding people, as long as his/her personal items are isolated;
- ✓ Approximately a fifth of the respondents believe that by skipping some of the medications, the health of M/XDR tuberculosis patient will not be severely threatened and if they feel better, they can altogether default from treatment;
- ✓ Also approximately a fifth of the respondents feel less responsibility towards public safety: they believe that the (AFB +) M/XDR tuberculosis patient does not necessarily need to wear a medical mask in public places;
- ✓ It must also be indicated that 12 of the patients who had a positive result in their last sputum AFB test, remarked that in case of the isolation of personal items, an AFB + patient is not dangerous for surrounding people; 4 patients remarked that if a patient feels better, he/she can default from the treatment process. In spite of the fact that the number of such patients is not high, they still create a potential risk for surrounding people, the main reason for which is an insufficient awareness level (See Table 4);

TABLE 4: RESPONDENTS AWARENESS ON TB IN DIFFERENT CLINICAL GROUPS

		Last sputum result (AFB)					
		Positive		Negative		Total	
		No	%	No	%	No	%
Persons suffering from M/XDR TB (AFB+) do not pose threat to individuals being in close contact with them (Family members, for instance) if their private belongings are isolated.	Relevant	12	36.4%	32	25.4%	44	27.7%
	Irrelevant	20	60.6%	67	53.2%	87	54.7%
	Difficult to answer	1	3.0%	27	21.4%	28	17.6%
If a person suffering from M/XDR TB feels good at some point in time, their health shall not be threatened and are free not to terminate the treatment.	Relevant	4	12.1%	29	23.0%	33	20.8%
	Irrelevant	28	84.8%	77	61.1%	105	66.0%
	Difficult to answer	1	3.0%	20	15.9%	21	13.2%

✓ As for awareness regarding the issue that the bacilli causing M/XDR tuberculosis is resistant to at least which two medications – in this case there is a lack of information: 40.5% responded correctly; 17 of those respondents, however, responded to an alternate provision positively as well (hence, they did not possess accurate information). (*See Figure 23*) (This means that the share of individuals possessing accurate information relevant to the statement was 22.1%).

So regardless of the satisfied level of information provided to the TB patients by the health workers, still the patients consider that the smear positive TB is not dangerous for public and that some doses can safely be skipped

4.5 REASONS FOR M/XDR TB TREATMENT LOST TO FOLLOW UP

Respondents were given a list of reasons for why they defaulted or why a person might default from M/XDR TB treatment to determine the importance of each factor. As demonstrated by our survey, the most important reasons for default from TB treatment are related to challenges in adhering to the treatment regimen. The patients named the quality of medicine, quantity of drugs and number of doses, and duration of treatment (also related to daily administration of medicines) as negative

factors. Side effects should be considered most important. As shown by the present survey, side effects have been recorded in the cases of 137 (84%) out of the 163 respondents. Out of the 26 patients (16%) who did not demonstrate side effects during the treatment, only 15 considered the given reason to be unimportant. (*See Table #5*)

TABLE 5. REASONS FOR TREATMENT LOST TO FOLLOW-UP IN M/XDR TB PATIENTS

List of factors/reasons	Mean	Mode
Due to side effects	3.95	5
Lack of trust in medical staff (doctors, nurses) due to their incompetence	1.47	1
Doctors are not caring enough	1.47	1
Late provision of medicine	1.34	1
Inability to adjust to treatment regimen	3.38	5
Duration of treatment	3.16	1
Large amount of medication	3.59	5
Unavailability of in-patient hospital	1.20	1
Poor conditions in the health care institution	1.31	1
The patient does not want to be hospitalized	1.58	1
Poor quality of medication	3.09	5
Social/financial problems	2.38	1
Unavailability of the voucher	2.04	1
Employment/ lack of time	1.67	1
Distance from the health care institution (TB center)	1.56	1
Prevented from looking for a job	1.41	1
Changing place of residence	1.17	1
Using traditional treatment methods (like healers, etc)	1.11	1
Society's negative attitude to TB patients (fear of disclosing TB status)	1.23	1
Due to depression	2.69	1
Lack of family support	1.36	1
Significant improvement of health condition after starting treatment	1.73	1
Due to substance (alcohol, drug) dependence	1.32	1

A total of **4 factors** were identified using the factor analysis method. These factors united similar reasons for treatment default or the reasons for treatment default were distributed by homogenous groups, labeled as follows:

1st Factor – ‘Systemic and social/cultural factor’

2nd Factor – ‘Medication/treatment regimen’

3rd Factor – ‘Substance dependence’

Another (4th) factor “Unavailability of in-patient hospital’ was indicated only by 6 respondents.

(See Table 6)

TABLE 6. DISTRIBUTION OF REASONS FOR X/MDR TREATMENT DEFAULT IN HOMOGENOUS GROUPSM/XDR

‘Systemic and social/cultural factor’	‘Medication/treatment regimen’	Substance dependence
Lack of trust in medical staff (doctors, nurses)	Side effects	Substance (alcohol, drug)
Doctors are not caring enough	Inability to adjust to treatment regimen	Continuation of treatment is considered senseless
Late provision of medicine	Duration of treatment	
Poor conditions in the health care institution	Large amount of medication	
The patient does not want to be hospitalized	Poor quality of medication	
Social/financial problems	Employment/ lack of time	
Unavailability of the voucher (voucher abolished)	Changing place of residence	
Distance from the health care institution (TB center)	Depression	
Prevented from looking for a job		
Using traditional treatment methods (like healers, etc)		
Society’s negative attitude to TB patients		

As seen from the table, respondents grouped systemic problems under a single factor, mainly related to doctors’ professionalism and inappropriate treatment of patients (uncaring attitude), poor

conditions in the hospital, and long distance from the health care institution, which might have a negative impact on the patient's willingness to receive treatment in the hospital. Seeking alternative treatment (approaching healers, etc.) could be caused by the above-mentioned problems. These problems are also related to the social/financial and cultural problems. For example, the poor financial situation is related to difficulties getting a job. The effect of the stigma not only on society, but also on family members, is also very important.

The second factor practically confirms the results of the general evaluation of the reasons for the default from treatment by pointing to the problems with the medication used for M/XDR TB (side effects, quality of medication, the necessity of receiving medication in large amounts, the treatment regimen and resulting depression), which is an important factor given the fact that most respondents noted considerable deterioration of mood following their involvement in the M/XDR TB treatment program).

The problem of employment/lack of time is directly linked with the administration of medication since most patients do not disclose their health status to the employer. As for changing the place of residence, this factor might become a de-motivator for the continuation of treatment (e.g. the patient might not be able to contact the TB center/ health care providers due to increased distance, etc).

An interesting aspect of the third factor is that substance dependence is not named by the majority of substance-dependent individuals (alcoholics, IV drug users) as an important de-motivator for treatment default. Such an opinion is held by 29 of the 41 alcohol using patients and 8 of the 15 IV drug users). At the same time, the majority of IV drug users (9 respondents) consider the continuation of treatment to be senseless. As shown by the survey, 19 patients (11.7%) continued the treatment of TB using alternative resources (primarily, private doctors) following treatment default. In addition to indicating a lack of trust in the treatment system, these data also imply that these patients create danger for other people, since it becomes difficult to monitor their health

condition (e.g. to determine whether the patient spreads bacilli). According to respondents, during the course of treatment before default the majority of patients received medication on a daily basis. The number of non-compliant patients was only 31 (19%). However, it became evident that out of the 132 respondents (81%) receiving medication on a daily basis, 101 respondents (76.5% from the given group) named side effects as a possible reason for treatment default (see the following figures for comparison: out of the 132 patients, 86 patients (65.2%) named inability to adjust to the treatment regimen, whereas large amount of drugs was named by 88 respondents – 66.7%). (*See Figures 24,25,26*)

Respondents were asked to name the **most important factor that might become the main reason for M/XDR TB treatment default**. The data below partially support the results previously obtained during the assessment of default criteria. In particular, one half of respondents indicated side effects. Social/financial problems were named as the second factor (in terms of importance) responsible for treatment default. However, other factors, the share of which has been slightly redistributed, should be also taken into consideration. (*See Figure 27*)

Descriptions of the **main motivators for the completion of M/XDR TB treatment** point to medication and the treatment regimen in general. Most respondents named 3 main motivators with the first motivator rated as much more important. These are: 1. Improved quality of medication with minimal side effects; 2. Reintroduction of the food voucher and the improvement of the patients' financial support (in the form of vouchers), and; 3. Free treatment regimen, implying a reduced amount of medicine, the facilitation of the provision of medication to the patients' homes, etc. (*See Figure 28*)

So, the two main factors identified by the respondents as a cause of default are side effects and social/financial status. And respectively, the patients identified the improved quality of drugs and the re-introduction of food vouchers as main motivator to resume the treatment. the one of the most

important factors resulting in default was listed the side effects. The third motivator identified “free treatment” which should be addressed properly.

4.6 QUANTITATIVE ANALYSIS: ANALYSIS OF THE RISK FACTORS THAT PROMOTE DEFAULT FROM TREATMENT

Various factors impact patients’ decisions to default from treatment. In order to assess these impacts, statistical analysis using logistic regression was conducted.

The sample population was grouped as follows: the group of patients who defaulted permanently (that is, did not re-enroll after defaulting, unfavorable outcome), and the group of patients who enrolled in treatment again after defaulting (favorable outcome). The persons who were interviewed at the hospital and/or were enrolled in treatment in 2013 were deemed not to have permanently defaulted from treatment. In all, there were 25 such patients out of 163. The other 138 patients were classified as permanent defaulters.

Analysis included the factors which were identified as risk-factors for defaulting from treatment during qualitative study (focus-groups) and the factor analysis of the survey data. Univariable and multivariable logistic regression was conducted. The analysis revealed that out of the risk-factors that were mentioned during the focus-groups and indicated by factor analysis, only 7 were significant in univariable logistic regression models (*See Table 7*).

TABLE 7. ODDS RATIOS OF THE DIFFERENT FACTORS AND COMBINED FACTORS ALONG WITH THEIR P-VALUES FROM LOGISTIC REGRESSION. NAMES OF FACTORS ARE SHORTENED FOR CONVENIENCE. OR DENOTES OR OF LEAVING TREATMENT. NAN DENOTES ERROR OF CALCULATIONS.

Group	Factor	Univariable Model		Multivariable Model	
		OR (95% CI)	P-value	OR (95% CI)	P-value
Medical Care issues	side effects	6.68 (2.73, 17.29)	<0.001	4.08 (1.15, 14.69)	0.029
	Unbearable treatment routine	11.22 (3.99, 40.21)	<0.001		
	Excessive medication	3.51 (1.47, 8.71)	0.005		

	Low quality of medication	3.62 (1.42, 10.53)	0.011		
Financial and time problems	Treatment is too long	8.42 (3.01, 30.07)	0.001	7.94 (2.45, 30.17)	<0.001
	No time to take treatment	1.24 (0.38, 5.59)	0.742		
	Treatment interferes with job search	0.58 (0.16, 2.72)	0.431		
	No voucher	0.58 (0.23, 1.53)	0.248		
	Social/financial problems	0.94 (0.39, 2.46)	0.894		
Mental state	Depression	5.48 (1.79, 23.91)	0.008	12.00 (2.94, 69.53)	0.002
	treatment is ineffective/unnecessary	NaN	0.989		
Condition of tuberculosis	Cavity	7.68 (2.74, 27.45)	0.001	0.14 (0.03, 0.51)	0.004
	XDR-TB	0.27 (0.10, 0.77)	0.011		
	Positive sputum culture	7.70 (30.8, 19.93)	<0.001		
	Has support from family	0.58 (0.24, 1.40)	0.213	0.24 (0.06, 0.79)	0.024

In the multivariate setting, only 3 of them are significant at best (*See Table 8*). To include as many factors in the statistical analysis as possible, the factors were grouped thematically (grouping is given in *Table 7*) and then were used in logistic regression. All of the grouped factors are highly significant (*Table 7***Error! Reference source not found.**). In all, 15 factors were used to construct the grouped factors.

TABLE 8. ALTERNATIVE LOGISTIC REGRESSION MODEL CONSISTING OF INDIVIDUAL FACTORS. GIVEN ARE THE FACTORS ALONG WITH THEIR OR AND P-VALUES FROM REGRESSION. OR DENOTES OR OF LEAVING TREATMENT.

Factor	OR(95% CI)	P-value
Side effects	5.07 (1.73, 16.01)	0.004
Social/financial problems	2.02 (0.68, 6.80)	0.228
Depression	3.30 (0.87, 16.34)	0.099
XDR-TB	0.30 (0.10, 0.95)	0.032
Has support from the family	0.34 (0.11, 1.01)	0.052

The analysis showed **two main risk-factors** that have a very high impact on a patient's decision not to resume the treatment. Firstly, **being depressed** or regarding the treatment as ineffective or unnecessary is the biggest risk-factor, as it increases the odds of defaulting 12.00 times (95% CI [2.94,69.53]). Secondly, **a financial/time constraint of the patient is** also a major obstacle with OR 7.94 (95% CI [2.45,30.17]).

Medical service issues are also important in this regard. Side effects, lengthy, heavily-medicated treatment or the low quality of medication increases a patient's odds of leaving treatment by a factor of 4.08 (95% CI [1.15,14.69]).

Among the factors that influence a patient to complete the treatment, the **condition of tuberculosis** also has a considerable significance. Patients who have XDR-TB, cavity, or positive sputum culture have 7.24 times larger odds of staying in the treatment than the patients who do not (95% CI [1.96,30.19]). This result signifies that the more visibly severe and lethal the condition is, the more willing the patients are to receive treatment.

Support from the social environment is also an important factor. The patients, who stated that they are in a friendly relationship with their immediate family, have 4.24 times bigger odds of staying in the treatment (95% CI [1.27,16.47]). It may seem counterintuitive that only a very small share (3.68%) of patients state that the lack of family support contributed to their decision to default from treatment. One possible explanation is that patients refrain from publicly talking about their families in a negative context.

Discussion: Both experts and respondents stressed in discussions that side effects are one of the main reasons for defaulting from treatment. Logistic regression analysis revealed that while the effect of this factor is significant in the univariable model, it becomes significant only when combined with other factors from medical care *issues (See Tables 7, 9) in the multivariable model.* This suggests

that although patients assert side effects are the main reason they decide to leave treatment, in reality, other related issues are involved as well, such as the length of treatment, and/or the intensity/quality² of medication causing the side effects.

The statistical analysis of the data revealed that the factor - the termination of the treatment is caused by the fact that patients leave as soon as their health conditions improve - is insignificant in both the univariable and multivariable models (*See Table 9*).

Impact of social stigma on treatment default was not revealed (*See Table 8*). An overwhelming majority (96.93%) of the patients stated that this problem did not influence their decision to default from treatment.

One of the concerns experts raised was the low quality of the information patients receive about tuberculosis when enrolling in the treatment. The analysis showed that there is no significant link between how well the patient is informed and their risk of leaving the treatment (*See Table 9*). This is not unexpected considering that 85.27% of the patients receive detailed information and 94.47% of them receive all the necessary recommendations. In this regard, it should also be mentioned that the majority of the patients have no complaints about trusting their doctors (91.41%) or of their doctor's attitudes toward them (92.63%). These two factors did not prove to be significant in either the univariable or the multivariable models (*See Table 9*).

TABLE 9. OR AND P-VALUES FROM ALTERNATIVE MULTIVARIABLE MODEL. AS IT CAN BE SEEN, INDIVIDUAL FACTORS FROM THE COMBINED FACTOR “MEDICAL SERVICE ISSUES” (THE FIRST FOUR FACTORS) ARE NOT SIGNIFICANT.

Factor	OR (95% CI)	P-value
side effects	2.24 (0.66, 7.93)	0.197

² It should be mentioned that patients sometimes do not have information about side effects of their medication. So, when the side effects arise, patients mistakenly report quality of medication as poor.

Unbearable treatment routine	2.07 (0.53, 9.22)	0.308
Excessive medication	1.74 (0.30, 10.46)	0.537
Low quality of medication	1.36 (0.38, 5.01)	0.634
Financial and time problems	4.60 (1.20, 21.09)	0.034
Mental state	7.67 (1.63, 48.93)	0.017
Condition of tuberculosis	0.20 (0.07, 0.76)	0.021
Has support from family	0.27 (0.07, 1.00)	0.051

A connection between demography and defaulting from treatment was not identified. It is especially surprising that there is no discernible link between the income of a patient’s household and their odds of leaving. However, an inspection identified that the households of the majority of the surveyed patients (150 of 163, or 92%) earn less than 600 GEL per month. Because the patients are homogenous in income, the connection between welfare conditions and defaulting from treatment cannot be identified. We should also note that the link between prisoner status and the risk of leaving did not prove significant (*See Table 10*) either. This is not likely to be a statistical shortcoming as there are 40 former prisoners in the sample of 163. With this distribution, any significant relationship would have been identified.

TABLE 10. OR AND P-VALUES FROM THE UNIVARIABLE REGRESSIONS OF THE FACTORS WHICH WERE DISCUSSED DURING FOCUS GROUPS AND FACTOR ANALYSIS, BUT DID NOT PROVE SIGNIFICANT IN ANALYSIS. NAN DENOTES ERROR OF CALCULATIONS.

Factor	OR (95% CI)	P-value
Health condition improved	3.43 (0.65, 63.23)	0.242
Stigma	NaN	0.991
Informed before enrolling	1.48 (0.25, 28.03)	0.719
Does not trust doctors	NaN	0.988
Dislikes attitude from doctors	2.08 (0.38, 38.87)	0.439

Income above 300 GEL	2.08 (0.64, 9.40)	0.269
Is prisoner	0.91 (0.31, 2.36)	0.853

So, according to the quantitative analysis, the side effect of the drugs along with other medical factors is the major risk factor for defaulting. Interestingly, stigma was not identified as a risk factor, nor the demographic data.

4.7 SIDE EFFECTS, THEIR MANAGEMENT, AND OTHER DISCOMFORTS ASSOCIATED WITH THE TREATMENT PROCESS

Multi-drug-resistant tuberculosis patients, who are undergoing a treatment of second line medications, might experience various side effects. The majority of these effects is not severe and can be managed without treatment default, but should these effects not be discovered and treated, they might escalate and threaten the patient’s life. Inadequate management of side effects increases the likelihood of disrupted or ineffective treatment.

Studies conducted in various countries ^{11,12,13} have determined that the second level medications are accompanied by ototoxicity, mental, neurological, endocrine, dermatological and digestive system side effects, electrolyte metabolism disorders and other severe effects. It is of great importance to diagnose the above-mentioned side effects in their early stages. For example, mental side effects can begin with irritability, anxiety and personality change of the patient; in this case, depression can be avoided by affecting psycho-social and socio-economic irritators, conducting group therapy and through the employment of antidepressants.

84% of the patients who participated in our study stated that they had experienced side effects during the treatment process; 71% of respondents believe that the side effects were not handled successfully during the M/XDR TB treatment process. Half of the former patients (49.6%) remarked that they experienced side effects during the first 2-3 weeks of the treatment process. Most commonly specified symptoms are vomiting/nausea, weakness and headaches/dizziness. Mental side effects, such as anxiety and

depression, were specified by 40% of patients. According to the results of the KAP-study¹⁴ that was conducted last year only 27.8% of the patients who were undergoing treatment consulted with a therapist. Upon being asked why the side effects of medications were not handled successfully, 20% remarked that the tuberculosis treatment process did not encompass the employment of medications and procedures necessary for managing side effects. 10% believe that the medical staff could not manage to handle side effects adequately, while 26% think that side effects were extremely severe. (See Figures 29-35)

4.8 ACCESSIBILITY OF DIFFERENT SERVICES

Respondents were given a list of components required for the treatment of M/XRD TB and were asked to state whether each of these components were accessible. They were also asked to assess their satisfaction with the components which they did find to be accessible during the treatment.

As shown by our study, all the needed components turned out to be accessible for the majority of respondents (98 respondents – 60.1%). At the same time, of the listed components at least one component was accessible for all the respondents covered by the study.

It has to be noted that, for the most part, 1, 2, or 3 components needed for the treatment of M/XRD TB were inaccessible for a certain category of respondents. The following table shows exactly which components were not accessible for patients. (See Table 11)

TABLE 11. ACCESS TO DIFFERENT COMPONENTS OF M/XDR TB TREATMENT PACKAGE

	<i>How many components were inaccessible</i>						
	1	2	3	4	5	6	
Consultations provided by a doctor at the Center of Tuberculosis		1	1			2	4
Ambulatory studies		3	1				4
Treatment in Hospital	4	2	2			1	9
Medications for tuberculosis		1					1

Service provided by a social worker	8	11	8	4	3	2	36
Service provided by a psychologist			8	4	3	2	17
Service provided by a consultant at the office of counseling	1	2	8	4	3	1	19
Service provided by a caretaker		10	6	3	3	2	24
Service provided by a nurse	1	1	2				4
Medications for treating side effects	10	7	3	1	3	2	26
Total	24	38	39	16	15	12	144

The number of such respondents is not small, given the fact that M/XRD TB treatment services are basically free for the patients covered by the program. Furthermore, as noted by 74 respondents (45.4%) one or two treatment components were not available at their place of residence. Also, “are not available at my place of residence” implied the absence of services provided by psychologists, social workers or the services provided by the consultant for compliance with treatment. All these components can play an important role in the successful completion of treatment without any interruptions. **However, it should be also mentioned that the patients are not consistently aware of the importance of the above components.** A large part of respondents does not think that the services provided by psychologists, social workers or consultants are necessary for compliance with treatment. This category of patients includes 3 respondents who did not think they need to undergo ambulatory tests or consultations from a doctor at the TB center. In general, 111 respondents (68.1%) _noted that they did not need at least one treatment component. Out of these, the majority of respondents stated that they did not need at least 1 or 2 M/XRD treatment components. (See Figures 36-40)

Low awareness of the relevant services was named by respondents as the main reason for the inaccessibility of an M/XRD TB treatment component. It should be noted that over one half of respondents (55.4%) found it difficult to answer the question, which may also point to a low level of awareness. (See Figure 41)

According to survey results the satisfaction rate is quite high for some of the services received by M/XRD TB patients. Respondents also give a positive assessment of the treatment process and treatment conditions. However, this does not mean that nothing needs to be improved. As stated by respondents, in addition to M/XRD TB treatment, the major problem is the treatment of the side effects of the medication. It has to be noted that when assessing the reasons for the termination of M/XRD TB treatment, 76 respondents (46.6%) named the quality of medicine as one of the important factors. Side effects were named as an important factor by 118 respondents (72.4%). (*See Figure 42*)

4.9 EMPLOYMENT

The majority of respondents (69.3%) were not employed when diagnosed with M/XDR TB (and none of the employed respondents was an IV drug user) and only 28 of the employed patients (17.2%) continued working after being diagnosed with M/XDR TB. (*See Figure 43*)

The remainder of the 135 respondents (82.7%) who were not working when diagnosed with M/XDR or who were not able to continue working, named two main reasons for unemployment: 1. no opportunity to find a job, and; 2. the inability to work because of poor health conditions. (*See Figure 44*)

As indicated by the research, a large share of respondents (113 respondents (69.3%), out of whom 13 are alcohol abusers) who were not employed when being diagnosed with M/XDR TB did not try to find a job after being diagnosed because of the specificity of their disease, poor health condition or a lack of willingness to work. (*See Figure 45-46*)

4.10 COMMUNICATION AND CULTURAL STEREOTYPES

In general, M/XDR tuberculosis patients do not conceal their health condition from their family members, friends, relatives and neighbors. There were no respondents who had never discussed the

disease with anyone else. 98.2% of respondents remarked that their family members know about their disease. The low level of awareness of the patients' co-workers is, on the one hand, caused by the **high unemployment rate of M/XDR tuberculosis patients and, on the other hand, by the low social density of such relationships and perhaps, by the fear of losing one's job.** Family members of all female respondents are aware of their disease. Relatives and neighbors of those patients who reside in the countryside are relatively more aware of the respondents' health condition. If a patient is open with one group, then, usually, he/she is open with several other groups as well; namely, openness with family members is linked to openness with neighbors, relatives and friends.

The respondents remarked that they have mostly friendly relationships with people with whom they interact: those with whom patients connect emotionally, as well as with medical personnel. According to the study, only a small number of respondents referred to tension or conflict with the above-described groups. It should be noted that the greatest source of tension, as well as the greatest source of comfort is identified with family members. The index of neutral relationships is also high: from the so-called "primary groups"(neighbors, relatives, friends, family members), respondents have neutral relationships with their neighbors.

The majority of respondents assert that, when they were diagnosed with the disease, they enjoyed adequate support from their close ones. 54.6% felt strong support from their family members and relatively neutral support from their neighbors. It is important that those patients who experienced side effects while taking M/XDR tuberculosis medications referred more strongly to the strong support from their family members, relatives and neighbors.

30.7% of the respondents reported the belief that the society is indifferent to the problems of M/XDR tuberculosis patients; 28.8% believe that the society expresses empathy, but does not take supportive actions. 14.7% of the respondents remarked that the society is not empathetic to M/XDR tuberculosis patients, while only 9.2% claimed that the society tries to help them. Such percentage distribution

suggests that the **major part of M/XDR tuberculosis patients experience empathy from the society**. In general, the quality of interaction with close ones (especially family members) depends on what level of empathy the M/XDR tuberculosis patient feels from the society. 52.8% of the respondents have never felt a neutral attitude from surrounding people, while 46% have felt it often or sometimes. Naturally, the latter group is in close connection with relationships with close ones. **The fact that nearly half of the respondents have felt negative attitudes from surrounding people, once again highlights the attitude of the society to those infected with tuberculosis.**

The emotional condition of a patient and the change of this condition after beginning the M/XDR tuberculosis treatment process are in turn linked to the perception of the patient, as well as the attitude of the society to M/XDR patients and the character of the nature of relationships with their close ones. **After beginning the treatment process of M/XDR tuberculosis, patients are prone to becoming more anxious, aggressive, depressive, pessimistic or reserved; one quarter of the patients reported that their** mental condition has not changed and only 5.5% became calmer and more balanced.

11.6% of the respondents were denied medical service without explanation at various medical facilities (except the Tuberculosis center) because of their exact disease. 13.5% reported that the medical staff delayed medical service on purpose. The number of instances in which the confidentiality principle was broken by the medical staff of the Tuberculosis Center, as well as other medical facilities, is also high. The above-described data is correlated with how often patients have felt negative attitudes from surrounding people. An **indifferent attitude to the patients is clearly emphasized by the given data**. Nevertheless, only 4.3% with regard to the Tuberculosis Center and 3.7% with regard to the medical staff of other medical facilities describe their experience as either tense or one in which conflict occurred.

It should also be noted that more respondents feel relative support from the personnel of the Tuberculosis Center than from the personnel of other medical facilities. (*See Figures 47-51*)

5 DISCUSSION

According to the study findings, 11% of patients (28 patients) died after defaulting from M/XDR TB treatment (26 from M/XDR TB). Over one half of respondents (almost 60%) are of reproductive age. Almost the same number of respondents belong to the lower social stratum. There is a group of patients (33,7% identified in the given survey) who stayed in the treatment for less than 2 months. This group is worth mentioning because of posing threat to public health.

The majority of patients received information about M/XDR tuberculosis from the medical personnel at the National Tuberculosis Center. In spite of the fact that the majority of the respondents did not express dissatisfaction with the quality of the information that was supplied to them by the medical personnel, a contradiction was found in their opinions: 1. They considered themselves less aware of the National Center of Tuberculosis services (the respondents have relatively accurate information regarding the so-called “rules,” which are, for example, following a specific regime and hygiene, conducting a treatment process at hospital, etc.); 2. Self-evaluation (of the respondents) regarding the awareness level of multidrug resistant tuberculosis and the actual awareness level are different. Deficiencies caused by a lack of information can be noticed regarding such provisions, as those that contain not only individuals infected with M/XDR tuberculosis, but also the threat to public health.

The majority of the respondents are infected with pulmonary tuberculosis; the initiation date of their M/XDR TB treatment process is almost evenly distributed throughout the years 2008 – 2012 (several patients are registered in the year of 2013).

As for the central question of the study – the factors causing default from M/XDR TB treatment – univariate analysis of the study results showed that the main reason is the side effects caused by the

medications (the majority of respondents named this as one main reason). Among the other reasons were named social/financial problems. It should be mentioned that the patients who continue treatment (in this case these are the patients who got involved in the program after treatment default and stayed in the in-patient hospital in the course of survey or got registered, again, in 2013) also name the same problem. The above means that the given evidence does not point to the existence of a single risk-factor responsible for the default from M/XDR TB treatment. This is proved by regression analysis which enabled to thematically group the existing factors and logistic regression analysis carried out using combined factors. The above method shows that side-effects cannot be considered a clearly important factor in terms of treatment default. They are rather related to second rank medication linked problems (probability of treatment default increases 4.08 fold (confidence interval - 95% [1.15, 14.69])). The two most important risk-factors responsible for treatment default are the patient's disposition (depression)³ (12 fold increases the probability of treatment default; confidence interval – 95% [2.94, 69.53]) and the patient's financial/time constraints (7.94-fold increases the probability of treatment default; confidence interval 95% b.o. [2.45, 30.17]). In addition, the existence of social support (family, friends) has turned out to be an important factor (probability of completing treatment increases 4.24 fold (95% - confidence interval [1.27, 16.47])). Factor analysis revealed almost the same tendencies: at first glance patients were displaying fewer complaints to the services of the National Center of Tuberculosis, although the factor analysis also showed latent negative attitudes, when “systematic” as well as the chain socio-cultural problems were merged into a single factor. The second factor unites medication related problems (quality, side-effects, inconveniences caused by daily use of a big amount of medicine, treatment regimen, etc) and depression:

³ It should be mentioned that depression/restlessness was mentioned by 40% of respondents as one of the psychiatric **side-effects**. Furthermore, almost 60% complained about the intensification of pessimistic mood and **depression** after involvement in M/XDR TB treatment. Respondents' low social status and unemployment should be also taken into consideration (60.7% of respondents are from the families with a maximum of 300 GEL of average monthly income and 69.3% are unemployed).

71% believe that the side effects were not handled successfully during the multidrug resistant tuberculosis treatment period and name the extreme severity of the side effects, the unavailability of medications and procedures required for treating them, and the lack of adequately managing them by medical personnel, as the main reasons for defaulting from treatment

The above-described problems are directly connected to the opinions expressed by the patients regarding the main motivators for defaulting from M/XDR TB treatment: 1. Medications of better quality (without side effects, or with minimal manifestations); 2. Free treatment regime, and; 3. The issue of vouchers/strengthening of financial support is also important – the respondents believe that the food voucher program should be renewed (which is related to the patient's financial situation)

The availability of components required in the treatment process of multidrug resistant tuberculosis is an issue that needs to be separately noted. For a majority of the respondents, some of the treatment components were either not available or not existent at their place of residence (including such important components as a therapist, a social worker, and an adherence consultant). The study showed a low interest among the respondents towards the given components (they do not regard them as necessary), the reason of which is a lack of awareness.

The majority of M/XDR tuberculosis patients speak about "passive support" from the society and often or sometimes feel negative attitudes from surrounding people (in spite of the fact that quite a large portion of the respondents enjoys the emotional support/ benevolence of their family members and other close ones and the fact that there are no respondents who had never talked to anyone else about his/her disease). This indicated an existent social stigma about people infected with tuberculosis. The existence of social stigma is detected not only on the part of the society, but from medical personnel as well – there are events which even show signs of discrimination and criminality (i.e. 11.6% noted refusal to conduct medical service without explanation, while 13.5% referred to a

purposeful delay of medical service. The study also indicated breaches of the confidentiality principle by medical personnel – 18 respondents).

In general, the given survey has revealed the tendencies supporting the findings of internationally conducted studies. In particular, it points to the existence of two main factors – individual and systemic risk-factors (uniting a number of other factors) which are mainly responsible for treatment default. In line with the internationally conducted studies the present survey shows that the risk-factors identified through regression and factor analysis are interrelated. For example, depression (also, regarding treatment as a useless process) can be caused by medication (psychiatric side-effects the reduction of which is extremely important for the continuation of treatment) and dissatisfaction with medication related services (one of the risk - factors identified by regression analysis – the factor combined with side-effects, like quality, duration, treatment regimen, was shown to be linked to depression by factor analysis). It can be also related to a poor financial situation, and/or fear of losing a job (financial/time constraints) as well as a lack of social support. A part of systemic problems can be viewed in the context of above findings. This could be the unavailability of a psychologist or a consultant ensuring compliance with treatment. Also, some patients regard this component as unnecessary, which points to a poor communication between the patient and the health care provider despite the fact that, as demonstrated by the survey, most patients show trust in doctors.

6 CONCLUSION

The findings of the given survey enable us to draw the following conclusions: Risk-factors for the default from M/XDR TB treatment are mainly of psycho-social and socio-economic nature and there is no one single factor.

The risk-factors for treatment default are represented by the patient's depression, on the one hand, and socio-economic and systemic problems, on the other hand, with the latter closely interlinked

with the former factor. The motivators to continue the treatment are less side effects and financial support for patients. The accessibility for the services and stigma were not considered as risk factors for the treatment default in Georgia. Interestingly, the accessibility of the TB services and low TB awareness were not identified as risk factors for default. The following measures need to be taken to increase motivation for continuing treatment:

1. To identify the default risk factors, it is recommended to conduct a case-control study with the control of the patients who adhere and complete the treatment
2. Review the information provided to the family and patients and adjust it to the survey findings (smear positive cases, importance of treatment adherence, side effects, infection control measures)
3. Promote the functions of the National TB services in the country emphasizing that it is free of charge
4. It is also important to facilitate support to patients, first of all, and, especially, to their family members through the provision of the relevant information. The treatment program should consider the components described by respondents as inaccessible, unavailable or unnecessary (like psychologists, social workers, and consultants who can help ensure compliance with treatment). This will also improve communication between the patient and the treatment provider regarding treatment default. As already mentioned, the emotional and mental condition of M/XDR TB patients needs to be improved. Such an improvement might become a precondition for changing patients' attitudes towards treatment.
5. Provide employment opportunities to the DR TB patients during the course of the treatment (vocational training, etc.)
6. Effective management of medicine side-effects (especially for psychiatric side-effects) requires the development and introduction of algorithms and protocols as well as the early identification of side effects and their treatment. (e.g. including group therapy and the administration of antidepressants) Furthermore, the drugs and services for the management of side effects should

be included in an integrated treatment program and provided to the patient together with the medicines used for the treatment of TB.

7. The treatment program should consider the patients' demand for the provision of vouchers/ increasing financial support..As already mentioned, the provision of vouchers is one of the motivators for the continuation of treatment especially for socially vulnerable households who constitute a large share of patients.
8. Given the fact that the severity of the patient's condition (e.g. collapse of lung tissue) is related to the motivation for the continuation of treatment, the patient could be exposed to both positive (such as 'TB is curable') and negative (negative results in the case of treatment default) information about M/XDR and its treatment.

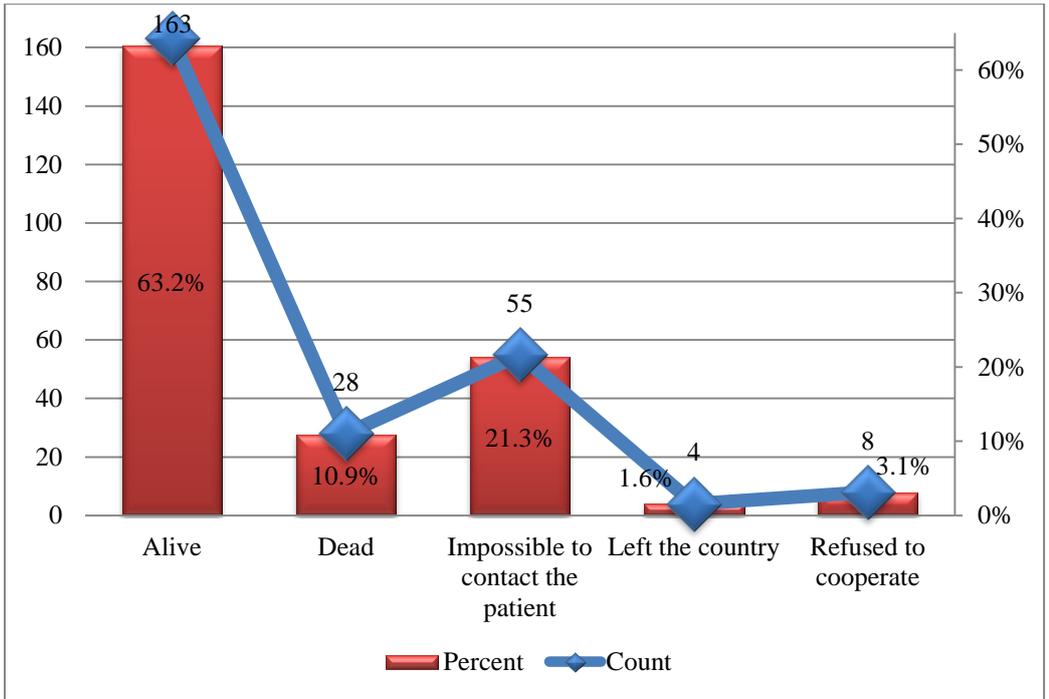


Figure 2. Distribution of respondents by regions

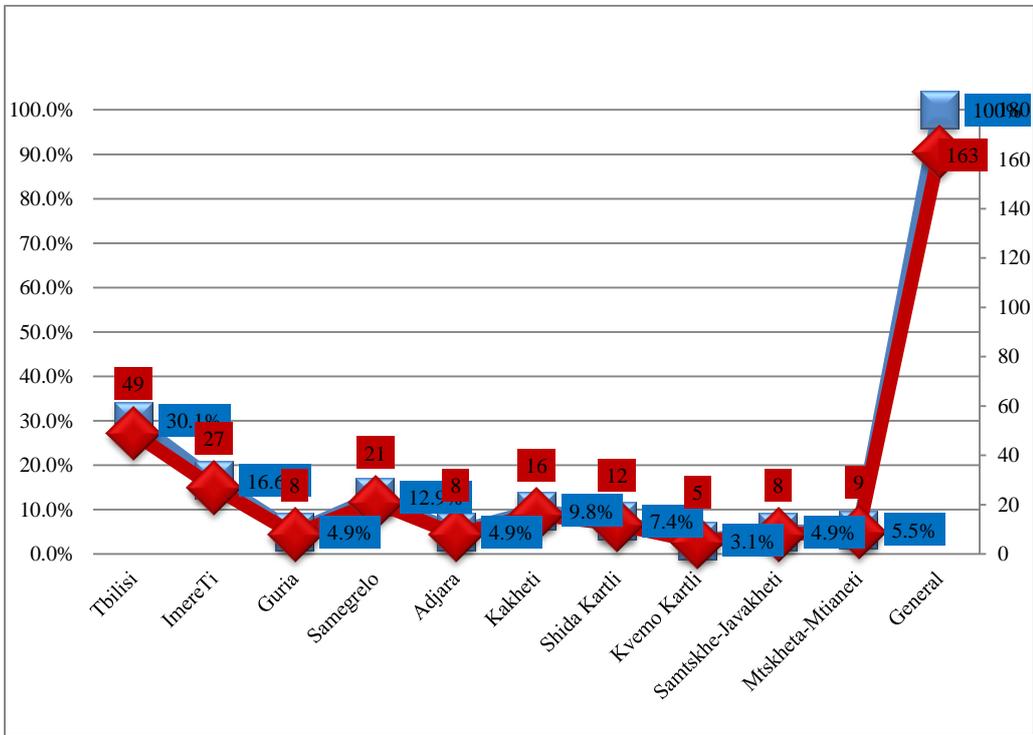


Figure 3. TB related death among defaulted patients

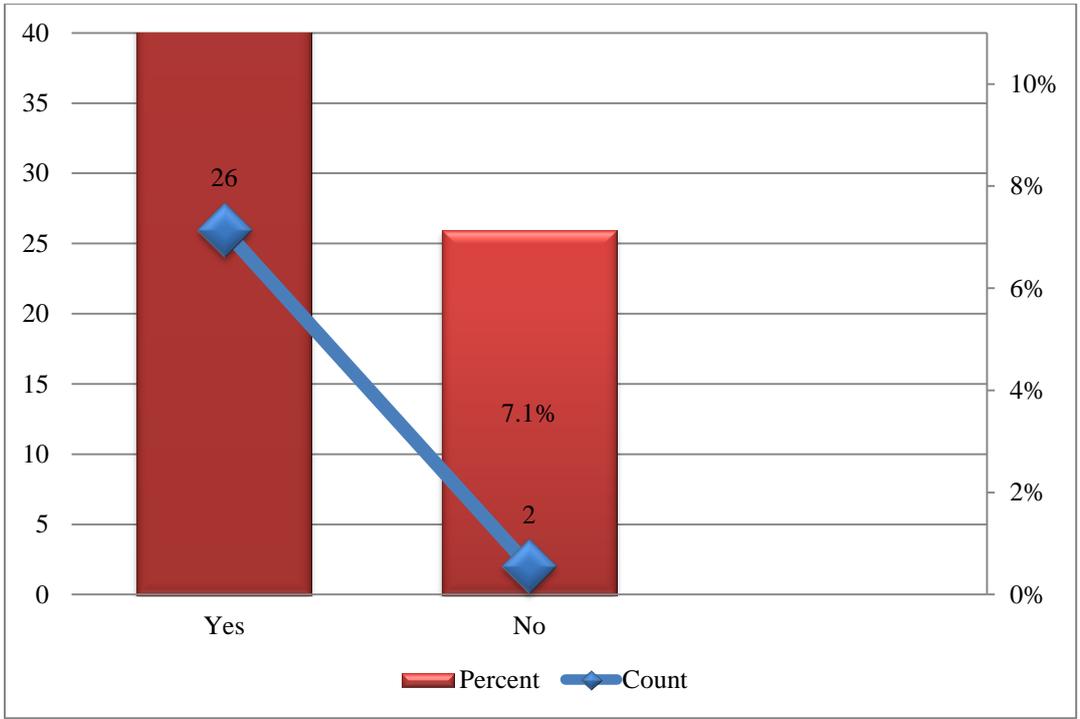


Figure 4. Reenrollment of the M/XDR TB Treatment Program after default

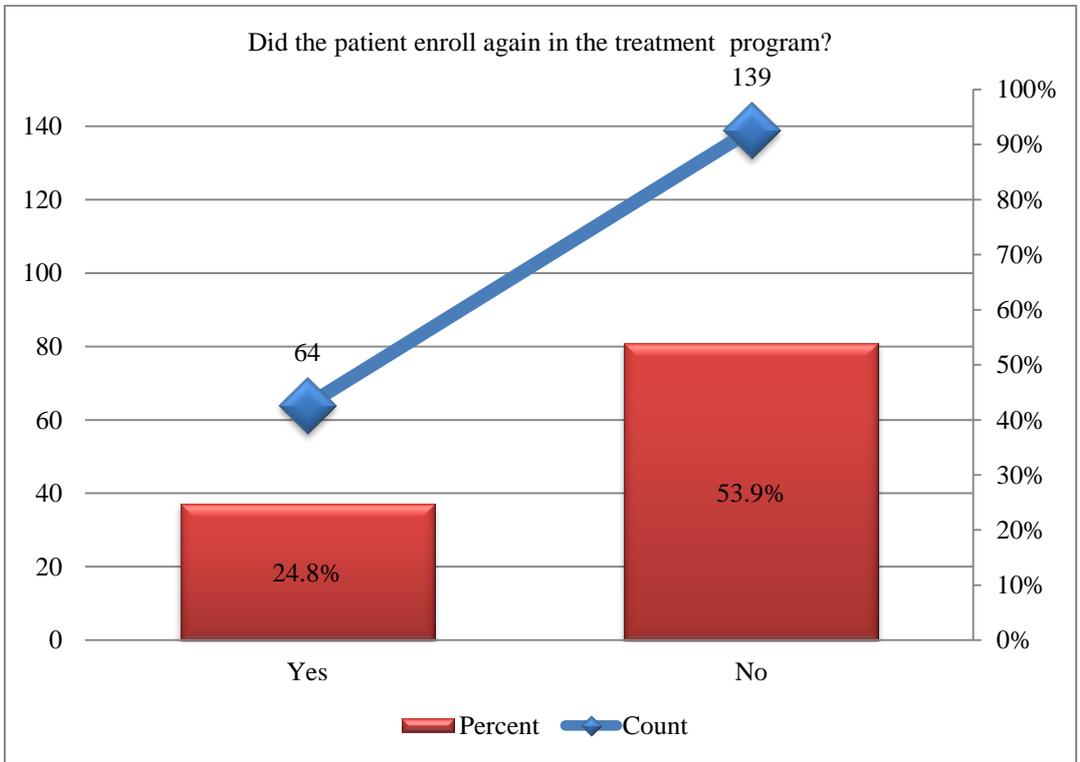


Figure 5. Distribution of respondents by gender

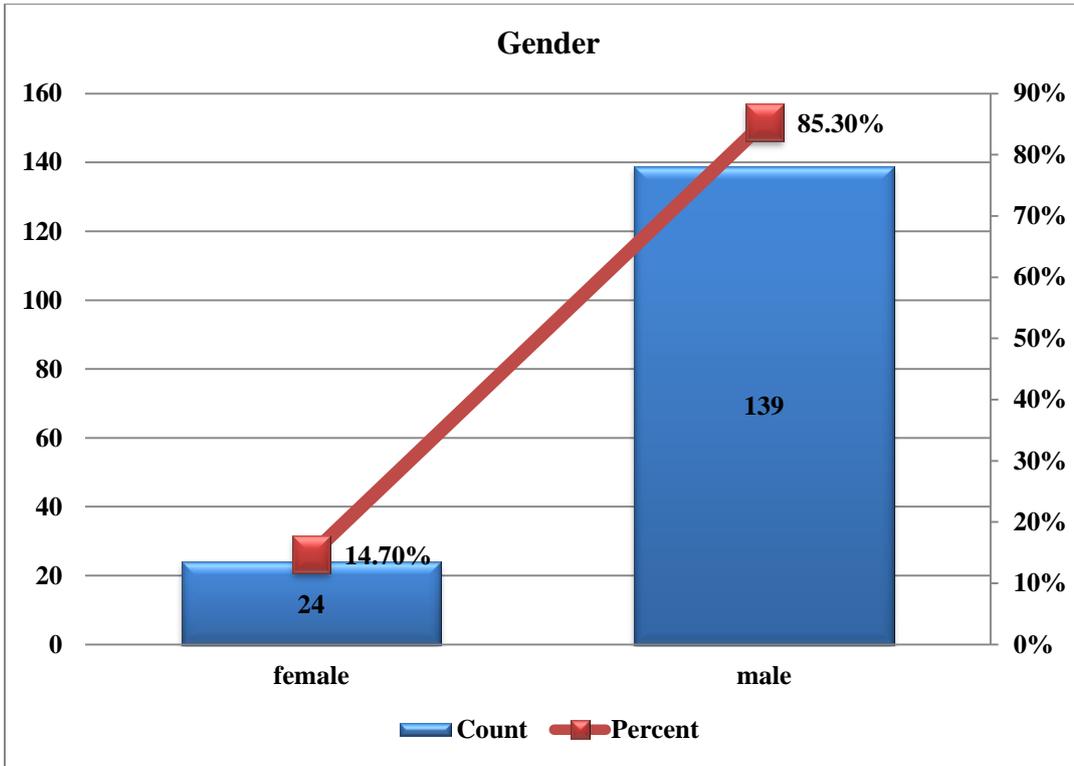


Figure 6. Distribution of respondents by age

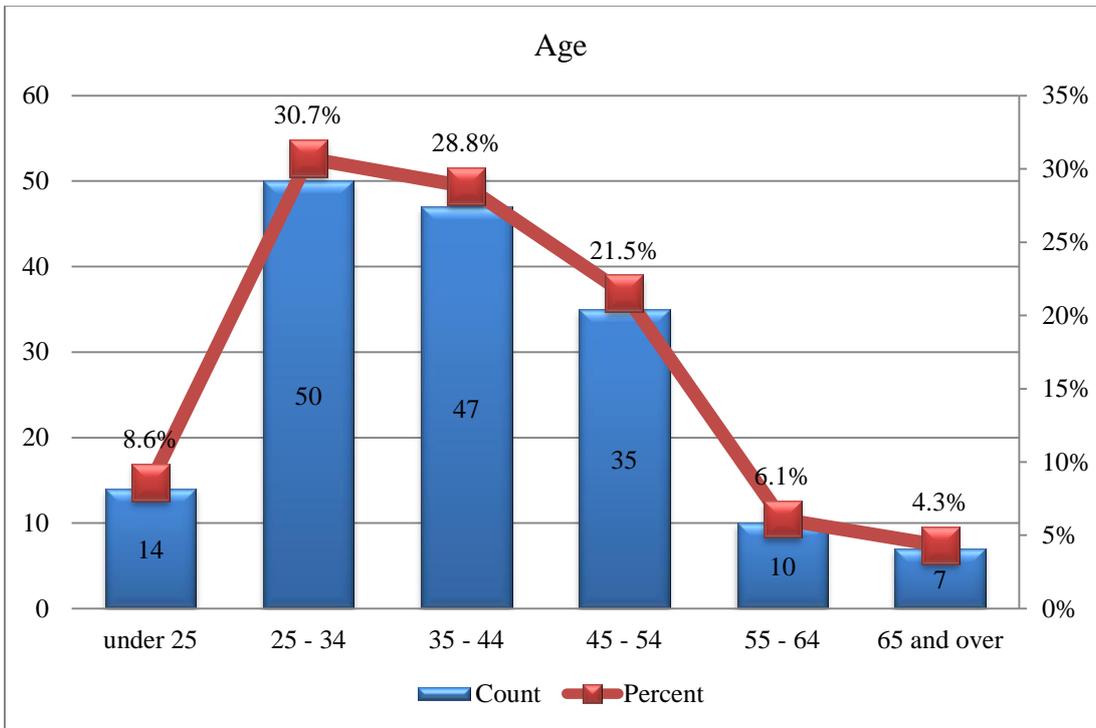


Figure 7. Distribution of respondents by marital Status

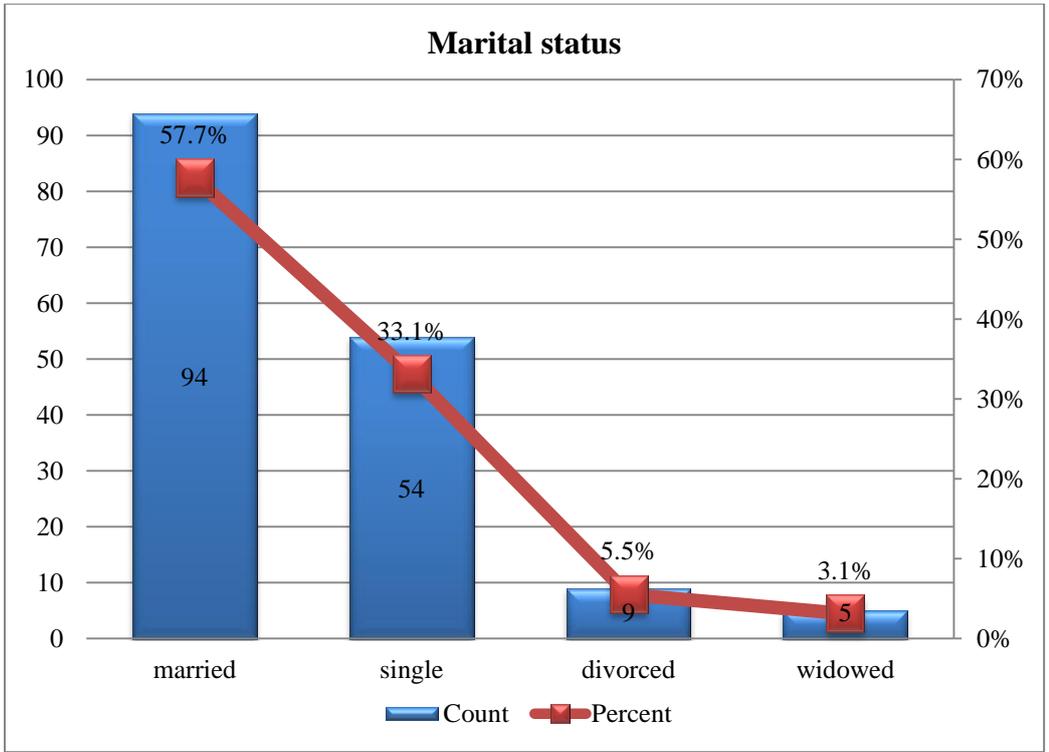


Figure 8. Distribution of respondents by level of education

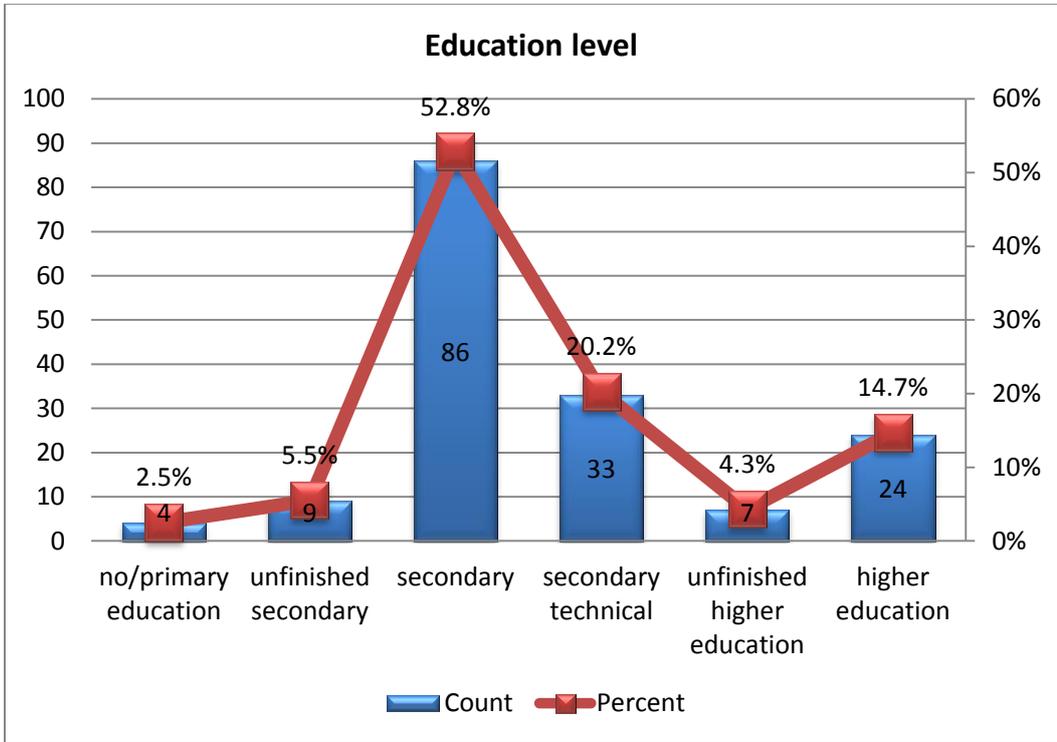


Figure 9. Distribution of respondents by occupation

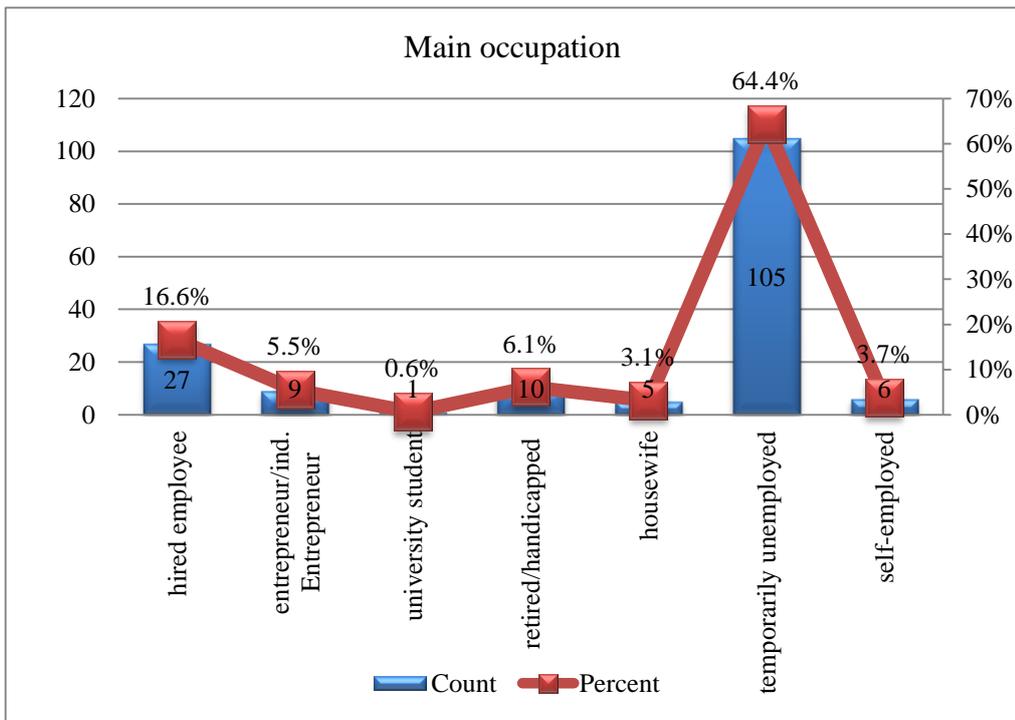


Figure 10. Distribution of respondents by the number of people in households

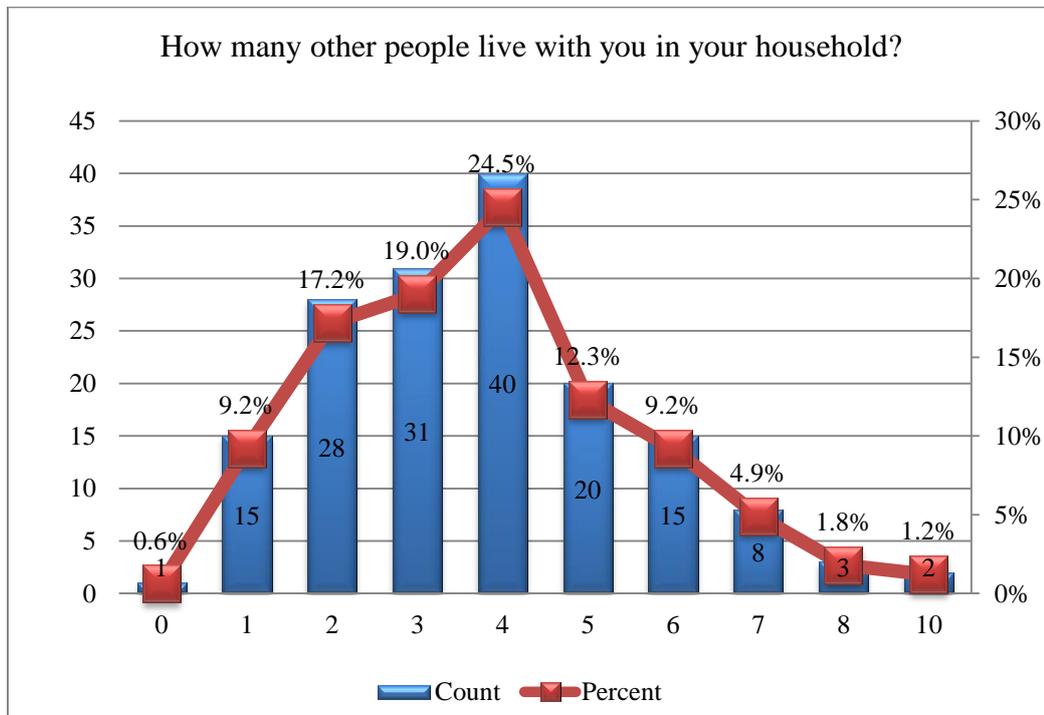


Figure 11. Distribution of respondents by average monthly household income in cash

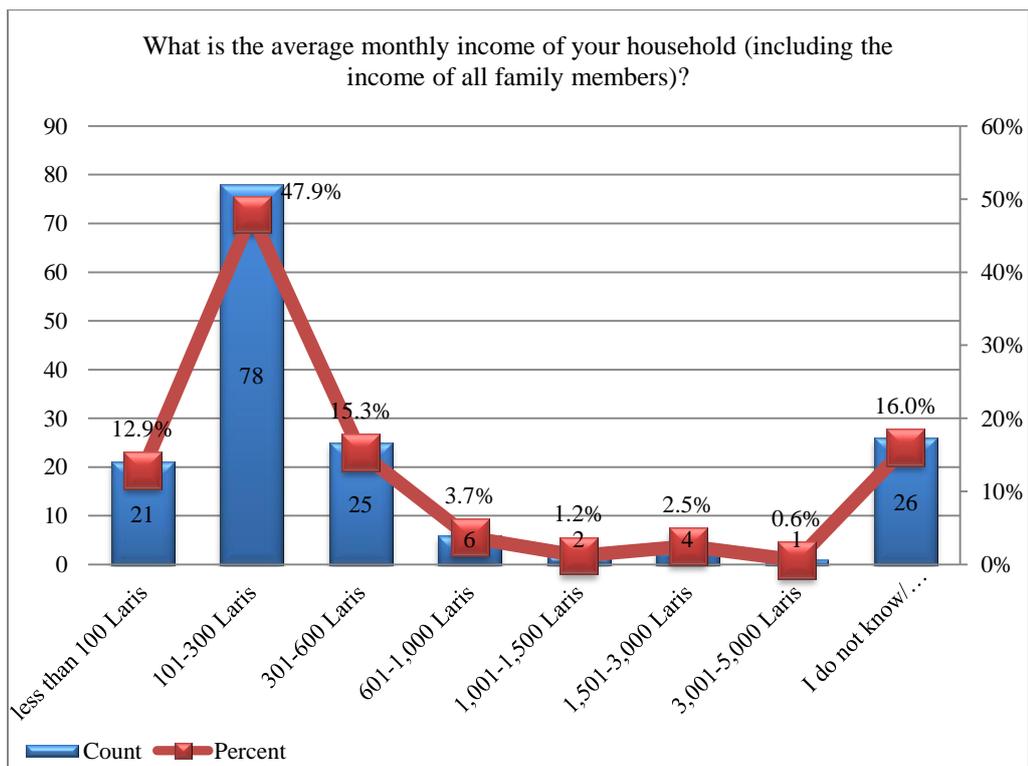


Figure 12. Distribution of respondents by frequency of reinitiating of TB treatment after default

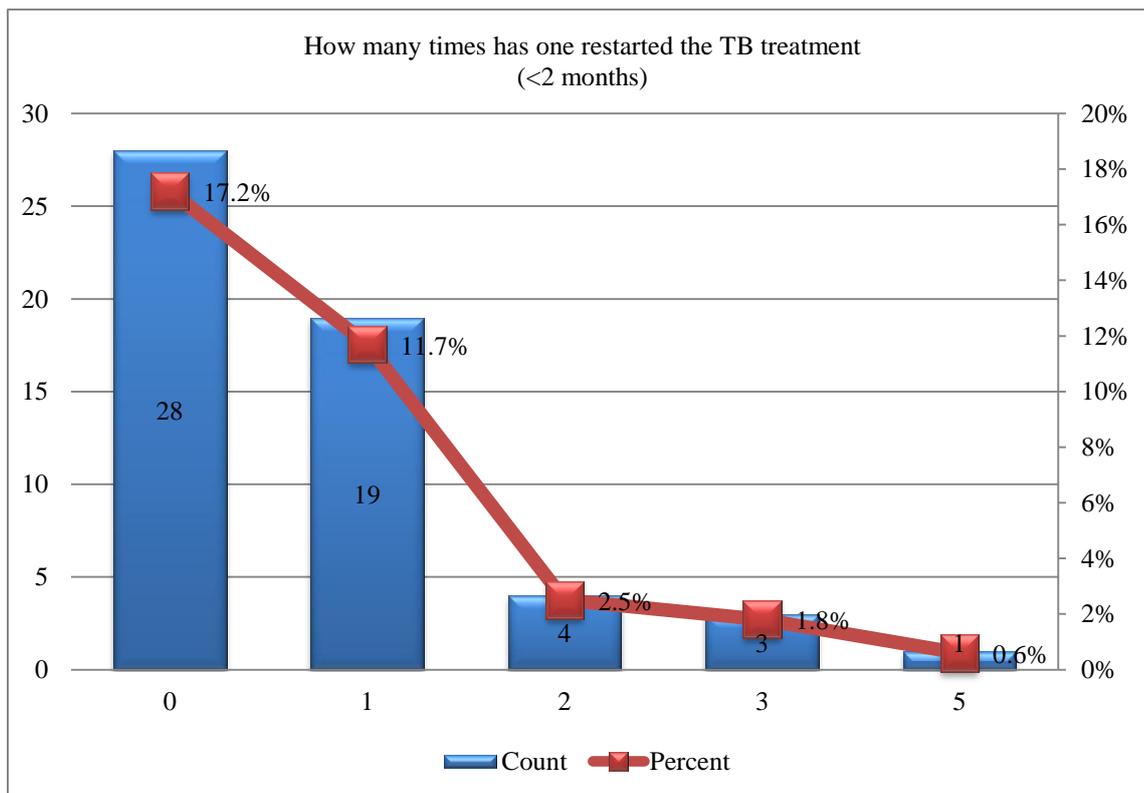


Figure 13. Distribution of respondents by the date of M/XDR TB diagnosis

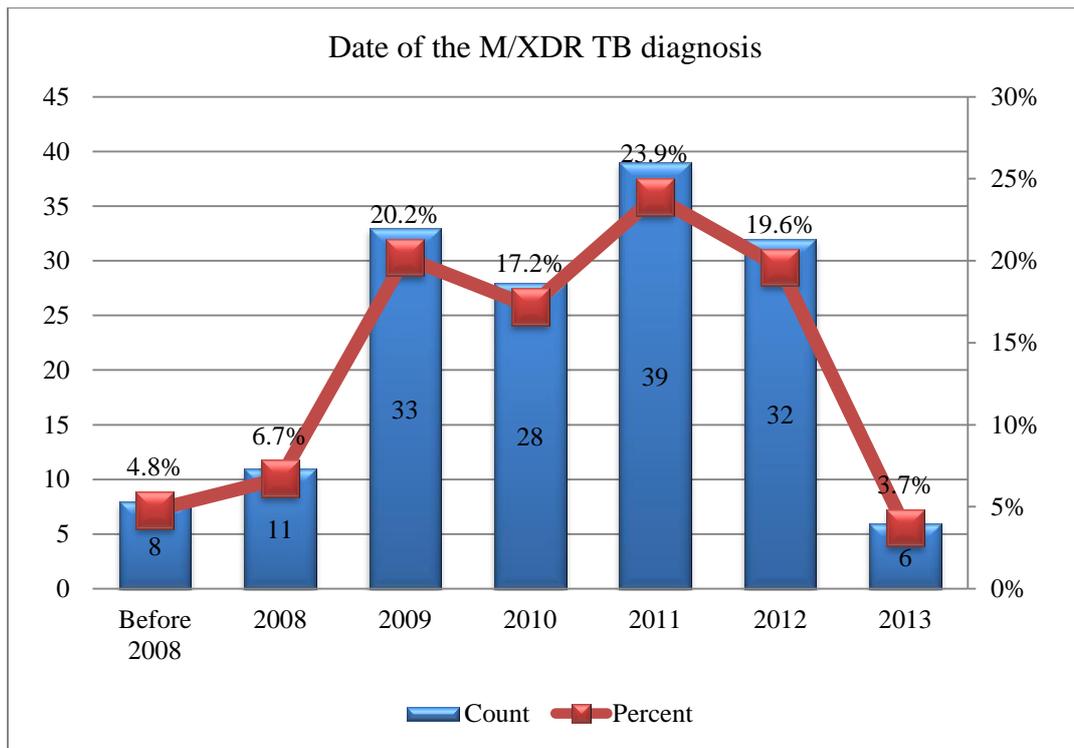


Figure 14. Distribution of respondents by place of residence

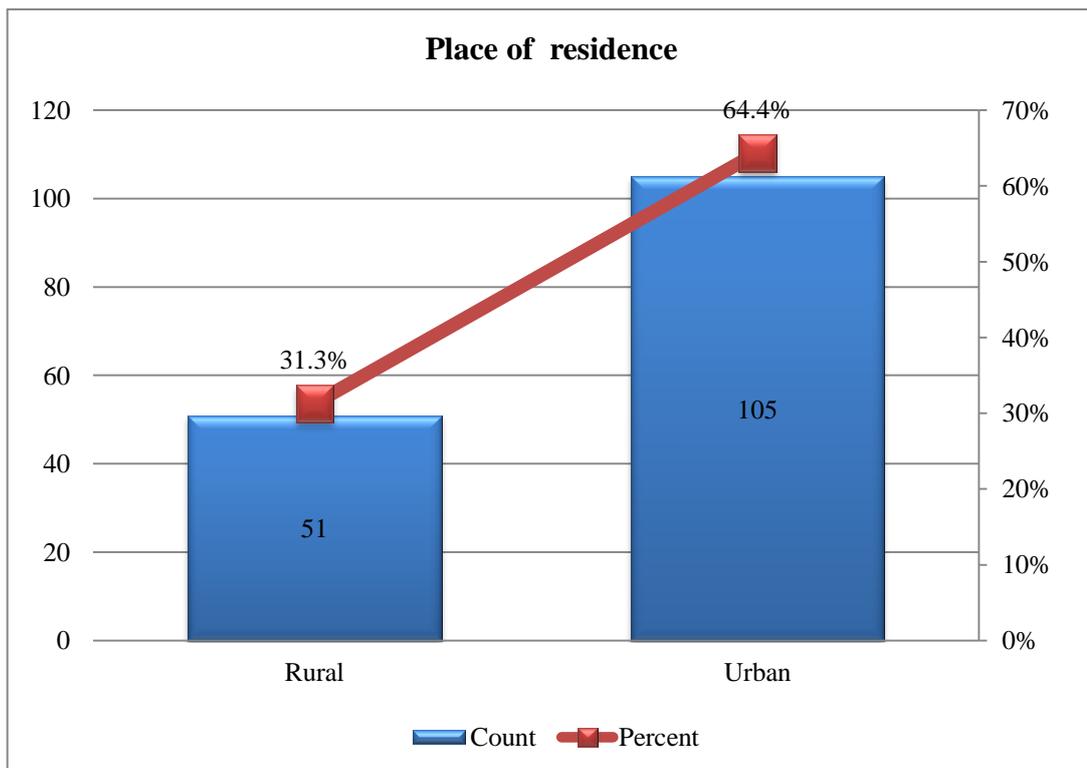


Figure 15. Distribution of respondents by number of concomitant conditions

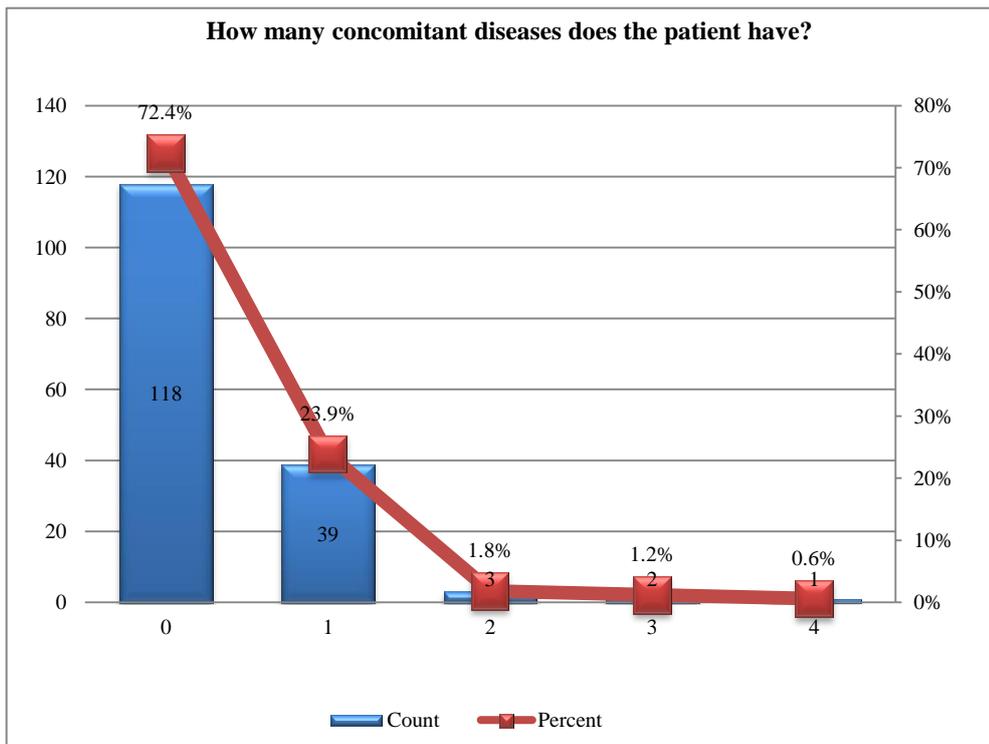


Figure 16. Distribution of respondents by TB occurrence status (new or retreatment)

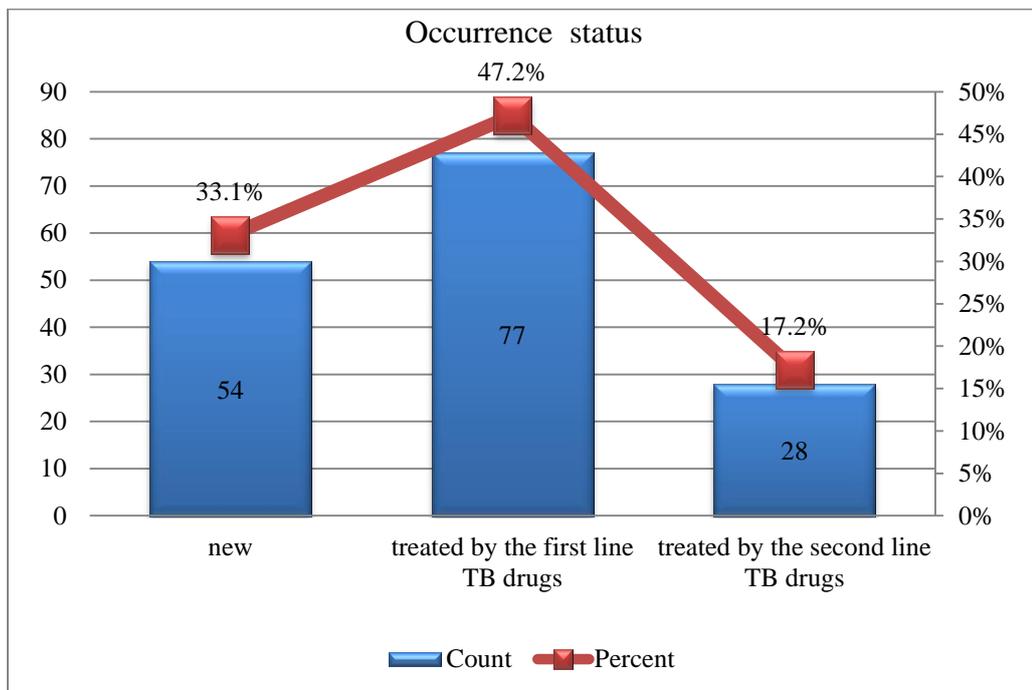


Figure 17. Distribution of respondents by the date of treatment initiation

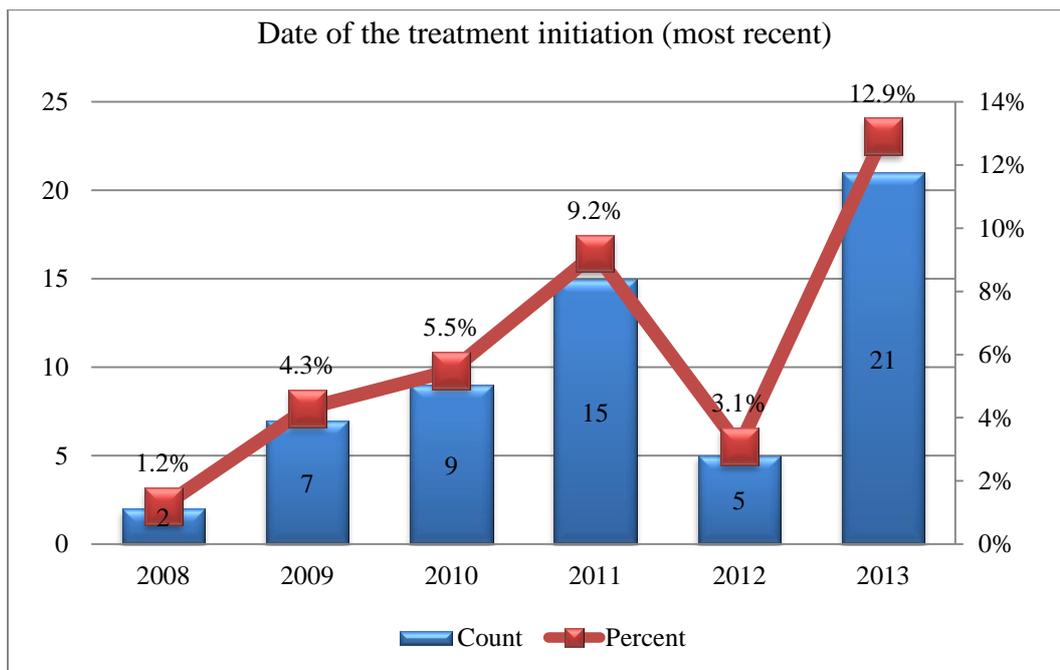


Figure 18. DST profile among respondents

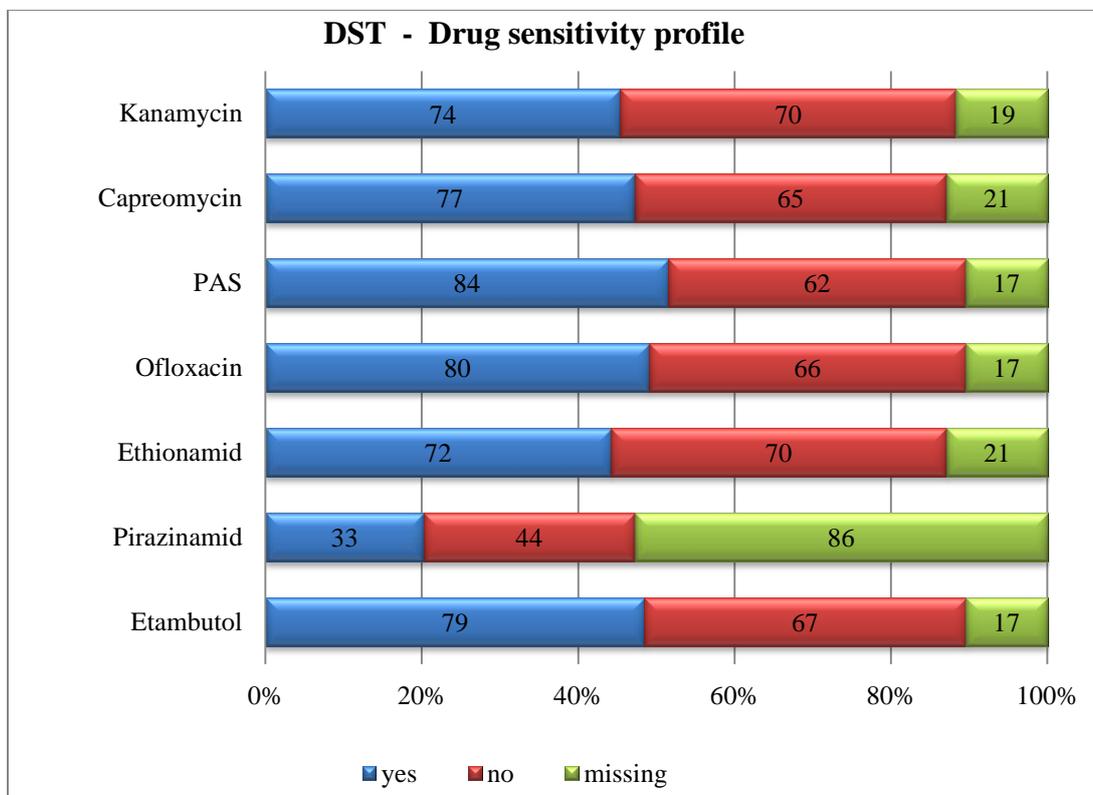


Figure 19. Distribution of respondents by the reasons for avoiding hospital treatment during the intensive phase of the disease

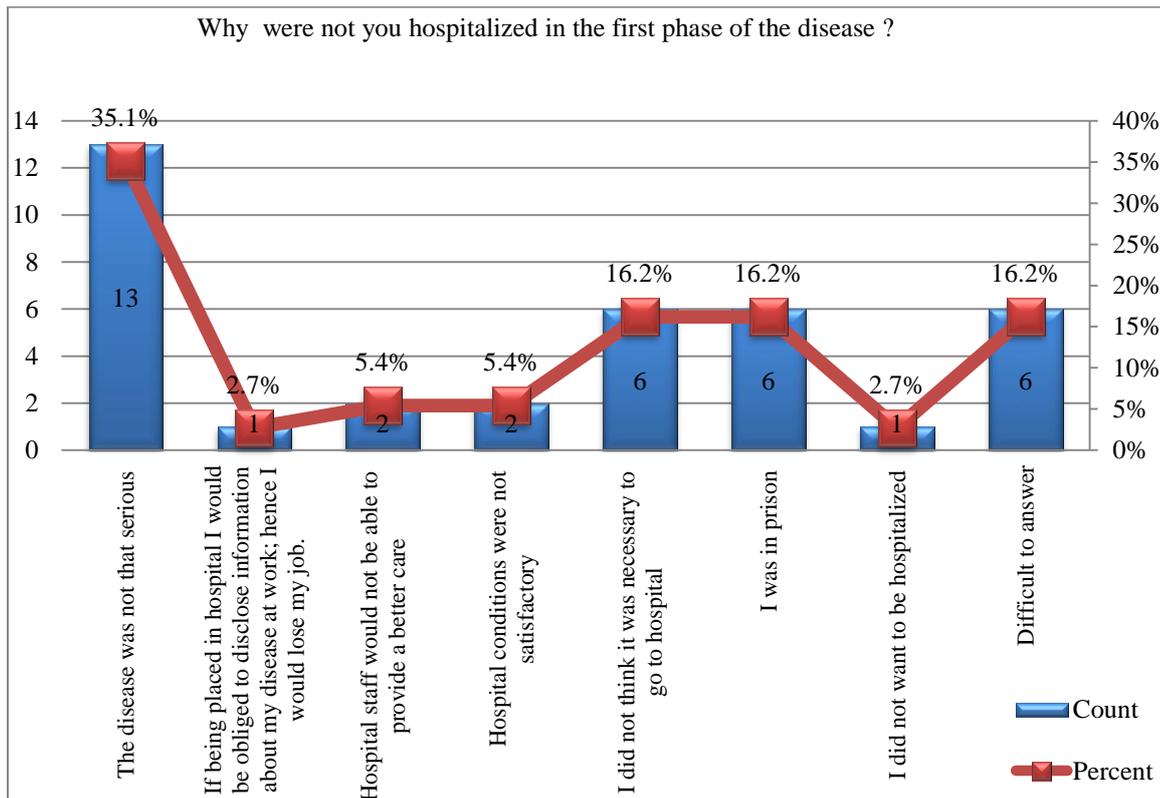


Figure 20. Sources of information about M/XDR Tuberculosis

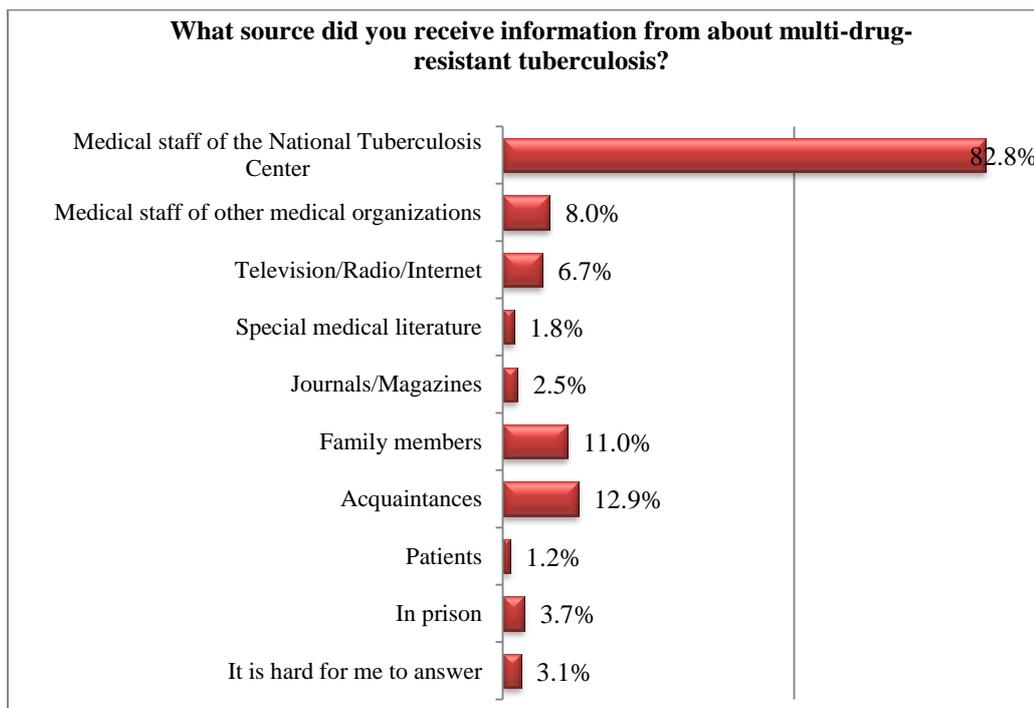


Figure 21. Awareness of respondents about various aspects of M/XDR Tuberculosis

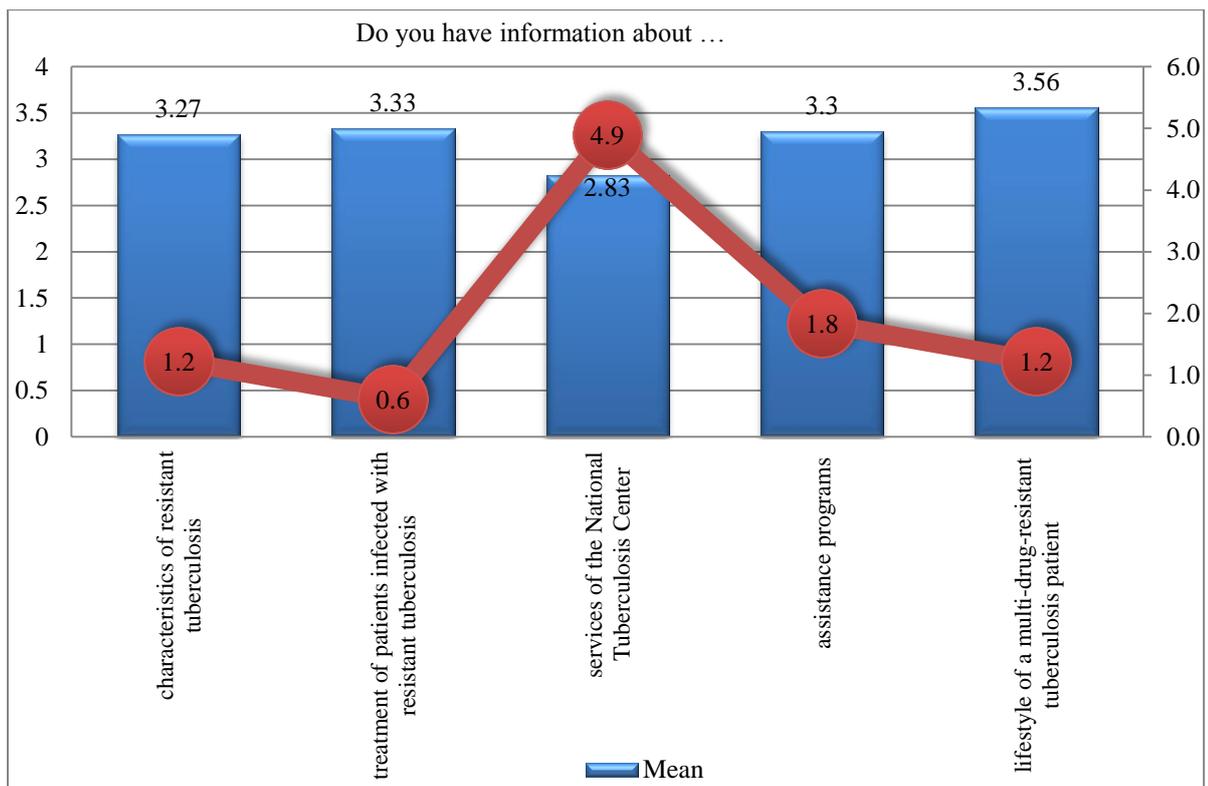


Figure 22. Awareness of respondents' family members about various aspects of M/XDR Tuberculosis

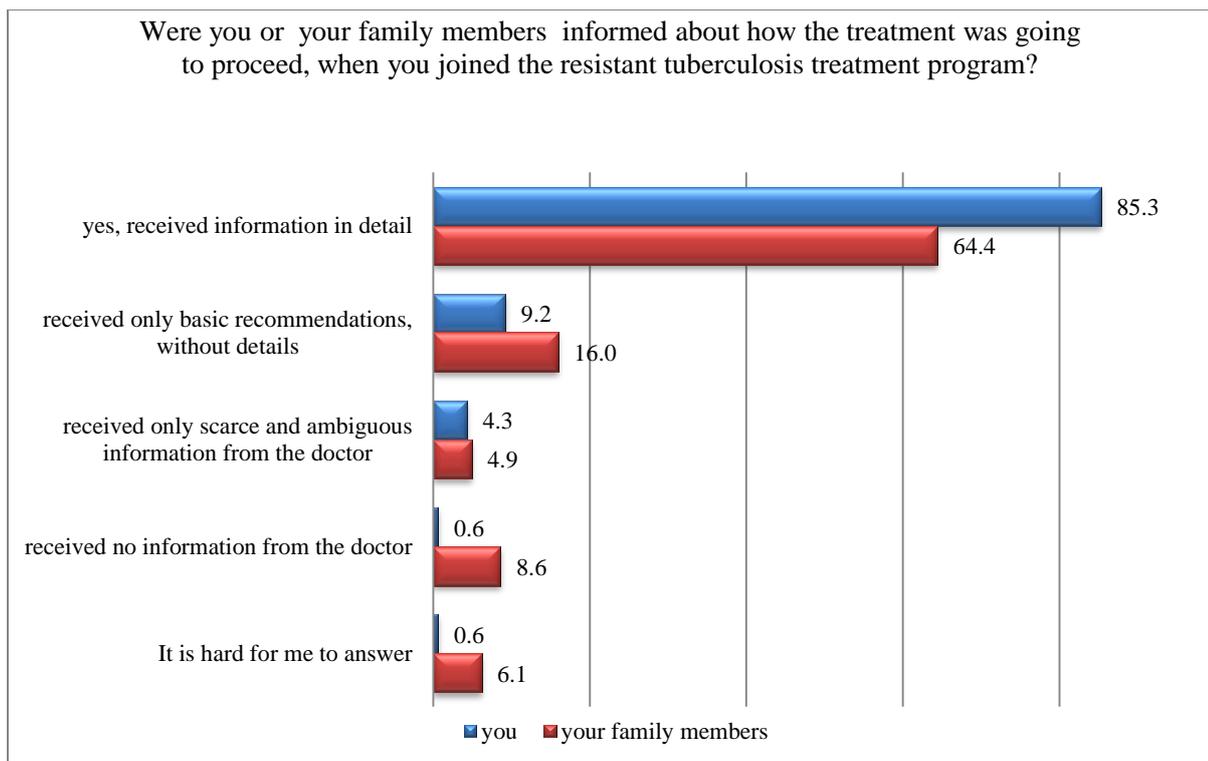


Figure 23. The main reasons for poor TB counseling as identified by the respondents

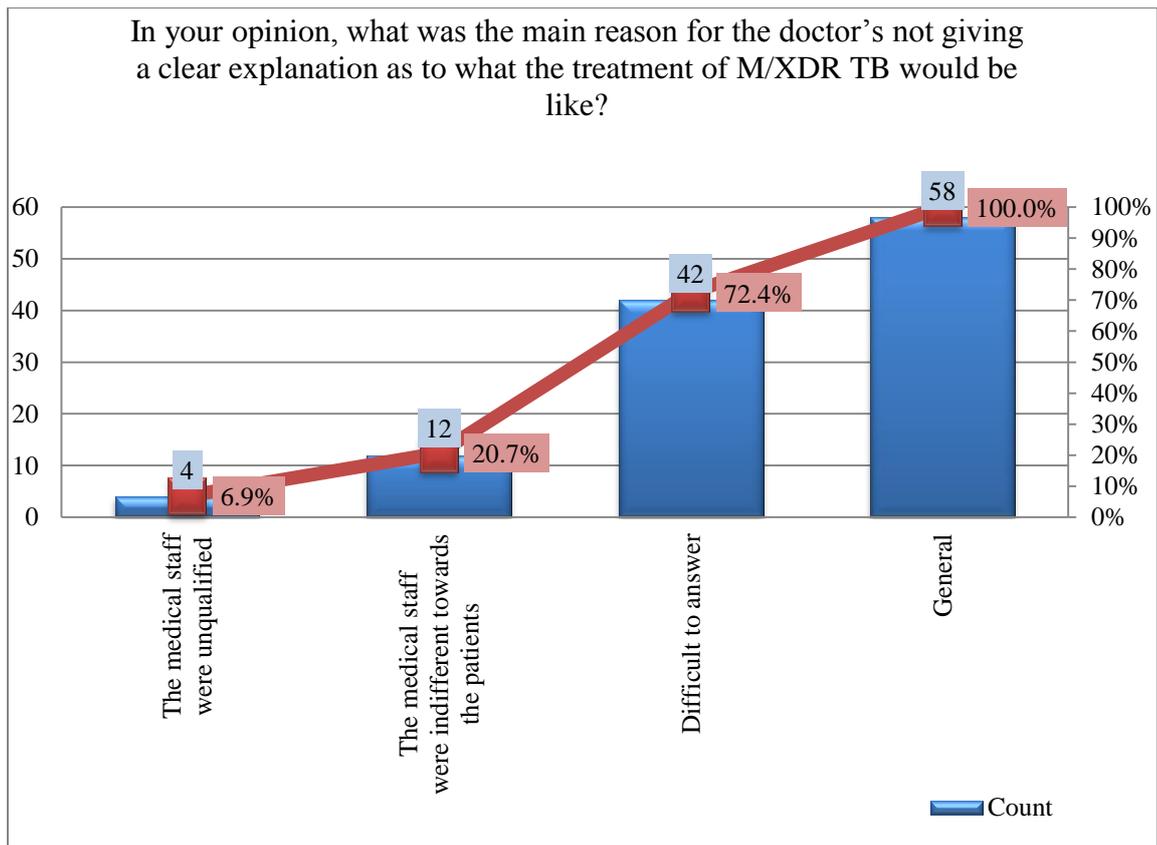


Figure 24. Distribution of respondents by their answers on M/XDR TB related statements

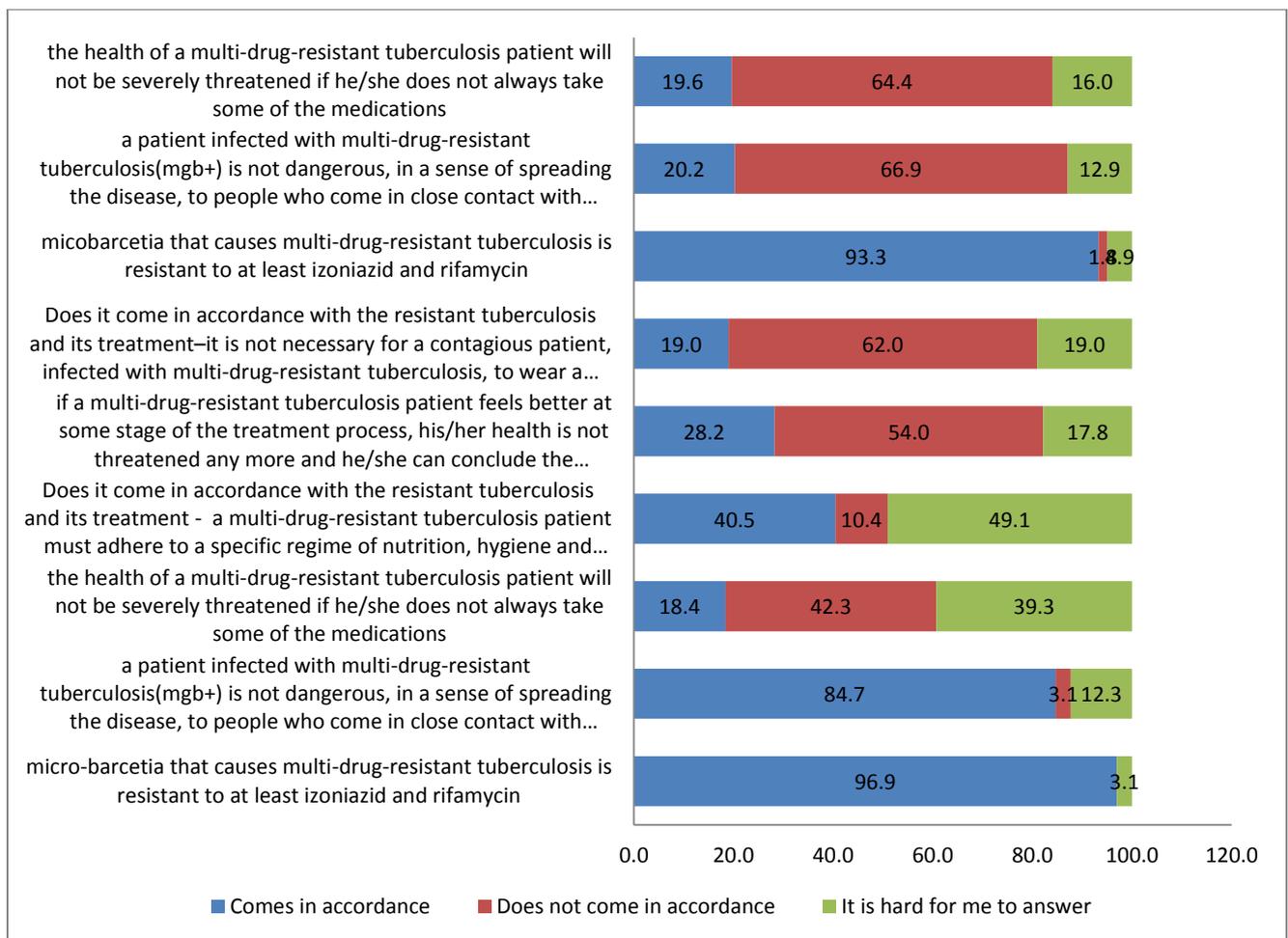


Figure 25. Distribution of respondents by using alternative sources for TB treatment after defaulting from the National TB Program

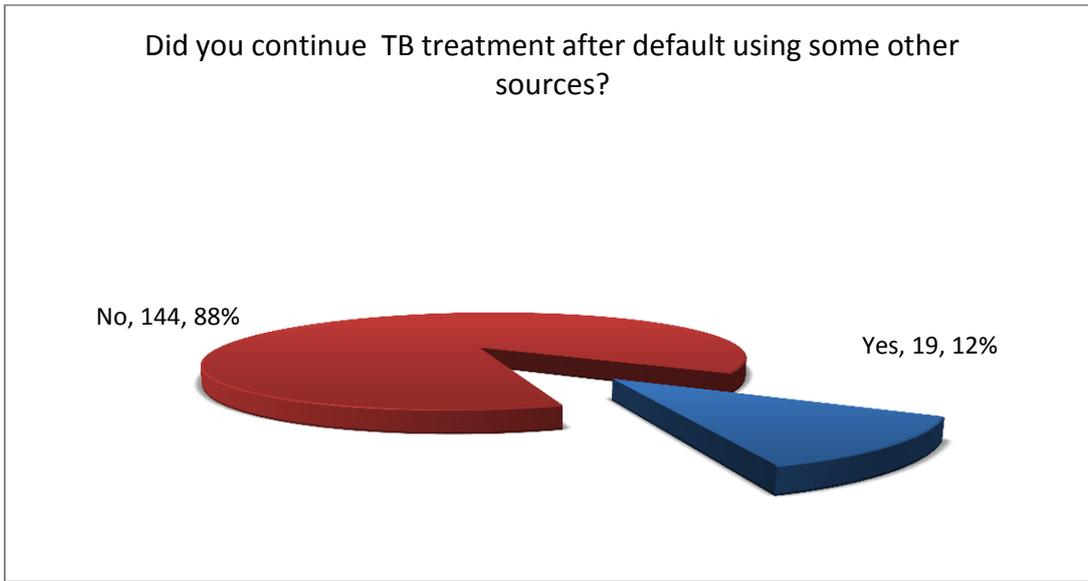


Figure 26. Distribution of respondents by types of alternative sources used for TB treatment after defaulting from the National TB Program

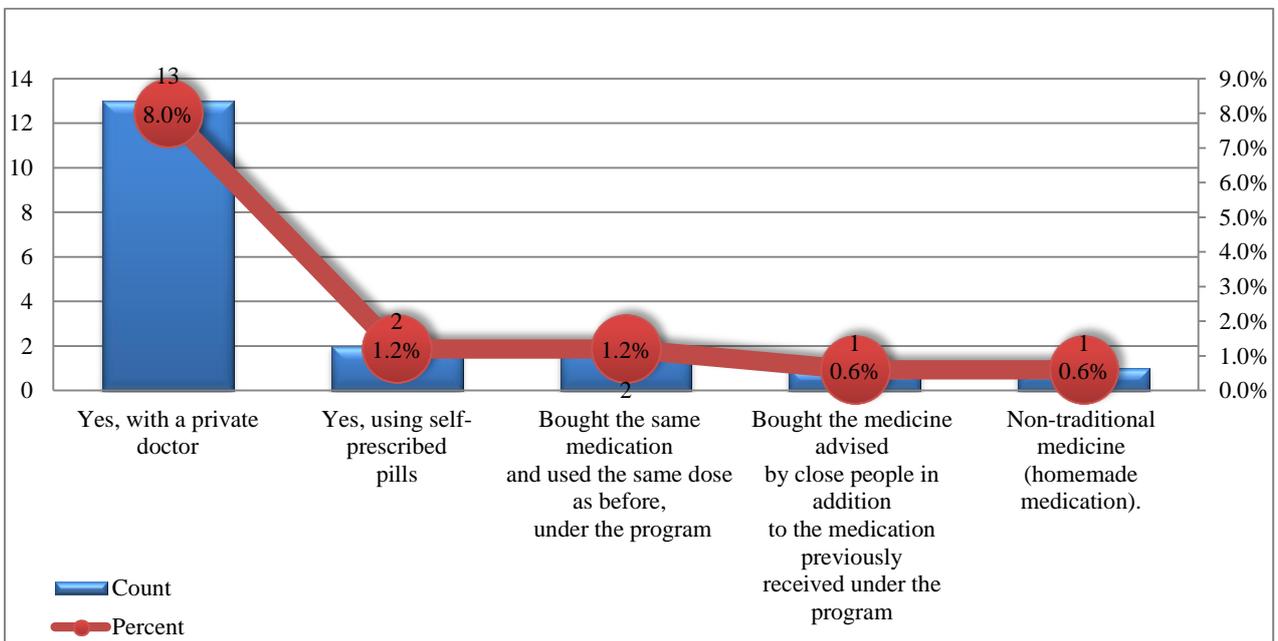


Figure 27. Distribution of respondents by frequency of attending DOT sessions while on treatment

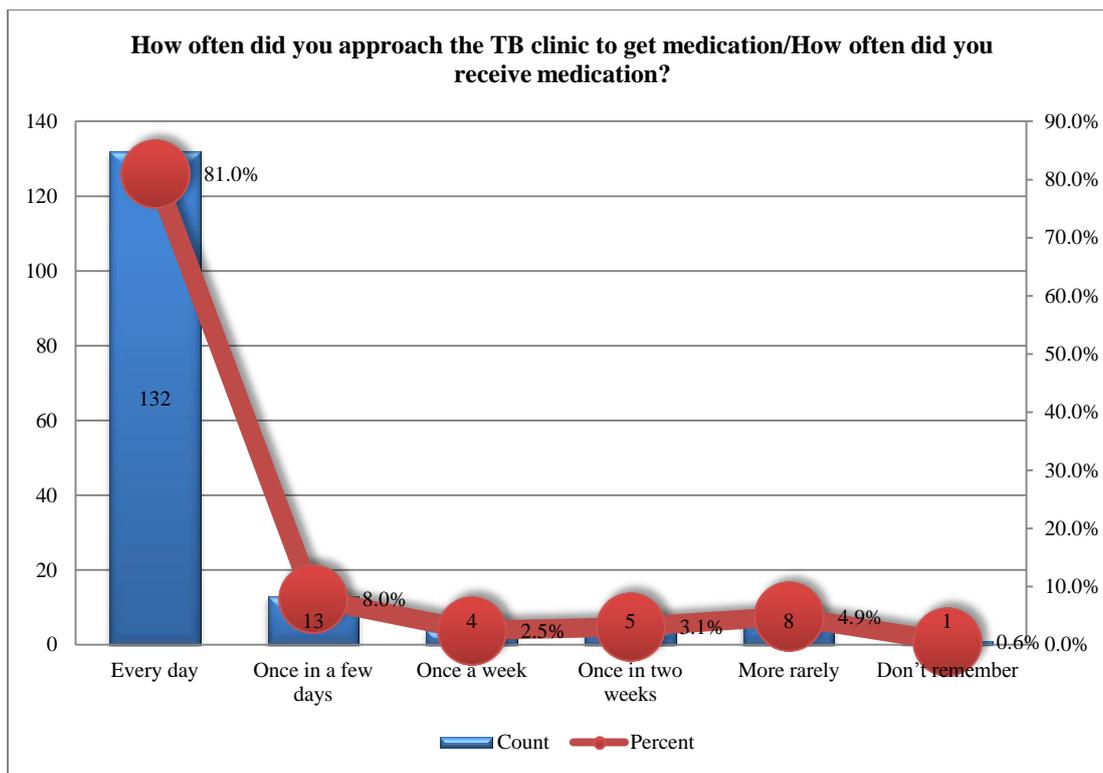


Figure 28. The most important factor which made patients to default from treatment

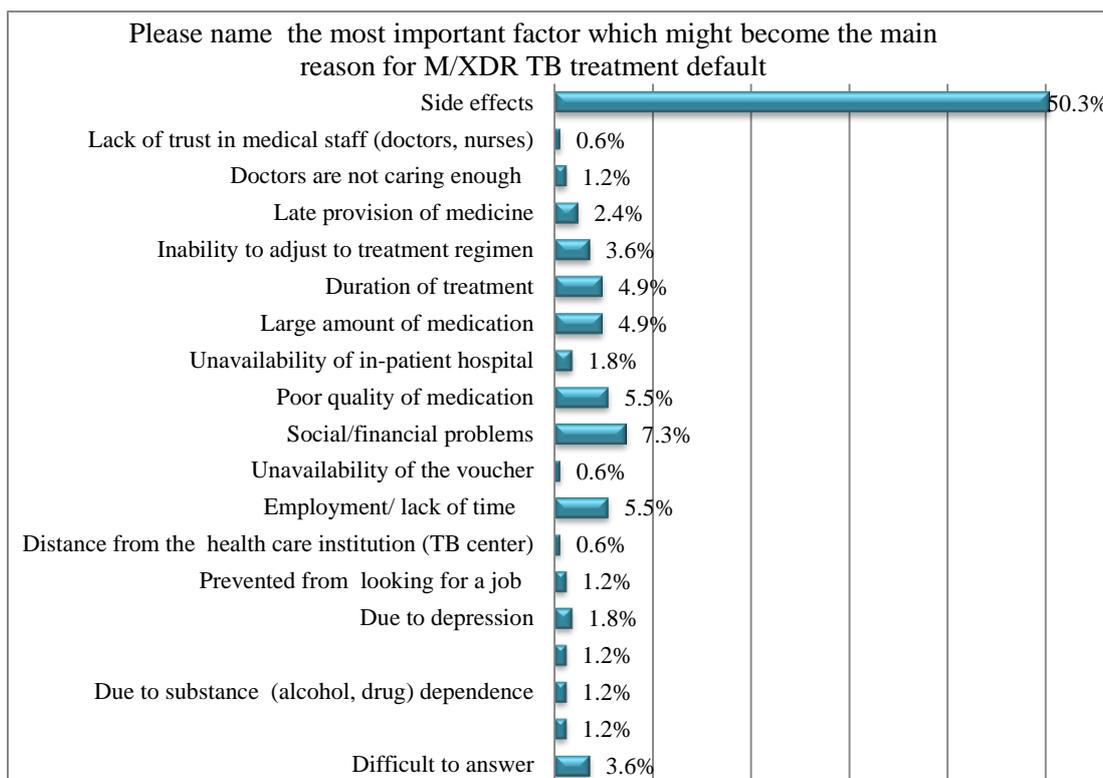


Figure 29. The main factors, which encourage M/XDR TB patients to complete the treatment without interruption

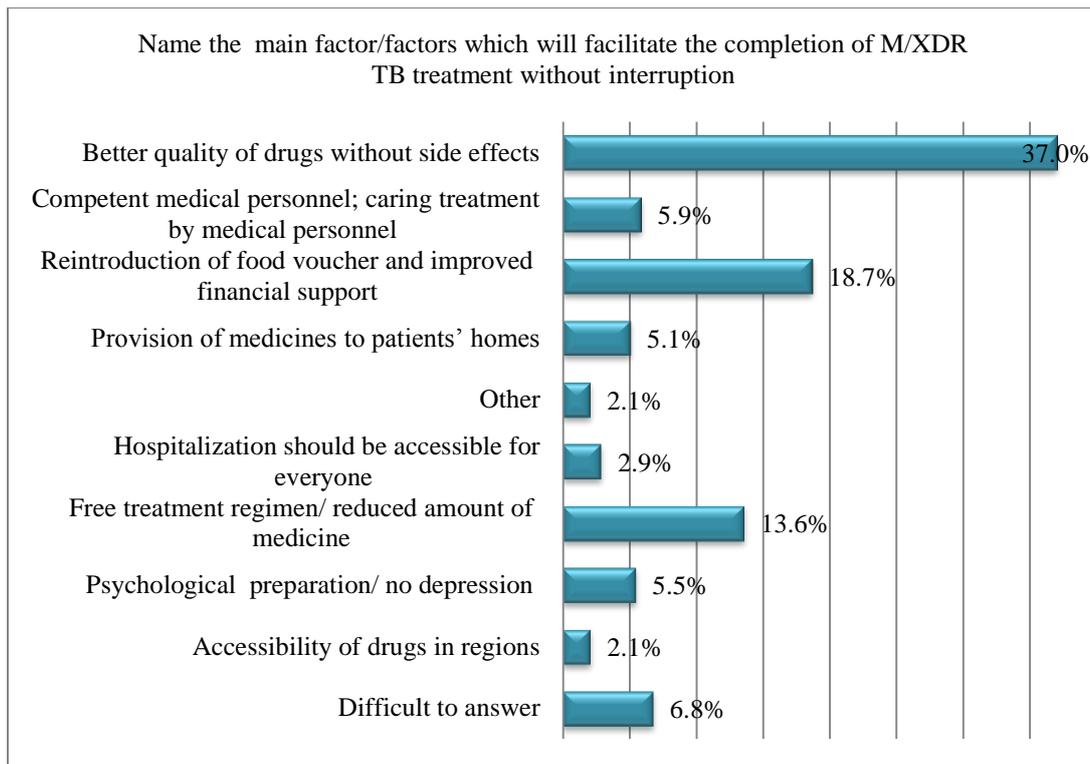


Figure 30. Impact of TB treatment on quality of life of M/XDR patients

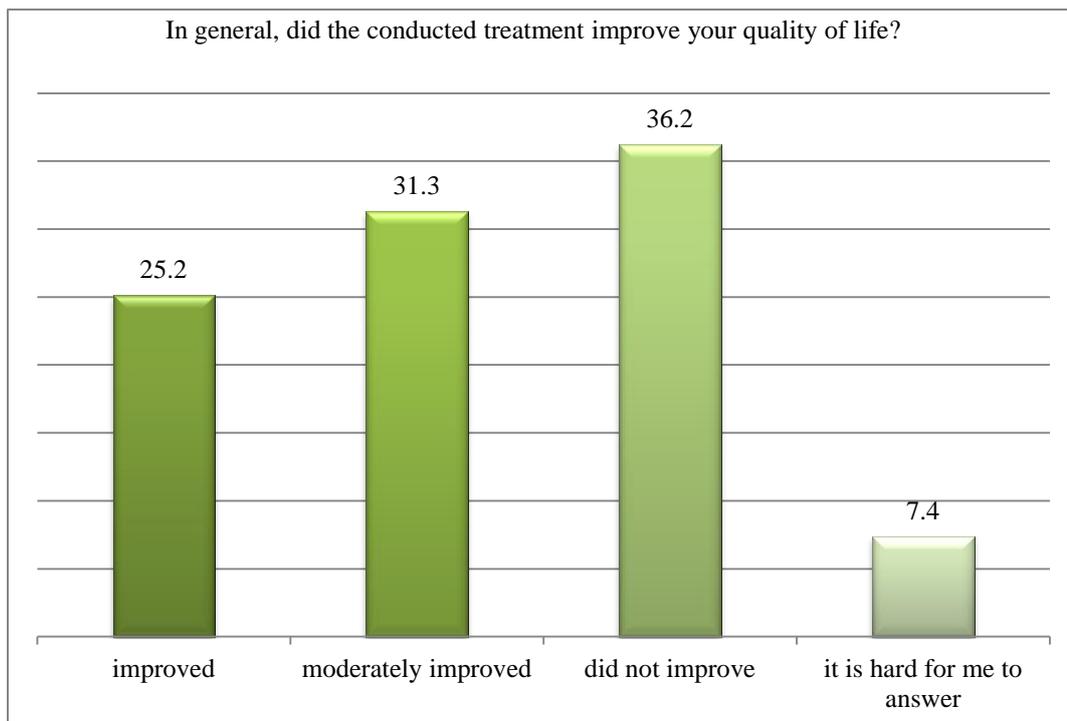


Figure 31. Distribution of respondents by manifestation of TB drug side effects

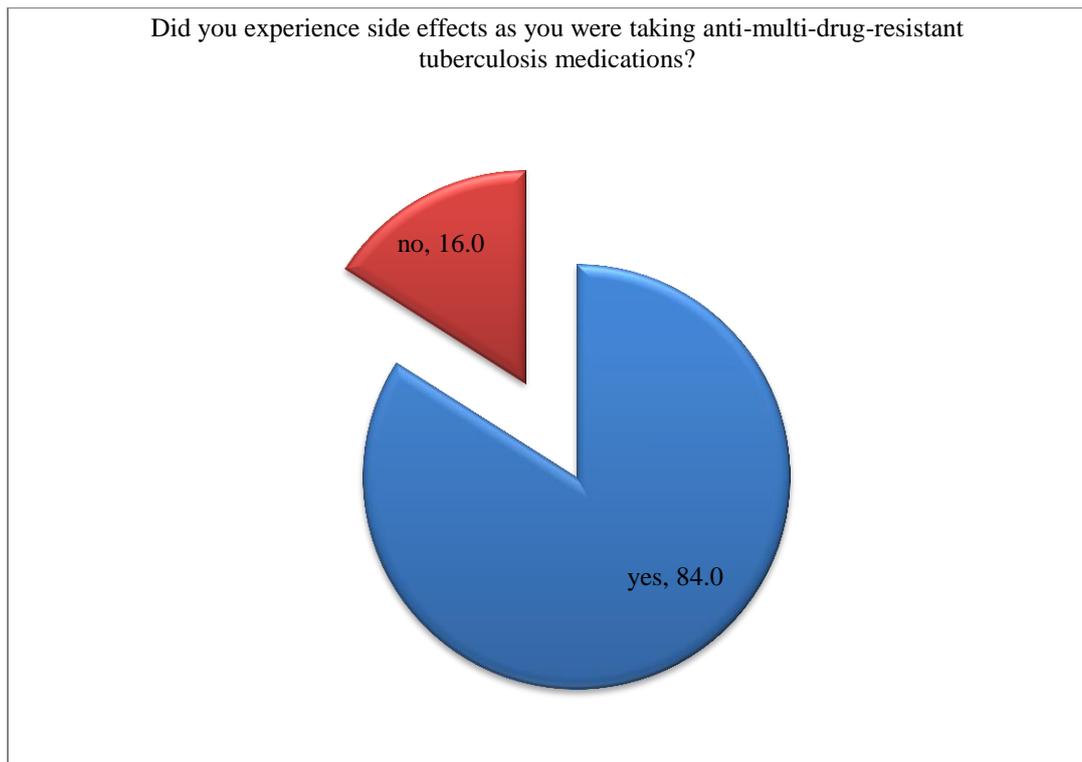


Figure 32. Distribution of respondents by the stage of TB drug side effect manifestation

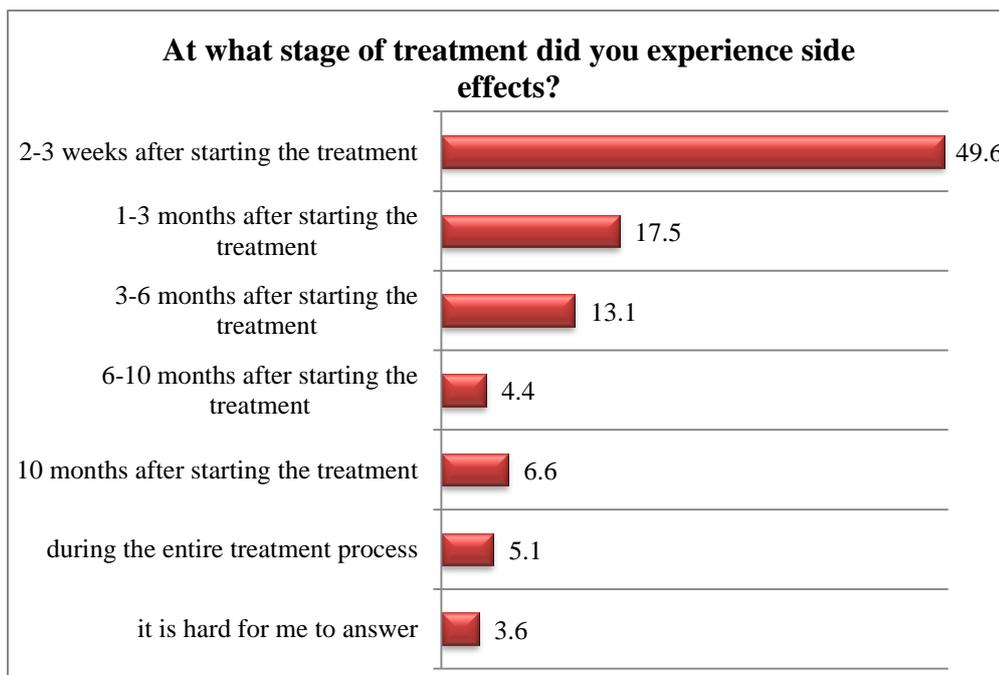


Figure 33. Distribution of respondents by the number of drugs causing side effects

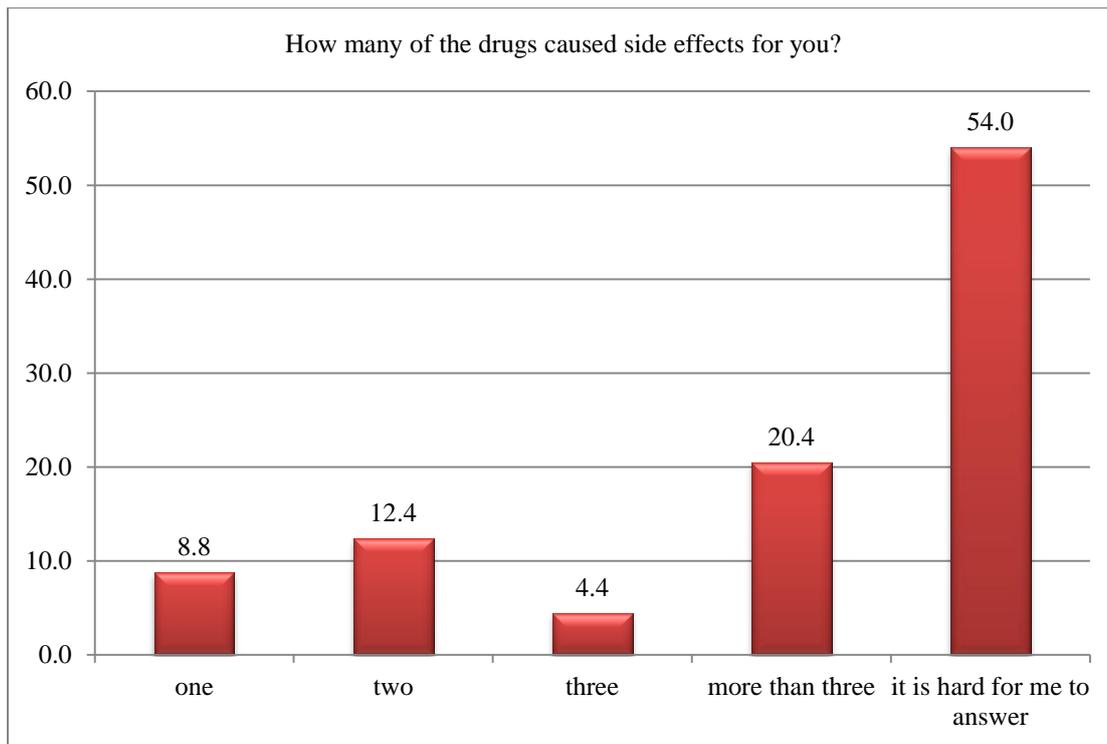


Figure 34. Types of side-effects experienced by respondents after taking anti TB drugs

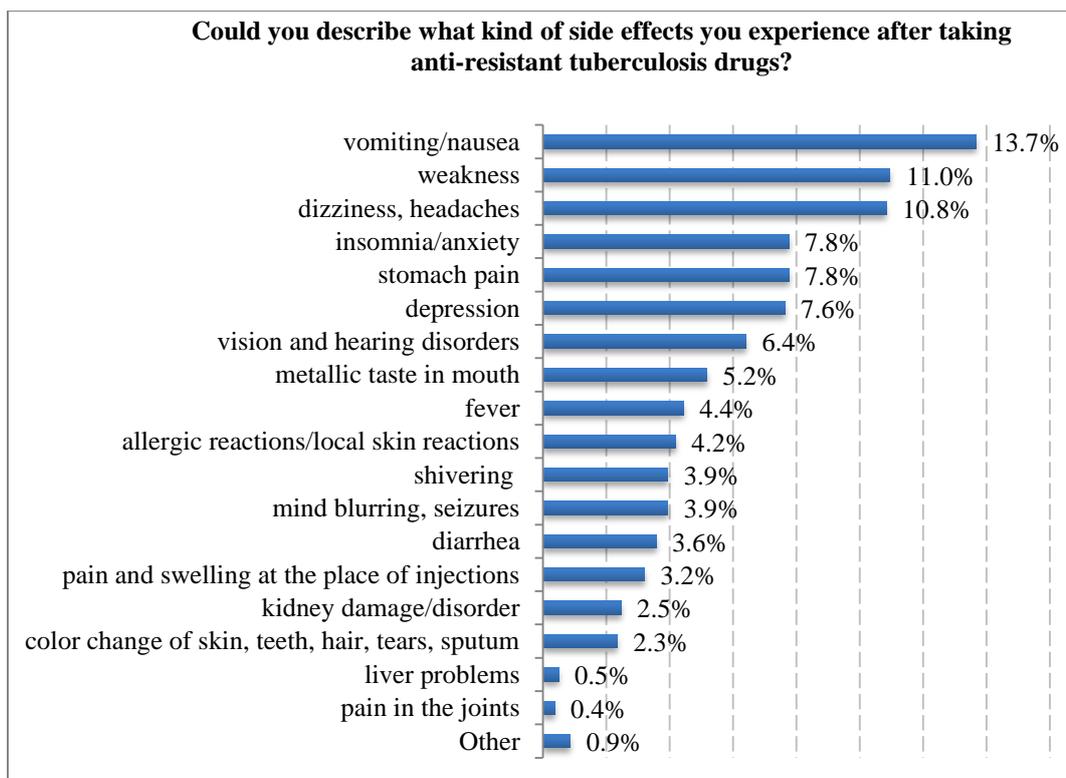


Figure 35. Distribution of respondents by the perceived quality of side effects management

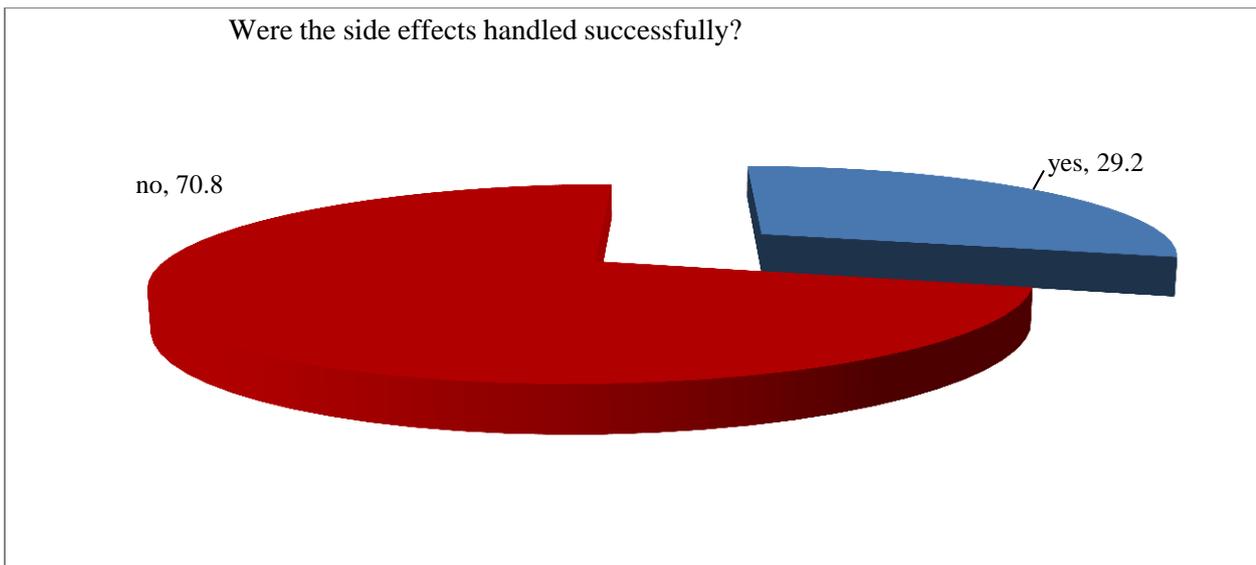


Figure 36. Reasons for side-effects management failure as understood by the respondents

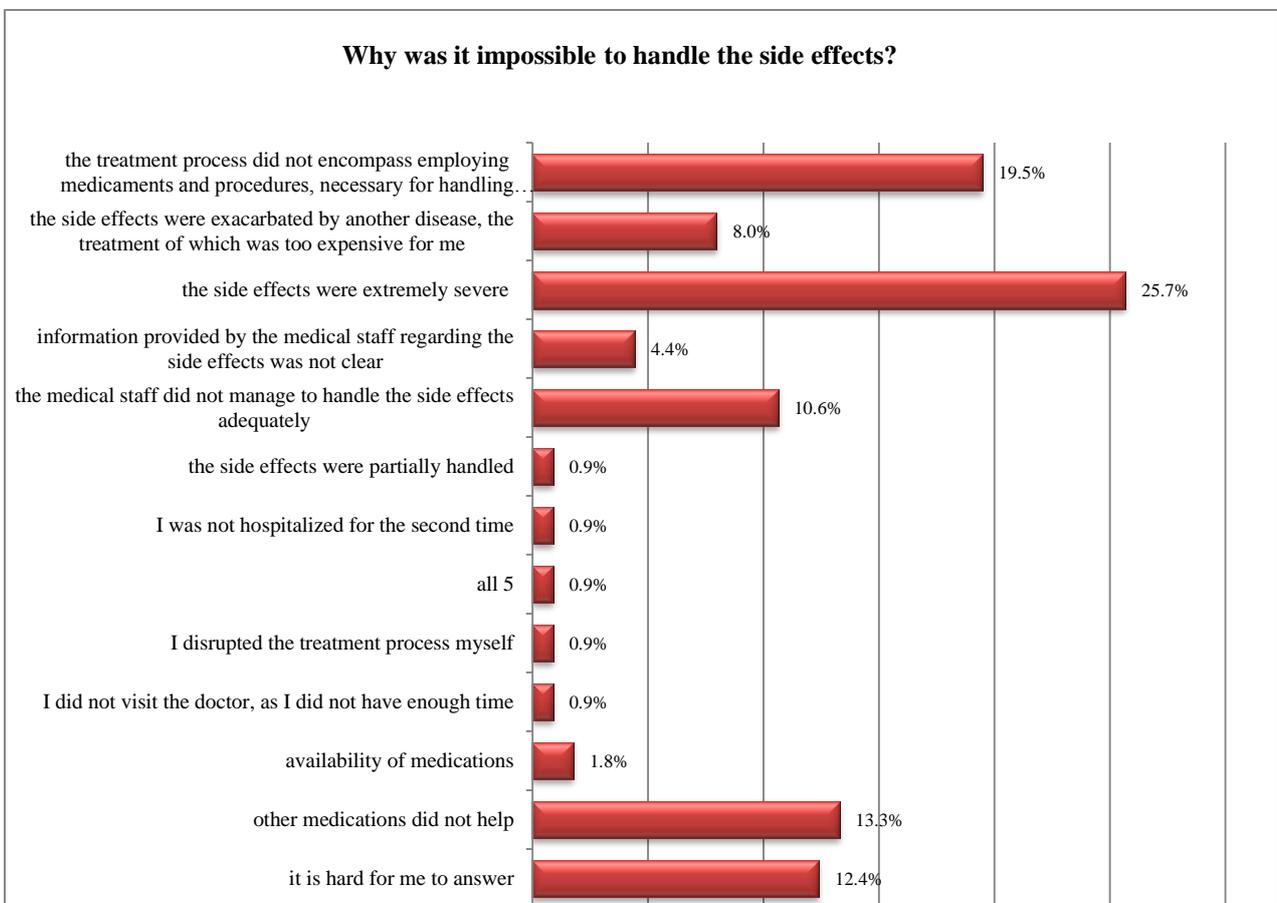


Figure 37. Distribution of respondents by accessibility to various components of a comprehensive M/XDR TB treatment package

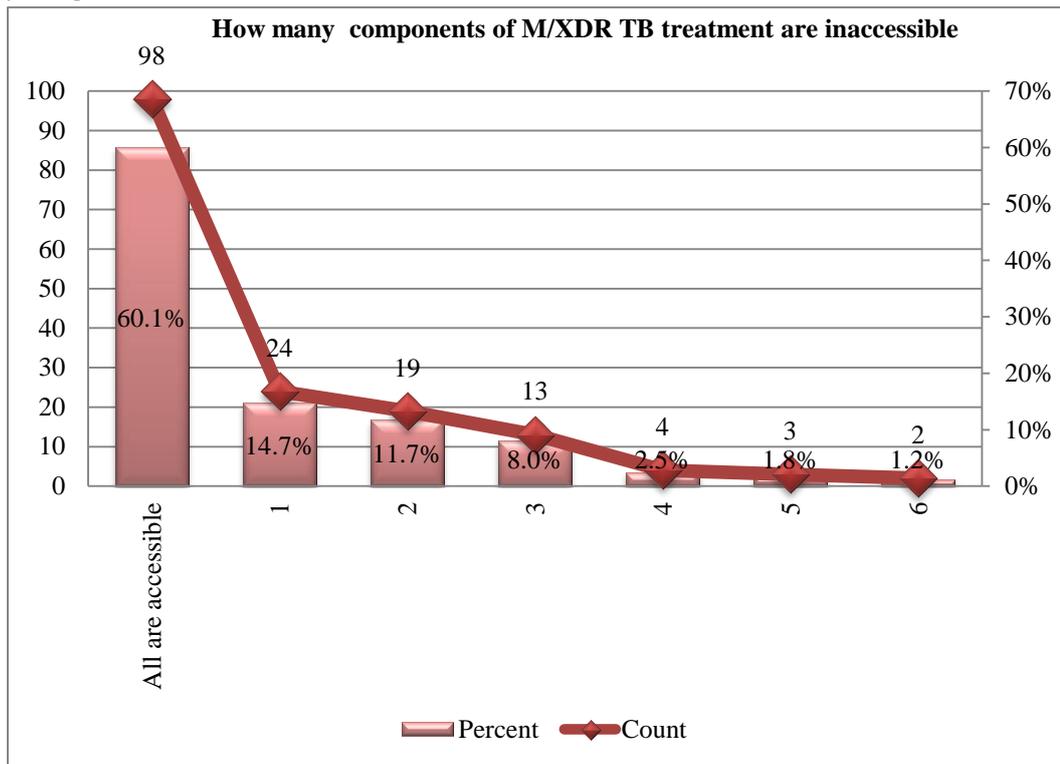


Figure 38. Distribution of respondents by geographic accessibility of various components of M/XDR treatment package

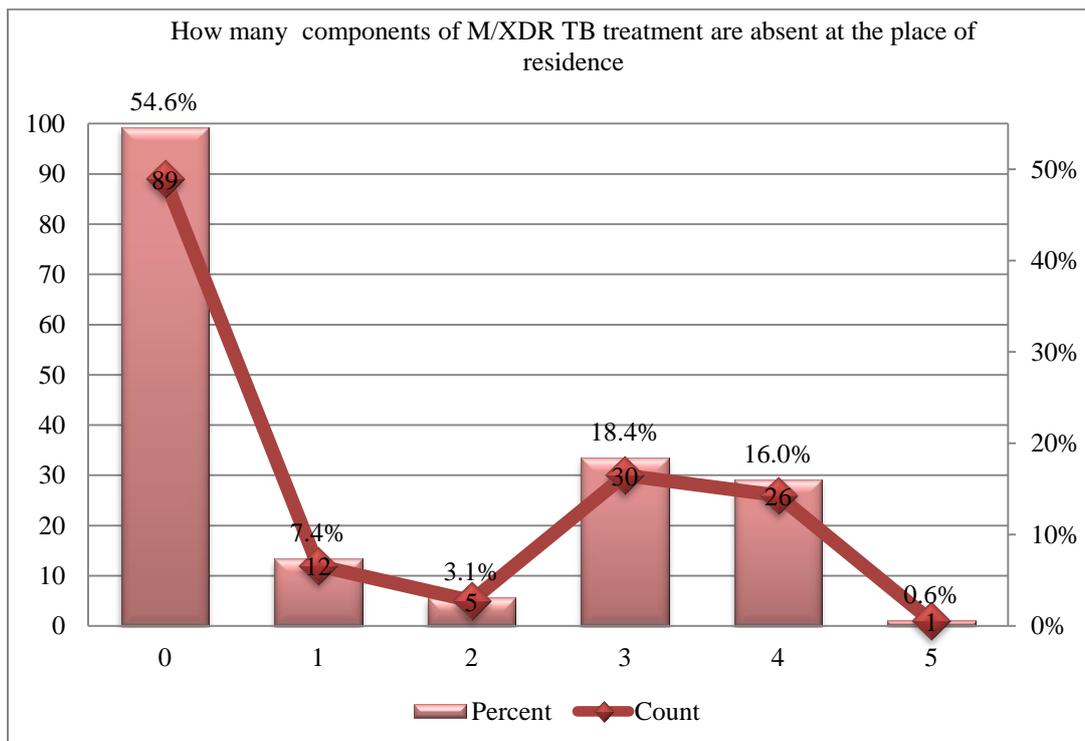


Figure 39. Distribution of respondents by geographic accessibility of various components of M/XDR treatment package (1)

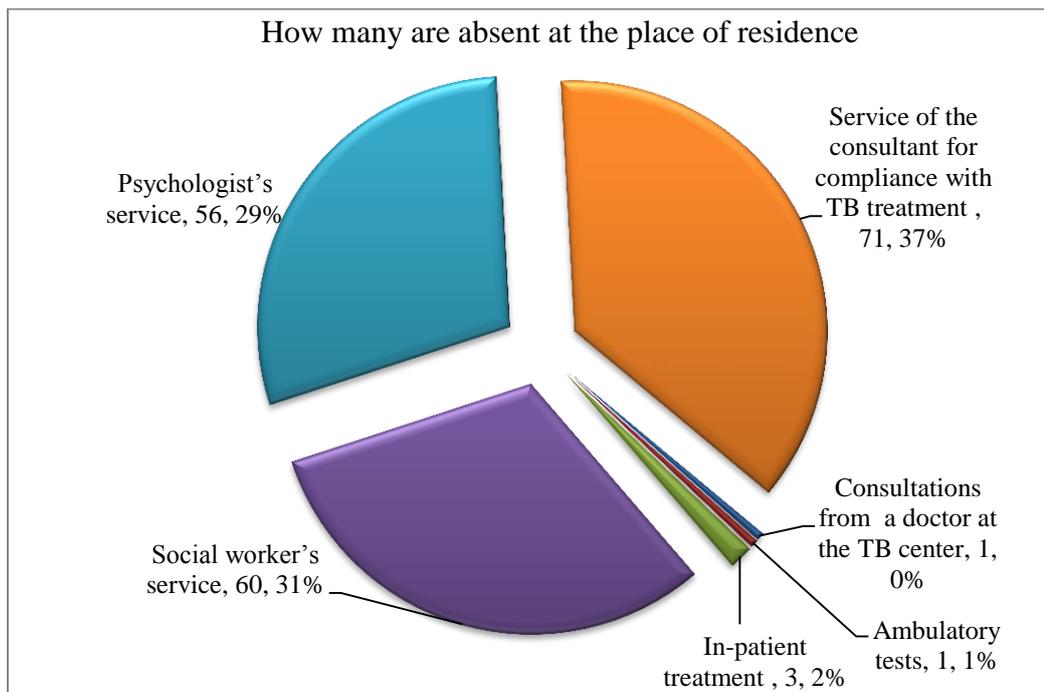


Figure 40. Respondents' opinion about the necessity of various components of M/XDR TB treatment package

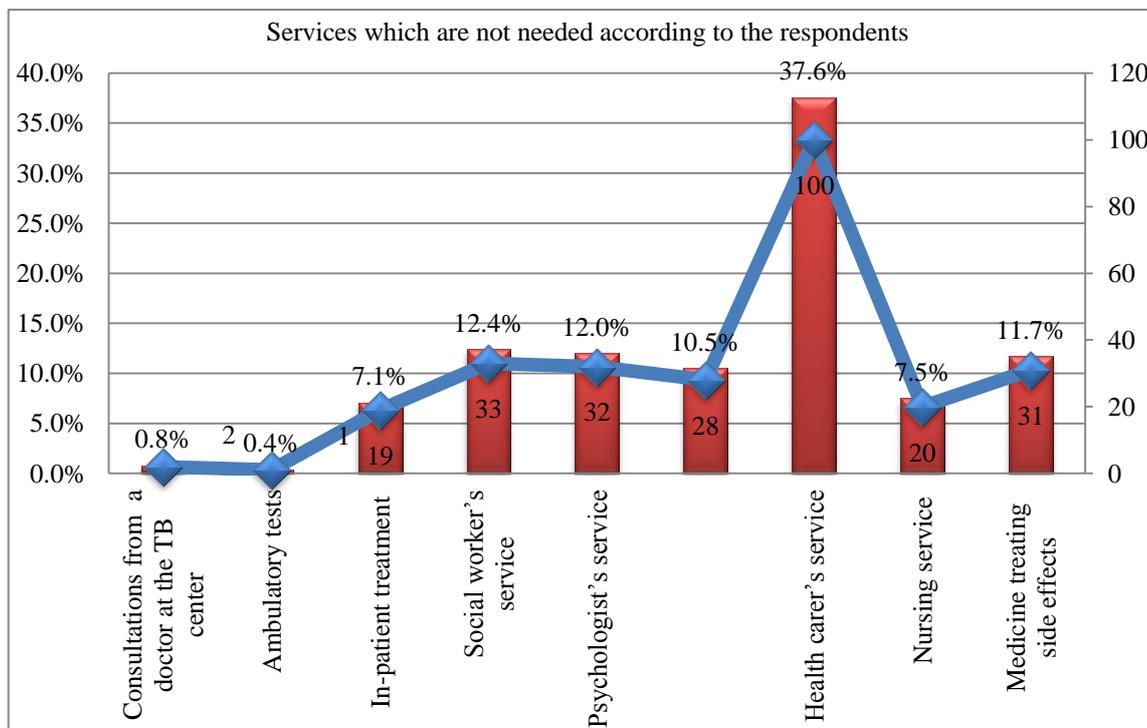


Figure 41. Respondents' opinion about the necessity of all components of M/XDR TB treatment package

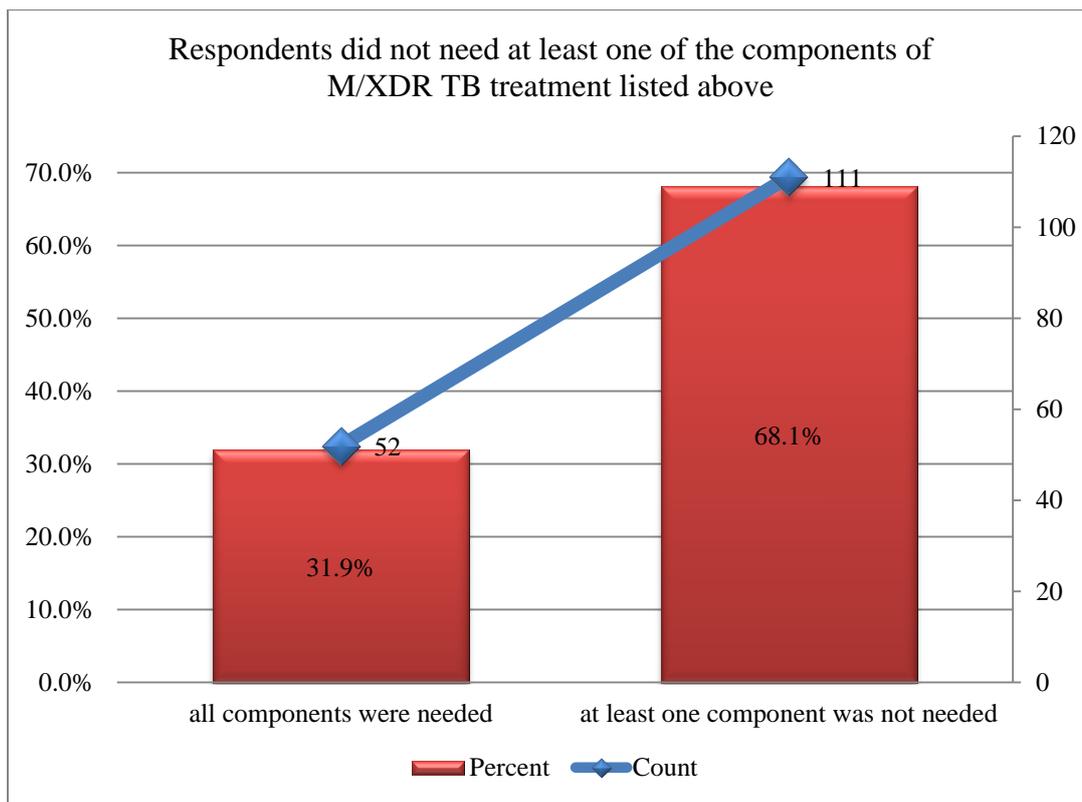


Figure 42. Factors which limited access to various M/XDR TB treatment components

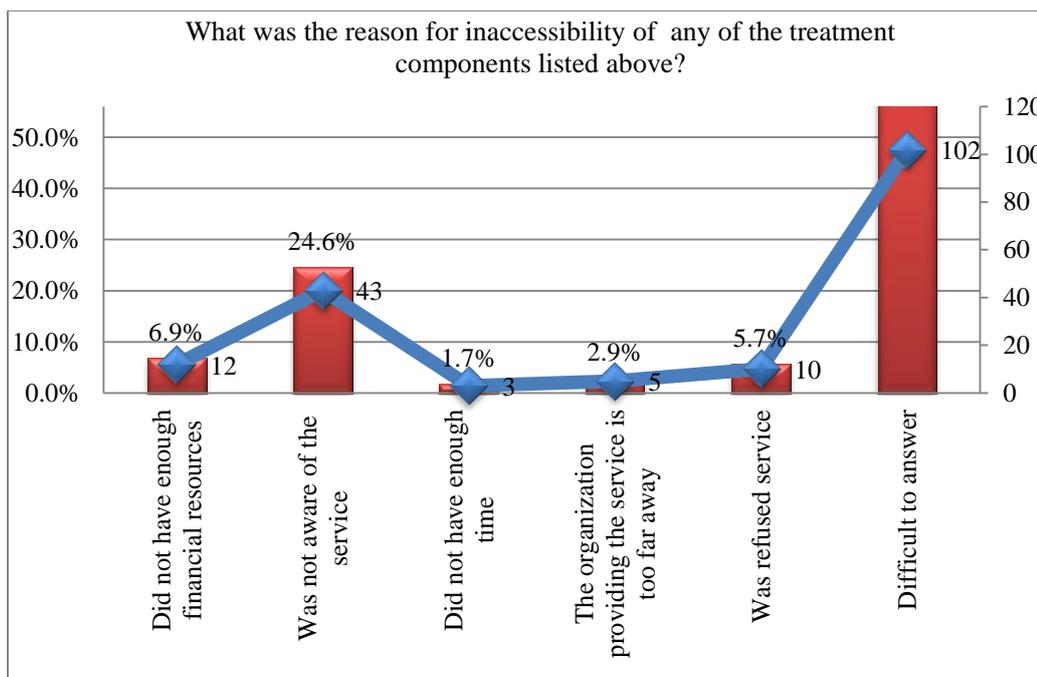


Figure 43. Respondents' satisfaction with M/XDR TB Treatment

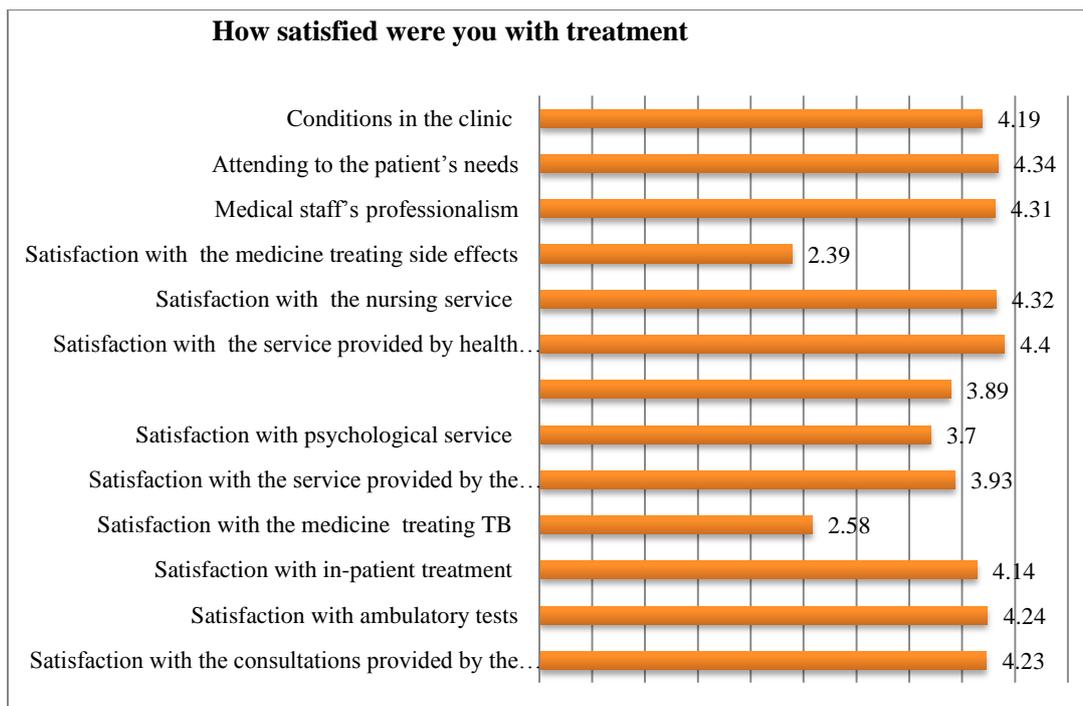


Figure 44. Distribution of respondents by the employment status at the time of M/XDR TB diagnosis

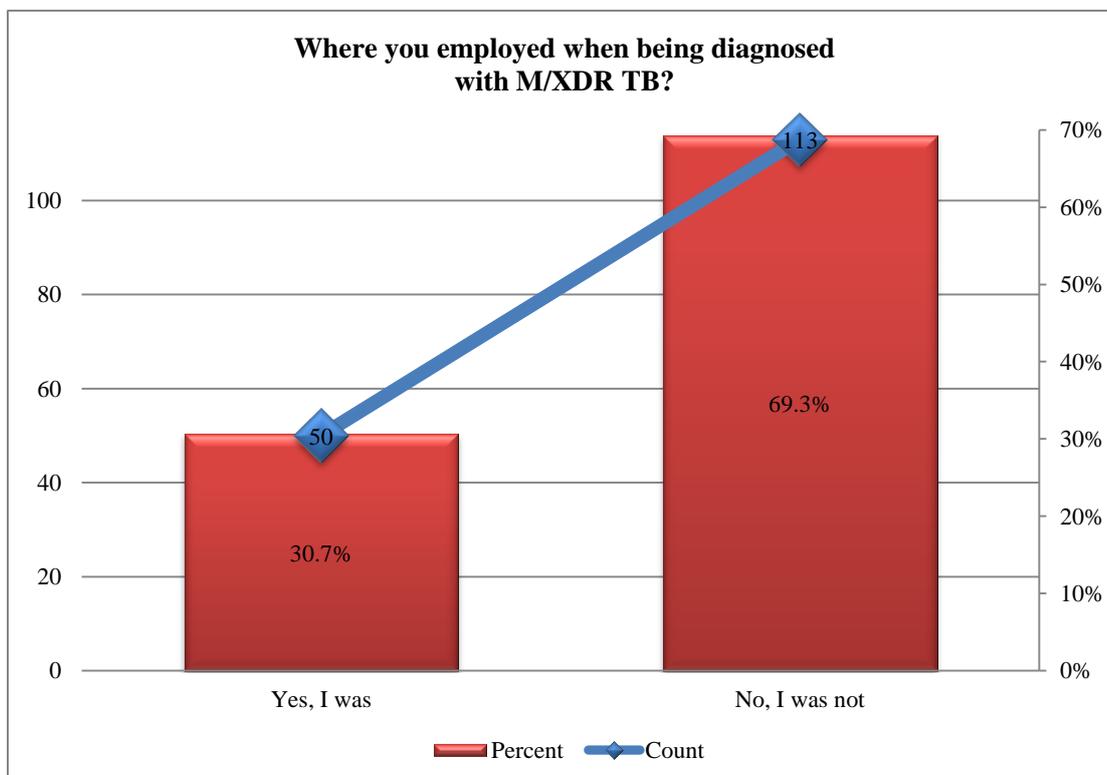


Figure 45. Distribution of respondents by the employment status during the M/XDR TB course of treatment

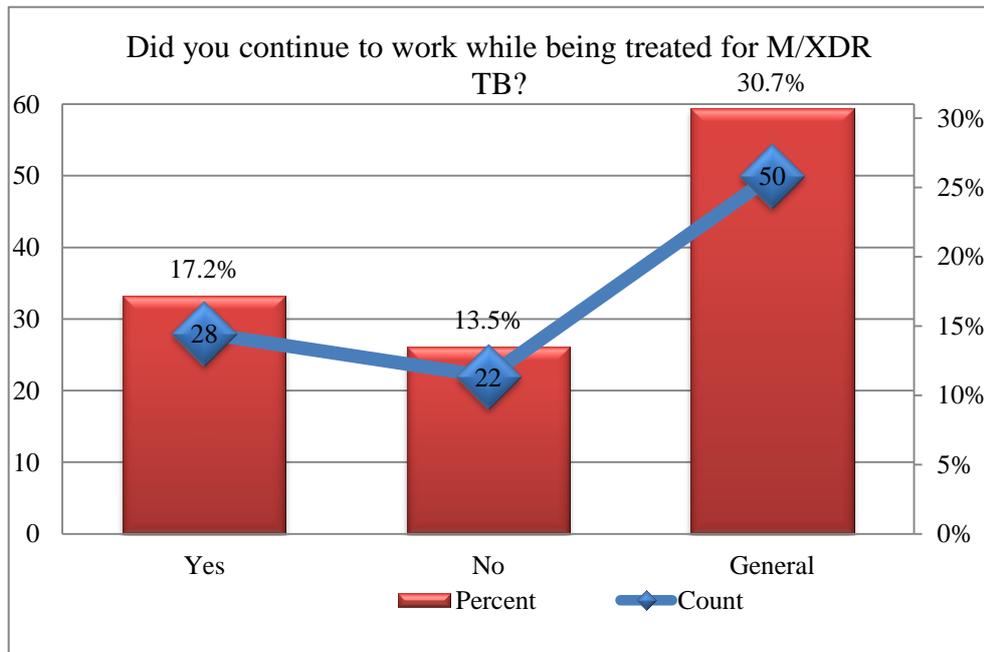


Figure 46. Reasons for unemployment during the M/XDR treatment

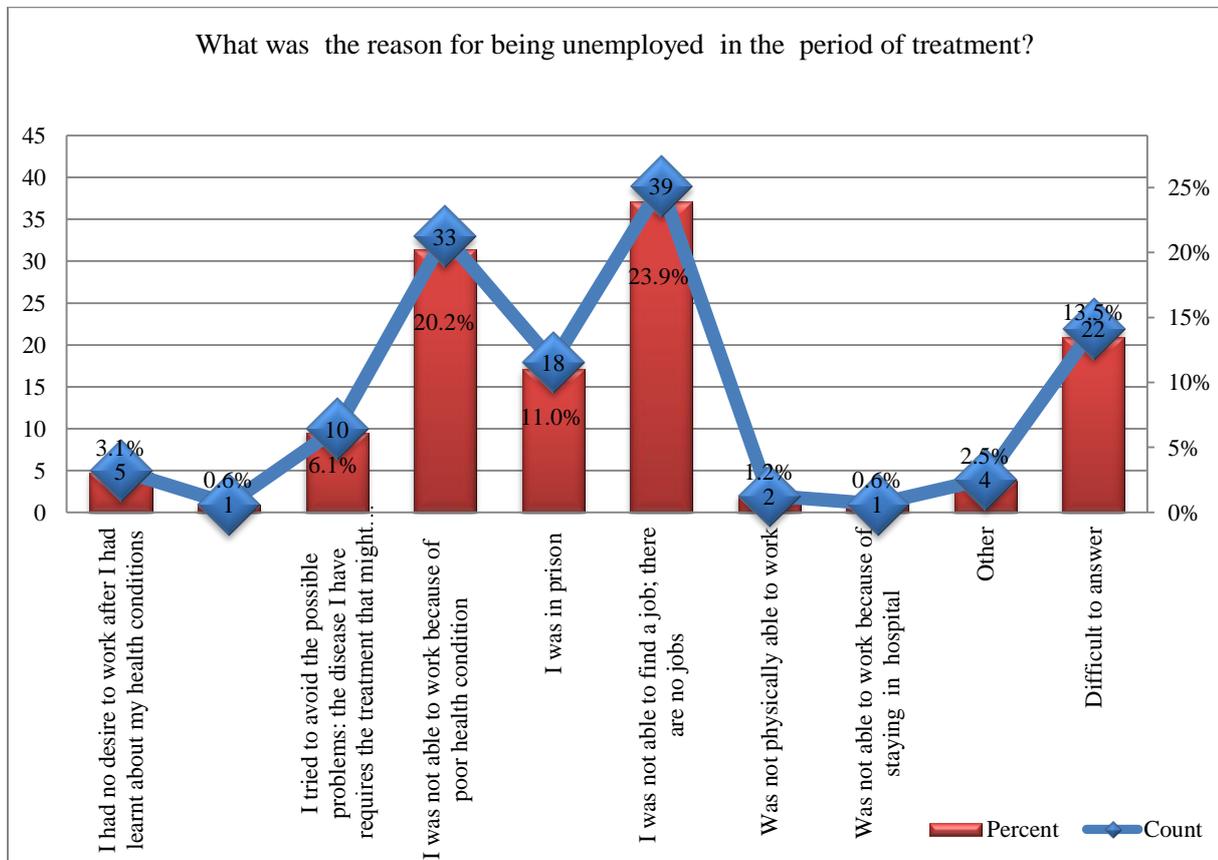


Figure 47. Reasons for not looking for a job during the TB treatment

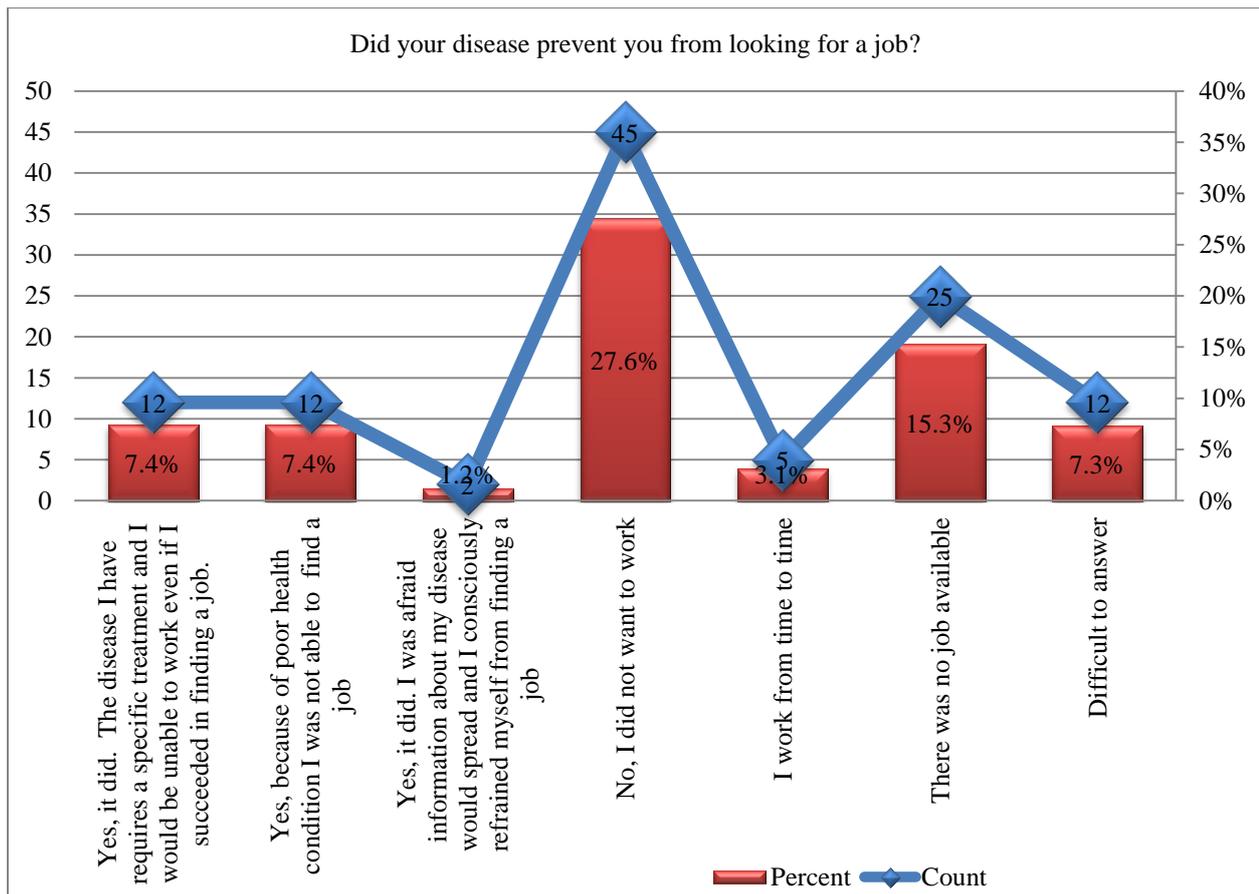


Figure 48. Disclosing the diseases status by the respondents

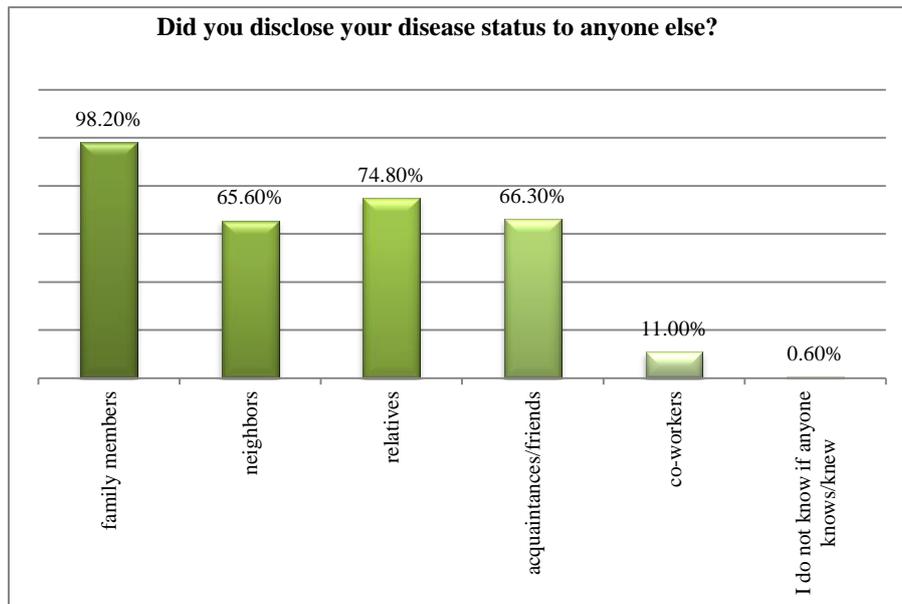


Figure 49. Relationship and support provided by respondents family members

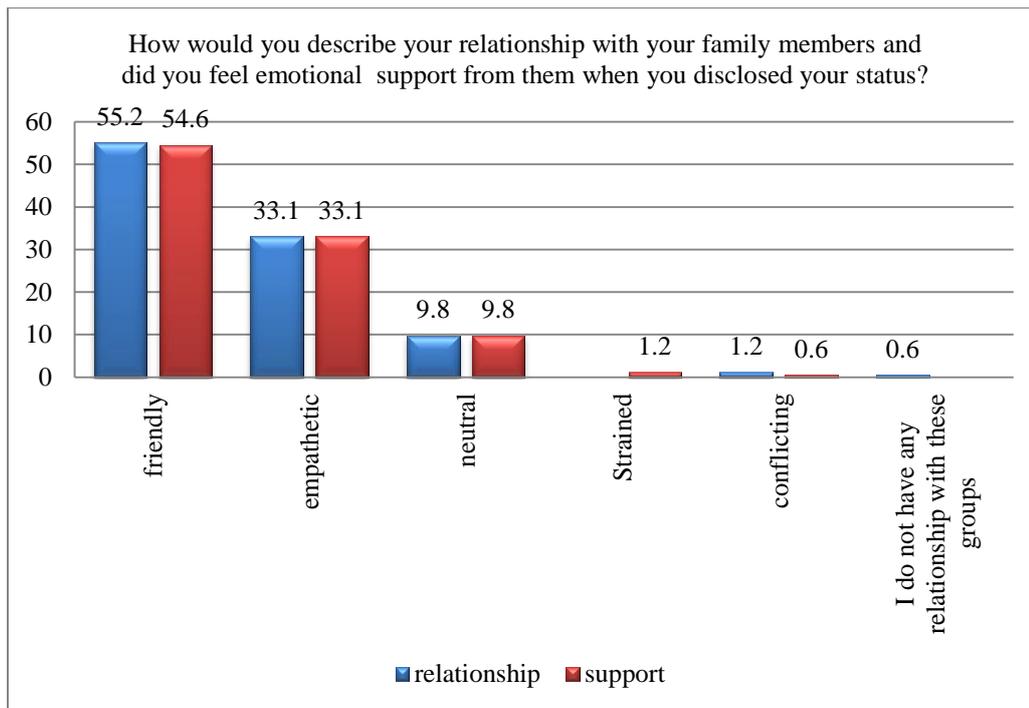


Figure 50. Respondents' perception of the attitude of the society to M/XDR TB patients

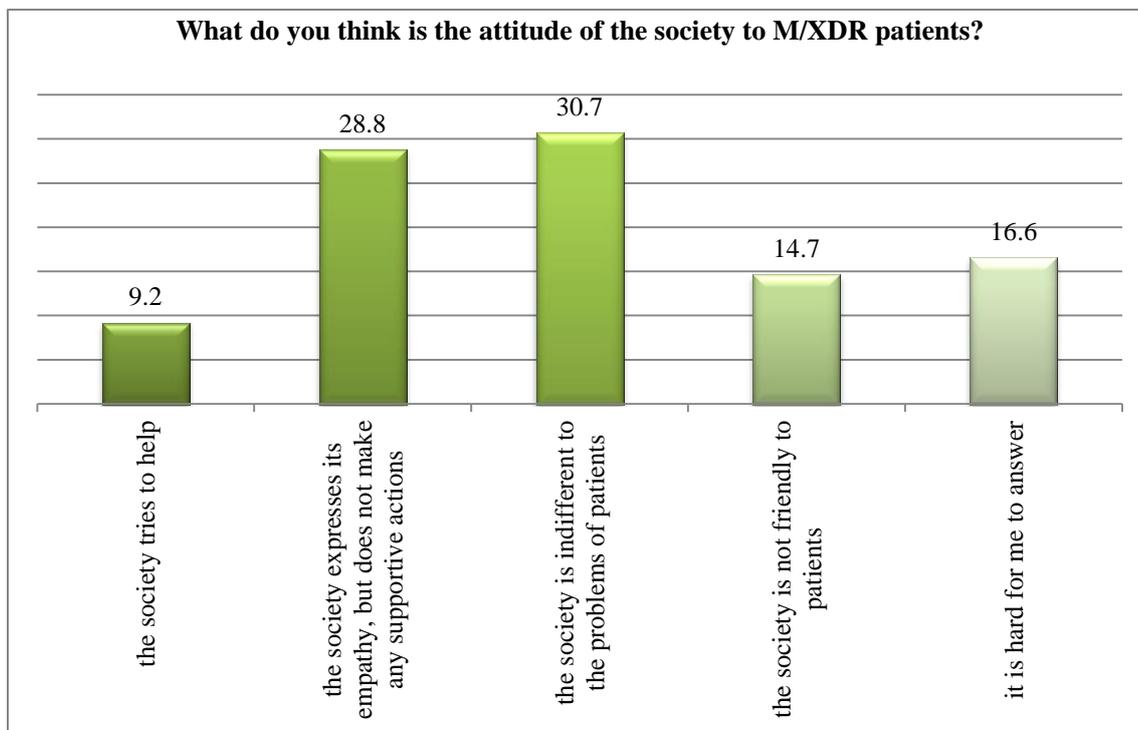


Figure 51. Respondents' experience of TB related discrimination and breach of confidentiality

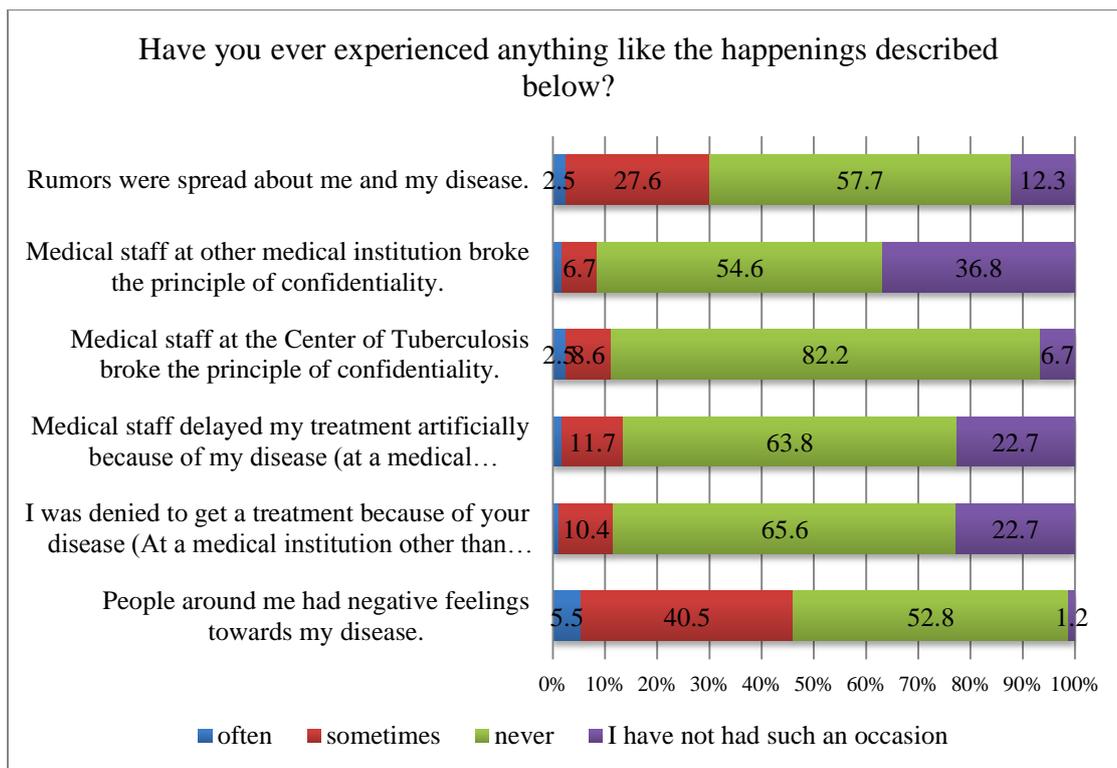
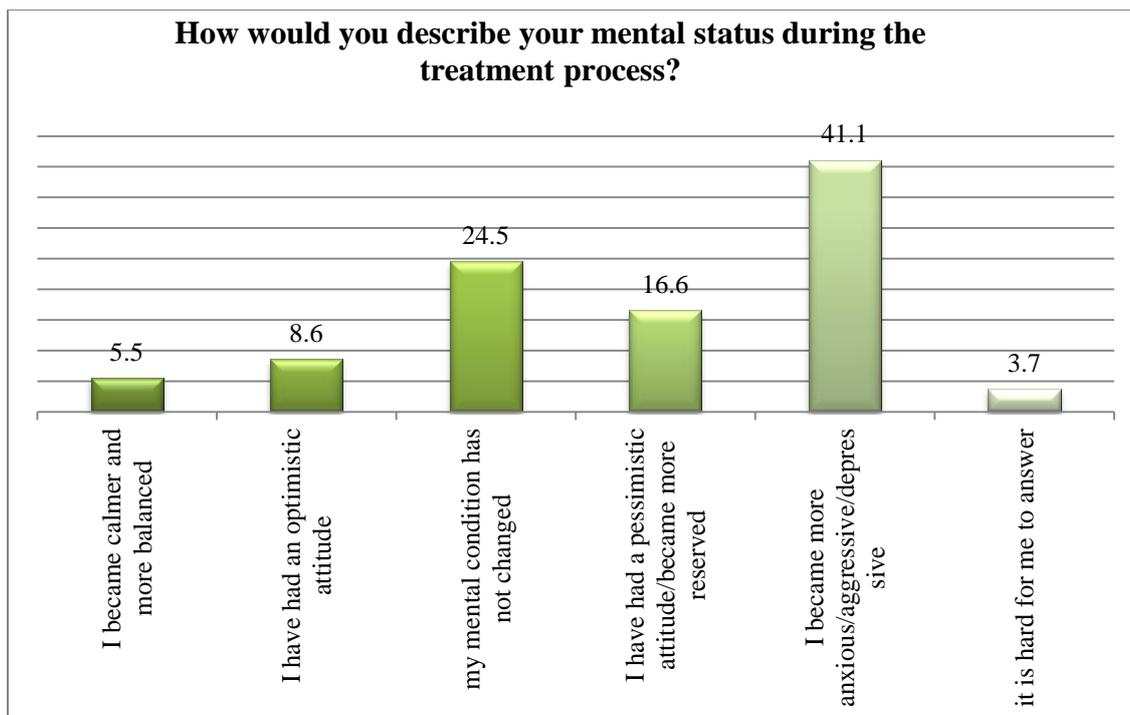


Figure 52. Distribution of respondents by their mental/ psychological status during the course of TB treatment



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