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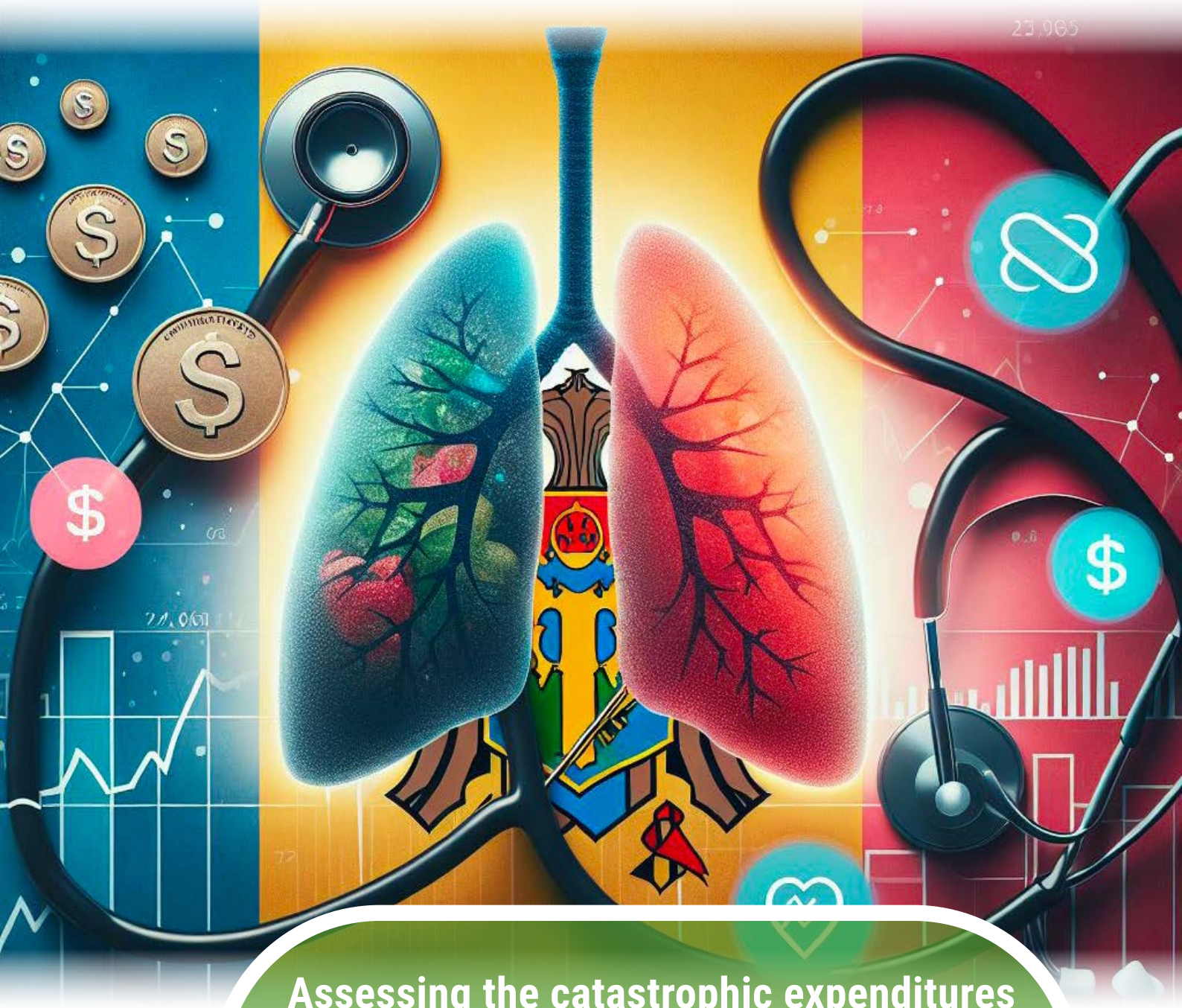

Assessing the catastrophic expenditures associated with tuberculosis treatment incurred by affected households in the Republic of Moldova

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The study on the *Assessment of the catastrophic expenditures associated with tuberculosis treatment incurred by affected households in the Republic of Moldova* carried out by the AFI Public Association at the request of the National Tuberculosis Response Program (NTRP) in coordination with the Center for Health Policy and Analysis (PAS Center) and with the support of the Global Fund to Fight HIV/AIDS, Tuberculosis and Malaria (GF).

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ABBREVIATIONS AND ACRONYMS

AO AFI	Public Association “Act for Involvement”
MPE	maximum permissible error
PAS Center	Center for Health Policy and Analysis
IP	Institute of Pulmonology “Chiril Draganiuc”
TB	Tuberculosis
NTP	National Tuberculosis (Response) Program
RR-TB	Rifampicin-resistant tuberculosis
MDR-TB	Multidrug-resistant tuberculosis
WHO	World Health Organization
DS	Standard deviation
CICI	Confidence interval
OR	Odds Ratio
GDP	Gross Domestic Product
GF	Global Fund to Fight HIV/AIDS, Tuberculosis and Malaria
VST	Video-supported treatment

Acknowledgments

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The research report reflects the opinion of the authors and does not necessarily represent the views of the donor or any other affiliated organization.

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BACKGROUND

General considerations

At global level, it is estimated that about half of the world's population is not covered by essential health services, and about two billion people face financial hardship due to out-of-pocket health expenditure, including more than 300 million people living in extreme poverty. At the level of the European Region, although many countries have well-developed health systems, there are still significant challenges in ensuring universal access to essential health services and in financially protection of the population. A significant proportion of the population is estimated to face catastrophic health expenditure, particularly in low- and middle-income countries. While the exact percentage may vary from country to country, the general trend indicates that the financial burden of health expenditure remains a major problem. By 2021, around 10% of the European population will have experienced financial hardship due to out-of-pocket health expenditure and a significant proportion will be living in extreme poverty because of this expenditure[1].

Tuberculosis (TB) clearly illustrates how out-of-pocket payments can affect health and economic well-being, and is an example of a disease that can contribute significantly to the disease poverty trap[2]. In many countries, TB diagnosis and treatment are free in public health systems, funded by national budgets and international support, which helps to reduce economic barriers, facilitate access to care and treatment adherence[3]. Eliminating direct costs to patients increases referral and treatment continuity, which are essential elements in TB control[4]. Despite efforts to provide free TB care, many patients and their families continue to incur significant direct and indirect costs associated with the disease and accessing health services, which limit access to care and put people at risk of financial ruin or worsening poverty[2,5–8].

Poverty is both a major determinant of TB morbidity[7,8] and one of the main consequences of TB disease. Studies show that eliminating extreme poverty could reduce the global burden of TB by more than a third by 2035[9,10]. This target is closely linked to the Sustainable Development Goal[11], which aims to eradicate poverty, and the World Health Organization (WHO) END TB Strategy target, which aims to eliminate the catastrophic expenditure associated with TB[12,13]. These include direct medical and non-medical expenditures as well as revenue losses. Catastrophic expenditure is defined as expenditure exceeding 20% of annual household income[6].

In 2016, a study conducted in the Republic of Moldova assessed the financial impact of resistant TB on households. The results showed that more than a third of households affected by resistant TB had catastrophic expenditures, i.e. expenditures that exceed their financial capacity and push them into poverty[14]. The study identified several determinants

contributing to these catastrophic expenditures[14,15]. The results also highlighted the significant burden that TB imposes on households, thus contributing to the perpetuation of poverty among the affected population[8].

This study aimed to complement and extend existing research by estimating the proportion of households facing both susceptible and resistant TB-related catastrophic costs. The objective was to dynamically track the evolution of catastrophic expenditures over time in order to better understand the economic impact of TB and to identify effective measures to reduce the financial burden on affected households. In this context, the results of the study will provide a clear picture of how TB influences the economic situation of TB-affected households in the Republic of Moldova and will contribute to the development of more effective and targeted public health policies.

Study location

The Republic of Moldova is a state located in southeastern Europe, bordering Romania to the west and Ukraine to the north, east and south, with a population of about 2.6 million inhabitants. The territory is organized into administrative-territorial units: municipalities, districts, towns and villages.

After gaining independence from the former Soviet Union, the country went into economic decline, which led to increasing poverty and health problems among the population, including TB. Despite considerable economic performance over the last decades, the Republic of Moldova remains one of the poorest countries in Europe. Even though the consumption-led, remittance-led growth model has generated considerable growth and reduced poverty, it became less sustainable long before the COVID-19 pandemic. Moldova's economic activity has been affected by the war in Ukraine and the impact of the COVID-19 pandemic, leading to an economic downturn. According to the World Bank classification, the Republic of Moldova is an upper-middle income country[17]. GDP per capita, fluctuating in recent years, increasing 0.7% in 2023 compared to 2022[16].

In the Republic of Moldova, since 2001, national TB control programs have been running, approved by Government decisions every 5 years. Currently, the country is implementing the National Tuberculosis Response Program (NTRP) for the 2022-2025 years which aims to reduce the TB burden as a public health problem in the Republic of Moldova[18].

The Ministry of Health has primary responsibility for TB control in the country. It exercises this responsibility through the central unit of the program - the Institute of Pulmonology "Chiril Draganiuc" (IFP) in collaboration with other governmental and non-governmental entities, international partners. TB control interventions are provided through a network of specialized institutions and primary health care services. In the country, there is a national SIME TB national database through which the notification and registration of TB patients is ensured[19]. To implement national programs, the Republic of Moldova has benefited since 2003 from non-reimbursable grants for TB control from the Global Fund to Fight HIV/AIDS, Tuberculosis and Malaria (GF). The Republic of Moldova has successfully implemented several policies and measures aimed at TB prevention and care and the constant involvement of primary health care in early detection and directly observed treatment. Universal access to quality TB diagnosis and treatment is ensured for all people, with complete geographical coverage, supportive policies for appropriate TB treatment have been developed.

The Republic of Moldova is among the 18 countries in the European Region where TB control is a priority and among the 30 countries with a high burden of multidrug-resistant (MDR) and Rifampicin-resistant (RR) tuberculosis in the world[20].

According to WHO estimation, in 2023, the Republic of Moldova was expected to detect 76 cases per 100 thousand population (range: 64-88), while 71 cases per 100 thousand population were diagnosed. It should be noted that the notification rate of TB cases halved (49% reduction) compared to 2006 and decreased by about 1.5 times (30% reduction) compared to 2014. The share of MDR/RR cases among new TB cases was 24%, and among re-treatment cases - 53%. The success rate among new and relapsed TB cases was 85% (cohort 2022), and among MDR/RR-TB cases - 70% (cohort 2021)[21].

TB treatment is complex and requires standardized and long-term therapy. In the Republic of Moldova, TB treatment is offered free of charge to all people regardless of ethnicity, religion, gender or age. However, people from vulnerable groups, such as people on low incomes, homeless people or people living in remote rural areas, may have difficulties in accessing general health services, including TB services, both in terms of diagnosis and treatment.

In the current context, the burden of TB is the main challenge for the NTRP and a major obstacle to achieving effective TB control. This burden is amplified by the diversity of socio-economic problems faced by patients and their families, including poverty, limited access to health services, poor housing conditions and social stigmatization. All of these can contribute to difficulties in timely diagnosis and treatment, including of TB, which complicates control efforts to eradicate the disease.

METHODOLOGY

The operational study was conducted following the fundamental steps of scientific research methodology, ensuring a rigorous and systematic approach:

Preparation: At this stage, the phenomenon to be studied was defined and the specific objectives of the research were set. This step included identifying the main problems and formulating research hypotheses.

Design: The type of study suitable for the research was determined and appropriate research methods were selected. Sampling procedures were also established to ensure representativeness of the data collected.

Data collection: Data were collected using interview administered questionnaires and by extracting relevant information from the national SIME TB database. This step was essential to obtain accurate and relevant data.

Data processing: The data collected were checked, validated and coded to ensure accuracy and consistency. This process included the identification and correction of any errors or omissions.

Interpretation: At this stage, the data were subjected to statistical analysis and the results were discussed. Based on the analysis, conclusions were drawn, and recommendations developed.

Aim of the study

Analysis of the catastrophic costs associated with the treatment of susceptible and drug-resistant tuberculosis faced by households in the Republic of Moldova affected by this disease.

Objectives of the study

1. Multidimensional description of TB patient profile (susceptible and drug resistant) from socio-demographic, epidemiologic and clinical aspects.
2. Analysis of TB patients' (susceptible and resistant) perceptions of their needs and the process of resuming normal life after recovery from TB disease.
3. Description of indirect expenditures associated with susceptible and resistant tuberculosis incurred by households (families) of patients affected by this disease.
4. Description of direct expenditures associated with susceptible and resistant tuberculosis incurred by households (families) of patients affected by this disease.

5. Determining the proportion of TB patient households (families) facing catastrophic expenditure associated with susceptible and resistant TB.
6. Assessment of risk factors associated with catastrophic expenditures incurred by households (families) of patients with susceptible and resistant tuberculosis.

Study design

The present study is a prospective, cohort study and is based on a cross-sectional design. The research was conducted over the period from September 2023 to December 2024.

Sample size

All patients who met the eligibility criteria were enrolled in the study. The study population comprised two samples: for susceptible and resistant TB.

The 95% confidence interval (95% confidence interval) with a maximum permissible error (MPE) of 5% was applied to determine the sample size of the study samples (susceptible and resistant TB). The number of adult patients (age older than 18 years) notified in the year 2022 (new or recurrent case) and initiating treatment for susceptible TB and resistant TB, respectively, civil sector, right bank of the Nistru River, served as a benchmark.

Table 1. Sample size included in the study, susceptible and resistant tuberculosis

Name	S usceptible TB	Resistant TB
No. of notified new cases and relapses initiating treatment	1442	266
Calculated sample size (CCI-95%; MPE-5%)	304	158
+10% (admitting non-response values)	30	16
Final sample size	**334 or ~333**	**174 or ~180**

Sample size, susceptible tuberculosis

The final sample size comprised 330 susceptible TB patients who met the inclusion and exclusion criteria for the study. During the study, three patients were reclassified to the resistant TB sample due to changes in their resistance profile.

Inclusion criteria:

1. Patient notified new or recurrent case
2. Patient notified with susceptible TB and started treatment for susceptible TB
    a. had at least 2 months of treatment in the initial phase
    b. had at least 2 months of continuation phase
    c. had treatment and a favorable outcome established at least 2 months ago
3. Adult, age≥ 18 years at the time of starting treatment for susceptible TB

4. Mentally able to give a structured interview based on the questionnaire
5. Signed informed consent for participation in the study

Exclusion criteria:

1. Notified patient with active TB who has not started treatment for active TB;
2. Patient notified with susceptible TB for other types of re-treatment (other than recurrent);
3. Patient notified with susceptible TB in penitentiary system and eastern region of the country.

Sample size, resistant tuberculosis

The sample size comprised 183 resistant TB patients who met the inclusion and exclusion criteria for the study. During the study, three patients were reclassified out of the susceptible TB sample due to changes in their resistance profile.

Inclusion criteria:

1. Patient notified new or recurrent case
2. Patient notified with MDR/RR-TB and initiated treatment for MDR/RR-TB
    a. had at least 2 months treatment in the initial phase
    b. followed the treatment for at least 2 months in the continuation phase
    c. has had treatment and a favorable outcome established at least 2 months ago
3. Adult, age≥ 18 years at time of treatment initiation for resistant TB
4. Mentally able to give a structured interview based on the questionnaire
5. Signed informed consent for participation in the study.

Exclusion criteria:

1. Notified patient with MDR/RR-TB who have not started treatment for MDR/RR-TB
2. MDR/RR-TB patient for other types of re-treatment (other than recurrent cases)
3. Patient notified with MDR/RR-TB in the penitentiary system and eastern region of the country.

Potentially eligible respondents were selected for participation in the study and recruited through institutions responsible for the registration and treatment of TB patients. Some of them were excluded before or after the interview for some reasons.

Recruitment of respondents

Lists of patients meeting the eligibility criteria were extracted from the SIME TB nominal case database. After extraction, an anonymous unique identifier was created for each person, which did not allow direct or indirect identification of the person. This anonymous unique identifier was used for coding the data collection instruments.

Respondent recruitment followed the principles of sampling and sub-sampling.

For the sample of susceptible TB patients, random sample extraction was applied using specialized statistical tools based on the lists extracted from SIME TB, respecting the sub-sampling criteria. Thus, following the respect of eligibility as well as the interviewing principles, the final sample for susceptible TB constituted - 330 respondents, consisting of

- Initial phase of treatment (intensive phase) - 109 patients who at the time of the interview were at least 2 months after TB treatment initiation; all eligible patients who initiated treatment for TB susceptible TB between September and October 2023 were recruited.
- Continuation phase - 111 patients who at the time of interview had at least 2 months of continuation phase of TB treatment. We recruited all eligible patients who initiated treatment for susceptible TB between June-July 2023.
- Post-treatment phase (after completion of TB treatment) - 110 patients who at the time of the interview were at least 2 months after completion of treatment for susceptible TB. All eligible patients who had initiated and completed treatment for sensitive TB between September and October 2023 were recruited.

For the resistant TB sample, random sample extraction was applied using specialized statistical tools based on the lists extracted from the SIME TB, respecting the sub-sampling criteria. Thus, following the respect of eligibility, but also of the interviewing principles, the final sample for MDR/RR-TB constituted - 183 respondents, consisting of:

- Initial phase of treatment (intensive phase) - 62 patients who at the time of the interview were at least 2 months after MDR/RR-TB treatment initiation; all eligible patients who initiated MDR/RR-TB treatment between August and October 2023 were recruited.
- Continuation phase - 60 patients who at the time of interview had at least 2 months of treatment for MDR/RR-TB at the continuation phase. All eligible patients initiating treatment for MDR/RR-TB between April and June 2023 were recruited.
- Post-treatment stage (after completion of TB treatment) - 61 patients who at the time of interview were at least 2 months after MDR/RR-TB treatment completion. All eligible patients who had initiated and completed treatment for MDR/RR-TB were recruited between August and October 2023.

Data collection and processing

The data collection steps included: extracting the list of TB cases from the SIME TB database and interview (standard questionnaire-based interview). After extracting nominal data for each person, an anonymous unique identifier was created and used for coding the survey instruments.

The study was based on standardized interviews using questionnaires and informed consent for participants. Three types of questionnaires were used: two for the treatment period (initial and continuation phases) and one for the period after treatment completion (post-treatment).

The questionnaires were based on a review of the literature, national and international studies in the field, and international recommendations and guidelines [6,22,23].

The questionnaires were developed in two languages: Romanian and Russian. They were pre-tested on a few 2-3 respondents (per each stage) and adjusted based on the testing results. The questions in the questionnaires were grouped into compartments (socio-demographic characteristics; harmful habits; TB diagnosis and treatment; knowledge and attitudes towards TB; confidence in health care; perceptions and opinions; standard of living) and contained single, multiple and complex answers.

Respondents were interviewed by interviewers trained in interviewing, data collection and confidentiality. Prior to completing the questionnaire, written informed consent was obtained from the respondent. The interview was conducted in the language preferred by the respondent. The questionnaire was completed by the interviewer during the interview, without the presence of a third person, respecting the principles of confidentiality. After the questionnaires, the respondent was compensated with a hygiene/food package. Respondent questioning was conducted from November 2023 to April 2024.

During the interviews, the coded questionnaires were centralized at the national level (IFP, NTP monitoring and evaluation department) where they were subjected to checks, validations of consistency of completion and processed for analysis.

An application developed for this purpose was used to process the data. When entering the questionnaires the results obtained were superimposed, thus avoiding input errors. Data analysis was performed using the "SPSS Statistical Analysis Program (IBM SPSS Statistics for Windows, Version 20.0. Armonk, NY: IBM Corp)". Data quality was ensured by visually checking and validating the data in the completed questionnaires, automated validation of some logic errors in data entry, including allowing only permissible values to be entered, automatically ensuring crossovers, and enforcing the entry of mandatory items. The analysis program allowed the grouping of the obtained material by grouping methods - simple, complex and repeated, and depending on the kind of evidential signs, typological (including qualitative signs) and variational (grouping of quantitative signs, expressed by figures) grouping in tabular form was performed.

Analysis methodology

Statistical analysis

Statistical analysis of the data involved: continuous variables were expressed as mean with standard deviation (SD) or median, and categorical variables were presented as frequencies. The Student t-t test, ANOVA test or Mann-Whitney U test were applied to compare means and medians depending on the number of groups analyzed. Comparison of frequencies was performed using the chi-square (χ^2) test and Fisher's exact test (if the group had less than 30 subjects). The Odds Ratio (OR) was used to determine the association between TB-related catastrophic expenditure and the determinants. The interpretation of the odds ratio values was as follows: OR=1 indicates no association between exposure and the phenomenon; OR>1 suggests that exposure is a risk factor for the occurrence of the phenomenon; OR<1

indicates that exposure has a protective effect on the phenomenon. Interpretation of the obtained results was based on statistical significance ($p<0.05$) at 95% confidence interval. The value $p<0.05$ was considered significant.

Expenditure analysis

Each respondent was interviewed only once, reporting TB-related expenditures for that interview period. Those interviewed in the initial phase of treatment provided data on the diagnostic phase and the first months of treatment. Those interviewed in the continuation phase reported costs for that treatment period. Finally, those interviewed after completion of treatment provided information for both the last months of treatment (the continuation phase) and the first months after completion of TB treatment. Only cases in which patients had completed TB treatment and had a treatment outcome were included in the analysis of expenditure data (indirect and direct).

Definitions and interpretations used for calculations and analysis:

Respondent and household income - expresses the income in money value reported by the respondent. The respondent indicated both his/her personal and household income.

Welfare payments (temporary incapacity benefit and motivational support)

- The benefit for temporary incapacity for work due to TB is 100%
- Motivational support - support in monetary value offered for the purpose of adherence to treatment to TB patients undergoing outpatient treatment for this disease.

Total household income - sum of wage income, income from other activities, income from all other sources for all household members, including welfare payments.

Indirect expenditures - indirect expenditures (or lost income) were estimated based on self-reported income (both respondent and household income up to the initiation of treatment TB) expressed in dollar value. The cost of a day in money value and the number of days in treatment were used for the estimates.

Direct expenditure - includes direct payments related to TB. Direct expenditure expresses the sum of medical and non-medical expenditure.

- Direct medical out-of-pocket expenditures included formal and informal payments reported by respondents paid for TB services from the period of diagnosis to the completion of treatment, and included payments for tests, analyzes, investigations, consultations, medicines, para-pharmaceuticals.
- Direct non-medical out-of-pocket expenditures included extra payments incurred during the period of accessing health services, from the time of diagnosis to the completion of treatment and included: expenditures for food, various utilities such as hygiene items or personal items during the hospitalization, transportation costs of the respondent (to TB facilities for medical consultation and pill collection) and of household visitors (during the hospital period). Transportation costs were calculated based on distance traveled to TB facilities and number of visits.

Catastrophic expenditures - total expenditures incurred by TB patient households during TB diagnosis and treatment that exceed the threshold of 20% of annual household income before TB[6].

Household - a group of related or unrelated persons who live together and have a common budget or a person who lives and manages separately and does not belong to another household. NB: - household (family) - has been used in the report to correctly understand the concept of household as set out in the definition.

Members of the household - persons present in the household or temporarily absent (away on vacation, staying with relatives, hospitalized, etc.). Guests, persons temporarily employed in the household, persons living in rented accommodation and having a separate budget are not considered as members of the household.

Welfare refers to the cumulative standard of living of a household. It is calculated based on data on household ownership of a selected set of goods, such as televisions, bicycles and cars; housing characteristics, such as floor material; type of drinking water source; and toilet and sanitation facilities. The well-being index considers characteristics related to wealth status, avoiding variables that are not relevant, and is expressed in quintiles.

Quintile - one of the four values dividing the frequency series into five equal parts, so that the first 20% (quintile I) represents the population with low wealth index (poorest households) and the last 20% (quintile V) - with high wealth index (richest households).

Households in poverty - according to the World Bank the international extreme poverty line is set at 2.15 USD per person/per day[24]. When calculating this index, the National Bank of Moldova rate as of 01/02/2024 was considered[1] (questions/answers in the questionnaires were in MDL, later converted to USD).

WHO *case definitions* [25,26]

- New TB case - a patient diagnosed with TB for the first time who has not received previous TB treatment or has received treatment for less than one month
- Recurrent TB case - a patient who has been previously treated for TB and has been declared cured or treatment completed, but subsequently develops the disease again
- Bacteriologically confirmed - the presence of Mycobacterium tuberculosis has been confirmed by any laboratory test (microscopy, culture, nucleic acid amplification tests, etc.)
- MDR-TB: Resistance to at least Rifampicin and Isoniazid; RR-TB: Resistance to Rifampicin, with or without resistance to other drugs. The concept of resistant TB was used in the study and included MDR-TB and RR-TB cases
- Sensitive (susceptible) TB: Rifampicin sensitivity.

[1] https://bnm.md/ro/content/ratele-de-schimb: 1 USD = 17.7639 MDL, on 01/02/2024

Migration in the anamnesis - if the patient has been abroad for more than 3 consecutive months in the last 12 months prior to TB diagnosis.

Diagnostic period - the two-month interval until the diagnosis of TB is confirmed.

Initial treatment period - the first two months of treatment.

Treatment period - the period from the start of TB treatment to its completion.

Interim and continuation period - the period at least two months after starting TB treatment.

Post-treatment period - the interval of at least two months after completion of TB treatment.

Ethical considerations

The study protocol and the instruments used in the study were approved by the National Clinical Trial Ethics Committee of the Republic of Moldova by decision no. 1597 of October 25, 2023.

SUSCEPTIBLE TUBERCULOSIS

General characteristics of the sample

The study sample comprised 330 respondents with susceptible TB: 109 respondents for the initial treatment period, 111 respondents for the continuation phase and 111 respondents surveyed two months after completion of treatment.

Representativeness

The study sample, consisting of 330 respondents with susceptible TB, was analyzed according to demographic parameters (gender, residence, age) to determine the representativeness in relation to routine statistical data (1396). The results demonstrated that the patient profile of the study sample faithfully reflects the profile of the patient with susceptible TB in the Republic of Moldova (p>0.05, Table 2).

Table 2. Representativeness of the study sample in relation to notified cases of susceptible tuberculosis in the Republic of Moldova in 2023, right bank of the Nistru River region, civil sector.

Variable name	Study sample, treatment period				Susceptible TB cases notified	p
	Initial	Continue	Latest 2 months after	Total		
	n (%)	n (%)	n (%)	n (%)	n (%)	
Total	**109**	**111**	**110**	**330**	**1396**	
Sex						
Men	79 (72.5)	76 (68.5)	79 (71.8)	234 (70.9)	1054 (75.5)	0.084
Women	30 (27.5)	35 (31.5)	31 (28.2)	96 (29.1)	342 (24.5)	0.084
Residence environment						
Urban	49 (45.0)	35 (31.5)	39 (35.5)	123 (37.3)	518 (37.1)	0.946
Rural	60 (55.0)	76 (68.5)	71 (64.5)	207 (62.7)	878 (62.9)	0.946

Variable name	Study sample, treatment period				Susceptible TB cases notified	p
	Initial	Continue	Latest 2 months after	Total		
	n (%)	n (%)	n (%)	n (%)	n (%)	
Age						
18-24 years	7 (6.4)	2 (1.8)	4 (3.6)	13 (3.9)	48 (3.4)	0.657
25-34 years	13 (11.9)	18 (16.2)	16 (14.5)	47 (14.2)	202 (14.5)	0.889
35-44 years	38 (34.9)	29 (26.1)	31 (28.2)	98 (29.7)	386 (27.7)	0.467
45-54 years	21 (19.3)	25 (22.5)	25 (22.7)	71 (21.5)	326 (23.4)	0.461
≥ 55 years old	30 (27.5)	37 (33.3)	34 (30.9)	101 (30.6)	434 (31.1)	0.859

Socio-demographic characteristics

The study sample for susceptible TB was predominantly male (76%) and rural (63%). The mean age of respondents was 47.0 ± 13.9 years, with a median of 45 years, ranging from 18 to 89 years. Most respondents were over 35 years of age (82%).

In terms of educational attainment, 57% of the participants had incomplete secondary education. The proportion of married (including cohabiting) and unmarried (single, widowed, divorced) was equal (50%). About 11% of the participants reported migration in the anamnesis, and 3.3% had detention in the anamnesis. The majority of households had less than 3 persons (62.7%), and 26% of respondents indicated the presence of persons under 18 years of age in the household (Table 3).

Statistical analysis revealed significant differences only in the case of migration (p= 0.028) between treatment periods, while level of education, marital status, employment, employment in the labor force, detention in the anamnesis, number of persons in the household and presence of persons under 18 years in the household did not show significant variations (p>0.05, Table 3).

Table 3. Socio-demographic characteristics of the study sample, susceptible tuberculosis

Variable name	Total	Treatment period			Value p
		Initial	Continue	Latest 2 months (after)	
	n (%)	n (%)	n (%)	n (%)	
Total	**330**	**109**	**111**	**110**	
Studies*					0.741
No education/primary	26 (8.8)	6 (5.5)	11 (9.9)	12 (10.9)	
Incomplete secondary	186 (56.4)	62 (56.9)	65 (58.6)	59 (53.6)	
Specialized secondary	90 (27.3)	31 (28.4)	29 (26.1)	30 (27.3)	
Higher	25 (7.6)	10 (9.2)	6 (5.4)	9 (8.2)	
Employment*					0.345
Employed	128 (38.8)	46 (42.2)	38 (34.2)	44 (40.0)	
Self-employed	2 (0.6)	0 (0.0)	0 (0.0)	2 (1.8)	
Unemployed	91 (27.6)	32 (29.4)	31 (27.9)	28 (25.5)	
Other	109 (33.0)	31 (28.4)	42 (37.8)	36 (32.7)	
Marital status*					0.436
Married	165 (50.0)	50 (45.9)	55 (49.5)	60 (54.5)	
Single	165 (50.0)	59 (54.1)	56 (50.5)	50 (45.5)	
Migration in anamnesis					**0.028**
Yes	36 (10.9)	19 (17.4)	9 (8.1)	8 (7.3)	
No	294 (89.1)	90 (82.6)	102 (91.9)	102 (92.7)	
Detention in anamnesis					0.672
Yes	11 (3.3)	5 (4.6)	3 (2.7)	3 (2.7)	
No	319 (96.7)	104 (95.4)	108 (97.3)	107 (97.3)	
No. persons in household					0.328
<3 persons	207 (62.7)	74 (67.9)	69 (62.2)	64 (58.2)	
>3 persons	123 (37.3)	35 (32.1)	42 (37.8)	46 (41.8)	
Presence of persons aged< 18 in the household					0.755
Yes	85 (25.8)	26 (23.9)	28 (25.2)	31 (28.2)	
No	245 (74.2)	83 (76.1)	83 (74.8)	79 (71.8)	

Married: married or cohabiting, unmarried: single, widowed, divorced. Education: primary (4 grades); incomplete secondary - 5 to 11 grades, secondary (specialized): 12 grades and professional secondary; higher - complete and incomplete; Employment: employed (civil servant, driver or manager, skilled specialist, unskilled specialist, farmer); self-employed (holder of a driver's license or permit, etc.), Unemployed (registered or not registered with the employment office), other (daily wage laborer, pupil, student, retired, people with disability, on maternity or paternity leave)

Level of well-being

The table below provides an overview of the household material situation, main expenditure categories and dietary status at different stages: before TB diagnosis, during treatment and after treatment completion, as collected from survey participants. Most households were materially poor, with a significant proportion living in poverty (34%), and the percentage of very poor households increased during TB from 15% to 18%. Food accounted for 62% of household expenditure categories, followed by household maintenance (32%) and health expenditure (5.2%). The degree of nutrition varied, with about one-third (28%) considering it insufficient and only 5.2% very good or excellent (Table 4).

Table 4. Level of well-being, study sample, susceptible tuberculosis

Variable name	Total	Before TB	During TB	After TB	p-value
	n (%)	n (%)	n (%)	n (%)	
Total	**330**	**109**	**111**	**110**	
Household material situation					0.152
Living in poverty	50 (15.2)	16 (14.7)	20 (18.0)	14 (12.7)	
Pretty poor	62 (18.8)	18 (16.5)	23 (20.7)	21 (19.1)	
Not so good	164 (49.7)	50 (45.9)	57 (51.4)	57 (51.8)	
Good situation	51 (15.5)	22 (20.2)	11 (9.9)	18 (16.4)	
Very good situation	3 (0.9)	3 (2.8)	0 (0.0)	0 (0.0)	
Most important category of expenditure*					0.442
Food	201 (61.5)	70 (64.2)	72 (64.9)	59 (55.1)	
Household maintenance	104 (31.8)	34 (31.2)	32 (28.8)	38 (35.5)	
Health	17 (5.2)	4 (3.7)	4 (3.6)	9 (8.4)	
Items	2 (0.6)	0 (0.0)	1 (0.9)	1 (0.9)	
Other	3 (0.9)	1 (0.9)	2 (1.8)	0 (0.0)	
Degree of nutrition					0.117
Insufficient	92 (27.9)	27 (24.8)	40 (36.0)	25 (22.7)	
Enough	145 (43.9)	48 (44.0)	42 (37.8)	55 (50.0)	
Good	76 (23.0)	24 (22.0)	27 (24.3)	25 (22.7)	
Very good/excellent	17 (5.2)	9 (8.3)	2 (1.8)	5 (4.5)	

* Health: medicines, medical tests, consultations; Items: clothing, shoes, etc.

Table 5 shows the relationship between respondents' self-assessed household material situation and the household wealth index. The analysis shows a clear relationship between the Well-being Index and self-assessment of material situation. Households with lower Well-being Indices tend to perceive themselves as being in poverty or quite poor, while households with higher Well-being Indices have a more positive perception of their material situation. Thus, in the 'poorest' category, 36% of respondents consider themselves to be living in poverty, while only 1.5% consider themselves to be in a good situation. In the "richest" category, only 4.5% consider themselves to be living in poverty, while 33% consider themselves to be in a good situation and 4.5% in a very good situation. According to the Well-being Index, in the 'richest' household, 29% of households consider themselves to be in a good situation, compared to only 11% in the 'average' household.

Table 5. Level of household wealth in relation to household material status, sample susceptible tuberculosis

Household material situation	**Household Wealth Index (Quintiles)**					**Total**
	Poorest household	Poor household	Medium index household	Wealthy household	Richest household	
Living in poverty	24 (36.4)	11 (16.7)	4 (6.1)	8 (12.1)	3 (4.5)	50 (15.2)
Pretty poor	19 (28.8)	19 (28.8)	14 (21.2)	6 (9.1)	4 (6.1)	62 (18.8)
Not so good	22 (33.3)	34 (51.5)	41 (62.1)	33 (50.0)	34 (51.5)	164 (49.7)
Good situation	1 (1.5)	2 (3.0)	7 (10.6)	19 (28.8)	22 (33.3)	51 (15.5)
Very good situation	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	3 (4.5)	3 (0.9)
Total	**66**	**66**	**66**	**66**	**66**	**330**

Analyzing the data in line with the international extreme poverty line (according to the World Bank), reveals that about one-fifth (23.9%, 79 out of 330) of households were living in poverty before the burden of TB disease. Their percentage increased to 29.4% (97 out of 330) in the initial treatment period and remained relatively constant at 28.8% (95 out of 330) in the continuation period (Figure1).

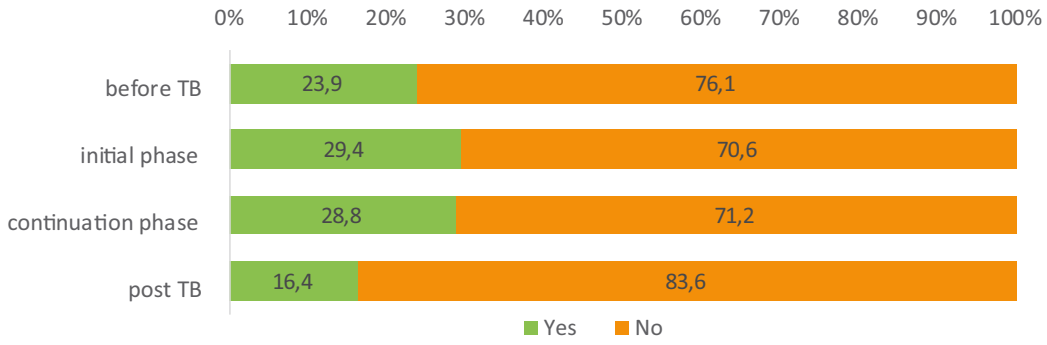

Figure 1. Households in poverty, TB-sensitive sample

Essential documents: identity card, citizenship, insurance

The survey revealed that 98.2% (324) of the respondents have an ID card and citizenship of the Republic of Moldova, 37.9% (125) have a passport and 27.1% (89) have a work permit. Two persons (0.6%) hold a provisional ID card. Driving license is held by 23.9% (79) of the participants. 3.6% (12) of the respondents have citizenship of other countries.

By the time of TB diagnosis, 188 (57.0%) of the study participants indicated that they had a health insurance policy. The following sources of policy ownership were mentioned: from employer (54), self-purchased (14), free insurance (117) and other sources (3).

Respondents who did not have a health insurance policy (142) indicated various reasons for this situation. The most common reason was not being employed (56.6%, 81) or not having a formal job (37.1%, 53). Other reasons included: the perceived high cost of health insurance (19.6%, 28), the perception that insurance is not necessary (15.4%, 22) and seeing health insurance as unnecessary because they pay for health care anyway (7.7%, 11). A smaller percentage, 5.6% (8), work abroad and therefore do not have a health insurance policy in the country, and 4.9% (7) did not give any clear answer why they do not have a health insurance policy.

Harmful habits

The analysis of harmful behaviors among the respondents reveals a considerable prevalence of smoking and alcohol consumption, with drug use being rarer. In terms of smoking, 44.8% (148 out of 330) of the respondents stated that they currently smoke, and of these, 32.4% (48 out of 148) smoke between 10 and 20 cigarettes daily. It is notable that 25.7% (85 out of 330) of the respondents have smoked in the past, of which 34.1% (29 out of 85) quit because of TB and 23.5% (20 out of 85) for other reasons.

Alcohol consumption in the last year before TB diagnosis was reported as follows: 7.6% (25 out of 327) drank alcohol four times a week or more often, 8.9% (29 out of 327) two or three times a week, 17.1% (56 out of 327) two or four times a month. The majority of respondents (45.0%, 147 out of 327) drank alcohol once a month or less rarely, while 21.4% (70 out of 327) indicated that they did not drink alcohol at all. During TB treatment, one-third (30.8%, 99 out of 321) of the respondents mentioned drinking alcohol, of whom 13 (13.1%) drank alcohol four times a week or more often, 26 (26.3%) two or three times a week, and 60 (60.6%) two or four times a month.

Injecting drug use was mentioned by 2.7% (9) of the respondents, of which 2 had used in the last 12 months. Non-injecting drug use was indicated by 6.1% (20) of the participants, of which 1.5% (5) had used such drugs in the last year.

Knowledge, attitudes and practices on tuberculosis

In the survey, participants (219[2]) were asked about their initial source of information about TB disease. In the most common cases, respondents found out about TB from their doctor when they became ill in person (35.6%, 78). In 26.5% (58) of cases, respondents learned about TB from the media, including television or radio. Other sources of information included information from relatives (13.2%, 29), from physicians when a family member became ill (5.5%, 12), and from close friends who became ill with the disease (4.6%, 10). The least common sources were social networks (2.7%, 6) and the internet (4.1%, 9), and 7.8% (17) of respondents could not recall the source where they learned about TB.

The overwhelming majority of respondents (97%) knew that TB is a contagious disease. This was recognized by 96% of those surveyed during the first months of treatment, 95% of those surveyed during the continuation phase and 99% of those who completed treatment (Table 6).

Study participants demonstrated a clear understanding of airborne TB transmission during coughing, with this way being mentioned 94% of the time, with no statistically significant differences in responses between the responses offered during treatment ($p > 0.05$, Table 6).

The study revealed a statistically significant difference in the perception of TB transmission by handshaking. During the initial treatment period, 34% of participants believed in this way of transmission, whereas after completing treatment, only 13% still held this belief ($p = 0.009$). Regarding other modes of transmission, such as habitual, blood, sexual contact and the belief that TB is a congenital disease, these perceptions persisted in respondents' answers throughout treatment, with small variations but without statistical significance, indicating that perceptions did not change ($p > 0.05$, Table 6).

Integrated knowledge of the ways of TB transmission showed a significant change in the level of awareness during treatment. In the first months of treatment and during the continuation period, about one-third of participants (28% and 30%, respectively) had correct knowledge about TB transmission. After completion of treatment, this proportion increased significantly to 50% ($p=0.001$). Regarding knowledge about TB treatability, a variable perception was observed during the treatment course, with no statistically significant differences (Table 6).

[2] Initial and intermediate treatment period

Table 6.Knowledge and attitudes on tuberculosis, susceptible tuberculosis sample

Name	Total	Treatment period			p
		Initial	Continue	Latest 2 months after	
	n (%)	n (%)	n (%)	n (%)	
Total	**330**	**109**	**111**	**110**	
TB infectiousness					0.261
Yes	314 (96.9)	104 (96.3)	103 (95.4)	107 (99.1)	
No	10 (3.1)	4 (3.7)	5 (4.6)	1 (0.9)	
Ways of TB transmission					
Through the air while coughing					0.304
Yes	296 (94.3)	96 (92.3)	95 (92.2)	105 (98.1)	
No	10 (3.2)	5 (4.8)	4 (3.9)	1 (0.9)	
I don't know	8 (2.4)	3 (2.9)	4 (3.9)	1 (0.9)	
Habitual transmission					0.400
Yes	154 (49.5)	55 (53.9)	59 (57.3)	40 (37.7)	
No	145 (46.6)	42 (41.2)	41 (39.8)	62 (58.5)	
I don't know	12 (3.9)	5 (4.9)	3 (2.9)	4 (3.8)	
Through blood					0.290
Yes	38 (12.2)	16 (15.7)	13 (12.6)	9 (8.5)	
No	240 (77.2)	73 (71.6)	83 (80.6)	84 (79.2)	
I don't know	33 (10.0)	13 (12.7)	7 (6.8)	13 (12.3)	
By shaking hands					**0.009**
Yes	72 (23.2)	35 (34.3)	23 (22.3)	14 (13.2)	
No	227 (73.0)	63 (61.8)	77 (74.8)	87 (82.1)	
I don't know	12 (3.9)	4 (3.9)	3 (2.9)	5 (4.7)	
Through sexual contact					0.365
Yes	25 (8.1)	10 (9.8)	8 (7.8)	7 (6.7)	
No	250 (80.6)	76 (74.5)	87 (84.5)	87 (82.9)	
I don't know	35 (11.3)	16 (15.7)	8 (7.8)	11 (10.5)	
TB is a congenital disease					0.150
Yes	9 (2.9)	6 (5.8)	1 (1.0)	2 (1.9)	
No	275 (88.1)	85 (82.5)	95 (92.2)	95 (89.6)	
I don't know	28 (9.0)	12 (11.7)	7 (6.8)	9 (8.5)	
Integrated knowledge about TB transmission					**0.001**
Correct	115 (35.9)	30 (28.3)	32 (29.6)	53 (50.0)	
Incorrect	205 (64.1)	76 (71.7)	76 (70.4)	53 (50.0)	
Tuberculosis is treatable					0.547
Yes, definitely	101 (31.5)	36 (33.6)	27 (25.5)	38 (35.2)	
Yes, if is treated in time	166 (51.7)	51 (47.7)	61 (57.5)	54 (50.0)	
Partially	42 (13.1)	14 (13.1)	14 (13.2)	14 (13.0)	
No	12 (3.7)	6 (5.6)	4 (3.8)	2 (1.9)	

Non-Response: TB contagiousness (6), Airborne during coughing (16), Habitual transmission (19), Blood (19), Hand shaking (19), Sexual contact (20), TB is a congenital disease (18), Integrated knowledge about TB transmission (10) Tuberculosis is treatable (9)

Specific questions on TB management practices asked in the survey revealed that 98.2% (321 out of 327) of the participants wanted to start treatment immediately after TB diagnosis. A sizable proportion, 76.9% (250 out of 325), were aware that TB treatment is long-term, and 70.6% (228 out of 323) were aware that it involves taking multiple drugs. At the same time, 83.7% (272 out of 325) of the cases were aware of the need for strict adherence to the prescribed regimen, 74.8% (241 out of 322) knew about the consequences of not completing the treatment, and 65.7% (213 out of 324) were informed about the possible side effects of anti-TB drugs.

Behavioral analysis of measures to prevent the transmission of the disease showed that 82.9% (271 out of 327) of the participants used a handkerchief when coughing or sneezing, 82.2% (268 out of 326) tried to reduce contact with others, 65.7% (215 out of 327) used separate dishes and 61.5% (201 out of 327) lived separately from other family members.

Addressability and diagnosis

Persistent cough (mean duration (MD) of 3.9 weeks) was the most common symptom, specified by 63.2% (139) of respondents (220[3]). Weakness and unmotivated fatigue (MD 3.2 weeks) were experienced in 66.8% (147) cases, night sweats (MD 3.0 weeks) in 51.4% (113) cases, and weight loss (MD 3.8 weeks) in 51.8% (114) cases among participants. Symptoms such as lack of appetite (MD 3.4 weeks), chest pain (MD 3.0 weeks) and fever (MD 2.7 weeks) were mentioned in 48.2% (106), 31.8% (70) and 26.9% (59) cases, respectively. Streaks of blood in sputum were rare, being reported by 5.5% (12) of respondents, with a mean duration of 1.5 weeks. Hemorrhage was mentioned by only one respondent, and 6.7% (22) of participants indicated that they had no symptoms.

Seeking medical assistance was mainly driven by persistent cough, reported by 61.4% (121) of respondents (197[4]). Other significant symptoms that led to seeking medical help included weakness and unmotivated tiredness, mentioned by 54.8% (108) of participants, as well as night sweats and weight loss, each reported in 36.58% (72) cases. Lack of appetite was another common symptom, reported by 35.0% (69) of respondents. Chest pain and fever were also common reasons for seeking medical attention, being reported by 26.9% (53) and 25.9% (51) of respondents, respectively. Blood streaks in the sputum or hemorrhage were reasons for seeking medical attention in 6.6% (13) and 1.5% (3) cases. In addition, 12.7% (25) of the respondents indicated other reasons that were not characteristic of TB but served as a reason for referral.

At the onset of characteristic TB symptoms, only one fifth (20.0%; 39) of the respondents (195[5]) recognized them as TB symptoms and immediately sought medical attention. Approximately half (49.2%; 96) of the participants considered it to be a common cough that would pass on its own, and about a quarter (26.7%; 52) contacted a doctor but took cold medicine. In 8.2% (16) cases, respondents thought that the symptoms were associated with COVID-19 and would pass on their own, and in 6.7% (13) cases, they were afraid that it might be TB and did not tell anyone.

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[3] Initial and interim period, valid answers

[4] Initial and intermediate period, valid answers

[5] Initial and intermediate period, valid answers

In 2.1% (7 out of 330) of cases, TB was diagnosed during screening.

The study revealed different time intervals between the onset of symptoms and seeking medical attention among participants (n=197).[6] Thus, 17.8% (35) of respondents sought medical assistance in less than a week, while 19.8% (39) did so within 1-2 weeks. In 23.4% (46) cases, respondents sought medical attention within 2-3 weeks, while 39.1% (77) of respondents waited more than 3 weeks before seeking medical attention. Participants who sought medical care after more than three weeks (77) cited various reasons for this delay, such as lack of money (46.7%, 36), fear of investigations (22.1%, 17), lack of time (18.2%, 14), and distrust of doctors (2.6%, 2).

It has been observed that 46.3% (101) of the respondents (218[7]) were referred to a respiratory physician on the recommendation of their family doctor, while 14.2% (31) were referred by other health workers. In addition, 8.3% (18) of the respondents were advised by family members to consult a respiratory physician. About a fifth of the participants (19.3%, 42) decided to consult a specialist on their own initiative and 11.8% (26) were advised by a friend or relative.

An important aspect highlighted by the study is the tendency of some patients to take non-TB-specific drug treatments at home on their own initiative, before the diagnosis is confirmed. According to the data, 17.4% of the participants (19 out of 109[8]) used such treatments on the recommendation of their pharmacist, relatives or friends, from the onset of symptoms until the diagnosis was confirmed.

The analysis also included the time intervals between completion of TB-specific investigations and communicating the diagnosis to respondents (109[9]). The majority, 66.1% (72), received the information about the diagnosis within 1-3 days. In 22.0% (24) cases, the diagnosis was communicated within 4-7 days, and in 5.5% (6) cases within 1-2 weeks, while 6.5% (7) of the respondents waited 3 weeks or more to learn their diagnosis.

Of the total 330 respondents, 3.3% (11) opted for the services on a private clinic. They turned to private clinics for diagnostic services in 8.3% (9 out of 109[10]) cases and for medical services during treatment in 1.8% (2 out of 111[11]) cases. The p-value= 0.002 suggests that respondents were more likely to go to private clinics for diagnostic services.

Regarding access to emergency services, the majority of respondents did not require urgent medical interventions in the period from diagnosis to completion of treatment. Of the 330 respondents, only 6 persons (1.8%) reported that they had used emergency services, accessing them during the period of diagnosis or initial treatment.

Approximately one-fifth of the study participants (21.8%, 72 out of 330) were referred to the Council for Determination of Disability and Work Capacity. The majority (75%, 54 out of 72) of those referred to the Council were referred because of TB. In 15.3% of cases (11 out of 72), the referral was due to other diseases, and in 9.7% of cases (7 out of 72), patients were

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6 Initial and intermediate period, valid answers

7 Initial and intermediate treatment period, valid responses

8 Initial treatment period, valid responses

9 Initial treatment period, valid responses

10 Initial treatment period

11 Treatment period (last 2 months), valid answers

referred due to both TB and other diseases. Of those referred, two thirds (66.7%, 48 out of 72) received a TB-related disability.

The majority (85.4%, 41), of those who received a disability rating were categorized with Grade II (marked), one respondent (2.1%) received Grade I disability, indicating a severe disability, five respondents (10.4%) received Grade III disability, indicating a medium level disability. One (2.1%) respondent did not provide any answer.

Epidemiological and clinical characteristics

Table 7 provides a detailed picture of the epidemiological and clinical characteristics of the study participants. Of the total 330 respondents, the vast majority (81%) were new TB cases. In terms of disease localization, the majority (92%) had pulmonary TB, and bacteriological confirmation was obtained in 68% of the participants. All respondents followed a long treatment regimen, with no cases treated with a short regimen. Hospitalization was required for 81.5% of patients. In addition, 8.5% of the respondents had originated from outbreaks, and in 6.5% cases someone in the family had suffered from TB within the last 2 years, including at the time of the interview.

Table 7. Epidemiological and clinical profile, susceptible tuberculosis sample

Name	n (%)
Total	**330**
Case type	
New case	268 (81.2)
Recurrent	62 (18.8)
Treatment regime	
Short	0 (0.0)
Long	330 (100)
Localization of the disease	
Pulmonary	305 (92.4)
Extra pulmonary	25 (7.6)
Bacteriologically confirmed	
Yes	225 (68.2)
No	105 (31.8)
Hospitalized	
Yes	269 (81.5)
No	61 (18.5)
Comes from the outbreak	
Yes	28 (8.5)
No	302 (91.5)
TB in household, last 2 years	
Yes	21 (6.5)
No	304 (92.1)

Non-response: household TB, last 2 years (5)

Adherence to tuberculosis treatment

The study showed variations in the timing of starting TB-specific treatment. Within 1-3 days of diagnosis, 73.4% (80) of the study participants started TB-specific treatment (109[12]). About one-fifth (19.3%, 21) started within one week, 5.5% (6) within two weeks, and 1.8% (2) within three weeks.

Sources of obtaining TB pills varied by treatment site (inpatient or outpatient) and treatment modality (DOT or VST), as detailed in Table 8. In the same context, respondents were asked to identify the most used source for obtaining pills. In the inpatient setting, pills were in the least common cases brought to the ward daily by medical staff, a fact mentioned by 78% of respondents. In outpatient settings, in the most frequent cases, respondents personally picked up their pills from the procedure cabinet at the medical point, which was indicated by 73% of DOT respondents and 69% of VST respondents (Table 8).

Regarding the frequency of pill pick-up for outpatient TB treatment with DOT, the respondents (312) specified the following frequencies: 69.9% (218) picked up pills 5-7 times a week, 5.1% (16) 3-4 times a week, 3.2% (10) 1-2 times a week, 9.9% (31) 2-3 times a month, 4.2% (13) once a month or less rarely, and 7.7% (24) did not indicate the frequency. When administered by (VST, n=48), the frequency of pill pick-up ranged from 7 to 30 days (MD 14.5±7.6 days).

The present study revealed that some respondents were asked by the medical staff to bring TB pills to the village health point from the district pulmonary physio-pathology office. This aspect was mentioned by 8.9% (28 out of 312) of the respondents who were on outpatient DOT treatment. The requests were monthly for 17 respondents, every time they went to the clinic for 7 of them, and 3 did not specify the frequency.

Table 8. Sources of anti-tuberculosis pills, sample susceptible tuberculosis

Name	inpatient DOT, n (%)	outpatient	
		DOT, n (%)	VST, n (%)
Total	**85**	**312**	**48**
Medical staff brought the pills daily to the ward (inpatient), home (ambulatory) for administration	73 (85.9) **66 (77.6)***	8 (2.6)	4 (8.3)
Someone they knew (relatives, friends, etc.) went to the medical office and brought them home (ambulatory)	-	1 (0.3)	3 (6.3)
Taking pills from the nurse's desk and administering them yourself in the ward (inpatient)	16 (18.8)	-	-
The medical staff gave them to him for a few days so that he could administer them himself in the ward (inpatient).	3 (3.5)	-	-
Administer the pills in the procedure room (inpatient), at the medical point (outpatient)	20 (23.5)	244 (78.2) **228 (73.1)***	-
The medical staff gave them to him for 1-2 days (Saturday, Sunday) to administer at home	5 (5.9)	178 (57.1)	-

[12] Sample initial treatment period, valid responses

Name	inpatient DOT, n (%)	outpatient	
		DOT, n (%)	VST, n (%)
The medical staff gave them to him for 3 and more days to administer at home	1 (1.2)	35 (11.2)	-
The respondent picks them up personally at the medical office (VST)	-	-	34 (70.8) **33 (68.8)***
Someone from the NGO came every day and brought them home (outpatient)	-	6 (1.9)	-
Someone from the NGO came every few days and brought them to my home (outpatient)	-	22 (7.1)	12 (25.0)

* most frequent source of pill popping; DOT- Directly Observed Treatment, VST- Video Supported Treatment

DOT inpatient (85) - no. of respondents surveyed in the first two months of treatment who were hospitalized

On whether they were assisted by someone when taking their TB pills, 96.5% (82 out of 85[13]) of patients mentioned that they were assisted in hospital, while 94.2% (294 out of 312) mentioned the same for outpatient treatment. Thus, in outpatient settings, in most cases, the majority of participants (90.4%, 266) were assisted by nurses, 4.5% (13) by doctors, 2.1% (6) by NGO representatives, 1.4% (4) by relatives and 1.7% (5) by others, without specifying by whom.

Study participants were asked how often they were assisted when taking their TB pills, both in inpatient (82) and outpatient (294) settings. In inpatient settings, 91.5% (75) said they were always assisted, compared with 65.3% (192) in outpatient settings. Almost always 6.1% (5) of respondents were almost always assisted in hospital and 32.0% (94) in outpatient. They were assisted in about half of the cases, 1.0% (3) of the respondents in hospital and 1.4% (4) of the respondents in outpatient, and occasionally 2.4% (2) in hospital and 1.4% (4) in outpatient. Respondents who received treatment through the VST program (48) streamed videos once a day (95.8%, 46) or twice a day (4.2%, 2).

Over the course of TB treatment, the proportion of study participants who did not take specific drugs for non-medical reasons was relatively constant between treatment stages, with no statistically significant differences (p=0.773, Table 9).

[13] No. of respondents surveyed in the first two months of treatment who were hospitalized

Table 9. Non-administration of TB pills for non-medical reasons, sample susceptible tuberculosis

Name	Treatment period			p
	Initial (n,%)	Intermediate (n,%)	Last 2 months (n,%)	
Not taking TB medicines				0.773
Yes	12 (11.0)	10 (9.0)	13 (11.8)	
No	97 (89.0)	101 (91.0)	97 (88.2)	
Total	109	111	110	

Respondents (n=35, Table 9) indicated various non-medical reasons for not taking their TB medications. The most common reasons were forgetfulness (37.1%, 13) and alcohol consumption, which led to forgetting to administer medication (34.3%, 12). Some respondents mentioned that they felt worse (25.7%, 9) or that they were away from home (20.0%, 7). In 14.3% (5) cases, respondents specified that they did not have the pills with them, or they felt well (8.6%, 3) and for this reason they stopped taking the pills. A small number of respondents indicated that they could not swallow the pills (5.7%, 2) or did not want anyone to notice that they were receiving such pills (5.7%, 2). At the same time, the majority (82.9%, 29) of the respondents who indicated that they did not take the TB drugs specified that during treatment they happened not to take the drugs on their rest days.

Side effects of anti-tuberculosis drugs

In about half (47.3%, 156 out of 330) of the cases, study participants reported experiencing at least one adverse reaction to antituberculosis treatment. Various adverse reactions were observed during antituberculosis treatment at different periods of treatment: the first two months, the intermediate period and the last two months. In the first two months, nausea was reported by 33% of participants, but this proportion decreased significantly to 16% in the last two months (p=0.005). Similarly, the incidence of vomiting decreased from 11% to 2.8% (p=0.059) and diarrhea from 12% to 2.8% (p=0.003). Gastric pain followed a downward trend from 24% to 11% (p=0.022). Other side effects, such as liver pain, headache, rash, reduced visual acuity, hearing impairment, myalgias and/or arthralgias, depressive symptoms, somnolence and insomnia, did not show statistically significant changes during treatment (Table 10).

Table 10. Adverse reactions to antituberculosis drugs, susceptible tuberculosis sample

Name	Total	Treatment period			p
		Initial	Intermediate	Last 2 months	
		n (%)	n (%)	n (%)	
Total		**109**	**111**	**110**	
Nausea					**0.005**
Yes	74 (22.6)	36 (33.0)	21 (18.9)	17 (15.7)	
No	254 (77.4)	73 (67.0)	90 (81.1)	91 (84.3)	
Vomiting					0.059
Yes	23 (7.0)	12 (11.0)	8 (7.2)	3 (2.8)	
No	305 (93.0)	97 (89.0)	103 (92.8)	105 (97.2)	
Diarrhea					**0.003**
Yes	19 (5.8)	13 (11.9)	3 (2.7)	3 (2.8)	
No	310 (94.2)	96 (88.1)	108 (97.3)	106 (97.2)	
Gastric (stomach) pain					**0.022**
Yes	54 (16.4)	26 (23.9)	17 (15.3)	11 (10.1)	
No	275 (83.6)	83 (76.1)	94 (84.7)	98 (89.9)	
Liver pain					0.536
Yes	22 (6.7)	9 (8.3)	8 (7.2)	5 (4.6)	
No	307 (93.3)	100 (91.7)	103 (92.8)	104 (95.4)	
Headache					0.204
Yes	58 (17.6)	25 (22.9)	17 (15.3)	16 (14.7)	
No	271 (82.4)	84 (77.1)	94 (84.7)	93 (85.3)	
Skin rash					0.397
Yes	19 (5.8)	9 (8.3)	5 (4.5)	5 (4.6)	
No	310 (94.2)	100 (91.7)	106 (95.5)	104 (95.4)	
Reduced visual acuity					0.520
Yes	28 (8.5)	12 (11.0)	8 (7.2)	8 (7.2)	
No	301 (91.5)	97 (89.0)	103 (92.8)	102 (92.8)	
Decreased hearing					0.352
Yes	12 (3.6)	6 (5.5)	4 (3.6)	2 (1.8)	
No	317 (96.4)	103 (94.5)	107 (96.4)	108 (98.2)	
Myalgia and/or arthralgia					0.358
Yes	57 (17.3)	23 (21.1)	19 (17.1)	15 (13.6)	
No	272 (82.7)	86 (78.9)	92 (82.9)	95 (86.4)	
Presence of depressive symptoms					0.225
Yes	30 (9.1)	14 (12.8)	7 (6.3)	9 (8.2)	
No	299 (90.9)	95 (87.2)	104 (93.7)	101 (91.8)	
Feeling drowsy					0.085
Yes	28 (8.5)	14 (12.8)	5 (4.5)	9 (8.2)	
No	301 (91.5)	95 (87.2)	106 (95.5)	101 (91.8)	
Insomnia*					0.193
Yes	27 (8.2)	12 (11.0)	5 (4.5)	10 (9.1)	
No	302 (91.8)	97 (89.0)	106 (95.5)	100 (90.9)	

*non-response: nausea (2), vomiting (2), diarrhea (1), gastric pain (1), liver pain (1), headache (1), skin rash (1), reduced visual acuity (1), hearing impairment (1), myalgia and/or arthralgia (1), presence of depressive symptoms (1), feeling drowsy (1), insomnia (1)

A total of 39.7% (62/156) of study participants reported taking medication to manage their adverse reactions. Of these (62), 30.6% (19) received their medications from medical staff during inpatient treatment, 14.5% (9), received them from the doctor's office or medical unit. The majority, 56.5% (35), purchased the necessary medicines on their own, while others 8.1% (5) did not specify the source from where they obtained the medicines.

Tuberculosis and associated medical conditions

Study participants were asked questions about associated diseases and other medical conditions.

HIV co-infection

Of the 330 study participants 11.5% (38) were HIV positive or approximately every 8th respondent had this co-infection.

Viral hepatitis

In 1.6% (5 out of 308) cases, respondents mentioned that they had been diagnosed with hepatitis A, and in 5.2% (16 out of 306) cases with hepatitis B, D or hepatitis C.

Diabetes mellitus

Among the study participants 9.0% (15) indicated that they had been diagnosed with diabetes mellitus, which means that approximately every 22nd respondent suffered from this condition.

Other diseases

At the same time, respondents also mentioned other TB-related chronic diseases they had at the time of the interview. Half (50.3%, 166 out of 330) reported suffering from other conditions such as: cardiovascular diseases (21.1%, 35), respiratory diseases (other than TB) (14.5%, 24), gastrointestinal diseases (11.4%, 19), infectious diseases other than HIV infection (10.8%, 18), renal diseases (6.6%, 11), trauma (6.6%, 11), gynecological diseases (3.6%, 6), chronic hepatitis (3.0%, 5), oncological and occupational diseases (1.2% each, 2). In about one fourth of the cases (24.7%, 41), respondents do not know the diagnosis of the diseases they suffer from.

Asked to indicate whether they are receiving treatment for conditions other than TB, about half (51.4%, 75 out of 146) of the respondents answered in the affirmative. Of these, 25.3% (19) mentioned that they received medication for the treatment of these conditions from their doctor or nurse when they were hospitalized, 38.7% (29) received them from their doctor's office or medical point, and in 44.0% (33) cases, they obtained them from the pharmacy. Five (8.0%) of the respondents did not specify the source of the medicines.

Trust in health services

Study participants' trust in their pulmonary specialist was predominantly positive, with high weights of very high and high trust over the duration of treatment. In the first two months, 62% of respondents reported very high confidence, this increased to 66% in the middle period but decreased to 55% in the last two months of treatment. Confidence in the family doctor was also overwhelmingly positive, but slightly lower compared to that in the TB

specialist, with 43% very confident in the first two months, 40% in the middle period and 37% in the last two months (Table 11).

The frequency with which the respondents were informed about their health status by their TB doctor was quite high, with more than 95% of the respondents being informed at each visit during the treatment (Table 11).

Satisfaction with TB services increased over the course of treatment, increased over the treatment duration, with 36% of respondents very satisfied in the first two months and 51% in the last two months of treatment (Table 11).

Table 11. Confidence in health services, susceptible TB sample

Name	Total	Treatment period			p
		Initial	Inter mediar	Latest 2 months	
	n (%)	n (%)	n (%)	n (%)	
Total		**109**	**111**	**110**	
Trust in the TB doctor					
Very much	200 (61.0)	67 (61.5)	73 (66.4)	60 (55.0)	0.265
Much	124 (37.8)	40 (36.7)	36 (32.7)	48 (44.0)	0.222
A little	3 (0.9)	2 (1.8)	1 (0.9)	0 (0.0)	-
Very little/not at all	1 (0.3)	0 (0.0)	0 (0.0)	1 (0.9)	-
Trust in the family doctor					
Very much	127 (39.9)	45 (42.9)	44 (40.0)	38 (36.9)	0.564
Much	157 (49.4)	48 (45.7)	55 (50.0)	54 (52.4)	0.663
A little	23 (7.2)	7 (6.7)	7 (6.4)	9 (8.7)	0.829
Very little/not at all	11 (3.4)	5 (4.8)	4 (3.6)	2 (1.9)	0.512
Frequency of health information provided by the TB doctor					
At each visit (consultation)	39 (97.0)	106 (97.2)	108 (98.2)	105 (95.5)	0.686
Rarely or not at all	10 (3.)	3 (2.8)	2 (1.8)	5 (4.5)	0.482
Satisfaction with TB services at different phases of treatment					
Very satisfied	146 (44.2)	39 (35.8)	51 (45.9)	56 (50.9)	0.071
Satisfied	174 (52.7)	63 (57.8)	58 (52.3)	53 (48.2)	0.291
Moderately satisfied	6 (1.8)	4 (3.7)	2 (1.8)	0 (0.0)	-
Dissatisfied	4 (1.2)	3 (2.8)	0 (0.0)	1 (0.9)	-

Non-Response: Trust in the TB doctor (2), Trust in the family doctor (12), Frequency of health information provided by the TB doctor (1)

Perceptions of needs and returning to normal life after disease

Family support and encouragement, together with a richer and higher quality diet, were considered essential by 63% and 56% of respondents respectively. Financial resources for transportation to TB medical facilities (31%) and following treatment at home (28%) were important for about one-third of participants. Around one-fifth of respondents mentioned free treatment for comorbidities (19%), being able to support their family (20%), help in the household (18%) and confidentiality of TB diagnosis (18%). Other needs mentioned in smaller proportions included being able to talk to other patients about TB disease (6.2%), psychological

counseling (4.0%) and picking up pills after office hours (2.2%). A more detailed analysis of perceived needs at different stages of treatment is presented in Table 12.

Table 12. Respondents' perceptions of the needs for successful completion of treatment, susceptible TB sample

Name	Total	Treatment period			p
		Initial	Inter mediate	Latest 2 months	
	n (%)	n (%)	n (%)	n (%)	
Total	**325**	**108**	**110**	**107**	
Family support and encouragement	203 (62.5)	64 (59.3)	71 (64.5)	68 (63.6)	0.935
Picking up your pills after office working hours	7 (2.2)	1 (0.9)	4 (3.6)	2 (1.9)	0.399
Access to counseling to discuss the disease	13 (4.0)	3 (2.8)	3 (2.7)	7 (6.5)	0.290
Financial resources for transportation to TB medical facilities	102 (31.4)	27 (25.0)	36 (32.7)	39 (36.4)	0.408
Free treatment for co-morbidities	60 (18.5)	18 (16.7)	16 (14.5)	26 (24.3)	0.270
A richer and higher quality nutrition	181 (55.7)	63 (58.3)	60 (54.5)	58 (54.2)	0.772
Being able to continue to support their family	64 (19.7)	21 (19.4)	23 (20.9)	20 (18.7)	0.930
Confidentiality of TB diagnosis to acquaintances and colleagues	58 (17.8)	18 (16.7)	18 (16.4)	22 (20.6)	0.656
The opportunity to discuss TB disease with other patients	20 (6.2)	5 (4.6)	5 (4.5)	10 (9.3)	0.240
Help with household activities*	39 (17.9)	19 (26.9)	20 (18.2)	-	1.000
Receiving TB treatment at home*	58 (26.6)	29 (26.9)	29 (26.4)	-	1.000

Non-response (5), *Respondents interviewed at baseline and intermediate stage of treatment

The most common difficulty encountered by respondents during TB treatment was hospitalization, mentioned in 44% of cases. Other significant challenges included daily visits to the health unit (37%), taking medication as recommended (33%) and quitting smoking (30%). Inactivity (22%), keeping the TB diagnosis confidential (20%), absence from the family (20%), adverse effects of specific treatment (16%), abstinence from alcohol (15%) and being able to support their family (16%) were also considered difficult by a significant

number of respondents. In a smaller proportion (3.2%), respondents mentioned the difficulty of administering treatment in parallel with continuing to work (Table 13).

A detailed analysis of the difficulties encountered during treatment, presented in Table 13, reveals that the main challenges encountered by patients during treatment were taking the medication as recommended (p=0.007) and adverse effects (p=0.029), both of which showed statistically significant differences between treatment stages.

Table 13. Perceptions of major challenges during tuberculosis treatment, susceptible tuberculosis sample

Name	Total	Treatment period			p
		Initial	Inter mediate	Latest 2 months	
	n (%)	n (%)	n (%)	n (%)	
Total	**322**	**106**	**109**	**107**	
Quitting smoking	96 (29.8)	37 (34.9)	32 (29.4)	27 (25.2)	0.302
Abstinence from alcohol	49 (15.2)	16 (15.1)	20 (18.3)	13 (12.1)	0.447
Taking medicines as recommended	105 (32.6)	31 (29.2)	27 (24.8)	47 (43.9)	**0.007**
Side effects	51 (15.8)	24 (22.6)	17 (15.6)	10 (9.3)	**0.029**
Hospitalization	142 (44.1)	46 (43.4)	42 (38.5)	54 (50.5)	0.207
Absence from the family	63 (19.6)	26 (24.5)	22 (20.2)	15 (14.0)	0.151
Lack of activity	70 (21.7)	28 (26.4)	23 (21.1)	19 (17.8)	0.303
Keeping the diagnosis confidential from acquaintances/colleagues	64 (19.9)	21 (19.8)	17 (15.6)	26 (24.3)	0.277
Family maintenance/support	51 (15.8)	22 (20.8)	19 (17.4)	10 (9.3)	0.064
Daily visit to the health unit*	80 (37.0)	-	41 (37.6)	39 (36.4)	0.971
Treatment and continuation of work*	7 (3.2)	-	3 (2.8)	4 (3.7)	0.980

Non-response (8), * Respondents interviewed at the intermediate stage and after treatment completion

After completing treatment, life can bring various challenges and worries, and respondents were asked to mention the basic ones. Patients' biggest concerns were the risk of getting sick again, mentioned by 66% of respondents, worry that treatment might not be effective (48%), and the risk of passing the disease to family members (35%). Other significant concerns included fear of being refused for employment because of a history of TB (33%) and the ability to continue the same profession (23%). Concerns about life after treatment were similarly experienced throughout treatment, with no statistically significant differences (Table 14).

Table 14. Main concerns about life after treatment, susceptible TB sample

Name	Total	Treatment period		
		Initial	Inter mediate	p
	n (%)	n (%)	n (%)	
Total	**212***	**104**	**108**	
Treatment may not be effective	102 (48.1)	51 (49.0)	51 (47.2)	0.899
The risk that acquaintances, colleagues may find out that I have TB	31 (14.6)	16 (15.4)	15 (13.9)	0.909
Refusal of employment due to TB history	70 (33.0)	38 (36.5)	32 (29.6)	0.355
Ability to continue the same profession (job)	48 (22.6)	26 (25.0)	22 (20.4)	0.521
Risk of passing TB disease to family members	74 (34.9)	33 (31.7)	41 (38.0)	0.419
The risk of getting sick again	141 (66.5)	71 (68.3)	70 (64.8)	0.698
The risk of not being able to have children	6 (2.8)	4 (3.8)	2 (1.9)	0.644

Non-response (8); *Respondents surveyed at baseline and intermediate stage of treatment

Indirect costs associated with susceptible tuberculosis

Average monthly income

The respondent's average monthly income decreased drastically from 3493 MDL [CI 95%: 3174-3811] before diagnosis to 383 MDL [CI 95%: 282-484] in the first months of treatment. Although income increased to 1763 MDL [CI 95%: 1488-2037] in the follow-up period and to 2052 MDL [CI 95%: 1820-2283] after treatment completion, it did not completely return to baseline ($p<0.001$).

The mean monthly income of respondents (329) varied at different stages of treatment. Prior to diagnosis, 57.4% (189) of the respondents had incomes between 2001 and 6000 MDL, and 19.5% (64) between 1001 and 2000 MDL. The percentage of respondents with no income increased from 8.5% (28) to 28.9% (95) in the first months of treatment, and those with incomes below 1000 MDL increased dramatically from 5.5% (18) to 56.8% (187). In the continuation phase of treatment, 35.6% (117) of the patients had no income and 35.6% (117) had incomes between 1001 and 2000 MDL. After treatment completion, 55.6% (183) of the respondents had incomes between 1001 and 2000 MDL, indicating economic recovery, although 21.6% (71) still had no income. In comparison, incomes between 2001 and 6000 MDL decreased drastically in the first two months of treatment (from 57.4% (189) to 1.8%

(6)) but increased slightly in the intermediate period (20.7% (68)) and after treatment (17.9% (59)). Incomes above 6001 MDL remained relatively constant but at low levels (Figure 2).

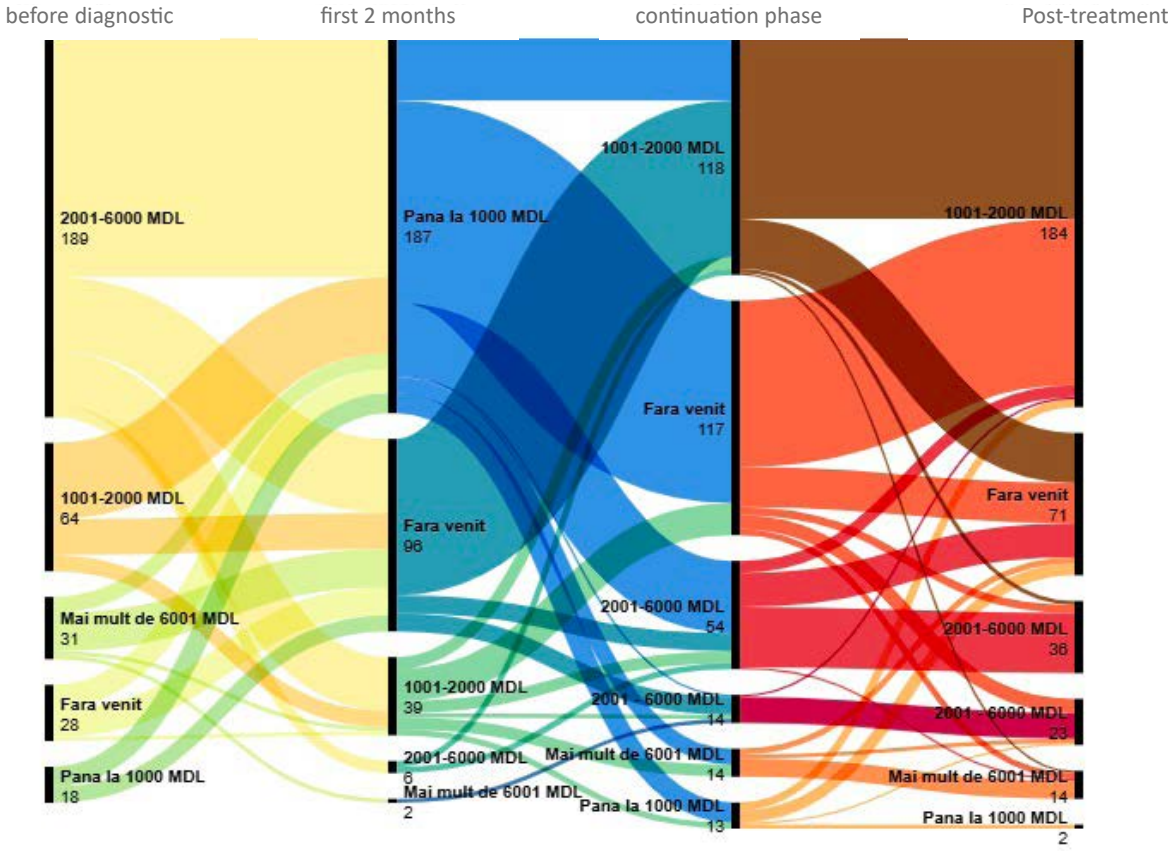

Figure 2. Respondent's average monthly income before TB diagnosis, during treatment and after treatment completion, susceptible TB sample

Post-treatment - the first 2 months after completing TB treatment

Welfare payments

Welfare payments are a type of financial support provided by the government to ensure the economic and social well-being of citizens. In the present study, welfare payments included: temporary incapacity benefits and motivational support for TB treatment adherence.

Recipients of temporary incapacity benefit were survey participants who were officially employed. They accounted for 39% (n=127 out of 329[14]) of the respondents. The estimated value per respondent averaged 13 701 MDL [CI 95%: 11308-16095] over the treatment period.

Beneficiaries of the motivational support provided to maintain adherence to TB treatment were all respondents. The average amount of motivational support per beneficiary for the entire treatment period was estimated at 10 213 MDL [CI 95%: 9821-10606].

[14] Sample for which income has been calculated

Lost time

We analyzed the time lost by study participants in accessing certain medical services for susceptible TB from diagnosis to completion of treatment, such as investigations, tests, medical consultations, and time lost on the way to pick up TB-specific pills.

In the diagnostic period, respondents lost about 7 hours and 6 minutes - time for investigations as well as traveling to doctors for medical consultation. Respondents continued to lose time for investigations, tests, and traveling to doctors, including during the baseline period (about 8 hours and 48 minutes) and the follow-up period (about 18 hours and 51 minutes). The time lost for picking up pills was the most significant portion, totaling about 48 hours and 46 minutes, equivalent to 2 days. The time lost for the entire treatment period was approximately 76 hours and 28 minutes or 3 days and 4 hours. In total, the time lost in accessing these services for the entire period from diagnosis to completion of treatment was 83 hours and 34 minutes, equivalent to 3 days and 11 hours (Table 15).

Table 15. Time lost in accessing TB services, susceptible TB sample

Name	*Average [CI 95%] minute*	*Average [CI CI95%] hours*
Diagnostic period		
Time lost for investigations, tests at the family doctor	16 [12-19]	0 hours 16 min [0 hours 12 min-0 hours 19 min]
Time lost for investigations, tests at the TB doctor	107 [76-137]	1 hour 47 min [1 hour 16 min-2 hours 17 min]
Time spent traveling to see a family doctor, TB doctor or other specialist	303 [282-323]	5 hours 3 min [4 hours 42 min-5 hours 23 min]
Sub-total (diagnostic)	*426 [370 - 463]*	*7 hours 6 min [6 hours 29 min-7 hours 43 min]*
Initial period of outpatient treatment		
Time for investigations, tests at your family doctor	10 [8.3-11]	0 hours and 9 min [0 hours 8 min- 0 hours 11 min]
Time for investigations, tests with your TB doctor	69 [61-76]	1 hour 8 min [1 hour 1 min-1 hour 16 min]
Time lost traveling to see the family doctor	[73-95]	1 hour 24 min [1 hour 13 min-1 hour 34 min]
Time lost traveling for medical consultation with a TB doctor	366 [332-399]	6 hours 5 min [5 hours 32 min- 6 hours 39 min]
Sub-total (initial phase)	*529 [484-572]*	*8 hours 48 min [8 hours 4 min-9 hours 32 min].*
Continuation phase of outpatient treatment		
Time lost for investigations, tests at your family doctor	37 [30-44]	0 hours 37 min [0 hours 30 min-0 hours 44 min]
Time lost for investigations, tests at the TB doctor	73 [64-81]	1 hour 12 min [1 hour 4 min-1 hour 21 min]

Name	*Average [CI 95%] minute*	*Average [CI CI95%] hours*
Time lost traveling for medical check-ups with a family doctor	205 [163-245]	3 hours 24 min [2 hours 43 min-4 hours 5 min]
Time lost traveling for medical consultation with a TB doctor	817 [714-919]	13 hours 36 min [11 hours 54 min-15 hours 19 min]
Sub-total (continuation phase)	*1132 [1006-1257]*	*18 hours 51 min [16 hours 46 min-20 hours 57 min]*
Time spent picking up pills (time lost on the way)	2927 [2515-3337]	48 hours 46 min [41 hours 55 min-55 hours 37 min]
Sub-total for the whole treatment period	*4588 [4005-5166]*	*76 hours 28 min [66 hours 45 min-86 hours 5 min]*
Total	5014 [4526-5501]	83 hours 34 min [75 hours 26 min-91 hours 41 min]

According to the collected data, 9.2% of the respondents (30 out of 326) had to miss work for investigations, tests or medical consultations, another 54.3% (177 out of 326) did not miss work, and 36.5% (119 out of 326) were not employed. They missed work 17.8% (19 out of 107) during the period of diagnosis, 3.6% (4 out of 110) in the intermediate period of treatment, 6.4% (7 out of 109) in the last months of treatment, indicating a significant association between treatment periods and the need to miss work ($p<0.001$). In succession, respondents were asked whether they lost income when they had to access medical services (investigations, analyses, medical consultation) during the period of diagnosis and during the period of treatment. The data analyzed showed a total loss of 32 [CI 95%:21-43] hours of work, which resulted in loss of income during the entire period from diagnosis to the completion of treatment. During the period of diagnosis, respondents lost an average of 1.6 [CI 95%:0.7-2.4] hours of work, and during the treatment course, the loss time was 30 [CI 95%:19-41] hours.

Indirect costs and associated factors

Total indirect costs from TB diagnosis to treatment completion averaged 18 726 MDL [16 148 - 21 304 MDL]. The analysis of indirect expenditures in dependence on the treatment period revealed that the dynamics of costs changed considerably as treatment progressed, being significantly higher in the continuation period compared to the first months of treatment. If in the first months of treatment indirect expenses represented 40% of the total, amounting to 7 444 MDL, in the continuation period, these expenses increase to 11 281 MDL, representing 60% of the total ($p=0.001$, Table 18, Figure 3).

The description and analysis of these expenditures by socio-demographic factors, level of wealth and health-related issues are presented below.

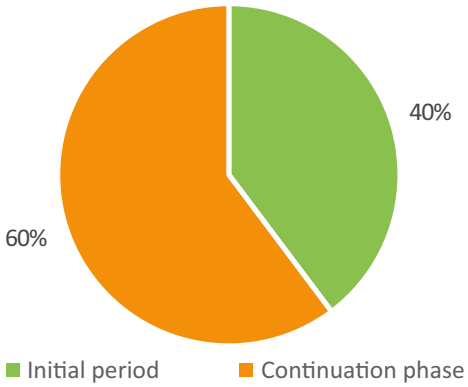

Figure 3. Share of indirect expenditures by treatment period, susceptible tuberculosis sample

Socio-demographic factors

The analysis of indirect expenditures in relation to socio-demographic factors shows that men, people under 45 years of age, married people, and those from households with three or more persons and from households with dependent children under 18 years of age had slightly higher expenditures during treatment. However, these differences were not statistically significant ($p>0.05$, Table 16).

In the same context, people in urban areas had significantly higher expenditures compared to those in rural areas ($p=0.028$), this difference was also evident in the initial treatment period ($p=0.018$, Table 16).

A noteworthy aspect is the statistically significant difference observed by dependence on educational level. Individuals with higher education had significantly higher expenditures (29 895 MDL) compared to the other categories, and the p-value associated with this difference is 0.002, indicating a statistically significant difference between education categories, this difference being evident throughout the treatment period ($p<0.005$, Table 16).

Regarding occupational status, employees had higher expenditures (22 882 MDL) compared to self-employed (6 901 MDL), unemployed (16 427 MDL) and other categories (15 735 MDL). The p-value of 0.008 indicates a statistically significant difference, which was also evident at the initial treatment stage ($p=0.008$, Table 16).

Table 16. Indirect expenditures in relation to socio-demographic factors, susceptible tuberculosis sample

Name	Indirect expenses, total		Treatment period			
			Initial		Continue	
	Average [CI95%], MDL (lei)	p	*Average [CI95%], MDL (lei)*	p	*Average [CI95%], MDL (lei)*	p
Sex						
Men	18909 [15591-22228]	0.828	7469 [6294-8645]	0.942	11440 [8942-13937]	0.801
Women	18281 [14565-21997]		7383 [5159-9608]		10897 [8251-13543]	
Place of residence						
Urban	22472 [16817-28127]	**0.028**	9090 [6672-11508]	**0.018**	13381 [9286-17476]	0.099
Rural	16519 [14138-18899]		6474 [5613-7335]		10044 [8157-11931]	
Age						
< 44 years	19861 [15465-24257]	0.409	8232 [6309-10155]	0.158	11629 [8534-14724]	0.735
≥ 45 years	17690 [14786-20594]		6725 [5742-7708]		10964 [8580-13348]	
Marital status*						
Married	21015 [16744-25285]	0.083	7962 [6295-9630]	0.344	13052 [9854-16249]	0.070
Single	16451 [13508-19394]		6949 [5646-8251]		9502 [7328-11676]	
Studies						
No education/ primary	13847 [9420-18275]	**0.002**	7068 [4547-9588]	**0.035**	6779 [3248-10310]	**0.007**
Incomplete secondary	17372 [13591-21153]		6562 [5245-7878]		10810 [8007-13613]	
Complete secondary	19979 [15612-24347]		8188 [5796-10581]		11791 [8552-15030]	
Higher	29895 [20097-39694]		11735 [7942-15528]		18160 [10239-26081]	
Employment*						
Employed	22882 [18794-26971]	**0.008**	9564 [7455-11674]	**0.008**	13318 [10316-16319]	0.077
Self-employed	6 901 [2517-11286]		6901 [2517-11286]		-	
Unemployed	16 427 [9843-23012]		5978 [3964-7992]		10449 [5611-15287]	
Other	15 735 [12977-18492]		6208 [5181-7235]		9811 [7456-12166]	
No. persons in household						
≤2 persons	17318 [14431-20205]	0.165	6996 [5889-8103]	0.278	10321 [8088-12555]	0.204
≥3 persons	21084 [16137-26031]		8194 [6071-10318]		12889 [9335-16444]	
Presence of persons aged < 18 years old in the household						
Yes	22700 [15713-29687]	0.073	8208 [5312-11104]	0.399	14492 [9502.19482]	**0.052**
No	17342 [14843-19840]		7178 [6172-8184]		10163 [8233.12093]	

Married: married or cohabiting. unmarried: single. widowed. divorced.

Welfare as a determinant of indirect expenditures

Respondents' indirect expenditures by household wealth revealed significant differences between the various socio-economic categories. Respondents from households in the poorest category had expenditures of 12,073 MDL. As the level of wealth is higher, an increase in expenditures was observed: respondents from poor households had expenditures of 13,599 MDL, while those from average households had expenditures of 17,207 MDL. The differences became even more pronounced in the higher wealth categories, with respondents from the richest households having expenditures of 26 330 MDL, and those from the richest category - 24 509 MDL. p-value of 0.001 indicates that these differences are statistically significant. The economic burden varied considerably throughout treatment, both in the first months of treatment (p=0.001) and in the follow-up period (p=0.011, Table 17).

In the same sense, the indirect expenditures of the study participants were analyzed depending on whether their households were in poverty or not. Thus, those from households in poverty had significantly lower indirect expenditures compared to those from non-poor households, both in the first months of treatment and in the treatment continuation period. The p-value associated with these differences indicates that the observed differences are statistically significant, suggesting that they are not the result of chance but reflect distinct economic and social realities (Table 17).

Table 17. Indirect expenditures in relation to welfare factors, sample susceptible tuberculosis

Name	Indirect expenses, total		Treatment period			
	Average [CI CI95%], MDL (lei)	p	**Initial phase** *Average [CI CI95%], MDL (lei)*	p	**Continuation*** *Average [CI CI95%], MDL (lei)*	p
Level of well-being						
Poorest	12073 [9080-15066]	**0.001**	5489 [3224-7754]	**0.001**	6583 [4689-8478]	**0.011**
Poor	13599 [10868-16330]		5093 [4053-6132]		8506 [6301-10712]	
Medium	17207 [11914-22500]		6173 [4625-7721]		11034 [6727-15341]	
Rich	26330 [17663-34996]		10165 [7513-12818]		16164 [9695-22632]	
Richest	24509 [17869-31149]		10345 [6938-13753]		14163 [9271-19055]	
Households in poverty[15]						
Yes	11108 [8323-13894]	**0.001**	4221 [3039-5404]	**0.001**	6887 [4842-8932]	**0.011**
No	21133 [17905-24361]		8463 [7155-9770]		12670 [10243-15098]	

[15] https://www.worldbank.org/en/topic/measuringpoverty

Health factors as determinants of indirect expenditure

In the aspect of having a health insurance policy until the diagnosis of TB, for those insured before the diagnosis, the indirect expenditures averaged 21 214 MDL, while for the uninsured they were significantly lower (16 000 MDL) with a p-value of 0.045 indicating a statistically significant difference between the groups. This difference is evident both in the first months of treatment (8 481 MDL vs. 6 309 MDL, p=0.042) and in the follow-up period, although here the difference is not significant (12 733 MDL vs. 9 691 MDL, p=0.120, Table 18).

The study reveals the impact of hospitalization on indirect expenditures, as study participants who were hospitalized during treatment had indirect expenditures of 20 014 MDL, significantly higher compared to respondents who were not hospitalized and had indirect expenditures of 13 067 MDL. p-value of 0.039 indicates significant differences between groups, highlighting the impact of hospitalization on indirect expenditures incurred by respondents (Table 18).

Table 18. Indirect expenditures in relation to health determinants, susceptible tuberculosis sample

Name	Indirect expenses, total		Treatment period			
			Initial		Continue	
	Average [CI 95%], MDL (lei)	p	*Average[CI 95%], MDL (lei)*	p	*Average [CI 95%], MDL (lei)*	p
Total	18726 [16148-21304]	**-**	7444 [6395-8493]	**-**	11281 [9359-13204]	**0.001**
Insured before TB diagnosis						
Yes	21214 [18006-24422]	**0.045**	8481 [6932-10029]	**0.042**	12733 [10284-15182]	0.120
No	16000 [11902-20098]		6309 [4914-7703]		9691 [6676-12706]	
Hospitalized during treatment						
Yes	20014 [16919-23109]	**0.039**	7422 [6191-8653]	0.931	12591 [10282-14901]	**0.005**
No	13067 [10479-15656]		7541 [5815-9266]		5526 [4002-7050]	

Direct costs associated with susceptible tuberculosis

The analysis of sensitive TB-related expenditure reveals a clear distribution between medical and non-medical expenditure. According to the data, 57.5% of the total expenditures constituted medical expenditures, while 42.5% constituted non-medical expenditures (Figure 4).

In context, the detailed analysis of out-of-pocket expenditures provides a clear insight into the financial impact on the study participants. The mean total direct expenditure was MDL 15305 with a 95% confidence interval ranging between MDL 13761 and MDL 16849, indicating significant variability in expenditure between respondents.

Direct medical expenditures, which included costs for investigations, tests, drugs, and consultations, averaged 5960 MDL with a 95% confidence interval ranging from 5520 MDL to 6400 MDL. These data show that although there is variation in medical expenditures, most respondents experienced significant TB-related costs. On the other hand, direct non-medical expenditures, which included costs for transportation, food, and other expenses, averaged 9345 MDL, and the 95% confidence interval for these expenditures ranged between 8009 MDL and 10681 MDL, reflecting that non-medical expenditures may be even higher than medical ones, adding an additional financial burden associated with TB.

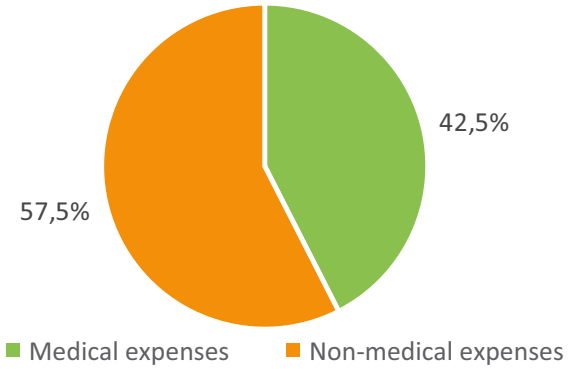

Figure 4. Share of medical and non-medical expenditures in total direct expenditures, sample susceptible tuberculosis

Medical expenses

Investigations, tests and medical consultations

Of the 318 respondents, 23 (7.2%) paid for investigations and tests. The expenses were most evident in the period of diagnosis, where 16.7% (18) of the respondents mentioned that they had such expenses. This was mentioned by one (0.9%) of the respondents in the first months of treatment and four (3.8%) in the follow-up period. The $p<0.001$ value indicates a statistically significant difference (Table 19).

Of the respondents who incurred expenses (23), the majority paid for imaging (X-rays - 17 and CT scans - 3). For blood tests 12 respondents paid and for urinalysis - 8. Three respondents mentioned that they paid for sputum examination, and three did not mention for which type of investigations, tests or analyses they paid. According to the answers received, 19 respondents paid at the hospital (polyclinic) house, two paid directly to the medical staff, and one made payments both at the hospital (or polyclinic) house and to the medical staff.

The average expenditure for investigations was 2302 MDL. In the period of diagnosis, the average cost of investigations was 1088 MDL, in the first months of treatment it amounted to 434 MDL, while in the period of continuation of treatment, the expenditure amounted to 780 MDL, and the p-value < 0.001 indicates a statistically significant difference between payments and periods (Table 20).

Table 19. Payment of investigations and medical consultations, sample susceptibletuberculosis

Name	Total	Diagnostic period	Treatment period		p
			Initial	Continue	
	n (%)	n (%)	n (%)	n (%)	
Total	329	108	111	110	
Investigations and analysis					
Yes	23 (7.2)	18 (16.7)	1 (0.9)	4 (3.8)	**<0.001**
No	295 (92.8)	90 (83.3)	105 (99.1)	100 (96.2)	
Medical consultations					
Yes	3 (0.9)	3 (2.8)	0 (0.0)	0 (0.0)	-
No	326 (99.1)	105 (97.2)	111 (100)	110 (100)	

Non-response: investigations, tests, analysis (n=11)

From the total of 329 respondents 3 (0.9%) specified that they paid money for the medical consultation, mentioning about it at the diagnostic stage (Table 19). The payments were made both to the medical staff (2) and in the hospital or polyclinic house (1). All three mentioned that they made these payments on the doctor's recommendation. The average expenditure for the medical consultation amounted to 156 MDL (Table 20).

Survey participants were asked whether they provided goods for investigations, tests or medical consultations. Out of a total of 329 respondents, 319 answered this question. Of these, 3 said that they provided, 302 said that they did not provide, and 11 did not wish to specify whether they provided or not. The purchases occurred at the diagnostic stage, and their monetary value averaged 79 MDL (Table 20).

Table 20. Direct medical out-of-pocket expenses for investigations, tests and medical consultations, sample susceptible tuberculosis

Name	Total direct expenditure	Diagnostic period	Treatment period		p
			Initial	Continue	
	Average [CI 95%] MDL (lei)	*Average [CI 95%] MDL (lei)*	*Average [CI 95%] MDL (lei)*	*Average [CI 95%] MDL (lei)*	
Investigations, tests, analysis	2302 [2141-2461]	1088 [985-1189]	434 [377-490]	780 [619-940]	**<0.001**
Medical consultations	[141-171]	[141-171]	-	-	-
Value of goods in MDL	79 [72-86]	79 [72-86]	-	-	-

Addressability and diagnosis

The study analyzed patients' referral to various non-TB medical services and the direct expenditures associated with them. Results show that study participants incurred considerable costs when accessing private clinics for TB diagnostic services. The mean expenditure for those who accessed such services at private clinics was 1960 MDL, with a 95% confidence interval between 1785 and 2133 MDL.

Expenditures for non-TB-specific treatments (on the advice of pharmacist, relatives, friends) were also notable. These expenditures reflect the use of treatments prior to correct diagnosis and averaged 843 MDL, with a 95% confidence interval between 766 and 921 MDL.

In contrast, emergency services and disability assessments did not involve direct expenditures for study participants.

Medicinal and para-pharmaceutical products

Since the start of TB treatment, 36% of participants (117 out of 329) reported that they had purchased any drugs. Thus, 37% of the respondents purchased drugs during the initial period of treatment, 39% during the intermediate period and 31% during the last months of treatment. The statistical analysis revealed that there was no significant association between treatment periods and drug procurement, and that the association was stable throughout the treatment duration (p=0.443, Table 21).

In the same context, the study revealed that 35% of the participants who purchased medication, purchased medication for side effects. In detail, 50% of the respondents purchased such medication in the first months of treatment, 19% in the middle phase and 36% in the last months of treatment. These data suggest significant variability by treatment period, with indicating that patients are more likely to purchase medication for adverse reactions in the early months of treatment compared to those in later treatment periods (p=0.010, Table 21).

With reference to the procurement of drugs for other TB-related medical conditions, 47% of the participants mentioned that they have procured such drugs. More specifically, 28% of the respondents purchased them in the first months of treatment, 63% in the middle and 50% in the last months of treatment. The analysis suggests that respondents in the mid-treatment period were more likely to purchase drugs for other medical conditions than those in other periods, and statistical tests confirm the association (p=0.005, Table 21).

The purchase of vitamins was mentioned by 51% of the study participants. In 60% of cases, they were purchased in the first months of treatment and in 47% of cases in the later periods of treatment. Statistical tests (p=0.396) indicate that there is no significant association between treatment periods and vitamin procurement, suggesting that the need for vitamins is constant throughout treatment (Table 21).

About having purchased para-pharmaceuticals, 5.2% of respondents indicated that they had purchased para-pharmaceuticals (first months of treatment - 2.5%, intermediate period - 7.0% and last months of treatment - 6.1%, with no statistically significant differences (p=0.631, Table 21).

Table 21. Procurement of medicinal and para-pharmaceutical products, sample susceptible tuberculosis

Name	Total	Treatment period			p
		Initial	Intermediate	Last 2 months	
	n (%)	n (%)	n (%)	n (%)	
Total	117 (35.6)	40 (37.0)	43 (38.7)	34 (30.9)	
Medicines for side effects					
Yes	40 (34.5)	20 (50.0)	8 (18.6)	12 (36.4)	**0.010**
No	76 (65.5)	20 (50.0)	35 (81.4)	21 (63.6)	
Medicines for associated medical conditions					
Yes	55 (47.0)	11 (27.5)	27 (62.8)	17 (50.0)	**0.005**
No	62 (53.0)	29 (72.5)	16 (37.2)	17 (50.0)	
Vitamins					
Yes	60 (51.3)	24 (60.0)	20 (46.5)	16 (47.1)	0.396
No	57 (48.7)	16 (40.0)	23 (53.5)	18 (52.9)	
Para-pharmaceuticals					
Yes	6 (5.2)	1 (2.5)	3 (7.0)	2 (6.1)	0.631
No	110 (94.8)	39 (97.5)	40 (93.0)	31 (93.9)	

Non-response: Medications for adverse reactions (n=1), Para pharmaceuticals (1)

Analysis of direct medical expenditures for drugs additional to TB treatment among study participants shows significant variability between treatment periods. This relates to the purchase of drugs required for associated medical conditions and vitamins. For drugs required for associated medical conditions, respondents had average expenditures of 272 MDL, with 56 MDL in the first months and 216 MDL in the continuation period of treatment (p=0.002). Similarly, for vitamins, an average of 182 MDL was spent, with 58 MDL in the first months and 124 MDL in the continuation period. The p-value of 0.044 also suggests a statistically significant difference. In contrast, medications for adverse reactions and para-pharmaceuticals did not show statistically significant variability, indicating that expenditures were constant throughout treatment (Table 22).

The vast majority (71.6%, 78 out of 109[16]) of the survey participants mentioned that they were able to procure all the necessary medicines. However, every fourth respondent (22.9%, 25) indicated that they did not have enough money to procure all the medicines. A small percentage (3.7%, 4) indicated that they already had these needed medicines, and 1.8% (2) did not specify what the reasons were for not procuring them.

[16] No answer (8)

Table22 . Expenditure on drugs and para-pharmaceuticals, susceptible tuberculosis sample

Name	Total direct expenditure	Treatment period		p
		Initial	Continue	
	Average [CI 95%] MDL (lei)	*Average [CI 95%] MDL (lei)*	*Average[CI 95%] MDL (lei)*	
Total	699 [444-953]	[156-230]	505 [254-756]	0.399
Medicines for side effects	228 [55-400]	76 [47-104]	[18-321]	0.388
Medicines for associated medical conditions	272 [169-375]	56 [44-67]	216 [114-318]	**0.002**
Vitamins	182 [116-246]	58 [46-68]	124 [60-187]	**0.044**
Para-pharmaceuticals	[2.8-35]	[2.1-6.1]	[4.2-30]	0.311

Non-medical expenses

Utilities at the inpatient period

Survey participants were asked questions about the expenses incurred during their stay in hospital for TB treatment, products, utilities or other non-medical items. These included food, non-alcoholic beverages, sweets, personal hygiene products (such as soap and toilet paper), and other items such as bed linen and pincushions. In this context, most respondents (75.9%, 82 out of 108) indicated that they had such expenditures. The average expenditure was 1377 MDL, with a 95% confidence interval between 1126 and 1628 MDL.

Transportation costs

During the period of diagnosis, transportation costs for traveling to specialists for consultations averaged 56 MDL. During treatment in the hospital, significant costs were incurred, with transportation from the respondent's home to the hospital where he was admitted averaging 123 MDL. Also, transportation costs for visitors to visit the respondent during hospitalization were considerable, reaching 1524 MDL (Table 23).

During the outpatient treatment period, transportation costs for traveling to the TB doctor and family doctor for consultations averaged 171 MDL during the initial treatment period and 291 MDL during the continuation period. Also, transportation costs for picking up pills from the health unit averaged 309 MDL (Table 23).

In total, transportation expenses over the entire period from diagnosis to completion of treatment amounted to 2351 MDL, reflecting the cumulative financial burden on study participants and their households (Table 23).

Table 23. Transportation costs during treatment, susceptible tuberculosis sample

Name	*Average [CI CI95%], MDL (lei)*
Diagnostic period	
Transportation costs for travel to medical specialists	56 [50-61]
Treatment in hospital	
Transportation costs from the respondent's home to the hospital(s) where he/she was admitted for TB treatment	123 [108-137]
Visitors' transportation costs for visiting the respondent during hospitalization	1401 [1058-1744]
Sub-total (hospitalization stage)	*1524 [1179-1867]*
Initial period of treatment in outpatient conditions	
Transportation costs for going to a TB doctor for consultation	87 [78-95]
Transportation costs for going to the family doctor for consultation	84 [73-94]
Sub-total (initial stage)	*171 [155-188]*
Treatment period, continuation phase in outpatient conditions	
Transportation costs for going to a TB doctor for consultation	270 [221-317]
Transportation costs for going to your family doctor for a consultation	21 [11-31]
Sub-total (continuation phase)	*291 [240-341]*
Transportation costs for picking up pills at the health unit	309 [195-422]
Total	**2351 [1819-2879]**

Expenses for additional nutrition

The study participants were asked whether they had additional expenses for food, including water, when they went to their family doctor or TB doctor for consultations or investigations, TB-related tests. During the period of diagnosis, 11.2% (37 out of 108[17]) of the respondents incurred such costs. As treatment progressed, respondents became more likely to incur additional food expenses, with the percentage increasing to 31.3% (98 out of 313[18]). The study revealed what these additional food expenses were. Thus, during the period of TB diagnosis these costs amounted to an average of 202 MDL [95% CI: 155-248], during the first

[17] Sample, initial treatment period

[18] Non-response (1, and 15 at the time of the survey were on inpatient treatment)

months of treatment - 25 MDL [95% CI: 19-30], and during the period of continuation of treatment - 47 MDL [95% CI: 33-60]. Over the entire treatment period these types of expenses amounted to an average of 72 MDL, with a 95% confidence interval of 57-86 MDL.

During TB treatment, study participants were also asked about other diet-related expenditures, such as the purchase of additional foods outside the usual diet according to doctor's recommendations. More than one-third of 31.4% (98 out of 312[19]) of the respondents mentioned having purchased such foods. In this regard, the study revealed statistically significant differences regarding additional expenditure on food due to TB at different stages of treatment. Thus, while in the baseline phase, respondents had an average additional expenditure for food of 410 MDL [CI 95%: 345-473], in the continuation phase, this average increased to 733 MDL [CI 95%: 565-900], p=0.001. Over the entire treatment, the mean expenditure amounted to 1142 MDL [CI 95%: 964-1320].

In the context, the study participants incurred additional food expenses by purchasing food when going for medical consultations, investigations and tests, as well as by purchasing additional food recommended by the doctor. The average amount of these expenses was 1416 MDL [CI 95%: 1225-1606] over the entire treatment period, starting from diagnosis and continuing throughout the treatment period.

Goods and thanks

Half (50%, 42 out of 84[20]) of the study participants who received treatment, including inpatient care, specified that they were visited by people in the household at the time of hospitalization. Thus, 28 of the respondents were visited by one person, 6 respondents were visited by 2 and 3 persons, one respondent was visited by 7 persons, and one respondent did not specify by how many persons he/she was visited. On average, respondents received 6.3 [CI 95%: 3-10] visits during hospitalization.

The analysis of visitors' expenditure on goods during hospitalization revealed an average expenditure of 4091 MDL, with a 95% confidence interval between 3181 and 5000 MDL.

Two of the survey participants (0.7%) mentioned that someone from their household thanked the medical staff for TB treatment, with expenditures of 200 MDL and 500 MDL respectively. According to the respondents' answers, no one outside the household thanked the medical staff. However, 25 (7.6%) of the respondents did not provide a response or indicated that they did not know if anyone outside the household had given thanks.

Direct expenditure in relation to welfare factors

The statistical analysis of direct expenditure (medical and non-medical) by household wealth revealed a clear trend: as wealth increases, the proportion of medical expenditure decreases and the proportion of non-medical expenditure increases, reflecting an unequal distribution of resources between different socio-economic groups. Medical expenditures constituted

[19] non-response (17)

[20] Sample initial period and who were hospitalized

49.0% of total expenditures for the poorest households, while for the poorest households this proportion was 42.6%. Households in the 'average' category allocated 40.8% of expenditure to medical needs. In contrast, 'rich' and 'richest' households allocated only 41.0% and 39.1% of expenditure to medical needs respectively (Figure 5).

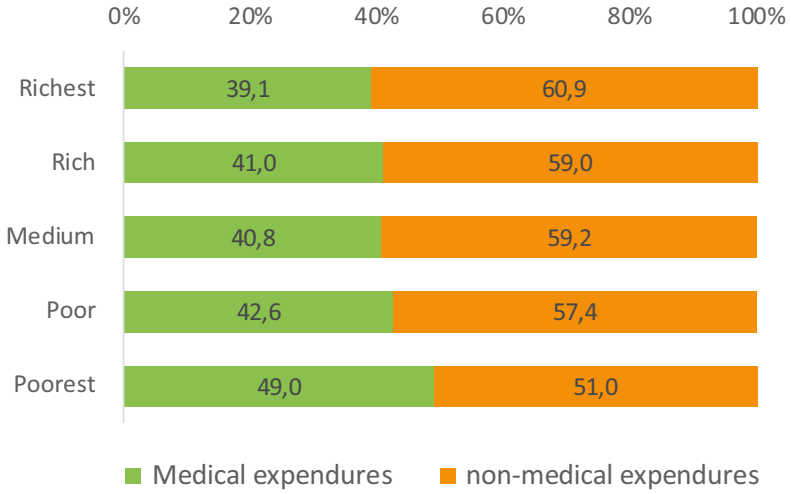

Figure 5. Share of medical and non-medical expenditure depending on household wealth level, susceptible TB sample

Covering direct expenditure

This study highlights the financial impact of TB on households, showing that a significant majority, 60.5% (199 out of 329) of participants, reported TB-related expenditures. To cover these costs, respondents turned to various sources and methods. In half of the cases, 50.8% (101 out of 199), expenses were covered from household savings. Monetary income, including salaries, scholarships and allowances, was another major source in 48.7% (97 out of 199) cases. Other methods of covering expenses included selling domestic animals or poultry (4.5%, 9 out of 199), borrowing from outside the household (7.5%, 15 out of 199), selling goods (2.5%, 5 out of 199), and selling agricultural products (0.5%, 1 out of 199). Some 5.5% (11 out of 199) of respondents received money to cover expenses in the form of gifts from people outside the household, such as friends, relatives, brothers or sisters. In 1.5% (3 out of 199) of cases, respondents did not specify the source (Figure 6).

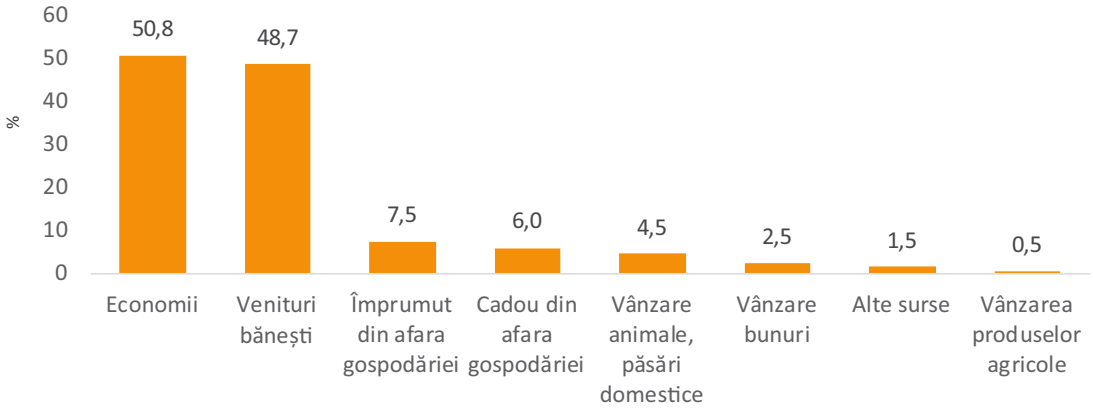

Figure 6. Sources of coverage of out-of-pocket expenditures, sample susceptible tuberculosis

Catastrophic expenditures associated with susceptible tuberculosis

TB-related catastrophic expenditure refers to the extreme financial costs that households incur because of TB treatment and management. These include both direct and indirect costs. Costs are considered catastrophic when they exceed a certain percentage of total household income, leading to severe financial hardship and significantly affecting quality of life.

Many households, 52%, had expenditures that constituted less than 20% of their annual income. However, a significant proportion of households affected by susceptible TB exceeded the catastrophic expenditure threshold, defined by the WHO as expenditure exceeding 20% of annual income. Thus, 48% of households had expenditures exceeding this threshold (Table 24).

In the same vein, the study revealed households that faced even higher catastrophic expenses. In 35% of households, they exceeded the 30% threshold, in 23% of households they exceeded the 40% threshold, in 16% of households they exceeded the 50% threshold, and in 10% of households they exceeded the 60% threshold (Table 24).

Table 24. Expenditure threshold, including catastrophic, susceptible tuberculosis sample

Spending threshold	N (%)
<20%	170 (51.7)
The catastrophic expenditure threshold	
>20%	159 (48.3)
>30%	115 (35.0)
>40%	77 (23.4)
>50%	54 (16.4)
>60%	33 (10.0)

Catastrophic expenditures and determinant factors

Socio-demographic factors

Educational attainment and employment are the socio-demographic factors most likely to influence households' likelihood of facing catastrophic expenditures in the context of sensitive TB. Households with respondents with primary education or no education were about five times more likely (OR= 4.8, p= 0.016) to face catastrophic expenditure compared to those with tertiary education. Likewise, households with respondents who were not employed or those with other forms of employment (such as day laborers, schoolchildren, students, retired, disabled, on maternity or paternity leave) were three times more likely (OR=3.1, p<0.001 and OR=3.4, p<0.001) to experience catastrophic expenditures compared to households in which respondents were employed or self-employed (Table 25).

Other socio-demographic factors, such as gender, age, place of residence, marital status, anamnestic migration, anamnestic incarceration, number of persons in the household, and presence of under 18s, did not show statistically significant differences in the risk of catastrophic spending (Table 25).

Table 25. Catastrophic expenditures and socio-demographic factors, susceptible tuberculosis sample

Variable name	Total n (%)	Catastrophic spending			
		>20% n (%)	<20% n (%)	OR [CI : 95%]	p
Total	329	159	170		
Sex					
Men	233 (70.8)	108 (67.9)	125 (73.5)	0.76 [0.47-1.2]	0.277
Women	96 (29.2)	51 (32.1)	45 (26.5)	1	
Place of residence					
Urban	122 (37.1)	53 (33.3)	69 (40.6)	0.73 [0.46-1.1]	0.209
Rural	207 (62.9)	106 (66.7)	101 (59.4)	1	
Age					
< 44 years	157 (47.7)	73 (45.9)	84 (49.4)	0.87 [0.56-1.34]	0.581
≥ 45 years	172 (52.3)	86 (54.1)	86 (50.6)	1	
Studies					
No education or primary school	26 (7.9)	18 (11.3)	8 (4.7)	4.8 [1.27-18.51]	**0.016**
Incomplete secondary	188 (57.1)	94 (59.1)	94 (55.3)	2.1 [0.87-5.16]	0.090
Specialized secondary	90 (27.4)	39 (24.5)	51 30.0)	1.6 [0.64-4.15]	0.309
Higher	25 (7.6)	8 (5.0)	17 (10.0)	1	
Employment					
Employed (including self-employed)	129 (39.2)	40 (25.2)	89 (52.4)	1	
Unemployed	91 (27.7)	53 (33.3)	38 (22.4)	3.1 [1.77-5.42]	**<0.001**
Other	109 (33.1)	66 (41.5)	43 (25.3)	3.4 [1.99-5.83]	**<0.001**
Marital status					
Married	164 (49.8)	72 (45.3)	92 (54.1)	0.7 [0.45-1.08]	0.123
Single	165 (50.2)	87 (54.7)	78 (45.9)	1	
Migration in anamnesis					
Yes	36 (10.9)	16 (10.1)	20 (11.8)	0.83 [0.41-1.68]	0.724
No	293 (89.1)	143 (89.9)	150 (88.2)	1	

Variable name	Total n (%)	Catastrophic spending			
		>20% n (%)	<20% n (%)	OR [CI : 95%]	p
Detention in anamnesis					
Yes	11 (3.3)	6 (3.8)	5 (2.9)	1.2 [0.38-4.32]	0.764
No	318 (96.7)	153 (96.2)	165 (97.1)	1	
Number of persons in household					
1 person	99 (30.1)	51 (32.1)	48 (28.2)	1.3 [0.77-2.23]	0.315
2 persons	107 (32.5)	53 (33.3)	54 (31.8)	1.2 [0.72-2.04]	0.465
≥3 persons	123 (37.4)	55 (34.6)	68 (40.0)	1	
Presence of persons aged< 18 years old in the household					
Yes	85 (25.8)	34 (21.4)	51 (30.0)	0.63 [0.38-1.04]	0.079
No	244 (74.2)	125 (78.6)	119 (70.0)	1	

Married (married, cohabiting); unmarried (single, widowed, divorced). Education: primary (4 grades); incomplete secondary (5 to 11 grades), specialized secondary (12 grades, professional secondary); higher (complete and incomplete); Employment: employed (civil servant, driver or manager, skilled specialist, unskilled specialist, farmer), including self-employed (holder of a driver's license or permit, etc.), Unemployed (registered or not registered with the employment agency), other (daily wage labourer, pupil, student, retired, people with disability, on maternity or paternity leave)

Harmful habits as determinant factors

Of the factors analyzed, only alcohol consumption during the period of TB disease had a significant impact on catastrophic expenditures. Households with respondents who reported drinking alcohol more than 4 times per month during the period of TB disease were more than twice as likely to experience catastrophic expenditure (OR=2.0, p=0.005, Table 26).

Smoking, drinking alcoholic beverages before TB diagnosis, and drug use did not significantly influence catastrophic expenditure (p> 0.005, Table 26).

Table 26. Catastrophic expenditures and harmful habits, susceptible TB sample

Variable name	Total n (%)	Catastrophic spending			
		>20% n (%)	<20% n (%)	OR [CI: 95%]	p
Total	329	159	170		
Smoker					
Yes	148 (45.0)	68 (47.1)	80 (47.1)	0.8 [0.54-1.30]	0.440
No	181 (55.0)	91 (57.2)	90 (52.9)	1	
Drinking alcohol (before TB)*					
Yes	110 (33.7)	57 (36.5)	53 (31.2)	1.3 [0.80-2.0]	0.3083
No	216 (66.3)	99 (63.5)	1 1 7 (68.8)	1	
Drinking alcoholic beverages (during TB disease period)					
Yes	99 (30.9)	59 (38.6)	40 (24.0)	2.0 [1.23-3.23]	**0.005**
No	221 (69.1)	94 (61.4)	1 2 7 (76.0)	1	
Drug use					
Yes	20 (6.1)	10 (6.3)	10 (5.9)	1.1 [0.43-2.65]	0.529
No	309 (93.9)	1 4 9 (93.7)	1 6 0 (94.1)	1	

Drinking alcoholic beverages (last 12 months before TB diagnosis, more than 4 times/month), Drug use (injecting, non-injecting, last 12 months)

Non-response: Alcohol consumption before TB (3), Alcohol consumption, during the period of TB disease (9)

Knowledge, diagnosis and addressability

Respondents who sought medical care more than 3 weeks after the onset of TB symptoms were 2.4 times more likely to experience catastrophic expenses compared to those who sought care in less than 3 weeks (p=0.003, Table 27).

Another factor analyzed was the degree of TB disability. Study participants with a degree of disability were estimated to be about three times more likely (OR = 2.9) to experience catastrophic expenditure than those without a degree of disability. However, the p value = 0.069 indicates that this association is not statistically significant but suggests a notable trend (Table 27).

Factors such as integrated knowledge of TB transmission, perception of treatability of TB disease, adherence to non-TB-specific drug treatment, and referral to private clinics did not have a significant impact on catastrophic expenditure (Table 27).

Table 27. Catastrophic expenditures and determinant factors related to knowledge, diagnosis and addressability, susceptible TB sample

Variable name	Total n (%)	Catastrophic spending			
		>20% n (%)	<20% n (%)	OR [CI: 95%]	p
Total	329	159	170		
Integrated knowledge about TB transmission					
Correct	115 (36.1)	49 (31.8)	66 (40.0)	1	0.080
Incorrect	204 (63.9)	105 (68.2)	99 (60.0)	1.4 [0.90-2.26]	
Tuberculosis is treatable					
Yes	266 (83.1)	129 (84.9)	137 (81.5)	1	
Partially	42 (13.1)	17 (11.2)	25 (14.9)	0.7 [0.37-1.39]	0.4238
No	12 (3.8)	6 (3.9)	6 (3.6)	1.0 [0.33-3.37]	1.000
Addressing for the medical care*					
< 3 weeks	119 (60.7)	44 (49.4)	75 (70.1)	1	
≥ 3 weeks	77 (39.3)	45 (50.6)	32 (29.9)	2.4 [1.33-4.31]	**0.003**
Non-specific TB drug treatment**					
Yes	19 (17.6)	4 (22.2)	15 (16.7)	1.4 [0.41-4.94]	0.518
No	89 (82.4)	14 (77.8)	75 (83.3)	1	
Addressing to a private clinic					
Yes	11 (3.3)	4 (4.1)	7 (4.1)	0.6 [0.17-2.09]	0.544
No	318 (96.7)	155 (97.5)	163 (95.9)	1	
Disability grade for TB***					
Yes	48 (66.7)	34 (75.6)	14 (51.9)	2.9 [1.03-7.92]	0.069
No	24 (33.3)	11 (24.4)	13 (47.1)	1	

Non-specific TB drug treatment - non-specific treatments on the recommendation of a pharmacist, relatives or friends, from the onset of the first symptoms until the TB diagnosis is confirmed.

* Initial and intermediate treatment period sample; ** Initial treatment period sample; *** Referred to the Disability and Capacity for Work Determination Council (72)

Non-Response: Tuberculosis is treatable (9), Addressing for medical care (23)

Epidemiological and clinical factors

The study revealed hospitalization and the presence of other chronic diseases as significant determinant factors of catastrophic expenditure among study participants with susceptible TB. Households with hospitalized respondents were more likely (OR=86.1, (p<0.001) to experience catastrophic expenditures compared to those of non-hospitalized respondents.

Also, households with respondents suffering from other chronic diseases were estimated to be 1.6 times more likely to face catastrophic expenditures compared to those without other chronic diseases (p=0.032, Table 28).

Other variables, such as medical insurance, type of TB case, localization of the disease process, bacteriological confirmation, origin from the outbreak, presence of TB in the household in the last two years, VST treatment, presence of adverse reactions, hepatitis B or C, diabetes mellitus and HIV co-infection, did not have a significant impact on catastrophic expenditure (p> 0.05).

Table 28. Catastrophic expenditures and epidemiologic and clinical factors, susceptible tuberculosis sample

Variable name	Total n (%)	Catastrophic spending			
		>20% n (%)	<20% n (%)	OR [CI: 95%]	p
Total	329	159	170		
Health insurance					
Yes	187 (57.0)	92 (58.2)	95 (55.9)	1	
No	141 (43.0)	66 (41.8)	75 (44.1)	0.9 [0.58-1.41]	0.668
TB case type					
New case	267 (81.2)	128 (80.5)	139 (81.8)	1	
Recurrent	62 (18.8)	31 (19.5)	30 (17.6)	1.1 [0.64-1.95]	0.684
Localization of the disease					
Lung	304 (92.4)	144 (90.6)	160 (94.1)	0.6 [0.26-1.37]	0.298
Extra pulmonary	25 (7.6)	15 (9.4)	10 (5.9)	1	
Bacteriologically confirmed					
Yes	224 (68.1)	112 (70.4)	112 (65.9)	0.8 [0.51-1.29]	0.408
No	105 (31.9)	47 (29.6)	58 (34.1)	1	
Hospitalized					
Yes	268 (81.5)	158 (99.4)	110 (64.7)	86.1 [11.7-631]	**<0.001**
No	61 (18.5)	1 (0.6)	60 (35.3)		
Comes from the outbreak					
Yes	43 (13.1)	15 (9.4)	28 (16.5)	0.52 [0.27-1.03]	0.072
No	286 (86.9)	144 (90.6)	142 (83.5)	1	
TB in household, last 2 years					
Yes	21 (6.5)	12 (7.6)	9 (5.4)	1.4 [0.59-3.54]	0.500
No	303 (93.5)	145 (92.4)	158 (94.6)	1	

Variable name	Total n (%)	Catastrophic spending			
		>20% n (%)	<20% n (%)	OR [CI: 95%]	p
VST treatment					
Yes	48 (15.4)	21 (13.7)	27 (17.0)	1	0.523
No	264 (84.6)	132(86.3)	132(83.0)	1.3 [0.69-2.38]	
Side effects					
Yes	155 (47.1)	78 (49.1)	77 (45.3)	1.2 [0.75-1.79]	0.494
No	174 (52.9)	81 (50.9)	93 (54.7)	1	
Viral hepatitis B, C					
Yes	16 (5.2)	8 (5.6)	8 (4.9)	1.2 [0.42-3.16]	0.802
No	289 (94.8)	134 (94.4)	155 (95.1)	1	
Diabetes mellitus					
Yes	15 (4.8)	10 (6.8)	5 (3.0)	2.3 [0.78-7.05]	0.183
No	296 (95.2)	136 (93.2)	160 (97.0)	1	
HIV					
Positive	38 (11.6)	19 (11.9)	19 (11.2)	1.1 [0.54-2.1]	0.961
Negative	291 (88.4)	140 (88.1)	151 (88.8)	1	
Other chronic diseases					
Yes	160 (48.6)	87 (54.7)	73 (42.9)	1.6 [1.1-2.48]	**0.032**
No	169 (51.4)	72 (45.3)	97 (57.1)	1	

Non-response: VST treatment (17), TB in household, last 2 years (5), Viral hepatitis B, C (24), Diabetes mellitus (21)

Perceived needs and recovery: determinants of catastrophic expenditures

The study also focused on respondents' perceptions of the needs required for successful completion of treatment and their impact on catastrophic expenditure. Respondents' perceptions of having financial resources for transportation to TB medical facilities (OR=1.6, p=0.043), receiving free treatment for comorbidities (OR=1.8, p=0.047), and being able to pick up their TB treatment at home (OR=2.0, p=0.021) were estimated to have a statistically significant influence on catastrophic expenditure. At the same time, other needs, although important to patients, did not have a significant impact (Table 29).

Table 29. Catastrophic expenditures and respondents' perceptions of needs for successful completion of treatment, susceptible TB sample

Variable name	Total n (%)	Catastrophic spending			
		>20% n (%)	<20% n (%)	OR [CI : 95%]	p
Total	329	159	170		
Family support and encouragement					
Yes	202 (61.4)	95 (59.7)	107 (62.9)	0.8 [0.56-1.36]	0.572
No	127 (38.6)	64 (40.3)	63 (37.1)	1	
Financial resources for transportation to TB medical facilities					
Yes	102 (31.0)	58 (36.5)	44 (25.9)	1.6 [1.12-2.63]	**0.043**
No	227 (69.0)	101 (63.5)	126 (74.1)	1	
Free treatment for co-morbidities					
Yes	60 (18.2)	36 (22.6)	24 (14.1)	1.8 [1.10-3.14]	**0.047**
No	269 (81.8)	123 (77.4)	146 (85.9)	1	
A richer and higher quality nutrition					
Yes	180 (54.7)	81 (50.9)	99 (58.2)	0.7 [0.48-1.15]	0.223
No	149 (45.3)	78 (49.1)	71 (41.8)	1	
Being able to continue to support own family					
Yes	63 (19.1)	28 (17.6)	35 (20.6)	0.8 [0.47-1.4]	0.575
No	266 (80.9)	131 (82.4)	135 (79.4)	1	
Help with household activities					
Yes	39 (11.9)	17 (10.7)	22 (12.9)	0.8 [0.41-1.57]	0.610
No	290 (88.1)	142 (89.3)	148 (87.1)	1	
Receiving TB treatment at home					
Yes	58 (17.6)	20 (12.6)	38 (22.4)	1	**0.021**
No	271 (82.4)	139 (87.4)	132 (77.6)	2.0 [1.11-3.61]	

The analysis of the determinants of catastrophic expenditure in the context of susceptible TB on respondents' perceptions of the major challenges encountered during TB treatment highlights that challenges such as hospitalization and daily visit to the health unit (for pill pick-up) were rated as significant factors that could influence catastrophic expenditure. Thus, for those who considered hospitalization and daily visit to the health unit as major challenges, the odds (OR=1.6; p=0.036 and OR=1.7; p=0.039) of experiencing catastrophic expenditure were estimated to be higher (Table 30).

Table 30. Catastrophic expenditures and respondents' perceptions of major challenges during tuberculosis treatment, susceptible tuberculosis sample

Variable name	Total n (%)	Catastrophic spending			
		>20% n (%)	<20% n (%)	OR [CI: 95%]	p
Total	329	159	170		
Quitting smoking					
Yes	95 (28.9)	43 (27.0)	52 (30.6)	0.8 [0.52-1.35]	0.543
No	234 (71.1)	116 (73.0)	118 (69.4)	1	
Abstinence from alcohol					
Yes	49 (14.9)	29 (18.2)	20 (11.8)	1.6 [0.90-3.09]	0.121
No	280 (85.1)	130 (81.8)	150 (88.2)	1	
Presence of adverse effects					
Yes	50 (15.2)	25 (15.7)	25 (14.7)	1.1 [0.59-1.97]	0.878
No	279 (84.8)	134 (84.3)	145 (85.3)	1	
Hospitalization					
Yes	142 (43.2)	78 (49.1)	64 (37.6)	1.6 [1.12-2.47]	**0.036**
No	187 (56.8)	81 (50.9)	106 (62.4)	1	
Lack of activity					
Yes	69 (21.0)	30 (18.9)	39 (22.9)	0.8 [0.45-1.33]	0.417
No	260 (79.0)	129 (81.1)	131 (77.1)	1	
Family support					
Yes	50 (15.2)	24 (15.1)	26 (15.3)	1.0 [0.53-1.79]	1.000
No	279 (84.8)	135 (84.9)	144 (84.7)	1	
Visiting the health unit daily					
Yes	80 (24.3)	47 (29.6)	33 (19.4)	1.7 [1.24-2.90]	**0.039**
No	249 (75.7)	112 (70.4)	137 (80.6)	1	

The study analyzed the determinant factors of catastrophic expenditure in the context of treatment for susceptible TB, focusing on respondents' main concerns about life after treatment. The ability to continue the same job after treatment was one of the factors investigated, and the results showed a significant difference. For those who felt that they would not be able to continue working in the same profession, the odds of experiencing catastrophic expenses were estimated to be twice as high (OR=2.1, p=0.040). Other factors analyzed, such as concern that treatment might not be effective and refusing employment because of a history of TB, did not show a significant relationship (p>0.05, Table 31).

Table 31. Catastrophic expenditures and main concerns about life after treatment, susceptible TB sample

Variable name	Total n (%)	Catastrophic spending			
		>20% n (%)	<20% n (%)	OR [CI: 95%]	p
Total	219*	97	122		
Treatment may not be effective					
Yes	91 (41.6)	41 (42.3)	50 (41.0)	1.0 [0.61-1.81]	0.891
No	128 (58.4)	56 (57.7)	72 (59.0)	1	
Refusal of employment due to TB history					
Yes	70 (32.0)	28 (28.9)	42 (34.4)	0.8 [0.43-1.37]	0.466
No	149 (68.0)	69 (71.1)	80 (65.6)	1	
Ability to continue the same profession (job)					
Yes	48 (21.9)	28 (28.9)	20 (16.4)	2.1 [1.12-4.20]	0.040
No	171 (78.1)	69 (71.1)	102 (83.6)	1	

* Initial and intermediate treatment period sample

Welfare and catastrophic spending

The study found a significant relationship between perceived level of wellbeing and catastrophic expenditures in the context of susceptible TB. The results showed that respondents who reported living in poverty were significantly more likely to experience catastrophic expenditure than those who were well-off. For example, those living in poverty are 6.4 times more likely to experience catastrophic expenses ($p<0.001$) and those who consider themselves quite poor are 5.2 times more likely ($p<0.001$). This trend holds for those who are not materially well off, who are 4.6 times more likely to experience catastrophic expenses ($p<0.001$, Table 32).

Nutrition was also found to be an important factor. Households with inadequate nutrition were 7.6 times more likely to experience catastrophic expenditures ($p=0.002$), and those with sufficient nutrition were 4.2 times more likely ($p=0.031$). In contrast, patients with good or very good nutrition did not show a statistically significant association with catastrophic expenditures (Table 32).

According to the well-being index, the poorest households are 3.2 times more likely to experience catastrophic expenditures ($p=0.002$) and the poorest households are 2 times more likely ($p=0.045$). In addition, households in poverty, according to the World Bank's international extreme poverty line, are 1.7 times more likely to experience catastrophic expenditures ($p=0.044$, Table 32).

Table 32. Catastrophic expenditures and welfare level, susceptible TB sample

Variable name	Total n (%)	Catastrophic spending			
		>20% n (%)	<20% n (%)	OR [CI: 95%]	p
Total	329	159	170		
Household material situation					
Living in poverty	50 (15.2)	30 (18.9)	20 (11.8)	6.4 [2.44-17.51]	**<0.001**
Pretty poor	62 (18.8)	34 (21.4)	28 (16.5)	5.2 [2.23-12.22]	**<0.001**
Not so good	164 (49.8)	85 (53.5)	79 (46.5)	4.6 [2.18-9.82]	**<0.001**
Good situation	53 (16.1)	10 (6.3)	43 (25.3)	1	
Level of nutrition					
Insufficient	92 (28.0)	57 (35.8)	35 (20.6)	7.6 [1.89-43.3]	**0.002**
Enough	145 (44.1)	69 (43.4)	76 (44.7)	4.2 [1.11-15.37]	**0.031**
Good	75 (22.8)	30 (18.9)	45 (26.5)	3.1 [0.82- 11.7]	0.138
Very good or excellent	17 (5.2)	3 (1.9)	14 (8.2)	1	
Household wealth index					
Poorest household	66 (20.1)	43 (27.0)	23 (13.5)	3.2 [1.47-6.95]	**0.002**
Poor Household	66 (20.1)	36 (22.6)	30 (17.6)	2.0 [1.20-4.12]	**0.045**
Medium index household	66 (20.1)	28 (17.6)	38 (22.4)	1.3 [0.62-2.53]	0.527
Wealthy household	66 (20.1)	28 (17.6)	38 (22.4)	1.3 [0.62-2.53]	0.527
Richest household	66 (19.8)	24 (15.1)	41 (24.1)	1	
Households in poverty					
Yes	79 (24.0)	46	33	1.7 [1.20-2.82]	**0.044**
No	250 (76.0)	113	137	1	

Health: medicines, medical tests, consultations; Clothing, footwear, etc.

Households in poverty: the international extreme poverty line according to the World Bank

RESISTANT TUBERCULOSIS

General characteristics of the sample

The study analysis included 183 study participants with RR/MDR TB: 62 respondents surveyed during the first months of treatment (2 months), 60 respondents surveyed during the continuation of treatment and 61 respondents surveyed more than two months after treatment completion.

Representativeness

The study sample with MDR/RR-TB (183) was analyzed based on demographic characteristics (gender, residence and age group) in relation to routine statistical data (351) on notification of MDR/RR-TB patients to assess representativeness. The results of the analysis showed that the patient's picture in the study sample fully reflects the patient's picture with MDR/RR-TB in the Republic of Moldova (p>0.05, Table 33).

Table 33. Representativeness of the study sample in relation to RR-TB cases in the 2023 cohort, Republic of Moldova, right bank of the Nistru River region, civil sector

Variable name	Study sample, treatment period				MDR/RR-TB cases notified	p
	Initial	Continuation	Latest 2 months after	Total		
	n (%)	n (%)	n (%)	n (%)	n (%)	
Total	**62**	**60**	**61**	**183**	**351**	
Sex						
Men	53 (85.5)	50 (83.3)	50 (82.0)	153 (83.6)	289 (82.3)	0.706
Women	9 (14.5)	10 (16.7)	11 (18.0)	30 (16.4)	64 (18.2)	0.604
Residence						
Urban	21 (33.9)	19 (31.7)	25 (41.0)	65 (35.5)	146 (41.6)	0.171
Rural	41 (66.1)	41 (68.3)	36 (59.0)	118 (64.5)	205 (58.4)	0.172
Age						
18-24 years	2 (3.2)	1 (1.7)	1 (1.6)	4 (2.2)	11 (3.1)	0.549
25-34 years	12 (19.4)	5 (8.3)	11 (18.0)	28 (15.3)	52 (14.8)	0.878
45-54 years	16 (25.8)	21 (35.0)	22 (36.1)	59 (32.2)	112 (31.9)	0.943
45-54 years	16 (25.8)	18 (30.0)	18 (29.5)	52 (28.4)	94 (26.8)	0.694
≥ 55 years old	16 (25.8)	15 (25.0)	9 (14.8)	40 (21.9)	82 (23.4)	0.696

Socio-demographic characteristics

The RR/TB study sample was mostly male (82%) and rural (58%). The mean age was 45 years with a standard deviation of 11.4 years, the youngest respondent being 21 years and the oldest 81 years. The predominant age group was between 45 and 54 years (32%, Table 33).

The majority of respondents (63%) had incomplete secondary education and 36% were unemployed. Migration and imprisonment each accounted for 15%. About 46% of households had more than three members and 31% had persons under 18 years of age. Statistical analysis revealed no significant differences between the treatment periods and the variables analyzed (level of education, marital status, migration and detention in anamnesis, number of persons in the household, presence of persons under 18 years of age), with a significance threshold p>0.05 (Table 34).

Table 34. Socio-demographic characteristics of the study resistant tuberculosis sample

Variable name	Total	Treatment period			p-value
		Initial	Continuation	Latest 2 months (after)	
	n (%)	n (%)	n (%)	n (%)	
Studies					0.344
No education/primary	15 (8.2)	3 (4.8)	7 (11.7)	5 (8.2)	
Incomplete secondary	115 (62.8)	36 (58.1)	35 (58.3)	44 (72.1)	
Specialized secondary	51 (27.9)	22 (35.5)	17 (28.3)	12 (19.7)	
Higher	2 (1.1)	1 (1.6)	1 (1.7)	0 (0.0)	
Employment					0.169
Employed	67 (36.6)	28 (45.2)	20 (33.3)	19 (31.1)	
Self-employed	2 (1.1)	0 (0.0)	2 (3.3.)	0 (0.0)	
Unemployed	52 (28.4)	16 (25.8)	14 (23.3)	22 (36.1)	
Other	62 (33.9)	18 (29.0)	24 (40.0)	20 (32.8)	
Marital status*					0.509
Married	102 (55.7)	32 (51.6)	37 (61.7)	33 (54.1)	
Single	81 (44.3)	30 (48.4)	23 (38.3)	28 (45.9)	
Migration in anamnesis					0.683
Yes	24 (13.1)	9 (14.5)	6 (10.0)	9 (14.8)	
No	159 (86.9)	53 (85.5)	54 (90.0)	52 (85.2)	
Detention in anamnesis					0.158
Yes	17 (9.3)	3 (4.8)	5 (8.3)	9 (14.8)	
No	166 (90.7)	59 (95.2)	55 (91.7)	52 (85.2)	
No. persons in household					0.245
<3 persons	106 (57.9)	33 (53.2)	40 (66.7)	33 (54.1)	
>3 persons	77 (42.1)	29 (46.8)	20 (33.3)	61 (45.9)	
Persons aged< 18 years					0.498
Yes	53 (29.0)	20 (32.3)	14 (23.3)	19 (31.1)	
No	130 (71.0)	42 (67.7)	46 (76.7)	42 (68.9)	

Married: married or cohabiting, unmarried: single, widowed, divorced. Education: primary (4 classes); incomplete secondary - 5 to 11 classes, secondary (specialized): 12 classes and professional secondary; higher - complete and incomplete; Employment: employed (civil servant, driver or manager, skilled specialist, unskilled specialist, farmer); self-employed (holder of a driver's license or permit, etc.), Unemployed (registered or not registered at the employment agency), other (daily wage labourer, pupil, student, retired, people with disability, on maternity or paternity leave)

Level of well-being

Households' material situation varied significantly over the duration of TB disease (p=0.001). The percentage of households with a fairly poor situation increased during TB treatment (35.0%) compared to the period before TB diagnosis (11%), and the percentage of those who reported living in poverty increased to 39% after completing TB treatment, compared to 21% before TB diagnosis and 13% during TB treatment. Well-off households were the fewest, with a significant decrease from 18% before TB to 6.6% after completion of TB treatment. None of the study participants rated their household's material situation as very good (Table 35).

Food remained the largest expenditure category in all periods studied, accounting for between 67% and 71% of the total (p=0.574). The percentage of undernourished households increased after completion of TB treatment (54%), compared to the periods before TB diagnosis (29%) and during TB treatment (35%), with a trend towards statistical significance (p=0.059). Household maintenance was the second most important category, ranging between 25% and 31%, while spending on health and other items was insignificant, remaining below 4% (Table 35).

Table 35. Level of well-being, resistant tuberculosis sample

Variable name	Total	Before TB	During TB	After TB	p-value
	n (%)	n (%)	n (%)	n (%)	
Household material situation					**0.001**
Living in poverty	45 (24.6)	13 (21.0)	8 (13.3)	24 (39.3)	
Pretty poor	42 (23.0)	7 (11.3)	21 (35.0)	14 (23.0)	
Not so good	69 (37.7)	31 (50.0)	19 (31.7)	19 (31.1)	
Good situation	27 (14.8)	11 (17.7)	12 (20.0)	4 (6.6)	
Very good situation	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	
Most important category of expenditures*					0.574
Food	122 (68.5)	41 (67.2)	39 (67.2)	42 (71.2)	
Household maintenance	50 (28.1)	17 (27.9)	18 (31.0)	15 (25.4)	
Health	4 (2.2)	1 (1.6)	1 (1.7)	2 (3.4)	
Other	2 (1.1)	2 (0.0)	0 (0.0)	0 (0.0)	
Level of nutrition					0.059
Insufficient	72 (39.3)	18 (29.0)	21 (35.0)	33 (54.1)	
Enough	76 (41.5)	29 (46.8)	24 (40.0)	23 (37.7)	
Good	27 (14.8)	11 (17.7)	13 (21.7)	3 (4.9)	
Very good/excellent	8 (4.4)	4 (6.5)	2 (3.3)	2 (3.3)	

*Health: medicines, medical tests, consultations; Items: clothing, shoes, etc.

Table 36 shows the relationship between the household's material situation, self-assessed by the respondents the well-being index. In context, the analysis shows a clear correlation between the well-being index and the self-assessment of material situation. The study found that households with lower welfare indices tend to perceive themselves as being in poverty or quite poor, while households with higher welfare indices have a more positive perception of their material situation. Thus, in the 'poorest' category, 67% of households consider themselves to be living in poverty, while none consider themselves to be in a good situation. In the "richest" category, only 2.8% consider themselves to be living in poverty, while 33% consider themselves to be in a good situation. Furthermore, in the 'rich' household index category, 22% of households consider themselves in a good situation, compared to only 11% in the 'medium' index category (Table 36).

Table 36. Level of household wealth in relation to household material situation, resistant TB sample

Household material situation	Household Wealth Index (Quintiles)					Total
	Poorest household	Poor household	Medium index household	Wealthy household	Richest household	
Living in poverty	24 (66.7)	8 (21.6)	6 (16.2)	6 (16.2)	1 (2.8)	45 (24.6)
Pretty poor	9 (25.0)	11 (29.7)	10 (27.0)	9 (24.3)	3 (8.3)	42 (23.0)
Not so good	3 (8.3)	15 (40.5)	17 (45.9)	14 (37.8)	20 (55.6)	69 (37.7)
Good situation	0 (0.0)	3 (8.1)	4 (10.8)	8 (21.6)	12 (33.3)	27 (14.8)
Total	**36**	**37**	**37**	**36**	**36**	**183**

Analysis of the data according to the World Bank's international extreme poverty index reveals that prior to TB diagnosis, 26.2% (48 out of 183) of households were in poverty, the percentage decreased to 23.5% (43 out of 183) in the initial treatment period. However, in the continuation period of treatment, the percentage of households in poverty increased significantly to 42.1% (77 out of 183), subsequently decreasing to 31.1% (57 out of 183) in the first months after completion of TB treatment (Figure 7).

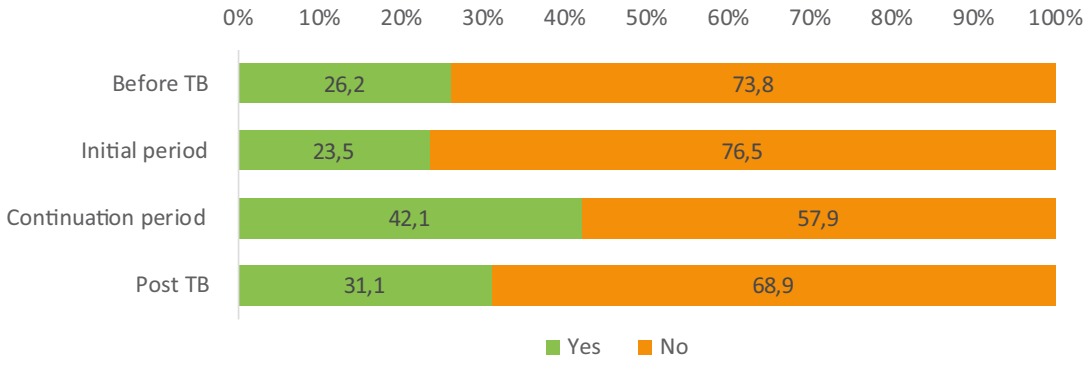

Figure 7. Households in poverty, resistant tuberculosis sample

Essential documents: identity card, citizenship, insurance

The survey revealed that 97.3% (178) of the respondents held an ID card and citizenship of the Republic of Moldova, 37.2% (68) had a passport and 33.1% (60) had a work card. One person (0.5%) had a temporary ID. Driving license was held by 21.3% (39) of the participants. Three (1.6%) of the respondents had citizenship of other countries.

Having health insurance policy was indicated by 103 (56.3%) of the respondents. Those who had the insurance policy mentioned the following sources of obtaining it: free insurance (64), from their employer (29), purchased on their own (9) and other sources (1).

Respondents who did not have a health insurance policy (80) indicated the following reasons: not being employed (61.3%, 42), informal employment (38.8%, 31), high cost of the policy (22.5%, 18), perception that the insurance is not necessary (11.3%, 9), working abroad (6.3%, 5), and also considering health insurance as unnecessary because they pay for medical services anyway (3.8%, 3). Two other (2.6%) respondents did not indicate the reason why they do not have a health insurance policy.

Harmful habits

The study revealed the prevalence of harmful habits among respondents, with a high frequency of smoking and alcohol consumption, while drug use was less common.

Smoking is a widespread practice, 56% (102) of respondents reported smoking at the time of the interview. Of these, 44% (45) smoked between 5 and 10 cigarettes a day and 22% (22) smoked between 10 and 20 cigarettes a day. A total of 45 of the respondents mentioned having smoked in the past, of which 32 had quit smoking: 16 because of TB and 16 for other reasons.

Alcohol consumption was analyzed over two periods: the last 12 months before TB diagnosis and during TB treatment. Prior to TB diagnosis, every tenth respondent (9%, 17) indicated that they drank alcohol frequently (four times a week or more often), every fifth respondent (19%, 34) drank alcohol two to three times a week, and 20% (37) drank alcohol 2-4 times a month. More than a third (36%, 66) reported drinking alcohol once a month or less infrequently, while 15% (28) did not drink alcohol at all. During the period of TB treatment, frequent drinking decreased to 5.6% (10), drinking two to three times a week decreased to 11% (20), and drinking 2-4 times a month remained constant at 20% (37). The percentage of those who drank alcohol once a month or less rarely, including not at all, increased to 63%.

Injecting drug use was recognized by 1.6% (3) of the respondents, and only one respondent had continued this behavior in the past 12 months. The use of other drugs, such as smoked or inhaled, was mentioned by 17 (9.3%) respondents, two of whom continued their use in the last year.

Knowledge, attitudes and practices on tuberculosis

The doctor was the main source of information about TB for study participants (122[21]), with the majority (41.8%, 51) first learning about TB when they became personally ill. Television and radio were mentioned as important sources of information in over a quarter of the cases (26.2%, 32). Close friends who became ill with TB was another source of information (12.3%. 15), followed by relatives (10.7%, 13) and the doctor when someone in the family became ill (2.5%, 3). Social networks and the internet served as primary sources in 2.5% (3) of cases each, and 1.6% (2) could not recall their initial source of information.

Considered to be a contagious disease by 95% of survey participants, TB is perceived to be airborne during coughing by the vast majority (96%) of respondents. However, other modes of transmission were also mentioned, such as habitual transmission, through blood, handshaking, sexual contact and the belief that TB is a congenital disease. These modes of transmission were recognized by participants at different times during treatment, with minor percentage variations and no statistically significant differences (p> 0.05), indicating that perceptions did not change during the illness period (Table 37).

The proportion of participants with correct knowledge about TB transmission varied over the course of treatment, being 42% in the first months of treatment, 29% in the continuation period and 35% after treatment completion, with no statistically significant differences (p=0.334). Perception that TB can be treated permanently increased from 18% in the initial treatment period to 32% after treatment completion, but these differences were not statistically significant (p=0.173, Table 37).

Table 37. Knowledge and attitudes on tuberculosis, resistant tuberculosis sample

Name	Total	Treatment period			p
		Initial	Continuation	Latest 2 months (after)	
	n (%)	n (%)	n (%)	n (%)	
Total	**183**	**62**	**60**	**61**	
TB infectiousness					0.406
Yes	164 (95.3)	55 (93.2)	52 (94.5)	57 (98.3)	
No	8 (4.7)	4 (6.8)	3 (5.5)	1 (1.7)	
How TB is transmitted					
Through the air while coughing					0.554
Yes	157 (95.7)	53 (96.4)	48 (92.3)	56 (98.2)	
No	5 (3.0)	1 (1.8)	3 (5.8)	1 (1.8)	
I don't know	2 (1.1)	1 (1.8)	1 (1.9)	0 (0.0)	

[21] Initial (first two months) and intermediate treatment period

Name	Total	Treatment period			p
		Initial	Continuation	Latest 2 months (after)	
	n (%)	n (%)	n (%)	n (%)	
Habitual transmission					0.440
Yes	80 (50.6)	24 (43.6)	31 (59.6)	25 (49.0)	
No	73 (46.2)	30 (54.5)	19 (36.5)	24 (47.1)	
I don't know	5 (3.2)	1 (1.8)	2 (3.8)	2 (3.9)	
Through blood					0.982
Yes	23 (14.6)	8 (14.5)	7 (13.5)	8 (15.7)	
No	117 (74.1)	40 (72.7)	40 (76.9)	37 (72.5)	
I don't know	18 (9.8)	7 (12.7)	5 (9.6)	6 (11.8)	
By shaking hands					0.683
Yes	35 (22.2)	9 (16.4)	13 (25.0)	13 (25.5)	
No	119 (75.3)	45 (81.8)	37 (71.2)	37 (72.5)	
I don't know	4 (2.5)	1 (1.8)	2 (3.8)	1 (2.0)	
Through sexual contact					0.909
Yes	19 (12.1)	7 (12.7)	7 (13.5)	5 (10.0)	
No	126 (80.3)	45 (81.8)	40 (76.9)	41 (82.0)	
I don't know	12 (7.6)	3 (5.5)	5 (9.6)	4 (8.0)	
TB is a congenital disease					0.459
Yes	6 (3.8)	1 (1.8)	1 (1.9)	4 (7.8)	
No	141 (89.2)	50 (90.9)	48 (92.30	43 (84.3)	
I don't know	11 (7.0)	4 (7.3)	3 (5.8)	4 (7.8)	
Integrated knowledge about TB transmission					0.334
Correct	59 (35.8)	25 (42.4)	16 (29.1)	18 (35.3)	
Incorrect	106 (64.2)	34 (57.6)	39 (70.9)	33 (64.7)	
Tuberculosis is treatable					0.173
Yes, definitely	44 (25.9)	11 (18.0)	15 (28.8)	18 (31.6)	
Yes, if treated in time	81 (47.6)	31 (50.8)	28 (53.8)	22 (38.6)	
Partially	35 (20.6)	15 (24.6)	8 (15.4)	12 (21.1)	
No	9 (5.3)	4 (6.6)	0 (0.0)	5 (8.8)	

Non-Response: TB contagious (11), airborne during coughing (19), habitual transmission (25), blood (25), handshaking (25), sexual contact (26), TB is a congenital disease (25), Integrated knowledge about TB transmission (10); Tuberculosis is treatable (13)

Practices related to TB management showed that 97.3% (178 out of 183) of the respondents were willing to seek treatment immediately after diagnosis. Also, 74.9% (134 out of 179) were aware that treatment is long-term, and 74.6% (132 out of 177) were aware that it involves taking multiple drugs. Some 84.4% (152/180) understood the need for strict adherence to the treatment, while 78.3% (137 out of 175) were aware of the risks associated with not completing treatment. In 71.6% (126 out of 176) of the cases, respondents were aware of the possible side effects of anti-tuberculosis drugs.

Behavioral analysis of the participants (183) regarding measures to prevent TB transmission revealed that since the time of TB diagnosis, 72.1% (132) of the respondents used personal handkerchief when coughing or sneezing, 66.7% (122) tried to reduce contact with people around, 57.4% (105) used separate dishes, 53.6% (98) chose to live in a separate room, separated from other family members.

Addressability and diagnosis

Among the most common symptoms reported by study participants (122[22]) were persistent cough, present in 64.8% (79) cases, weakness and unmotivated fatigue, reported in 63.1% (77) cases, and weight loss, observed in 59.0% (72) cases. The mean duration (MD) for these three symptoms ranged between 3.1 and 2.9 weeks. Night sweats and lack of appetite were reported by 46.7% (57) of participants (MD 2.5 and 2.6 weeks). Fever and chest pain were observed in 36.9% (45) and 36.1% (44) of cases (DM 2.6 and 2.5 weeks). Streaks of blood in sputum were reported by 7.4% (9) of the respondents, while hemorrhage was rare, being mentioned in 1.6% (2) cases, both symptoms with a mean duration of one week. Other non-TB specific symptoms were reported by 2.5% (3) of the respondents (MD 6.3 weeks), and 7.1% (13) of the respondents had no symptoms.

The most common reason cited by study participants (109[23]) for seeking medical attention was persistent cough (63.3%, 69). Other common reasons included weakness and unmotivated tiredness, reported by 34.4% (63) of respondents, and weight loss, observed in 48.6% (53) of cases. Fever was a reason in 38.5% (42), night sweats and lack of appetite in 35.8% (39), chest pain in 29.4% (32), and blood streaks in sputum in 10.1% (11) of respondents. Hemorrhage was a rare reason, mentioned in 1.8% (2) of cases. Other non-TB-specific symptoms were reported by 7.3% (8) of respondents.

At the onset of symptoms, 30.3% (33) of respondents (109[24]) recognized TB symptoms and sought medical attention. In contrast, 51.4% (56) thought it was just a trivial cough that would pass on its own. A further 22.0% (24) consulted their doctor and received treatment for a cold. In 11.0% (12) of cases, respondents were concerned that it might be TB, but did not inform anyone. In 9.2% (10) of the cases, they assumed that they had COVID-19 and that the symptoms would go away by themselves.

[22] Initial and intermediate treatment period, valid responses

[23] Initial and intermediate treatment period, valid responses

[24] Initial and intermediate treatment period, valid responses

In 1.6% (3 out of 183) of the cases, TB was diagnosed during the screening.

Within one week of the onset of symptoms, 14.8% (16) of the respondents (109) sought medical help within one week, within one-two weeks - 24.1% (26), within two-three weeks - 18.5% (20). 42.6% (46) of the respondents sought medical help for 3 weeks or more. Among the reasons for those who delayed more than three weeks (46) were lack of financial resources (21.7%, 10), lack of time due to work (23.9%, 11), fear of medical investigations (10.9%, 5) and lack of trust in medical staff (4.3%, 2). Three respondents (6.5%) did not specify the reason for delay.

Healthcare professionals referred most of the study participants (122) to their TB doctor, including family doctors (47.5%, 58) and other healthcare workers (13.9%, 17). Another significant group (22.1%, 27) went to the TB doctor on their own initiative. A further 7.4% (9) of respondents were advised by a family member, 3.3% (4) by a friend or relative, and 5.7% (7) mentioned that they had been advised by someone else, without specifying who.

An important aspect highlighted by the study was the tendency of some of the study participants to follow non-TB-specific drug treatments at home on their own initiative, before the TB diagnosis was confirmed. According to the data, 14.5% of the participants (9 out of 62[25]) used such treatments on the recommendation of their pharmacist, relatives or friends and followed it from the first symptoms until TB diagnosis was confirmed.

Analysis of the time interval between completion of TB-specific investigations and communication of the diagnosis revealed that respondents (62[26]) received the diagnosis in various time intervals. In 61.3% (38) cases, the diagnosis was communicated in 1-3 days, in 33.9% (21) cases in 4-7 days, in 3.2% (2) cases in 1-2 weeks, and in 1.6% (1) cases after more than 3 weeks.

The study investigated the frequency of patients going to private clinics to access TB services. Of the total 183 respondents, 3.3% (6) opted for private clinic services. They went to private clinics for diagnostic services in 8.1% (5 out of 62[27]) cases and for medical services during treatment in 1.6% (1 out of 61[28]) cases. The p=0.030 value suggests that respondents were more likely to go to private clinics for diagnostic services.

Access to emergency services was mentioned in 6.0% of cases (11 out of 183). Emergency services were accessed at the time of diagnosis or in the initial phase of treatment by 8 of the participants. Two participants used emergency services in the middle of treatment and one in the last months of treatment.

The survey results show that one third (30.1%, 55 out of 183) of the survey participants were referred to the Council for the Determination of Disability and Work Capacity. The majority of those referred (87.3%, 48) were referred to the Council because of TB. A smaller percentage were referred because of other illnesses (7.3%, 4) or a combination of TB and other illnesses (5.5%, 3).

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[25] Initial treatment period, valid responses

[26] Initial treatment period, valid responses

[27] Initial treatment period

[28] Treatment period (last 2 months), valid answers

Of the study participants who were referred to the Council, 69.1% (38 out of 55) received a TB-related disability grade. The majority of those who received a degree of disability (89.5%, 34 of 38) were categorized as Grade II, indicating a significant but not severe disability. Only one respondent (2.6%) was classified with grade III, indicating a moderate level disability. Three respondents (7.9%) did not indicate what degree of disability they received.

Epidemiological and clinical characteristics

Table 38 shows the epidemiological and clinical profile of the study participants. Of the total respondents, 67% are new cases while 33% are recurrent TB cases. In terms of treatment regimen, more than half (55%) were on a short treatment regimen. All patients had pulmonary TB, with no cases of extra pulmonary TB. Bacteriological confirmation was in 97% cases, and hospitalization was necessary for 96% of respondents. In 6.6% cases, they came from outbreaks, and in 4.6% cases someone in the family had TB within the last 2 years, including at the time of interview (Table 38).

Table 38. Epidemiological and clinical profile, resistant tuberculosis sample

Name	n (%)
Total	**183**
Case type	
New case	122 (66.7)
Recurrent	61 (33.3)
Treatment regime	
Short	100 (54.6)
Lung	83 (45.4)
Localization of the disease	
Lung	183 (100)
Extra pulmonary	0 (0.0)
Bacteriologically confirmed	
Yes	178 (97.3)
No	5 (2.7)
Hospitalized	
Yes	173 (94.5)
No	10 (5.5)
Comes from the outbreak	
Yes	12 (6.6)
No	171 (93.4)
TB in household, last 2 years	
Yes	8 (4.6)
No	167 (95.4)

Non-response: household TB, last 2 years (8)

Adherence to tuberculosis treatment

After being diagnosed with TB, the respondents (62[29]) started treatment within a relatively short time. Of these 59.7% (37) started treatment within the first 1-3 days, and 38.7% (24) started treatment within a week. Only one respondent (1.6%) started treatment more than one month later.

The sources of obtaining TB pills varied by treatment site (inpatient or outpatient) and treatment modality (DOT or VST), as detailed in Table 39. When asked about the most frequently used source, respondents indicated that in inpatient (58), medical staff brought the pills to the ward daily (47%). In outpatient settings (148), pills were picked up personally by respondents at the health unit in the case of DOT (70%) and VST (71%, 24).

In the context of outpatient treatment (148), the frequency of picking up TB pills from the health unit was as follows: 5-7 times a week (73.9%. 109), 3-4 times a week (8.1%, 12), 1-2 times a week (2.0%, 3), 2-3 times a month (4.1%. 6), once a month or less rarely (4.1%, 6), and some respondents did not specify the frequency (2.7%, 4). In the case of VST (24), the frequency of pill pick-up ranged from 7 to 30 days, with a mean of 24.2±8.6 days.

The survey revealed situations where the medical staff at the village health point asked the respondents to bring monthly TB pills from the district TB doctor office. About 12.8% (19 out of 148) of the respondents who received outpatient DOT treatment mentioned such requests.

Table 39. Sources of obtaining tuberculosis drugs during treatment, resistant tuberculosis sample

Name	Stationary DOT, n (%)	Ambulator	
		DOT, n (%)	VST, n (%)
Total	**58**	**148**	**24**
Medical staff brought the pills daily to the ward (inpatient), home (outpatient) for administration	35 (60.3) **27 (46.6)***	2 (1.4)	-
Someone they knew (relatives, friends, etc.) went to the health unit and brought them home (ambulatory)	-	4 (2.7)	1 (4.2)
Taking pills from the nurse's desk and administering them yourself in the ward (inpatient)	14 (24.1)	-	-
The medical staff gave them to him for a few days to administer on his own in the ward (inpatient)	10 (17.2)	-	-
Administer pills in the procedure room (inpatient) at the health unit (ambulatory)	20 (34.5)	111 (75.0) **104 (70.3)***	-
The medical staff gave them to him for 1-2 days (Saturday, Sunday) to administer at home	5 (8.6)	98 (66.2)	-
The medical staff gave them to him for 3 and more days to administer at home	-	15 (10.1)	-
Pick them up at the health unit (VST)	-	-	17 (70.8) **17 (70.8)***
Someone from the NGO came every day and brought them home (ambulatory)	-	12 (8.1)	-
Someone from the NGO came every few days and brought them to my home (ambulatory)	-	-	7 (29.2)

*most frequent source of pill pick-up; DOT- Directly Observed Treatment. VST- Video Supported Treatment

DOT stationary (85) - no. of respondents surveyed in the first two months of treatment who were hospitalized

[29] Initial treatment period, valid responses

The majority of study participants reported that they were supervised while taking TB pills, both in the inpatient (96.6%, 56 out of 58[30]) and outpatient settings (92.6%, 137 out of 148). In outpatient settings, supervision was mainly provided by nurses (94.2%, 129), but also by NGO representatives (2.9%, 4), doctors (1.5%, 2) and relatives (1.5%, 2). When asked how often they were supervised while taking TB pills, respondents indicated that they were always supervised in 87.5% (51) of the cases in the inpatient and 47.8% (71) of the cases in the outpatient setting, almost always in 8.9% (5) of the cases in the inpatient and 50.0% (74) of the cases in the outpatient setting, and about half of the cases in 3.6% (2) in the inpatient and 2.2% (3) in the outpatient setting. Of those who administered their pills through the VST program, 4.2% (2) sent the videos twice a day and 95.8% (46) sent the videos once a day.

Over the course of TB treatment, the proportion of participants who did not take their medication for non-medical reasons varied significantly between treatment stages (p=0.008), with the highest proportion of non-administration observed in the middle period (Table 40).

Table 40. Non-administration of TB pills for non-medical reasons, resistant TB sample

Name	Treatment period			p
	Initial (n, %)	Intermediate (n, %)	Last 2 months (n, %)	
Not taking TB medicines				
Yes	2 (3.2)	13 (21.7)	7 (11.5)	0.008
No	60 (96.8)	47 (78.3)	54 (88.5)	
Total	62	60	61	

The study participants (n=22, Table 18) mentioned various non-medical reasons for not taking their TB medications. The most common reasons were forgetfulness (13) and alcohol consumption, which led to forgetting to take medication (8). Some participants reported feeling worse (3) or not having their pills with them (4). Other reasons included feeling well, which led to discontinuation (1) and leaving home (1). One participant did not state the reason. Respondents also specified that during treatment they omitted taking their medication on rest days.

Side effects of anti-tuberculosis drugs

More than half (48.1%, 88 of 183) of study participants reported at least one adverse reaction to antituberculosis treatment. Adverse reactions were observed throughout the course of treatment. In the first two months, nausea was reported by 42% of respondents, but this proportion decreased significantly to 13% in the last two months of treatment (p<0.001). Similarly, the incidence of vomiting decreased from 19% to 3.3% (p=0.007), diarrhea from 21% to 0.0% (p<0.001), gastric pain from 26% to 3.3% (p=0.001), liver pain from 14.5% to 1.6% (p=0.016) and headache from 36% to 9.8% (p=0.001). Depressive symptoms and feeling drowsy varied, showing statistically significant differences (p=0.035 and p=0.007). Other side effects, such as rash, reduced visual acuity, decreased hearing, and myalgias or arthralgias, varied during treatment, but these variations were not statistically significant (Table 41).

[30] No. of respondents surveyed in the first two months of treatment who were hospitalized

Table 41. Adverse reactions to anti-tuberculosis drugs, resistant tuberculosis sample

Name	Total	Treatment period			p
		Initial	Intermediate	Last 2 months	
		n (%)	n (%)	n (%)	
Total		**62**	**60**	**61**	
Nausea					**0.000**
Yes	45 (24.6)	26 (41.9)	11 (18.3)	8 (13.1)	
No	138 (75.4)	36 (58.1)	49 (81.7)	53 (86.9)	
Vomiting					**0.007**
From	18 (9.8)	12 (19.4)	4 (6.7)	2 (3.3)	
No	165 (90.2)	50 (80.6)	56 (93.3)	59 (96.7)	
Diarrhea					**0.000**
Yes	15 (8.2)	13 (21.0)	2 (3.3)	0 (0.0)	
No	168 (91.8)	49 (79.0)	58 (96.7)	61 (100.0)	
Gastric (stomach) pain					**0.001**
Yes	24 (13.1)	16 (25.8)	6 (10.0)	2 (3.3)	
No	159 (86.9)	46 (74.2)	54 (90.0)	59 (96.7)	
Liver pain					**0.016**
Yes	13 (7.1)	9 (14.5)	3 (5.0)	1 (1.6)	
No	170 (92.9)	53 (85.5)	57 (95.0)	60 (98.4)	
Headache					**0.001**
From	38 (20.8)	22 (35.5)	10 (16.7)	6 (9.8)	
No	145 (79.2)	40 (64.5)	50 (83.3)	55 (90.2)	
Skin rash					0.903
Yes	13 (7.1)	4 (6.5)	5 (8.3)	4 (6.6)	
No	170 (92.9)	58 (93.5)	55 (91.7)	57 (93.4)	
Reduced visual acuity					0.907
Yes	11 (6.0)	4 (6.5)	4 (6.7)	3 (4.9)	
No	172 (94.0)	58 (93.5)	56 (93.3)	58 (95.1)	
Decreased hearing					0.133
Yes	6 (3.3)	4 (6.5)	2 (3.3)	0 (0.0)	
No	177 (96.7)	58 (93.5)	58 (96.7)	61 (100.0)	
Myalgia and/or arthralgia					0.046
Yes	40 (21.9)	20 (32.3)	11 (18.3)	9 (14.8)	
No	143 (78.1)	42 (67.7)	49 (81.7)	52 (85.2)	
Presence of depressive symptoms					**0.035**
Yes	18 (9.8)	11 (17.7)	3 (5.0)	4 (6.6)	
No	165 (90.2)	51 (82.3)	57 (95.0)	57 (93.4)	
Feeling drowsy					0.007
Yes	14 (7.7)	10 (16.1)	3 (5.0)	1 (1.6)	
No	169 (92.3)	52 (83.9)	57 (95.0)	60 (98.4)	
Insomnia					0.497
Yes	11 (6.0)	4 (6.5)	5 (8.3)	2 (3.3)	
No	172 (94.0)	58 (93.5)	55 (91.7)	59 (96.7)	

Participants mentioned that they took the necessary medication to manage their adverse reactions in 29.5% (26/88). Of these (26) mentioned that they had received their medication from medical staff during inpatient treatment (15) and/or had received it from the doctor's office or health unit(5) and/or had purchased it on their own (9).

Tuberculosis and other associated medical conditions

Study participants were asked questions about associated diseases and other medical conditions.

HIV co-infection

The study data show that out of 183 study participants, 10.4% (19) were HIV-positive or about every 9th respondent.

Viral hepatitis

Having ever been diagnosed with hepatitis A was mentioned by 2.3% (4 out of 172) of the respondents and hepatitis B, D or - by 6.0% (10 out of 168) of the respondents.

Diabetes mellitus

Among the study participants 7.1% (6) said they had diabetes mellitus, which means that about every 30th patient suffers from this condition.

Other diseases

Regarding other TB-related chronic diseases that the participants had at the time of the interview, 46.4% (85 out of 183) mentioned the following: gastrointestinal and infectious diseases (each 17.6%, 15), respiratory diseases (other than TB) (16.5%, 14), chronic hepatitis (10.6%, 9), kidney diseases and trauma (each 9.4%, 8), cardiovascular diseases (7.1%, 6), occupational diseases (2.4%, 2), gynecological diseases and oncological diseases (each 1.2%, 1). In 18.8% (16) cases, respondents do not know the diagnosis of the diseases they suffer from.

The 42.3% (36 out of 85) of the respondents mentioned that they had followed treatment for chronic conditions. Of these, 27.8% (10) mentioned that they received medicines from the doctor or nurse during hospitalization, in 44.4% (16) cases, they received them from the doctor's office or health unit, and in 30.6% (11) cases they purchased them from the pharmacy. Three (8.3%) of the respondents did not specify the source of the medicines.

Trust in health services

Study participants' trust in their TB doctor varied significantly over the treatment course ($p=0.010$). In the first two months, 58% of respondents reported a high level of trust, which remained stable in the middle period of treatment (58%) but decreased significantly after completion of treatment (34%). In contrast, the proportion of those indicating moderate trust at the start of treatment (42%) increased significantly after completion ($p=0.017$). Trust in the family doctor showed less significant changes. At the beginning of TB treatment, 41% of

respondents indicated very high confidence while only 25% of those who completed treatment maintained this level. Moderate confidence ranged from 43% at the start of treatment to 59% after completion with no notable statistical significance (Table 42).

The frequency of health status updates from the TB doctor remained consistently high: more than 95% of respondents received updates at each visit during treatment (p=0.228, Table 42).

Satisfaction with TB services remained relatively stable, with approximately 60% of participants reporting that they were satisfied at all stages of treatment (p=0.994) with a slight increase in very satisfied from 33.9% in the initial period of treatment to 39.3% in the last two months of treatment (p=0.801, Table 42).

Table 42. Confidence in health services, resistant tuberculosis sample

Name	Total	Treatment period			p
		Initial	Intermediate	Latest 2 months	
	n (%)	n (%)	n (%)	n (%)	
Total		**62**	**60**	**61**	
Trust in your TB doctor					
Very much	92 (50.3)	36 (58.1)	35 (58.3)	21 (34.4)	**0.010**
Much	88 (48.1)	26 (41.9)	23 (38.3)	38 (62.3)	**0.017**
A little	2 (1.1)	0 (0.0)	1 (1.7)	1 (1.6)	-
Very little or none	1 (0.5)	0 (0.0)	1 (1.7)	1 (1.6)	-
Trust in your family doctor					
Very much	57 (33.3)	24 (41.4)	19 (33.3)	14 (25.0)	0.388
Much	86 (50.3)	25 (43.1)	28 (49.1)	33 (58.9)	0.656
A little	23 (13.4)	7 (12.1)	9 (15.8)	7 (12.5)	0.999
Very little or none	5 (3.0)	2 (3.4)	1 (1.8)	2 (3.6)	0.834
Frequency of providing of health information from the TB doctor					
At each visit (consultation)	173 (97.2)	59 (96.7)	55 (94.8)	59 (100.0)	0.228
Rarely or not at all	5 (2.8)	2 (3.3)	3 (5.2)	0 (0.0)	-
Satisfaction with TB services at different stages of treatment					
Very satisfied	66 (36.1)	21 (33.9)	21 (35.0)	24 (39.3)	0.801
Satisfied	110 (60.1)	37 (59.7)	36 (60.0)	37 (60.7)	0.994
Moderately satisfied	5 (2.8)	3 (4.8)	2 (3.3)	0 (0.0)	-
Dissatisfied	2 (1.0)	1 (1.6)	1 (1.7)	0 (0.0)	-

Non-response: Trust in the family doctor (12). Satisfaction with TB services at different stages of treatment (5)

Perceptions of needs and returning to normal life after illness

To successfully complete their treatment, most respondents (62%) consider family support and a richer and better diet (58%) to be essential. About a third of respondents (30%) emphasized the need to have money for transportation to TB facilities. Other important needs included being able to receive treatment at home (26%), free treatment for associated diseases (22%), being able to support their family during their illness (20%), help in the household activities (19%), and confidentiality of TB diagnosis (16%). Less frequently mentioned needs included being able to talk to other patients about TB disease (6.1%), psychological counseling (5.6%), and picking up medication after office hours (2.8%).

Table 43 details the perceived needs during TB treatment. Only the opportunity to talk with other patients was found to be significant (p=0.013) while the rest of the needs did not show significant differences over the course of treatment (p>0.05).

Table 43. Perceptions of major challenges during tuberculosis treatment, resistant tuberculosis sample

Name	Total	Treatment period			p
		Initial	Intermediate	Latest 2 months	
	n (%)	n (%)	n (%)	n (%)	
Total	**179**	**62**	**59**	**58**	
Family support and encouragement	111 (62.0)	41 (66.1)	32 (54.2)	38 (65.5)	0.761
Picking up your pills after medical unit working hours	5 (2.8)	2 (3.2)	3 (5.1)	0 (0.0)	0.257
Access to psychological counseling to discuss TB disease	10 (5.6)	6 (9.7)	2 (3.4)	2 (3.4)	0.266
Financial resources for transportation to TB medical facilities	54 (30.2)	13 (21.0)	19 (32.2)	22 (37.9)	0.310
Free treatment for co-morbidities	39 (21.8)	14 (22.6)	12 (20.3)	13 (22.4)	0.965
A richer and higher quality diet	103 (57.5)	40 (64.5)	36 (61.0)	27 (46.6)	0.542
Being able to continue to support my family	35 (19.6)	15 (24.2)	11 (18.6)	9 (15.5)	0.610
Confidentiality of TB diagnosis to acquaintances and colleagues	28 (15.6)	8 (12.9)	10 (16.9)	10 (17.2)	0.819
The opportunity to discuss TB disease with other patients	11 (6.1)	3 (4.8)	0 (0.0)	8 (13.8)	**0.013**
Help with household activities*	23 (19.0)	11 (17.7)	12 (20.3)	-	0.942
Receiving TB treatment at home*	31 (25.6)	13 (21.0)	18 (30.5)	-	0.470

Non-response (4); Respondents interviewed at baseline and intermediate stage of treatment

During TB treatment, study participants considered hospitalization as the most difficult aspect (46%), followed by taking medication as recommended (41%) and quitting smoking (36%). In about one third of cases, respondents specified the difficulty of visiting the health unit daily (30%) and not being with their family (26%). Other difficulties included lack of activity (18%), abstaining from alcohol consumption and supporting family (18% each), keeping the diagnosis secret from acquaintances and colleagues (17%) and adverse effects of treatment (16%). The least problematic aspect considered was taking treatment and continuing to work (2.5%).

The detailed analysis of perceptions of difficulties encountered during treatment, presented in Table 44 , indicates that respondents encountered statistically significant challenges in the following categories: abstinence from alcohol use, taking medication as recommended, adverse effects, hospitalization, and inactivity ($p<0.05$).

Table 44. Perceptions on main difficulties encountered during tuberculosis treatment, resistant tuberculosis sample

Name	Total	Treatment period			
		Initial	Intermediate	Latest 2 months	p
	n (%)	n (%)	n (%)	n (%)	
Total	**179**	**60**	**60**	**59**	
Quitting smoking	65 (36.3)	24 (40.0)	23 (38.3)	18 (30.5)	0.481
Abstinence from alcohol	32 (17.9)	6 (10.0)	16 (26.7)	10 (16.9)	**0.038**
Taking medicines as recommended	73 (40.8)	18 (30.0)	21 (35.0)	34 (57.6)	**<0.001**
Side effects	28 (15.6)	14 (23.3)	9 (15.0)	5 (8.5)	**0.029**
Hospital admission	82 (45.8)	30 (50.0)	18 (30.0)	34 (57.6)	**0.011**
Absence from the family	47 (26.3)	13 (21.7)	17 (28.3)	17 (28.8)	0.764
Lack of activity	33 (18.4)	15 (25.0)	14 (23.3)	4 (6.8)	**0.011**
Keeping the diagnosis secret from people you know, colleagues	30 (16.8)	11 (18.3)	11 (18.3)	8 (13.6)	0.726
Family support	32 (17.9)	12 (20.0)	14 (23.3)	6 (10.2)	0.159
Daily visit to the health unit*	36 (30.3)	-	14 (23.3)	22 (37.3)	0.166
Treatment and continuing work*	3 (2.5)	-	3 (5.0)	0 (0.0)	-

Non-response (8); * Respondents interviewed at the intermediate period and after treatment completion

The main concerns of study participants after completing TB treatment were the risk of getting sick again (67%) and the effectiveness of treatment (52%). Other concerns included the risk of transmitting the disease to family members (38%) and employment difficulties due to a history of TB (31%), as well as the ability to continue in the same profession or trade. The risk of the diagnosis being found out by acquaintances or colleagues affected 20% of participants, and 1.7% were worried about not being able to have children.

Comparison between groups during treatment reveals that although there is variation in patients' perceptions, the differences are not statistically significant indicating a relative stability of concerns during treatment (Table 45).

Table 45. Main concerns about life after treatment, resistant tuberculosis sample

Name	Total	Treatment period		
		Initial	Inter mediate	p
	n (%)	n (%)	n (%)	
Total	**116***	**60**	**56**	
Treatment may not be effective	60 (51.7)	32 (53.3)	28 (50.0)	0.853
The risk that acquaintances, colleagues may find out about me having TB	23 (19.8)	8 (13.3)	15 (26.8)	0.102
Refusal of employment due to TB history	36 (31.0)	17 (28.3)	19 (33.9)	0.552
Ability to continue the same profession (job)	28 (24.1)	14 (23.3)	14 (25.0)	1.000
Risk of passing TB disease to family members	44 (37.9)	28 (46.7)	16 (28.6)	0.056
The risk of getting sick again	78 (67.2)	41 (68.3)	37 (66.1)	0.845
The risk of not being able to have children	2 (1.7)	2 (3.3)	0 (0.0)	-

Non-response (6); *Respondents interviewed at baseline and intermediate stage of treatment

Indirect costs associated with resistant tuberculosis

Average monthly income

As for the average monthly income of the respondent it was 3989 MDL [CI95%: 3424-4553] before diagnosis, in the first months of treatment the income dropped drastically to 94 MDL [CI95%: 42-146]. In the intermediate period of treatment, the mean monthly income increased to 952 MDL [CI95%: 750-1154], and after the completion of treatment it continued to increase to 1363 MDL [CI 95%: 1088-1638], but did not return to the initial level, these variations were statistically significant ($p < 0.001$). In context, the survey data reveal a decrease in the income of respondents (153) immediately after diagnosis and in the first months of treatment. Before diagnosis, the majority of the study participants had incomes between 2001 and 6000 lei (59.5%, 91), and a small percentage had no income at all (9.2%,

14). After diagnosis, the percentage of those with no income increased dramatically to 54.9% (84), and incomes above 1000 lei became rare (0.7%, 1). A slight improvement in income was observed in the follow-up period, but it remained much lower compared to the pre-diagnosis period. In the context, 41.2% (63) of the respondents had no income and 7.8% (12) had income between 2001 and 6000 lei. After completing the treatment, the respondents' incomes started to recover, but did not completely return to pre-diagnosis levels. During this period, 30.1% (46) had no income, and 43.1% (66) had income between 1001 and 2000 lei (Figure 8).

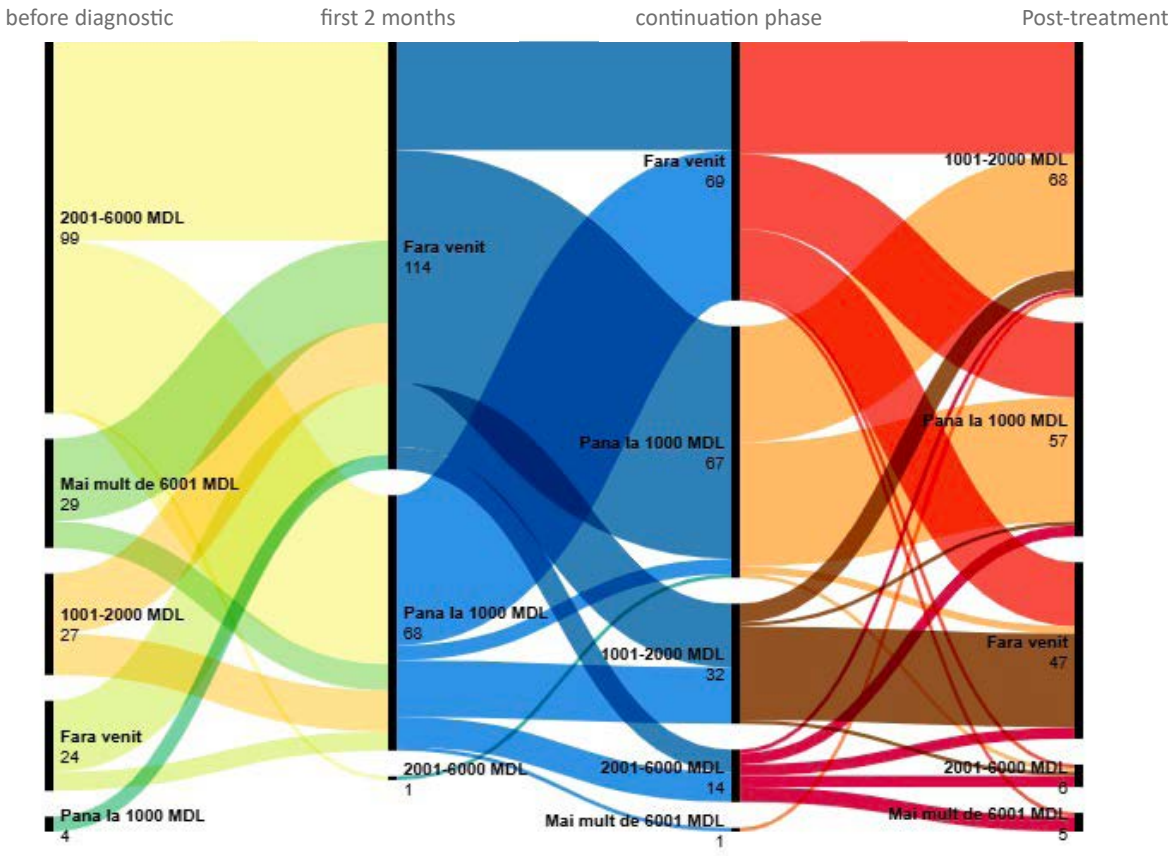

Figure 8. Average monthly income until TB diagnosis, during treatment and after treatment completion, resistant TB sample

Post-treatment - the first 2 months after completing TB treatment

Welfare payments

Welfare payments, a type of financial support provided by the government to ensure the economic and social well-being of citizens. In the present study welfare payments included: temporary incapacity benefits and motivational support for TB treatment adherence.

Beneficiaries of the temporary incapacity benefit were study participants who were officially employed. They accounted for 35% (53 out of 153[31]) of the respondents and received on average 18 429 MDL [CI 95%: 13366-23492].

[31] Sample for which income has been calculated

Beneficiaries of the motivational support provided to maintain adherence to treatment were all respondents. The average amount of motivational support received by respondents for the entire treatment period was estimated at 13 809 MDL [CI 95%: 12665-14953].

Lost time

The table 46 details the time lost in accessing medical services for drug-resistant TB from diagnosis to completion of treatment, which included time lost for investigations, tests, medical consultations and time lost on the way, including picking up TB-specific pills. Thus, study participants spent an average of 8 hours and 50 minutes for investigations, tests, medical consultations and travel time during the diagnostic period, 9 hours and 27 minutes during the initial treatment period and 30 hours and 58 minutes during the continuation period. Respondents spent an average of 86 hours (3 days and 14 hours) picking up the pills, which was the most time wasted. Total time consumed from diagnosis to treatment completion was 135 hours and 16 minutes, equivalent to 5 days and 15 hours.

Table 46. Time lost in accessing TB services, resistant TB sample

Name	*Average[CI 95%] minute*	*Average [CI 95%] hours*
Diagnostic period		
Time lost for investigations, tests at a family doctor	[11-50]	0 hours 31 min [0 hours 11 min-0 hours 50 min]
Time lost for investigations, tests at the TB doctor	[52-128]	1 hour 31 min [0 hours 52 min-2 hours 8 min]
Time spent traveling to see a family doctor, TB doctor or other specialist	408 [356-459]	6 hours 48 min [5 hours 56 min-7 hours 39 min]
Sub-total (diagnostic)	*[460-598]*	*8 hours 50 min [7 hours 40 min-9 hours 58 min]*
Initial period of outpatient treatment		
Time lost for investigations, tests at a family doctor	30 [23-37]	0 hours 30 min [0 hours 23 min-0 hours 37 min]
Time lost for investigations, tests at the TB doctor	57 [46-68]	0 h 57 min [0 hours 46 min-1 hours 8 min]
Time wasted traveling to see a family doctor	66 [53-78]	1 hour 6 min [0 hours 53 min-1 hour 18 min]
Time wasted traveling for medical consultation with a TB doctor	413 [353-473]	6 hours 53 min [5 hours 53 min-7 hours 53 min]
Sub-total (initial stage)	*566 [487-647]*	*9 hours 27 min [8 hours 7 min-10 hours 47 min]*

Name	*Average[CI 95%] minute*	*Average [CI 95%] hours*
Continuation period of outpatient treatment		
Time lost for investigations, tests at a family doctor	22 [18-26]	0 hours 22 min [0 hours 18 min-0 hours 26 min]
Time lost for investigations, tests at the TB doctor	62 [56-68]	1 hour 2 min [0 hours 56 min-1 hour 8 min]
Time wasted traveling to see a family doctor	311 [187-434]	5 hours 10 min [3 hours 7 min-7 hours 14 min]
Time wasted traveling for medical consultation with a TB doctor	1463 [1187-1738]	24 hours 22 min [19 hours 47 min-28 hours 58 min]
Sub-total (continuation stage)	*1858 [1524-2191]*	*30 hours 58 min [25 hours 24 min-36 hours 31 min]*
Time spent picking up pills (time lost on the way)	*5162 [4134-6188]*	*86 hours 1 min [68 hours 54 min-103 hours 8 min]*
Sub-total for the whole treatment period	*7586 [6145-9026]*	*126 hours 26 min [102 hours 25 min-150 hours 26 min]*
Total	**8116 [7008-9225]**	**135 hours 16 min [116 hours 48 min-153 hours 45 min]**

According to the collected data, 7.2% of the respondents (11 out of 152) had to miss work for investigations, tests or medical consultations, another 46.1% (70 out of 152) did not miss work, and 46.4% (71 out of 152) were not employed. They missed work 20.0% (8 out of 40) during the period of diagnosis, 3.8% (2 out of 52) in the intermediate period of treatment, 1.7% (1 out of 60) in the last months of treatment, indicating a significant association between treatment periods and the need to miss work ($p<0.001$). In succession, respondents were asked whether they suffered loss of income when they had to miss work to access medical services (investigations, analyses, medical consultations) during the period of diagnosis and during the treatment period. The data analyzed showed a total loss of 19 [CI 95%:13-25] hours of work (with corresponding loss of earnings) over the period from diagnosis to completion of treatment. During the diagnostic period, the mean loss was 1 [CI 95%:0.3-1.8] hours, and during treatment, the mean loss was 18 [CI 95%:12-24]) hours.

Indirect costs and associated factors

Total indirect expenditure from TB diagnosis to treatment completion averaged 36351 MDL [CI 95%: 30645-42057]. The study data indicate that indirect expenditures were considerable during the period of TB disease, especially during the continuation period of treatment, where expenditures were significantly higher compared to the first months of treatment. If in the first months of treatment the expenditures represented 40% of the total or on average 14

675 MDL, in the continuation period they increased to 21 675 MDL, forming 60% of the total (p=0.003, Table 49, Figure 9).

The description and analysis of indirect expenditure by socio-demographic factors, level of wealth and health-related issues are presented below.

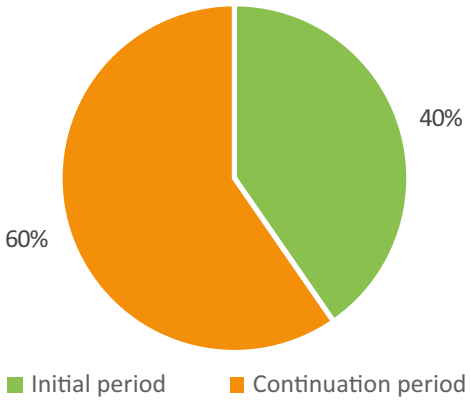

Figure 9. Share of indirect expenditure by treatment period, resistant tuberculosis sample

Socio-demographic factors

The analysis of indirect expenditures in relation to socio-demographic factors shows that rural and married individuals incurred higher expenditures during TB treatment, but these differences were not statistically significant (p>0.05). In addition, no statistically significant differences were observed in dependence on employment (p=0.798, Table 47).

The study reveals that women and respondents under 44 years of age incurred higher indirect expenditures during TB treatment. Although differences in total expenditures are not statistically significant (p=0.146 and p=0.088), expenditures appear significantly higher for women in the first months of treatment (p=0.033) and for younger patients in the continuation period (p=0.043).

Educational attainment appears to significantly influence indirect expenditures. Individuals with secondary education (including specialized education) had the highest expenditures (55 202 MDL), while those with no education or with primary education had the lowest expenditures (24 633 MDL), statistically significant differences (p<0.001).

The size of the household and the presence of children (< 18 years) considerably influence the indirect costs associated with the treatment of drug-resistant TB. Thus, households with three or more persons incurred significantly higher expenditures, averaging 44 326 MDL compared to those with two or fewer persons, which incurred 29 625 MDL (p = 0.011). In addition, households with children under 18 years of age incurred higher expenditures (48 822 MDL) than those without children under 18 years of age (30 476 MDL, p= 0.003).

Table 47. Indirect expenditure in relation to socio-demographic factors, resistant tuberculosis sample

Name	Indirect expenses, total		Treatment period			
	Average[CI 95%] MDL (lei)	p	**Initial** *Average [CI 95%] MDL (lei)*	p	**Continue** *Average [CI 95%] MDL (lei)*	p
Sex						
Men	[28862-40035]	0.146	[10949-15836]	**0.033**	[17032-25079]	0.487
Women	[25247-66043]		20941 [10885-30997]		[12387-37021]	
Place of residence						
Urban	32260 [24905-39614]	0.311	[10021-16663]	0.474	[13665-24170]	0.315
Rural	[30633-46282]		[11736-18987]		23096 [17838-28353]	
Age						
< 44 years	41311 [31278-51345]	0.088	15637 [11500-19774]	0.474	25674 [18715-32632]	0.043
≥ 45 years	31455 [25891-37020]		13726 [10391-17060]		17729 [14262-21196]	
Marital status*						
Married	38716 [31490-45941]	0.355	[11469-18132]	0.916	[18791-29040]	0.197
Single	[23996-42636]		14515 [10206-18824]		[12785-24817]	
Studies						
No education/ primary	24633 [14049-35216]	**0.000**	9406 [3659-15153]	**0.000**	[7223-23229]	**0.004**
Incomplete secondary	29565 [25155-33974]		11529 [9274-13784]		[14825-21246]	
Specialized secondary	[38559-71845]		[16093-30638]		[20503-43170]	
Higher	-		-		-	
Employment*						
Employeed	[30099-47728]	0.798	15713 [11272-20154]	0.749	23200 [17142-29257]	0.837
Unemployed	[20874-47893]		[7868-18422]		[12136-30340]	
Other	[26543-44077]		[10435-19171]		[14531-26483]	
No. persons in household						
≤2 persons	29625 [24423-34828]	**0.011**	[10107-16206]	0.215	[13043-19894]	**0.004**
≥3 persons	[33614-55037]		[11963-20988]		[20554-35145]	
Presence of persons aged < 18 in the household						
Yes	48822 [34323-63320]	**0.003**	[12118-24386]	0.065	[20714-40424]	**0.002**
No	[25763-35188]		[10397-15583]		[14309-20662]	

Married: married or cohabiting; unmarried: single, widowed, divorced.

Welfare as a determinant of indirect expenditures

Indirect expenditures associated with resistant TB varied significantly by household wealth level. Respondents from the *poorest* categorized households had expenditures of 33 651 MDL, while *richest* categorized households had expenditures of 58 629 MDL (p= 0.004). This difference is evident both in the first months of treatment, with expenditures of 14 821 MDL for respondents from the *poorest* households compared to 24 088 MDL for those from the *richest* households (p= 0.009), and in the follow-up period, with expenditures of 18 830 MDL for the *poorest* households and 34 541 MDL for the *richest* (p= 0.023).

Indirect expenditures of respondents from households in poverty were 19953 MDL versus those from households not in poverty 42156 MDL, with a p-value of 0.001, indicating that the observed differences are statistically significant. Differences also remained significant across treatment periods, both in the first months and in the follow-up period. Thus, respondents from households in poverty had significantly lower indirect expenditures compared to those from other households (Table 48).

Table 48. Indirect expenditure in relation to welfare factors, resistant tuberculosis sample

Name	Indirect expenses, total		Treatment period			
			Initial		Continue	
	Average [CI 95%], MDL (lei)	p	*Average [CI 95%], MDL (lei)*	p	*Average [CI 95%], MDL (lei)*	p
Level of well-being						
Poorest	[24490-42813]	**0.004**	[8969-20672]	**0.009**	[12002-25659]	**0.023**
Poor	[23181-38702]		[8023-15573]		[13229-25057]	
Medium index	[20525-43403]		[6509-17011]		[12794-27613]	
Rich	[19736-33694]		[7854-14688]		[10298-20588]	
Richest	[37010-80248]		[14923-33252]		[19784-49298]	
Households in poverty[32]						
Yes	19953 [13581-26324]	**0.001**	6762 [4237-9286]	**<0.001**	7893 [8556-17825]	**0.001**
No	42156 [35024-49287]		17476 [14167-20785]		17753 [19773-29585]	

[32] https://www.worldbank.org/en/topic/measuringpoverty

Health factors as determinants of indirect expenditure

Health insurance played an important role in managing treatment costs. The data show that patients insured until TB diagnosis had indirect expenditures of 33 304 MDL, compared with 38 854 MDL for the uninsured. Although the difference is not statistically significant (p=0.341), health insurance seems to provide some financial advantage in resistant TB. In the first months of treatment, expenditures were almost equal between the insured and the uninsured (14 583 MDL vs. 14 751 MDL), but in the follow-up period, the insured incurred lower expenditures (18 720 MDL vs. 24 103 MDL), although this difference is not statistically significant (p=0.173, Table 49).

Hospitalization during treatment also influenced indirect costs. Hospitalized patients had indirect expenditures of 36 538 MDL, compared with 31 764 MDL for non-hospitalized patients. In the first months of treatment, expenditures were similar between the two groups (14 492 MDL vs. 19 163 MDL), and in the follow-up period, hospitalized patients had higher expenditures (22 046 MDL vs. 12 600 MDL), although without statistically significant differences (p=0.352, Table 49).

Table 49. Indirect expenditure on health factors, resistant tuberculosis sample

Name	Indirect expenses, total		Treatment period			
			Initial		Continue	
	Average [CI 95%], MDL (lei)	p	*Average [CI 95%], MDL (lei)*	p	*Average [CI 95%], MDL (lei)*	p
Indirect expenses	[30645- 42057]	-	[12048-17302]	-	[17795-25555]	**0.003**
Insured before TB diagnosis						
Yes	[27304-39304]	0.341	14583 [10789-18377]	0.950	[14856-22584]	0.173
No	[29616-48092]		14751 [11048-18453]		[17756-30450]	
Hospitalized during treatment						
yes	[30636-42440]	0.749	[11795-17189]	0.497	22046 [18025-26067]	0.352
No	[8426-55101]		19163 [4187-34139]		[4060-21139]	

Direct costs associated with resistant tuberculosis

The study of resistant TB expenditure shows a clear differentiation between medical and non-medical costs. The data indicate that 35.6% of total expenditure comprised medical expenditure, while 64.4% comprised non-medical expenditure (Figure 10).

In context, the detailed analysis of direct expenditures provides a clear insight into the financial impact on households affected by resistant TB disease. The mean total direct

expenditure was 15400 MDL, with a 95% confidence interval ranging between 13754 MDL and 17045 MDL, indicating significant variability in expenditure between respondents.

Direct medical expenses, which include costs for investigations, tests, medicines and consultations, averaged 5450 MDL with a 95% confidence interval between 4809 MDL and 6090 MDL. These data suggest that, although there is variation, most respondents incurred considerable medical costs.

In contrast, non-medical direct expenses such as transportation, food, and other expenses averaged 9950 MDL, with a 95% confidence interval between 8389 MDL and 11511 MDL. These figures show that non-medical expenses can be even higher than medical expenses, adding an additional financial burden associated with resistant TB.

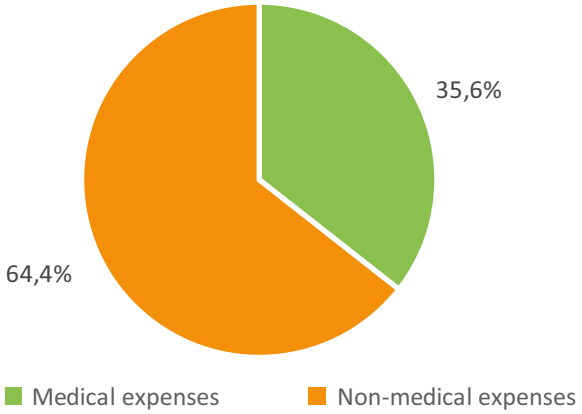

Figure 10. Share of medical and non-medical expenditures in total out-of-pocket expenditures, resistant tuberculosis sample

Medical expenses

Investigations, tests and medical consultations

Among the 153 respondents, 10 (7.1%) paid for investigations and tests. The expenses were incurred by 9 (22.5%) respondents during the period of diagnosis and by one respondent (2.3%) during the first months of treatment. Of the respondents who incurred expenses (10), 9 paid for radiologic examination. For blood tests 5 respondents paid, for urinalysis - 3 and for sputum examination - 3. Eight of the respondents paid only to the hospital (polyclinic) cashier, and one indicated that he paid both to the hospital (polyclinic) cashier and to the medical staff. The average expenses for investigations amounted to 1793 MDL, and in the diagnostic period these expenses amounted to 1790 MDL ($p<0.001$, Table 50).

None of the respondents mentioned that they paid money for the medical consultation or paid with any goods for the medical consultation or investigations, analysis.

Table 50. Payment for investigations and medical consultations, resistant tuberculosis sample

Name	Total	Diagnostic period	Treatment period		p
			Initial	Continuation	
	n (%)	n (%)	n (%)	n (%)	
Total	153	40	52	61	
Investigations and analysis					
Yes	10 (7.1)	9 (22.5)	1 (2.3)	0 (0.0)	**0.01**
No	130 (92.9)	31 (77.5)	43 (97.7)	56 (100)	
Average [CI 95%], MDL (lei)	1793 [1592-1992]	[1589-1990]	3. [0.1-6.1]	-	**<0.001**

No answer (n=13)

Addressability and diagnosis

The study analyzed patients' addressability to various non-TB medical services and the direct expenditures associated with them. Results show that study participants incurred considerable costs when accessing private clinics for TB diagnostic services. The average expenditure for those who accessed such services at private clinics was MDL 884, with a 95% confidence interval between MDL 782 and MDL 986.

Expenditures for non-specific TB treatments on own initiative (on the advice of pharmacist, relatives, friends) were also notable. These expenditures reflect the use of treatments before to correct diagnosis and averaged 2141 MDL, with a 95% confidence interval between 1796 and 2487 MDL.

In contrast, emergency services and disability assessments did not involve direct expenditures for study participants.

Medicinal and para-pharmaceutical products

Since the start of TB treatment, 28% of participants (43 out of 153) mentioned that they had purchased any medicines. Thus, 33% of the respondents purchased drugs in the initial period of treatment, 27% in the intermediate period and 26% in the last months of treatment. The statistical analysis indicates a low variability according to the periods of treatment and the purchase of medicines, being stable throughout the treatment (p=0.769, Table 51).

The present study shows that 39% of the participants who purchased medicines, purchased medication for adverse reactions. Five of the respondents purchased such products in the early months of treatment, seven in the mid-stage, and two in the last months of treatment. The p value equal to 0.079 indicates a possible trend that could become significant with a larger sample (Table 51).

Medicines for other associated medical conditions were purchased in about half of the cases (18 out of 43). In detail, five of the respondents purchased them in the first months of treatment, seven - in the middle period and six in the last months of treatment. Although there are variations in the share of patients purchasing medicines for other conditions at

different stages of treatment, these variations are not statistically significant (p=0.753, Table 51).

More than half of the respondents (56%, 24 out of 43) mentioned that they had procured vitamins during TB treatment. They procured vitamins in the first months of treatment - 8 of the respondents, in the intermediate period - 6 and in the last months of treatment - 10 of the respondents. The p-value equal to 0.493 indicates that the observed differences in vitamin procurement between the different stages of treatment are probably due to chance and not to a real relationship between variables (Table 51).

Procurement of para-pharmaceuticals by study participants was quite low at all treatment stages and the observed variations were not statistically significant (p=0.593, Table 51).

Table 51. Procurement of medicinal and para-pharmaceutical products, sample resistant tuberculosis

Name	Total	Treatment period			p
		Initial	Intermediate	Last 2 months	
	n (%)	n (%)	n (%)	n (%)	
Total	43 (28.1)	13 (32.5)	14 (26.9)	16 (26.2)	0.799
Medicines for side effects					
Yes	14 (32.6)	5 (38.5)	7 (50.0)	2 (12.5)	0.079
No	29 (67.4)	8 (61.5)	7 (50.0)	14 (87.5)	
Medicines for associated medical conditions					
Yes	18 (41.9)	5 (38.5)	7 (50.0)	6 (37.5)	0.753
No	25 (58.1)	8 (61.5)	7 (50.0)	10 (62.5)	
Vitamins					
Yes	24 (55.8)	8 (61.5)	6 (42.9)	10 (62.5)	0.493
No	19 (44.2)	5 (38.5)	8 (57.1)	6 (37.5)	
Para-pharmaceuticals					
Yes	2 (4.7)	1 (7.7)	0 (0.0)	1 (6.2)	0.593
No	41 (95.3)	12 (92.3)	14 (100)	15 (93.8)	

Non-response: Medications for adverse reactions (n=1), Parapharmaceuticals (1)

Table 52 provides a detailed analysis of expenditure on drugs and para-pharmaceuticals among study participants. The expenditure analysis shows that drugs for adverse reactions were the most important drugs to purchase in the first months of treatment, with a p-value < 0.001, indicating a statistically significant difference. These, in fact, and represented the most significant part of the expenditure for medicines, with a total average of 368 MDL. In the first months, the average expenditure for these medicines was 310 MDL, and in the follow-up period, it decreased to 58 MDL. In contrast, the expenditure for medicines for associated medical conditions, vitamins and para-pharmaceuticals did not show significant differences

between treatment periods (p>0.05), suggesting a constant need to procure them throughout the treatment.

Table 52. Expenditure on drugs and para-pharmaceuticals, resistant tuberculosis sample

Name	Total direct expenditure	Treatment period		p
		Initial	Continue	
	Average [CI 95%] MDL (lei)	*Average [CI 95%] MDL (lei)*	*Average [CI 95%] MDL (lei)*	
Total	[418-845]	425 [234-616]	206 [109-304]	0.430
Medicines for side effects	[177-560]	[125-494]	[6.8-110]	**<0.001**
Medicines for associated medical conditions	[62-161]	57 [34-79]	[11-100]	0.962
Vitamins	139 [89-190]	55 [37-73]	84 [37-131]	0.247
Para-pharmaceuticals	[5.9-22]	3.2 [2.6-6.1]	7. [3.4-19]	0.428

The majority of study participants (60.5%, 26 out of 43[33]) indicated that they had procured all the necessary medicines (prescribed by their doctor). However, every fourth one (25.6%, 11) specified that they did not have enough money to procure all the medicines, while a small percentage (4.7%, 2) indicated that they already had such medicines. In addition, 2.3% (1) did not specify the reasons for not procuring the necessary medicines.

Non-medical expenses

Utilities at the hospitalization period

Survey participants were asked questions about the expenses incurred during their stay in hospital for TB treatment, products, utilities or other non-medical items. These included food, non-alcoholic beverages, sweets, personal hygiene products (such as soap and toilet paper), and other items such as bed linen and pincushions. In this context, the majority of respondents (90.0%, 36 out of 40) indicated that they had such expenditures. The average expenditure was 3111 MDL, with a 95% confidence interval between 2570 and 3652 MDL.

Transportation costs

Table 53 highlights transportation expenses during diagnosis and treatment of study participants. During the period of diagnosis, transportation costs for traveling to medical specialists averaged 37 MDL.

[33] No answer (3)

During inpatient treatment, transportation costs from the respondent's home to the hospital where he was admitted for treatment averaged 154 MDL. At the same time, transportation costs for visitors to visit the respondent during hospitalization were considerable, averaging 1552 MDL. In total, for the hospitalization stage, transportation costs totaled 1706 MDL (Table 53).

In the outpatient treatment phase, the costs for consultations with the TB doctor and the family doctor were 207 MDL and 620 MDL, respectively, for the initial and continuation periods. Transportation to pick up the pills from the health unit during the entire outpatient treatment had an average cost of 631 MDL. The total costs for transportation from diagnosis to completion of treatment amounted to 3201 MDL, reflecting the financial burden on participants and their households (Table 53).

Table 53. Transportation costs during treatment, resistant tuberculosis sample

Name	*Average [CI 95%], MDL (lei)*
Diagnostic period	
Transportation costs for travel to medical specialists	37 [31-44]
Treatment in hospital	
Transportation costs from the respondent's home to the hospital(s) where he/she was admitted for TB treatment	154 [133-174]
Visitors' transportation costs for visiting the respondent during hospitalization	1552 [1147-1956]
Sub-total (hospitalization stage)	*1706 [1281-2130]*
Initial period of treatment in outpatient conditions	
Transportation costs for going to a TB doctor for consultation	141 [115-166]
Transportation costs for going to the family doctor for consultation	66 [53-78]
Sub-total (initial stage)	*207 [176-238]*
Treatment period, outpatient continuation phase	
Transportation costs for going to a TB doctor for consultation	594 [454-733]
Transportation costs for going to the family doctor for consultation	26 [9.6-54]
Sub-total (stage continued)	*620 [476-764]*
Transportation costs for taking pills from the health unit	*631 [433-829]*
Total	**3201 [2397-4005]**

Expenses for additional nutrition

Study participants were asked whether they had any additional expenses for food, including water, when they went to their family doctor or TB doctor for TB consultations or investigations. The analysis of additional expenditure on food when accessing medical services revealed that during the diagnosis period, 11.8% (18 out of 40[34]) of the respondents reported such

[34] Sample, initial treatment period

expenditure on food, and during the treatment period, this percentage increased to 25.4% (34 out of 134[35]). Thus, during the period of TB diagnosis these costs averaged 625 MDL [CI95%: 377-873], during the first months of treatment - 24 MDL [CI 95%: 18-30], and at the stage of continuation of treatment the average increased to 42 MDL [CI 95%: 28-57]. Over the entire treatment period these types of expenses averaged 66 MDL, with a 95% confidence interval between 51 and 82 MDL.

During TB treatment, study participants were asked about other nutrition-related expenditures, including the purchase of additional foods outside the usual diet as recommended by their doctor. Purchasing such food was mentioned by 26.9% (36 out of 134[36]) of the respondents. In this regard, the study revealed significant differences in additional expenditure on food due to TB at different stages of treatment. Thus, in the intensive phase, respondents had an average additional expenditure for food of 307 MDL [CI 95%: 189-425], while in the continuation phase, the average increased to 994 MDL [CI 95%: 619-1369], p=0.001. Over the entire treatment, the mean expenditure amounted to 1301 MDL [CI 95%: 908-1695].

In the context, the study participants incurred additional food expenses by purchasing food when going for medical consultations, investigations and tests, as well as by purchasing additional foods recommended by the doctor. The average amount of these expenses was 1992 MDL [CI 95%: 1513-2472] over the entire treatment period, starting from diagnosis and continuing throughout the treatment period.

Goods and thanks

Half (43.2%, 16 out of 37[37]) of the study participants who received treatment, including inpatient care, specified that they were visited by people in the household at the time of hospitalization. Thus, seven of the respondents were visited by 1 and 2 persons, one respondent was visited by 3 persons and another by five persons. On average, respondents received 4.4 [CI 95%: 2-7] visits during hospitalization.

The analysis of visitors' expenditure on goods during hospitalization revealed an average expenditure of 1681 MDL, with a 95% confidence interval between 1291 and 2070 MDL.

According to the respondents' answers, no one in the household or outside the household thanked the medical staff. However, 12 respondents (7.8%) did not provide a response or indicated that they did not know if anyone in the household or outside the household had offered thanks.

Direct expenditure in relation to welfare factors

Household wealth

An analysis of the distribution of medical and non-medical expenditure by household wealth reveals significant inequalities between different household groups. Households in the 'average' category allocate the highest share of expenditure to medical needs, while

[35] Non-response (19 at the time of the survey were receiving inpatient treatment)

[36] non-response (17)

[37] Sample initial period and having been hospitalized, non-response (3)

households in the 'poorest' and 'richest' categories allocate similar but lower proportions.

Medical expenditures constituted 30.7% of total expenditures for the poorest households, while for the poorest households this proportion was 34.4%. Households in the 'medium' category allocated 41.8% of expenditure to medical needs. In contrast, 'rich' and 'richest' households allocated only 37.9% and 31.9% of expenditure to medical needs respectively (Figure 11).

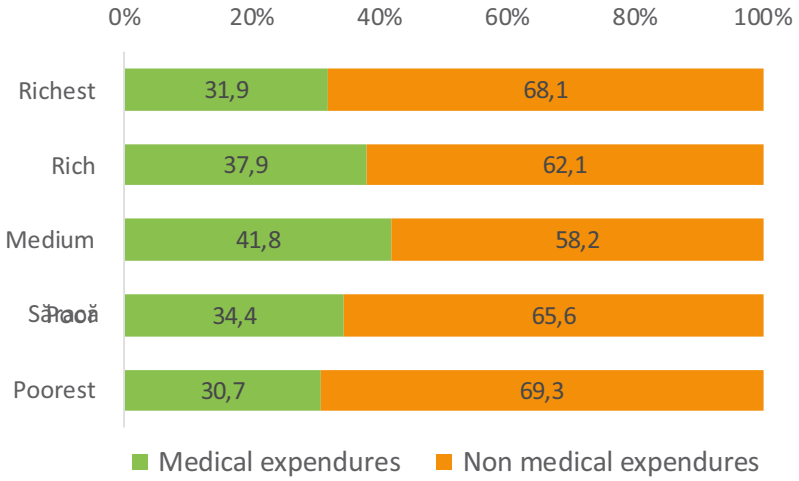

Figure 11. Share of medical and non-medical expenditure depending on household wealth, resistant tuberculosis sample

Covering direct expenditure

The survey revealed the considerable financial burden that resistant TB imposes on patients. More than half of the respondents (54.2%, 83 out of 153) had to incur TB-related expenses. To meet these costs, patients adopted various financial strategies. Most frequently, 31.4% (48 out of 153) of the respondents turned to their own household or family savings. In addition, 26.1% (40 out of 153) of the respondents used cash income, such as salaries, scholarships or allowances, to cover treatment costs. Other methods of covering expenses included selling domestic animals or poultry (2.6%, 4 out of 153), selling agricultural products (2.0%, 3 out of 153), receiving gifts from outside the household (2.6%, 4 out of 153), borrowing from outside the household (6.5%, 10 out of 153), and selling goods (2.0%, 3 out of 153).

The study highlighted the significant financial impact that drug-resistant TB imposed on study participants. More than half of the respondents (54.2%, 83 out of 153) had to incur expenses related to the disease. To cover these costs, patients resorted to different methods and sources. Predominantly, 31.4% (48 out of 153) of the respondents resorted to their own household or family savings. In addition, 26.1% (40 out of 153) of the respondents used earned income, such as salaries, scholarships or allowances. Some participants resorted to borrowing money from outside the household (6.5%, 10 out of 153), selling domestic animals or poultry (2.6%, 4 out of 153), receiving monetary gifts from outside the household (2.6%, 4 out of 153), selling agricultural products (2.0%, 3 out of 153), and selling goods (2.0%, 3 out of 153, Figure 12).

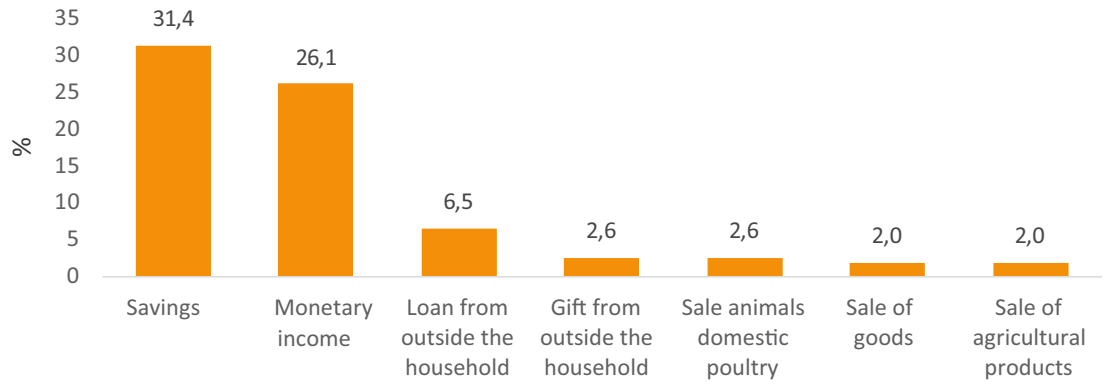

Figure 12. Sources of coverage of out-of-pocket expenditure, resistant tuberculosis sample

Catastrophic costs associated with resistant tuberculosis

TB-related catastrophic expenditure refers to the extreme financial costs that households incur because of TB treatment and management. These include both direct and indirect costs. Expenditures are considered catastrophic when they exceed a certain percentage of total household income, leading to severe financial hardship and significantly affecting quality of life. In this context, analyzing catastrophic expenditure thresholds is essential to understand the financial impact on patients and to develop effective resource management strategies.

Most of the households in the study (57%) had expenditures below the threshold of 20% of their income, suggesting that for them, the costs of TB burden were relatively manageable. However, a significant proportion (43%) of households had catastrophic expenditures, exceeding the 20% threshold defined by the WHO as catastrophic expenditure (Table 54).

In addition, the study revealed households facing even higher catastrophic expenses. A quarter of households (24%) had expenses exceeding 30% of their income, and 6.5% had expenses exceeding 40%. In extreme cases, 4.6% of households had expenditures exceeding 50% and 2.6% had expenditures exceeding 60% (Table 54).

Table 54. Expenditure threshold, including catastrophic, resistant tuberculosis sample

Spending threshold	N (%)
<20%	88 (57.5)
The catastrophic expenditure threshold	
≥20%	65 (42.5)
≥30%	37 (24.2)
≥40%	10 (6.5)
≥50%	7 (4.6)
≥60%	4 (2.6)

Catastrophic expenditure and determinant factors

Socio-demographic factors

The study found that some socio-demographic factors, such as residential background, education level, employment status, marital status, and the presence of persons up to 18 years of age in the household could significantly influence the likelihood of having catastrophic expenditure in the case of resistant TB burden (Table 55).

Households in rural areas were 2.4 times more likely to face catastrophic expenditures than those in urban areas (p=0.016). Educational attainment also had a significant impact, with people with no education or less than primary education estimated to be 4.6 times more likely to face catastrophic expenditure (p=0.042).

Employment status had a major impact on expenditure. In context, the study estimated 13.3 times more likely for the unemployed (p<0.001) and 18 times more likely for other categories (day laborers, schoolchildren, students, retired, disabled, maternity or paternity leave, p<0.001) to have catastrophic expenses.

Another important factor was marital status, with estimated triple odds (OR=2.9, p=0.001) of unmarried people facing catastrophic expenditure.

The presence of under-18s in the household also influenced expenditure. Households with no dependents under 18 were 2.4 times more likely to experience catastrophic expenditure than those with dependents (p=0.025).

In terms of age, people aged over 45 were twice as likely to experience catastrophic spending (OR=1.8). However, the p-value=0.059 indicates that this association is not statistically significant but suggests a notable trend.

Other socio-demographic factors, such as gender, migration, and detention in anamnesis, did not have a significant impact on catastrophic expenditures.

Table 55. Catastrophic expenditure and socio-demographic factors, resistant tuberculosis sample

Variable name	Total	Catastrophic spending			
	n (%)	≥20% n (%)	<20% n (%)	OR [CI: 95%]	p
Total	153	65	88		
Sex					
Men	127 (83.0)	54 (83.1)	73 (83.0)	1.0 [0.43-2.37]	1.000
Women	26 (17.0)	11 (16.9)	15 (17.0)	1	
Medium of residence					
Urban	52 (34.0)	15 (23.1)	37 (42.0)	1	
Rural	101 (66.0)	50 (76.9)	51 (58.0)	2.4 [1.18-4.95]	**0.016**
Age					
< 44 years	76 (49.7)	27 (41.5)	49 (55.7)	1	
≥ 45 years	77 (50.3)	38 (58.5)	39 (44.3)	1.8 [0.92-3.38]	0.059

Variable name	Total n (%)	Catastrophic spending			
		≥20% n (%)	<20% n (%)	OR [CI: 95%]	p
Studies					
No education or primary school	13 (8.5)	8 (12.3)	5 (5.7)	4.6 [1.05-21.6]	**0.042**
Incomplete secondary	97 (63.4)	46 (70.8)	51 (58.0)	2.6 [1.12-6.42]	**0.023**
Specialized secondary	43 (28.1)	11 (16.9)	32 (36.4)	1	
Employment					
Employed (including self-employed)	55 (35.9)	5 (7.7)	50 (56.8)	1	
Unemployed (unemployed)	42 (27.5)	24 (36.9)	18 (20.5)	13.3 [4.05-50.0]	**<0.001**
Other	56 (36.6)	36 (55.4)	20 (22.7)	18.0 [5.74-65.2]	**<0.001**
Marital status					
Married	86 (56.2)	27 (41.5)	59 (67.0)	1	**0.001**
Single	67 (43.8)	38 (58.5)	29 (33.0)	2.9 [1.47-5.56]	
Migration in anamnesis					
Yes	22 (14.4)	11 (16.9)	11 (12.5)	1.4 [0.58-3.53]	0.489
No	131 (85.6)	54 (83.1)	77 (87.5)	1	
Detention in anamnesis					
Yes	15 (9.8)	7 (10.8)	8 (9.1)	1.2 [0.41-3.52]	0.787
No	138 (90.2)	58 (89.2)	80 (90.9)	1	
Number of persons in household					
1 person	46 (30.1)	30 (46.2)	16 (18.2)	4.7 [1.97-11.28]	**0.001**
2 persons	37 (24.2)	15 (23.1)	22 (25.0)	1.7 [0.73-3.93]	0.2992
≥3 persons	70 (45.8)	20 (30.8)	50 (56.8)	1	
Presence of persons aged< 18 in the household					
Yes	49 (32.0)	14 (21.5)	35 (39.8)	1	
No	104 (68.0)	51 (78.5)	53 (60.2)	2.4 [1.10-5.41]	**0.025**

Married: married or cohabiting, unmarried: single, widowed, divorced. Education: primary (4 classes); incomplete secondary - 5 to 11 classes, secondary (specialized): 12 classes and professional secondary; higher - complete and incomplete; Employed: employed (civil servant, driver or manager, skilled specialist, unskilled specialist, farmer), including self-employed (holder of a driver's license or permit, etc.), Unemployed (registered or not registered at the employment agency), other (daily wage labourer, pupil, student, retired, people with disability, on maternity or paternity leave)

Harmful habits as determinant factors

The influence of harmful habits on catastrophic spending showed that drinking alcoholic beverages could have some impact. Alcohol consumption during the period of diseases had a significant influence, with households with respondents who consumed alcohol during this

period being twice as likely to experience catastrophic expenditure (OR=2.0, p=0.046). In the same sense, alcohol consumption before TB diagnosis showed a trend towards statistical significance. Thus, for households with such respondents, the odds of experiencing catastrophic expenditures were estimated to be double (OR=1.9, p=0.052) (Table 56).

Other factors, such as smoking and drug use, did not have a significant influence on catastrophic spending (p> 0.05, Table 56).

Table 56. Catastrophic expenditure and harmful habits, resistant tuberculosis sample

Variable name	Total	Catastrophic spending			
	n (%)	>20% n (%)	<20% n (%)	OR [CI: 95%]	p
Total	153	65	88		
Smoker					
Yes	80 (52.3)	32 (49.2)	48 (54.5)	0.8 [0.42-1.53]	0.313
No	73 (47.7)	33 (50.8)	40 (45.5)	1	
Drinking alcohol (before TB)*					
Yes	69 (45.4)	35 (54.7)	34 (38.6)	1.9 [1.1-3.68]	0.052
No	83 (54.6)	29 (45.3)	54 (61.4)	1	
Drinking alcoholic beverages (during TB disease period)					
Yes	59 (39.1)	31 (48.4)	28 (32.2)	2.0 [1.10-3.85]	**0.046**
No	92 (60.9)	33 (51.6)	59 (67.8)	1	
Drug use					
Yes	14 (9.2)	3 (4.6)	11 (12.6)	0.33 [0.09-1.25]	0.077
No	138 (90.8)	62 (95.4)	76 (87.4)	1	

Drinking alcoholic beverages (last 12 months before TB diagnosis, more than 4 times/month), Drug use (injecting, non-injecting, last 12 months)

Non-response: Alcohol consumption before TB (1), Alcohol consumption, period of TB disease (2)

Knowledge, diagnosis and addressability

The analysis revealed that the studied factors related to knowledge, diagnosis and addressability had no significant influence on the catastrophic expenditures related to resistant TB (Table 57).

Table 57. Catastrophic expenditures and determinants related to knowledge, diagnosis and addressability, resistant TB sample

Variable name	Total	Catastrophic spending			
	n (%)	>20% n (%)	<20% n (%)	OR [CI: 95%]	p
Total	153	65	88		
Integrated knowledge about TB transmission					
Correct	46 (33.8)	14 (25.0)	32 (40.0)	1	
Incorrect	90 (66.2)	42 (75.0)	48 (60.0)	2.0 [0.94-4.24]	0.100

Variable name	Total n (%)	Catastrophic spending			
		>20% n (%)	<20% n (%)	OR [CI: 95%]	p
Tuberculosis is treatable					
Yes	105 (74.5)	51 (86.4)	54 (65.9)	1	
Partially	28 (19.8)	7 (11.9)	21 (25.6)	0.3 [0.13-0.90]	0.068
No	8 (5.7)	1 (1.7)	7 (8.5)	0.1 [0.02-1.27]	0.100
Address after medical care*					
< 3 weeks	46 (56.1)	20 (54.1)	26 (57.8)	1	
≥ 3 weeks	36 (43.9)	17 (45.9)	19 (42.2)	1.1 [0.48-2.79]	0.735
Non-specific TB drug treatment**					
Yes	7 (17.5)	3 (42.9)	4 (12.1)	5.4 [1.87-33.7]	0.175
No	33 (82.5)	4 (57.1)	29 (87.9)	1	
Comes to private clinic					
Yes	4 (2.6)	3 (4.6)	1 (1.1)	4.2 [0.42-41.4]	0.312
No	149 (97.4)	62 (95.4)	87 (98.9)	1	
Disability grade for TB***					
Yes	37 (69.8)	19 (79.2)	18 (62.1)	2.3 [0.67-8.0]	0.235
No	16 (30.2)	5 (20.8)	11 (37.9)	1	

Non-specific TB drug treatment - non-specific treatments on the recommendation of a pharmacist, relatives or friends, from the onset of the first symptoms until the TB diagnosis is confirmed.

* Initial and intermediate treatment period sample; ** Initial treatment period sample;

*** Refer to the Disability and Capacity for Work Determination Council (53)

Non-Response: Integrated knowledge of TB transmission (17); Tuberculosis is treatable (12), Referral for care (10)

Epidemiological and clinical factors

Hospitalization and presence of chronic disease were determined as factors that could have an impact on catastrophic expenditure in resistant TB. Thus, hospitalization was associated with a significantly higher likelihood of catastrophic expenditure, with an OR of 7.3 and a p-value of 0.032. This suggests that those who were hospitalized were significantly more likely to incur catastrophic expenditures compared to those who were not hospitalized. In addition, the study estimated 3.8 more odds of experiencing catastrophic expenditures among those with chronic illnesses compared to those without chronic illnesses (p=0.001, Table 58).

Other factors analyzed, such as health insurance, type of case (new or recurrent TB), treatment regimen (short or long), bacteriologic confirmation, origin of outbreak, presence of TB in the household in the last two years, VST treatment, presence of adverse reactions, viral hepatitis B or C, diabetes mellitus and HIV co-infection, did not show statistically significant associations with catastrophic expenditure (p> 0.05, Table 58).

Table 58. Catastrophic expenditure and epidemiological and clinical factors, resistant tuberculosis sample

Variable name	Total n (%)	Catastrophic spending			
		>20% n (%)	<20% n (%)	OR [CI: 95%]	p
Total	153	65	88		
Health insurance					
Yes	90 (58.8)	39 (60.0)	51 (58.0)	1	
No	63 (41.2)	26 (40.0)	37 (42.0)	0.9 [0.47-1.76]	0.931
TB case type					
New case	105 (68.6)	44 (67.7)	61 (69.3)	1.2 [0.54-2.14]	0.967
Recurrent	48 (31.4)	21 (32.3)	27 (30.7)	1	
Treatment regime					
Short	98 (64.1)	39 (60.0)	59 (67.0)	1	
Lung	55 (35.9)	26 (40.0)	29 (33.0)	1.4 [0.65-2.78]	0.466
Bacteriologically confirmed					
Yes	149 (97.4)	63 (96.9)	86 (97.7)	0.7 [0.10-5.34]	1.000
No	4 (2.6)	2 (3.1)	2 (2.3)	1	
Hospitalized					
Yes	143 (93.5)	64 (98.5)	79 (89.8)	7.3 [1.9-59.07]	**0.032**
No	10 (6.5)	1 (1.5)	9 (10.2)	1	
Comes from the outbreak					
Yes	26 (17.0)	10 (15.4)	16 (18.2)	0.8 [0.34-1.94]	0.828
No	127 (83.0)	55 (84.6)	72 (81.8)	1	
TB in household, last 2 years					
Yes	7 (4.8)	2 (3.2)	5 (6.0)	0.52 [0.09-2.80]	0.699
No	139 (95.2)	60 (96.8)	79 (94.0)	1	
VST treatment					
Yes	22 (16.2)	7 (11.5)	15 (20.0)	0.5 [0.19-1.36]	0.243
No	114 (83.8)	54 (88.5)	60 (80.0)	1	
Side effects					
Yes	67 (43.8)	30 (46.2)	37 (42.0)	1.2 [0.61-2.25]	0.612
No	86 (56.2)	35 (53.8)	51 (58.0)	1	
Viral hepatitis B, C					
Yes	6 (4.3)	3 (5.2)	3 (3.7)	1.4 [0.27-7.38]	0.692
No	134 (95.7)	55 (94.8)	79 (96.3)	1	
Diabetes mellitus					
Yes	4 (2.8)	2 (3.3)	2 (2.4)	1.4 [0.19-10.20]	1.000
No	139 (97.2)	58 (96.7)	81 (97.6)	1	
HIV					
Positive	9 (5.9)	4 (5.7)	5 (5.7)	1.1 [0.20-5.28]	1.000
Negative	144 (94.1)	61 (93.8)	83 (94.3)	1	
Other chronic diseases					
yes	80 (52.3)	46 (70.8)	34 (38.6)	3.8 [1.84-8.11]	**0.001**
No	73 (47.7)	19 (29.2)	54 (61.4)	1	

Non-response: VST treatment (17), TB in household, last 2 years (7), Viral hepatitis B, C (13), Diabetes mellitus (10)

Perceived needs and recovery: determinants of catastrophic expenditures

The study focused on respondents' perceptions of the needs required to successfully complete treatment and their impact on catastrophic expenditures. The results revealed that the need for help with household activities had a significant impact on expenditures, with patients who considered this support necessary being 2.7 times more likely to encounter catastrophic expenditures (p=0.048). At the same time, other needs, although important to patients, did not have a significant impact on expenditures (Table 59).

Table 59. Catastrophic expenditures and respondents' perceptions of needs for successful completion of treatment, resistant tuberculosis sample

Variable name	Total	Catastrophic spending			
	n (%)	>20% n (%)	<20% n (%)	OR [CI: 95%]	p
Total	153	65	88		
Family support and encouragement					
yes	93 (60.8)	34 (52.3)	59 (67.0)	0.5 [0.27-1.04]	0.069
No	60 (39.2)	31 (47.7)	29 (33.)	1	
Financial resources for transportation to TB medical facilities					
Yes	48 (31.4)	20 (30.8)	28 (31.8)	0.9 [0.47-1.9]	1.000
No	105 (68.6)	45 (69.2)	60 (68.2)		
Free treatment for co-morbidities					
Yes	31 (20.3)	16 (24.6)	15 (17.0)	1.5 [0.72-3.51]	0.310
No	122 (79.7)	49 (75.4)	73 (83.0)	1	
A richer and higher quality nutrition					
Yes	84 (54.9)	38 (58.5)	46 (52.3)	1.3 [0.67-2.45]	0.512
No	69 (45.1)	27 (41.5)	42 (47.7)	1	
Being able to continue to support my family					
Yes	31 (20.3)	12 (18.5)	19 (21.6)	0.8 [0.36-1.84]	0.688
No	122 (79.7)	53 (81.5)	69 (78.4)	1	
Help with household activities					
Yes	17 (11.1)	11 (16.9)	6 (6.8)	2.7 [1.10-9.67]	**0.048**
No	136 (88.9)	54 (83.1)	82 (93.2)	1	
Receiving TB treatment at home					
Yes	27 (17.6)	11 (16.9)	16 (18.2)	0.9 [0.39-2.13]	1.000
No	126 (82.4)	54 (83.1)	72 (81.8)	1	

Respondents' perceptions of the major challenges encountered during treatment analyzed as determinants of catastrophic expenditures in the context of resistant TB revealed that certain challenges could influence these expenditures. Thus, abstinence from alcohol consumption (OR = 2.9, p = 0.013), hospitalization (OR = 2.6, p = 0.004) and daily visit to the medical unit for pill pick-up (OR = 2.4, p = 0.049, Table 60) were estimated to be more likely to encounter catastrophic expenditures.

Table 60. Catastrophic expenditures and respondents' perceptions of major challenges during tuberculosis treatment, susceptible tuberculosis sample

Variable name	Total n (%)	Catastrophic spending			
		>20% n (%)	<20% n (%)	OR [CI: 95%]	p
Total	153	65	88		
Quitting smoking					
Yes	55 (35.9)	20 (30.8)	35 (39.4)	0.7 [0.34-1.32]	0.307
No	98 (64.1)	45 (69.2)	53 (60.2)	1	
Abstinence from alcohol					
Yes	30 (19.6)	19 (29.2)	11 (12.5)	2.9 [1.26-6.61]	**0.013**
No	123 (80.4)	46 (70.8)	77 (87.5)	1	
Presence of adverse effects					
Yes	23 (15.0)	8 (12.3)	15 (17.0)	0.7 [0.27-1.72]	0.496
No	130 (85.0)	57 (87.7)	73 (83.0)	1	
Hospital admission					
Yes	71 (46.4)	39 (60.0)	32 (36.4)	2.6 [1.35-5.07]	**0.004**
No	82 (53.6)	26 (40.0)	56 (63.6)	1	
Lack of activity					
Yes	28 (18.3)	10 (15.4)	18 (20.5)	0.7 [0.30-1.65]	0.527
No	125 (81.7)	55 (84.6)	70 (79.5)	1	
Family support					
Yes	25 (16.3)	11 (16.9)	14 (15.9)	1.1 [0.45-2.55]	1.000
No	128 (83.7)	54 (83.1)	74 (84.1)	1	
Visiting the medical unit daily					
Yes	32 (20.9)	19 (29.2)	13 (14.8)	2.4 [1.15-5.27]	**0.049**
No	121 (79.1)	46 (70.8)	75 (85.2)	1	

The study analyzed the determinants of catastrophic expenditure in the context of treatment for susceptible TB, focusing on respondents' main concerns about life after treatment. The ability to continue the same profession after treatment was one of the factors investigated, and the results showed a significant difference. For those who felt that they would not be able to continue in the same profession, the odds of experiencing catastrophic expenses were estimated to be three times higher (OR=2.8, p=0.046). Other factors analyzed, such as concern that treatment might not be effective and refusing employment because of a history of TB, did not show a significant relationship (p>0.05, Table 31).

Table 61. Catastrophic expenditures and main concerns about life after treatment, resistant tuberculosis sample

Variable name	Total n (%)	Catastrophic spending			
		>20% n (%)	<20% n (%)	OR [CI: 95%]	p
Total	92*	39	53		
Treatment may not be effective					
Yes	44 (47.8)	16 (41.0)	28 (52.8)	0.6 [0.26-1.43]	0.296
No	48 (52.2)	23 (59.0)	25 (47.2)	1	
Refusal of employment due to TB history					
Yes	31 (33.7)	16 (41.0)	15 (28.3)	1.7 [0.73-4.22]	0.265
No	61 (66.3)	23 (59.0)	38 (71.7)	1	
Ability to continue the same profession (job)					
Yes	21 (22.8)	13 (33.3)	8 (15.1)	2.8 [1.10-7.67]	**0.046**
No	71 (77.2)	26 (66.7)	45 (84.9)	1	

* Initial and intermediate treatment period sample

Welfare and catastrophic spending

The study found a significant relationship between wealth level and catastrophic expenditures in the context of resistant TB. Results indicate a strong association between household wealth level and the odds of experiencing catastrophic expenditure. Households living in poverty were 5.2 times more likely (p = 0.009) and fairly poor households 3.4 times more likely (p = 0.044) to experience catastrophic expenditure compared to those not living in poverty (Table 62).

In terms of household wealth level, households with the poorest index had the highest odds of catastrophic spending (OR=9.5, p=0.001), followed by households with the average wealth index (23.5% of the sample) with significant odds of catastrophic spending (OR=6.2, p=0.002, Table 62).

Moreover, households in poverty according to the international extreme poverty index also had higher odds of catastrophic expenditures (OR=2.3, p=0.041, Table 62).

Table 62. Catastrophic expenditures and welfare level, resistant tuberculosis sample

Variable name	Total n (%)	Catastrophic spending			
		>20% n (%)	<20% n (%)	OR [CI: 95%]	p
Total	153	65	88		
Household material situation					
Living in poverty	38 (24.8)	23 (35.4)	15 (17.0)	5.2 [1.58-17.14]	**0.009**
Pretty poor	36 (23.5)	18 (27.7)	18 (20.5)	3.4 [1.10-11.2]	**0.044**
Not so good	57 (37.3)	19 (29.2)	38 (43.2)	1.7 [0.54-5.31]	0.525
Good situation	22 (14.4)	5 (7.7)	17 (19.3)	1	
Degree of nutrition					
Insufficient	62 (40.5)	34 (52.3)	28 (31.8)	3.0 [0.54-16.86]	0.359
Enough	61 (39.9)	22 (33.8)	39 (44.3)	1.4 [0.25-7.88]	>0.999
Good	23 (15.0)	7 (10.8)	16 (18.2)	1.1 [0.16-7.06]	>0.999
Very good or excellent	7 (4.6)	2 (3.1)	5 (5.7)	1	
Household wealth index					
Poorest household	29 (19.0)	19 (29.2)	10 (11.4)	9.5 [2.78-32.44]	**0.001**
Poor household	30 (19.6)	14 (21.5)	16 (18.2)	4.4 [1.32-14.50]	**0.025**
Medium index household	36 (23.5)	20 (30.8)	16 (18.2)	6.2 [1.95-20.01]	**0.002**
Wealthy household	28 (18.3)	7 (10.8)	21 (23.9)	1.7 [0.46-6.03]	0.646
Richest household	30 (19.6)	5 (7.7)	25 (28.4)	1	
Households in poverty					
Yes	40 (26.1)	23 (35.4)	17 (19.3)	2.3 [1.13-4.76]	**0.041**
No	113 (73.9)	42 (64.6)	71 (80.7)	1	

Health: medicines, medical tests, consultations; Clothing, footwear, etc.

Households in poverty: the international extreme poverty line according to the World Bank

DISCUSSIONS

Comprehensive study conducted in the Republic of Moldova, which determined the catastrophic expenses faced by households of susceptible and resistant TB patients in accessing health care services during the TB burden. The results of the study also provide a detailed picture of the profile of susceptible and resistant TB patients from various aspects, such as socio-demographic, well-being, epidemiological, clinical, but also perceptions, opinions on TB disease, all of which are analyzed, including through the prism of determinants that could influence the expenses associated with the burden of this disease.

Socio-demographic profile of the TB patient

In this context, the profile of the TB patient (susceptible and resistant) in the Republic of Moldova is as follows: the majority of patients are male, from rural areas and with an average age of 45-47 years. This trend is similar to that observed in other countries, such as India, where the prevalence of TB is higher among males and rural people[27].

Another aspect outlined in the TB patient profile is the level of education, with the majority of patients having incomplete secondary education and a significant proportion being unemployed. Migration and imprisonment in anamnesis were present in a small percentage of the respondents, but significant for understanding the social context of the patients. Studies show that education level, employment, migration and imprisonment can negatively influence behaviors and adherence to TB treatment[28–30].

Harmful behaviors are common among patients with both susceptible and resistant TB, with smoking and alcohol consumption being the most common behaviors observed, including in a study conducted in Russia[31]. Although the frequency of alcohol consumption decreased during treatment, alcohol consumption was present for the duration of treatment. These behaviors present risk factors that could negatively affect treatment adherence and therapeutic success[32].

Most patients hold essential documents such as identity cards and Moldovan citizenship. However, a significant proportion do not have a health insurance policy, and the lack of health insurance can be a barrier to accessing health services, as evidenced by the study in China, which showed that health insurance reduced catastrophic TB expenditure by 17%[33].

The impact of TB on the household welfare of TB patients is significant, worsening the material situation and increasing the proportion of poor households. Inadequate nutrition and high health expenditures are major problems affecting the quality of life of TB patients [17].

Knowledge, attitudes, addressability and diagnosis

The current study has shown that the physician remains the main source of TB information for patients with susceptible and resistant TB. However, patients with resistant TB are often less well informed about the disease, which can lead to delays in treatment and worsening of their health. Other sources of information, such as the media and online platforms, were mentioned less frequently, highlighting the need to diversify and intensify these channels. The literature includes the Malawi study which demonstrated that the combined use of interpersonal communication and the media increases the perception of TB risk, thus facilitating early diagnosis and effective treatment[34]. The WHO guidelines also emphasize that advocacy, communication and social mobilization campaigns are crucial for TB control, highlighting the need to diversify sources of information[35].

Knowledge of TB contagiousness was quite high in both groups of patients, recognizing TB as a contagious, airborne disease transmitted during coughing, demonstrating a high awareness of the need for strict adherence to treatment regimens, the importance of which was also highlighted in a study in India[36].

However, some misperceptions persist about the modes of TB transmission, such as transmission through handshaking, blood and sexual contact. It should be noted that prejudices and misperceptions about TB transmission are still common in many communities, underlining the importance of continued education and information campaigns[37–39].

The evolution of knowledge during treatment was more evident among patients with susceptible TB, where a significant increase in correct knowledge was observed after treatment completion. In contrast, patients with resistant TB did not show the same significant improvements. The level of TB knowledge among TB patients is variable, but continuing education can significantly improve knowledge and practices on prevention and control, emphasizes research conducted in Ethiopia[40].

Diagnosis and patient referral are essential processes for effective TB disease control and treatment. The study highlights that persistent cough is the main symptom that prompts patients to seek medical attention, regardless of whether they have susceptible or resistant TB. Although the symptoms were similar, there were differences in the duration and severity of symptoms in susceptible and resistant TB. The duration of persistent cough was slightly longer in susceptible TB, including more frequent weight loss and weakness. The comparative study in China showed that patients with susceptible TB may have more severe and longer-lasting symptoms than those with resistant TB[41].

Although cough and weakness are the main symptoms, there is a significant delay in seeking medical care, with most patients waiting more than three weeks, often due to lack of financial resources, fear of investigation and lack of time. Delay in seeking TB care is often attributed to financial constraints and fear of medical investigations, emphasized by other research[42,43] . These barriers need to be addressed through health policies that facilitate access to health services and reduce the stigma associated with TB.

Time to diagnosis - another critical aspect. Most patients with susceptible TB are diagnosed within 1-3 days, while patients with resistant TB can wait up to 7 days or more, due to the complexity of the tests required[44] . The study shows that although most patients were diagnosed with TB quickly, there is still room for improvement to reduce waiting times for all. A meta-analysis in 14 countries emphasizes the need to identify and address diagnostic

delays through personalized methods, outreach and education, ensuring universal access to health services to improve TB diagnosis and treatment [42].

There is a tendency for some patients to take non-TB-specific drug treatments at home, such as the use of broad-spectrum antibiotics, which can contribute to delays in correct diagnosis and the development of drug resistance[45]. It is essential that patients are educated to avoid self-medication and seek specialized care for appropriate treatment.

Tuberculosis treatment and adherence

The study shows a high hospitalization rate for both susceptible and resistant TB. The literature highlights pros and cons for hospitalization during TB treatment. The pros in most cases have been infection control[46], adequate monitoring of treatment[47] and management of complications[48], while the cons include high costs[47], psychological impact and social isolation[48]. In context, it emphasizes the importance of tailoring public health policies and health resources to effectively address the specific challenges of each type of TB. The meta-analysis included 16 studies from nine countries and compared community-based treatment with traditional hospitalization for patients with resistant TB showed that those who underwent treatment in the community-based regimen had a higher success rate and a lower failure rate compared with traditional hospitalization. Therefore, these results suggest that community treatment may provide an effective alternative to traditional hospitalization, improving treatment outcomes and reducing the burden on health systems[48].

Time of treatment initiation - another important aspect. Notable differences in the distribution of TB treatment initiation times are evident. The majority of patients with susceptible TB started treatment within the first few days, although some took up to a week or more, and for resistant TB, although many started treatments quickly, a significant proportion took up to a week or more. Data from the literature emphasize that delayed treatment initiation may be associated with greater clinical severity and higher infectiousness[49], and early treatment initiation may be associated with better treatment outcomes[50].

Pills taken monitoring is crucial for successful treatment. In the inpatient setting, almost all patients were assisted by medical staff, whereas in the outpatient setting, the proportion of those assisted was lower. This difference may influence treatment adherence, as direct supervision is associated with better compliance[51]. The observations of the present study underline the need for personalized treatment strategies that take into account the specificity of each patient, including through the implementation of additional support measures, such as the involvement of NGOs[52], but also the use video-assisted technologies[53,54].

Non-administration of TB medication for non-medical reasons is a significant problem. The most common reasons include forgetfulness, alcohol consumption, feeling unwell, being away from home, all of which are associated with non-adherence to treatment[55–58].

It is emphasized that medical staff required some respondents to bring TB pills to the village medical point from the district TB doctor office, which may lead to non-compliance and suboptimal results. This practice may also be perceived as an additional burden on the patient, negatively affecting motivation and adherence to treatment, according to the CDC self-study which emphasizes the importance of respecting patient rights, as well as TB confidentiality and easy access to medicines[59].

Side effects and other medical conditions

Adverse reactions to anti-tuberculosis drugs are common in both susceptible and resistant TB, with significant differences in their type and frequency, the most common being nausea, vomiting, diarrhea and gastric pain. The study in Ghana found that half of TB patients experienced at least one adverse reaction to TB drugs, the most common being gastrointestinal reactions[60]. In comparison, among resistant TB patients, a higher incidence of adverse reactions was observed in the first months of treatment, but a more pronounced decrease in the later months compared to susceptible TB patients[61]. This could suggest that treatment for resistant TB may initially be more difficult to tolerate and that patients adapt during treatment[62].

The study results confirm that TB is often associated with a range of other medical conditions, including HIV co-infection, viral hepatitis, diabetes mellitus and other chronic diseases, which in turn complicate TB treatment and management, requiring an integrated and multidisciplinary approach.

The high prevalence of TB-HIV co-infection, similar for both susceptible and resistant TB, highlighted in this study, underscores the mutual impact on disease progression and treatment. The effective management of HIV co-infection among TB patients is crucial to reduce the financial burden on the health care system and risks to patients[63].

The varying prevalence of viral hepatitis (B, C) among TB patients is similar to the literature, which specifies that these medical conditions can complicate TB treatment due to drug interactions, impact on liver function, and higher costs[64].

Diabetes mellitus is an important comorbidity that may negatively influence TB disease course and treatment, irrespective of the type of resistance of the disease. We observe that diabetes is significantly present among patients with both susceptible and resistant TB, with a slightly higher prevalence in susceptible TB. Concomitant management becomes essential to improve treatment outcomes but also to reduce costs[65].

A wide range of chronic diseases associated with TB, including cardiovascular, respiratory, gastrointestinal, infectious, renal, trauma, gynecologic, chronic hepatitis, oncologic, and occupational diseases, identified in the present study, underscores the complexity of TB management in the presence of multiple chronic conditions. Patients with TB and multiple comorbidities require a multidisciplinary approach to ensure effective treatment and to reduce the risk of complications and healthcare costs[66].

Trust in health systems

TB patients' trust in health services is crucial for adherence and treatment success. Factors such as trust in the pulmonary and general practitioner and satisfaction with TB services positively influence patient experiences and treatment outcomes.

Patients with susceptible TB had predominantly positive trust in the TB doctor, with a slight decrease towards treatment completion. For patients with resistant TB, confidence varied significantly, decreasing after treatment completion, possibly due to additional difficulties and negative experiences associated with prolonged treatment.

Trust in the family doctor was mostly positive, but slightly lower compared to that in the TB doctor. This is supported by research indicating that TB patients tend to trust TB doctors more than family doctors, due to perceived expertise and higher frequency of interactions. Patient-doctor trust is essential for positive patient experiences, but also for promoting adherence to treatment[67].

During the TB treatment, the satisfaction of both susceptible and resistant TB patients with health care services increased significantly, becoming more evident towards the end of treatment, which is directly related to treatment progress and improvement in patients' health status. Clearly, it is becoming evident that patient satisfaction is strongly correlated with the quality of care and positive treatment outcomes[67].

Perceptions of needs and returning to normal life after disease

Family support and encouragement, together with a richer and higher quality nutrition, are considered essential for the success of TB treatment for both susceptible and resistant TB[68–70]. The need for financial resources for transportation to TB medical facilities and the ability to follow treatment at home are also highlighted as essential needs, these could facilitate access to medical care and reduce the financial burden on patients[71,72].

Less commonly mentioned needs include being able to talk to other patients about TB disease, psychological counseling, and picking up medication after health unit working hours[73,74]. It is noteworthy that the opportunity to talk to other patients about TB disease is considered significant only in resistant TB, and the need for psychological counseling more pronounced in susceptible TB.

Other notable needs include free treatment for associated diseases, the ability to support one's family, help in the household and confidentiality of TB diagnosis. Free treatment for TB-related diseases is essential to ensure a full and effective recovery of patients, but also to improve the quality of life of patients, including contributing to effective control[75].

Confidentiality of diagnosis is essential as it helps prevent stigmatization and protect patients' privacy[76]. Household help emphasizes the need for help in managing daily tasks during treatment[70,72,77].

The major challenges encountered by patients were hospitalization[48], daily visits to the health unit and taking medication as recommended[78]. Patients with resistant TB face greater challenges including adverse effects of treatment[79].

Perceived needs and challenges highlight the significant impact of treatment on daily life and the need for interventions to facilitate adherence to treatment, but also the need for tailored interventions to address the specificity of TB type (susceptible or resistant). In this context, integrated approaches combining medical treatment with social and psychological support are crucial to improve treatment outcomes and ensure a better quality of life for patients.

Indirect costs associated with tuberculosis

TB diagnosis and treatment had a significant economic impact on both household income and the patient's personal income. Although both incomes decreased during treatment, the patient's income was more severely affected. The economic recovery after treatment completion is evident, but the patient's income did not fully return to baseline levels, highlighting the need for economic support measures during treatment but also after treatment completion[80]. In comparison, the average monthly patient income was drastically reduced in both cases, but recovery was slower for resistant TB patients. This suggests that patients with resistant TB face greater economic hardship and require more substantial financial support to return to their initial level of income[80,81].

Welfare payments played a crucial role in supporting patients during treatment, including temporary incapacity allowances and motivational support for treatment adherence, essential for maintaining a minimum level of economic well-being. The average value of these payments was higher for patients with resistant TB, reflecting the need for greater financial support due to the duration and complexity of treatment. Without this support, average monthly income drops significantly, affecting quality of life and the ability to follow appropriate treatment. Ensuring adequate welfare payments is therefore essential to help families cope with financial challenges and maintain economic stability during critical periods of treatment[82].

The significant differences in time lost in accessing health services between patients with susceptible and resistant TB highlight the additional burden of resistant TB. Patients with resistant TB lost significantly more time compared to those with susceptible TB, both in accessing health services and in picking up pills[83,84]. In this context, it highlights the need for targeted interventions, including financial support measures, facilitated access to health services and economic rehabilitation programs. These measures are essential to help patients, particularly those with resistant TB, to recover their income and improve their quality of life, thereby reducing the economic and social impact of the disease[82].

Both patients with susceptible and resistant TB lost hours of work due to the need to perform medical tests and investigations, resulting in loss of income. Lost hours of work were present both during the period of diagnosis and during treatment, being higher during the treatment period. Facilitating access to medical services by offering flexible medical appointments, including outside regular working hours, could reduce the loss of working hours and income losses of TB patients.

Indirect costs (lost income) associated with TB treatment reveal that indirect costs increased considerably as treatment progresses, being higher in the continuation period compared to the initial treatment period for both susceptible and resistant TB. In resistant TB, these costs are even higher (in monetary value), reflecting an additional economic burden throughout the duration of treatment. Compared to the study conducted in 2016 in the Republic of Moldova, indirect expenditures for resistant TB changed proportionally forming 40% and 60% for the initial and continuation period of treatment, compared to 30% and 70%[14].

In the same context, a study conducted in India showed that TB patients incur significant indirect costs, which are even higher for resistant TB patients[85]. In China, another study highlights that indirect costs accounted for a significant share of total costs for patients with susceptible TB, similar to the situation in Cairo, where indirect costs were significant, especially in the pre-treatment phase[86]. In Ethiopia and Peru, resistant TB patients had

even higher indirect costs, reflecting the additional economic burden of treatment[87,88]. These findings emphasize the major economic impact of TB treatment, particularly for resistant forms, and highlight the need for appropriate financial support strategies to ensure treatment adherence and economic stability for patients.

Indirect expenditures associated with TB disease differ significantly by socio-demographic factors. For susceptible TB, households with employed patients and those in urban areas had considerably higher expenditures than those in rural areas. For resistant TB, women (in the early stages of treatment), but also households with three or more persons and those with children under 18 years of age incurred higher indirect costs. Level of education was found to be a common determinant of indirect costs for both susceptible and resistant TB. A study conducted in Mozambique determining indirect costs associated with resistant TB showed that highly educated and employed patients had higher indirect costs due to significant loss of income[89]. At the same time a study in India shows that the indirect costs associated with TB were higher among rural households[90].

The results of the analysis highlight the profound impact that wealth and poverty have on TB disease expenditure. For both susceptible and resistant TB, the poorest households had much lower indirect expenditures compared to the richest households. This emphasizes the disproportionate economic burden for poorer households. Although absolute expenditures are lower for these households, the relative impact on their budget is much higher. In contrast, richer households, while having higher expenditures, can bear these costs more easily due to superior financial resources. These differences highlight the need for public health policies that address economic inequalities and provide adequate financial support to vulnerable households.

In the context of health insurance, insured patients incur higher indirect expenditures than uninsured patients, especially in the context of susceptible TB, which was not observed in the case of resistant TB. However, it is suggested that health insurance may influence the level of indirect expenditures, as this is driven by employment, and in the case of disease, it leads to loss of income.

The impact of hospitalization on indirect expenditure is evident in the study. For susceptible TB, patients hospitalized during treatment had significantly higher indirect expenditures than those who were not hospitalized. For resistant TB, although the differences are not statistically significant, the trend indicates that hospitalization may lead to an increase in indirect expenditure. In context, over-hospitalization may add significant additional indirect costs for patients[5]. The creation of community support and education networks for patients and their families could facilitate home treatment management and reduce the need for hospitalization.

Direct expenditures related to tuberculosis

Direct expenditures (medical and non-medical) represent a considerable economic burden, with significant variability for both susceptible and resistant TB. Medical expenditures, which include costs for investigations, tests, medicines and consultations, in the case of susceptible TB account for 43% of total expenditures. For resistant TB, these medical expenditures represent 36% of the total. On the other hand, non-medical expenditures, such as transportation and food, are even higher, accounting for 57% of total expenditures for susceptible TB and 64% for resistant TB. Other studies have confirmed these findings. For

example, a study in India showed that out-of-pocket medical expenditures account for 43% of total costs[91]. In a comparative study conducted in Ethiopia, which analyzed TB-related costs over two years, it was observed that direct medical expenditures increased from 12% to 30%, while non-medical expenditures decreased from 76% to 17%. These data reflect the variability and significant impact of non-medical costs in TB management[92].

The analysis of expenditures for medical investigations and tests for susceptible and resistant TB reveals several aspects. First, the prevalence of expenditures is low (7%) for both types of TB. This suggests that, in general, patients do not frequently incur costs for investigations. However, the diagnostic step proves to be the costliest for both types of TB, with a higher percentage for resistant TB (23%) compared to susceptible TB (17%). This could indicate that diagnosing resistant TB involves more complex investigations and therefore higher costs.

In general, the expenses incurred were for imaging (X-rays and CT scans), blood and urine tests, and in single cases for sputum examination, results similar to the results of the previous study[14]. The mode of payment was through formal channels, although there were also cases of informal payments. Although the expenses for investigations and tests are relatively low, they are significant and vary depending on the period of illness (diagnosis or treatment) and type of TB. The study also highlights unique cases of payment for medical consultation and provision of goods to medical staff. All this emphasizes the need to improve access and equity to health services for TB.

In the context of healthcare-seeking behavior and out-of-pocket medical expenditures, it is outlined that patients with susceptible TB incur higher costs for diagnosis at private clinics compared to those with resistant TB[93]. In contrast, expenditures for non-TB-specific treatments (on the recommendation of relatives and pharmacist) were considerably higher for patients with resistant TB. In both cases, emergency services and disability assessments did not generate direct expenditures, indicating possible uniformity in access to these services. However, the differences emphasize the need for health policies to address inequities in access and costs associated with TB treatment and diagnosis. Educating patients and the community about the importance of using specific treatments can help reduce the use of non-specific treatments.

Medicines to supplement TB treatment are essential for the management of adverse reactions and associated medical conditions, thus helping to improve the effectiveness of treatment and patients' quality of life[94,95]. The survey results show differences in the purchase of these drugs, highlighting that a higher percentage of patients with sensitive TB (36%) purchase them compared to those with resistant TB (28%).

It is important to note that the toxicity of drugs for TB treatment requires additional medication to cope with side effects[94], and this medication is usually provided free of charge only during hospitalization. However, our study shows that TB patients incurred expenses for medication for side effects throughout their treatment. These expenditures were significant in both types of TB, but higher for patients with sensitive TB in the first months of treatment, probably because they are hospitalized at a lower rate and for a shorter duration. Medicines for associated medical conditions were more prevalent during the continuation period for susceptible TB, whereas for resistant TB there was no significant variation between treatment periods, as they were needed throughout the treatment. Vitamin procurement was in a similar proportion in both groups, indicating a constant need for supplementation throughout treatment. In this context, it is essential to monitor and reduce the economic burden on

patients, particularly in the first months of treatment, when expenditure on drugs for adverse reactions is highest.

Non-medical expenditures (for utilities, transportation and food) represent an additional burden on top of medical expenses, directly affecting patients' well-being in the context of both susceptible and resistant TB. Patients incurred expenditures for food, personal hygiene products and other items needed during hospitalization, similar to the results of the previous study, where 20% of the inpatient phase expenditures were for utilities[14]. The average expenditure on these items was significant, reflecting the need to cover additional costs on top of medical expenses. Transportation costs were also considerable, both for patients' travel to and from hospital and consultations and for visits by family members. These expenses increased as treatment progressed, highlighting the cumulative financial burden on households. A study from Ethiopia, reveals reduced indirect expenditures in the continuation phase of treatment compared to the initial phase[92].

In this context, a significant proportion of patients faced out-of-pocket expenses (60% for susceptible TB and 54% for resistant TB). To cover these expenses, both for susceptible and resistant TB, households had to resort to various ways of financially covering the costs of TB diagnosis and treatment. Household savings and earned income such as salaries, scholarships and allowances were the main sources of financing. In other cases households resorted to selling agricultural goods and products, borrowing, and receiving money in the form of gifts from people outside the household. All this highlights the significant financial impact that TB imposes on patients and their households.

Catastrophic spending

The current study has highlighted the significant financial impact of TB on households in the Republic of Moldova, both for susceptible and resistant TB. Catastrophic expenditures, defined as exceeding 20% of annual household income[6], were common in both cases, highlighting the economic burden that the disease imposes. Thus, for patients with susceptible TB, almost half of households (48%) experienced catastrophic expenditure. This high percentage indicates that although treatment for drug-sensitive TB may be more affordable than treatment for drug-resistant TB, the associated costs still remain a significant burden for many households. In the case of resistant TB patients, 43% of households exceeded the catastrophic expenditure threshold of 20%. Although this percentage is slightly lower than for susceptible TB, the financial burden remains considerable.

According to literature sources that have analyzed the expenditures incurred by people with TB it was found that a significant percentage of households faced catastrophic expenditures. For resistant TB, these proportions were 45% in India[91], 44% in Ethiopia[92], 87% in Vietnam[96], 40% in Papua New Guinea[97], 66% in Bangladesh[98]. For susceptible TB, 27% of households in Kenya and 50% of households in Bangladesh reported catastrophic expenditure[93,98].

The study conducted in the Republic of Moldova in 2016 that assessed catastrophic expenditures among households with resistant TB patients found that 30% of households faced such expenditures[14]. The present study, however, shows an increase in catastrophic expenditures for resistant TB. In contrast, a two-year study in Ethiopia showed a reduction in catastrophic costs from 65% to 44%[92] for resistant TB. Similarly, another comparative

study conducted in India for resistant TB showed an increase in costs from 35%[99] to 45%[91] over five years.

This study also highlights the extreme expenses faced by TB patient households. More than a third (35%) of households with susceptible TB and about a quarter (25%) of those with resistant TB had expenditures that exceeded 30% of their income. In addition, expenditures exceeding 60% of income were reported for both susceptible TB (10%) and resistant TB (2.6%). A meta-analysis that included 29 articles focusing on the catastrophic costs of TB highlighted several countries where catastrophic expenditures exceeded 30% of annual income, including Indonesia, Cambodia, Vietnam and Egypt[100].

The study emphasizes the importance of socio-demographic factors in determining TB-related catastrophic expenditure in both forms of the disease. Households with primary-educated or uneducated patients are about five times more likely to experience catastrophic expenditure[96]. Similar to the results of the previous study, employment status appears to have a major impact: households with respondents who are not employed or in other forms of employment are at much higher risk of catastrophic expenditure[14]. In the case of resilient TB, rural households become more vulnerable to catastrophic expenditures and are more likely to face such expenditures[101]. Marital status also plays an important role, with unmarried people at higher risk of facing catastrophic expenditures, similar to the results of the previous study[14]. In addition, households with persons under 18 years are more vulnerable. While there are similarities between susceptible and resistant TB, the magnitude of the impact of different factors varies, highlighting the need for tailored interventions to reduce the economic burden on patients. It is essential to pay particular attention to households with low levels of education, those with unemployed patients, and those in rural areas to ensure equitable access to health services and minimize the financial impact of the disease.

In TB-affected households, harmful habits can have a significant impact on catastrophic expenditures. Among these, alcohol consumption seems to play an important role; while smoking and drug use do not seem to have a notable influence. Alcohol has a consistent effect on expenditures, doubling the chances of households to face such costs in both susceptible and resistant TB. This suggests that interventions to reduce alcohol consumption among TB patients could help to mitigate the catastrophic expenditure associated with the disease. It should also be noted that excessive alcohol consumption is a major risk factor for TB associated with unfavorable TB treatment outcomes[102]. Although smoking and drug use have not shown a significant influence, it is important to continue monitoring these factors to fully understand their potential impact.

Determinants of TB knowledge, as well as addressability for health care, emphasize the importance of addressability in coping with catastrophic expenditure. Thus, respondents who sought medical care more than three weeks after the onset of symptoms were significantly more likely to face catastrophic expenditure in the case of susceptible TB. Other factors analyzed, such as the presence of degree of disability, integrated knowledge of TB transmission, perception of treatability of TB treatment, adherence to non-TB-specific drug treatment, and referral to private clinics, did not have a significant impact on catastrophic expenditure. In context, to reduce catastrophic expenditure in TB-affected households, it is essential to promote early health care seeking and to continue to educate the population about TB disease.

Similar to the results of the previous study conducted in the Republic of Moldova, hospitalization is a major determinant of catastrophic expenditure for TB-affected households, for both susceptible and resistant TB. Households with hospitalized patients were significantly more likely to incur such expenditures[14]. Results from other studies show that hospitalization increases the risk of catastrophic expenditures. For example, a study in China found that 58% of TB patients were hospitalized, and hospitalization was associated with catastrophic costs in 37% of households[103]. Another study in Vietnam showed that hospitalization and loss of income were major determinants of catastrophic expenditure among households affected by resistant TB[96]. These findings highlight the significant financial impact of hospitalization on TB-affected households and the need for health policies to reduce these costs.

The presence of chronic disease is also an important factor influencing catastrophic expenditure in TB-affected households. Households with members suffering from chronic diseases were significantly more likely to incur catastrophic expenditures compared to those without such conditions. This emphasizes the need for targeted interventions for effective chronic disease management among TB patients[95].

Although the study did not find statistically significant associations between catastrophic expenditure and other factors analyzed, such as health insurance, type of TB case (new or recurrent), treatment regimen (short or long), bacteriological confirmation, origin of outbreak, presence of TB in the household in the last two years, VST treatment, presence of adverse reactions, viral hepatitis B or C, diabetes mellitus and HIV co-infection, it is nevertheless important to continue to monitor these factors. This will help to develop more effective and personalized interventions that better respond to patients' needs and contribute to reducing catastrophic expenditures.

Analysis of respondents' perceptions of the needs required to successfully complete treatment in relation to catastrophic expenditures revealed several key determinant factors. In the case of susceptible TB, perceptions of the need for financial resources for transportation to medical facilities, the need for free treatment for comorbidities, and the possibility of receiving treatment at home are significant determinants of expenditure. In contrast, for resistant TB, the perceived need for help with household activities has a significant impact on catastrophic expenditures, with patients who perceive this support as necessary being more likely to incur such expenditures.

Major challenges encountered during treatment, such as hospitalization and daily visits to the medical point for pill pick-up, significantly influence catastrophic expenditures in both susceptible and resistant TB. Also, abstinence from alcohol consumption in resistant TB had a significant impact on catastrophic expenditures.

In terms of life after TB treatment, the ability to continue in the same profession is an important determinant for both types of TB. Those who feel that they will not be able to continue in the same profession are more likely to face catastrophic expenses, underlining the need for reintegration support.

An important factor that could influence catastrophic expenditures is the level of nutrition[9]. Undernourished households are more prone to catastrophic expenditures for susceptible TB, which was not observed for resistant TB.

The relationship between welfare level and catastrophic expenditures in susceptible and resistant TB is a key issue analyzed in this study, highlighting the significant influence of household welfare on the likelihood of encountering such expenditures. The study conducted in the Republic of Moldova in 2016 highlighted the link between TB-associated catastrophic expenditures and poverty[8]. The results of the present study reveal that in both forms of TB, poor households (based on patient perception) are significantly more likely to incur catastrophic expenditures compared to those with better material well-being. The Welfare Index confirms that the poorest households are the most affected in both susceptible and resistant TB. Also, households in extreme poverty, as per the international threshold set by the World Bank (USD 2.15 per person/per day), are more likely to experience catastrophic expenditures, also demonstrated in the 2016 study[14]. The significant influence of household well-being on the likelihood of experiencing catastrophic expenditure in the context of TB has been demonstrated in several studies. Studies in India and Kenya have shown that households with low levels of wellbeing are about five times more likely to experience TB-related catastrophic expenditures[91,93], and the Cairo study found that lower-income households are significantly more likely to incur catastrophic expenditures, particularly in the case of resistant TB[86].

STUDY LIMITATIONS

In the survey, income and expenditure data were self-reported by respondents, which may be a significant limitation. Another limitation of the study was that it was conducted by sub-samples, which necessitated estimating data for the entire sample based on self-reported information for sub-samples or treatment periods. The study also had limitations in terms of calculating income from TB patient support according to the degree of disability. These limitations highlight the need for more precise methods of data collection and analysis to obtain more accurate and reliable results.

CONCLUSIONS

1. The study revealed the significant financial impact of TB (susceptible and resistant) on households in the Republic of Moldova. Catastrophic expenses, defined as exceeding 20% of annual income, were incurred by 48% of households with susceptible TB patients and 43% of those with resistant TB. A significant proportion of households faced extreme catastrophic expenditures, exceeding 60% of annual income (10% for susceptible TB and 2.6% for resistant TB).
2. The determining factors in facing catastrophic expenditures were:
    a. Susceptible TB: Persons with primary education or no education, not employed, excessive consumption of alcoholic beverages during the period of TB disease, persons who have been receiving non-TB specific drug treatment until diagnosis, hospitalized persons suffering from chronic diseases, households with low welfare and households in poverty, but also people who perceived the following needs (need in financial resources for transportation to TB medical facilities, need for free treatment for comorbidities, need to receive TB treatment at home, need to be hospitalized, need to visit the medical unit daily)
    b. Resistant TB: people from rural areas, primary education or no education, not employed, one person in the household, presence of persons aged <18 years old in the household, excessive consumption of alcoholic beverages during the period of TB disease, hospitalized persons, persons suffering from chronic diseases, households with a low level of well-being and households in poverty, as well as persons who perceived the following needs (need for help in household activities, abstinence from alcohol consumption, need to be hospitalized, need to visit the medical unit daily, ability to continue the same profession or trade)
3. Direct expenditures (medical and non-medical) were faced by 60% of TB-affected households, and 54% of those affected by resistant TB. Households had to resort to savings, income from salaries, scholarships and allowances, sale of agricultural goods and products, loans and gifts to cover these expenses.
4. Indirect costs associated with TB treatment increased considerably as treatment progressed, being higher in the continuation period compared to the baseline period for both susceptible and resistant TB. Indirect costs were 60% for the baseline period and 40% for the continuation period.

5. There was a significant economic impact of TB diagnosis and treatment on household and patient income. Household income declined during treatment, patient income was very severely affected and did not fully return to baseline after completion of treatment. Economic recovery was slower for resistant TB patients.

6. Welfare payments have been essential to support patients during TB treatment, especially for those with resistant TB, due to the duration and complexity of treatment. These payments have helped to maintain a minimum level of economic well-being, preventing significant drops in income and ensuring treatment adherence.

7. The results of the study determined significant differences in time lost in accessing care between patients with susceptible and resistant TB, highlighting the additional burden of resistant TB.

RECOMMENDATIONS

1. To minimize the significant financial impact of TB on households, it is recommended to develop and implement financial assistance programs dedicated to TB-affected households to cover part of the medical and non-medical expenses.
2. Expand social care programs for people affected by TB.
3. Development of educational and support programs for people with primary education or without education, those in rural areas, promoting employment and reducing alcohol consumption.
4. Ensuring free access to specific treatments for side effects and comorbidities.
5. Facilitation of transportation to medical facilities by covering transportation costs, widespread implementation of the VST program, implementation of telemedicine solutions for remote patient monitoring.
6. Development and implementation of job reintegration programs for TB patients, including vocational training and job-finding support, including offering financial incentives for employers who hire recovered TB patients.
7. Expand and strengthen welfare payment programs for TB patients. These programs should include ongoing financial support throughout the duration of treatment and monitoring of treatment adherence.

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