



## BIOLOGICAL CHARACTERISTICS OF THE CAUSATIVE AGENT OF TUBERCULOSIS IN PATIENTS WITH PULMONARY TUBERCULOSIS

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### Abstract:

This paper presents the materials of microbiological studies of 449 bacteria-releasing bacteria tested for DST and who were hospitalized for various forms of pulmonary tuberculosis. When analyzing resistant strains of MBT, it was found that 50 (17.5%) were mono-resistant, 76 (26.7%) strains of MTB were poly-resistant, i.e., resistant to at least two anti-tuberculosis drugs and 159 (55.8%) were multi-resistant. **Conclusions:** A high percentage of primary drug resistance was established: MBT with multidrug resistance were identified in 38 (44.7%) previously untreated patients. Most of the isolated strains of mycobacterium had drug resistance simultaneously to 3-4 drugs.

**Keywords:** Tuberculosis, Drug Resistance, MDR, Mono-Resistance.

Over the past 10 years in the Republic of Uzbekistan, thanks to large-scale anti-tuberculosis measures, there has been a stabilization and decrease in morbidity and mortality from tuberculosis. However, at present, for Uzbekistan, as well as for many countries of the world, the problem of drug-resistant tuberculosis is of great importance.

### MATERIAL AND RESEARCH METHODS.

This paper presents the materials of microbiological studies of 449 bacteria-releasing bacteria tested for DST and who were hospitalized for various forms of pulmonary tuberculosis. Of these, 148 (33%) were newly diagnosed and 301 (67%) were re-treated, who were hospitalized in 2012. There were 344 (76.6%) men and 105 (23.4%) women between the ages of 20 and 70. The distribution of patients by clinical forms of tuberculosis is presented in table . No. 1.

Table No. 1  
Clinical forms of pulmonary tuberculosis

Tuberculosis form	Number of patients	%
Infiltrative	271	60,4
Fibrous-cavernous	74	16,5
Disseminated	40	8,9
Focal pulmonary tuberculosis	23	5,1
Tuberculoma	22	4,9
Cavernous	13	2,9
Exudative pleurisy	3	0,7
Meningitis	1	0,2
Tuberculosis of the intrathoracic lymph nodes	2	0,4
<b>Total</b>	<b>449</b>	<b>100</b>

The data given in the table indicate the severity of the clinical manifestations of the process in the surveyed contingent and the prevalence of

acute common forms of tuberculosis with disintegration and seeding.



The sputum of patients was subjected to repeated bacterioscopic and cultural studies at the time of admission to the hospital, and then periodically during treatment. The multiplicity of the study ranged from 1 to 12 times.

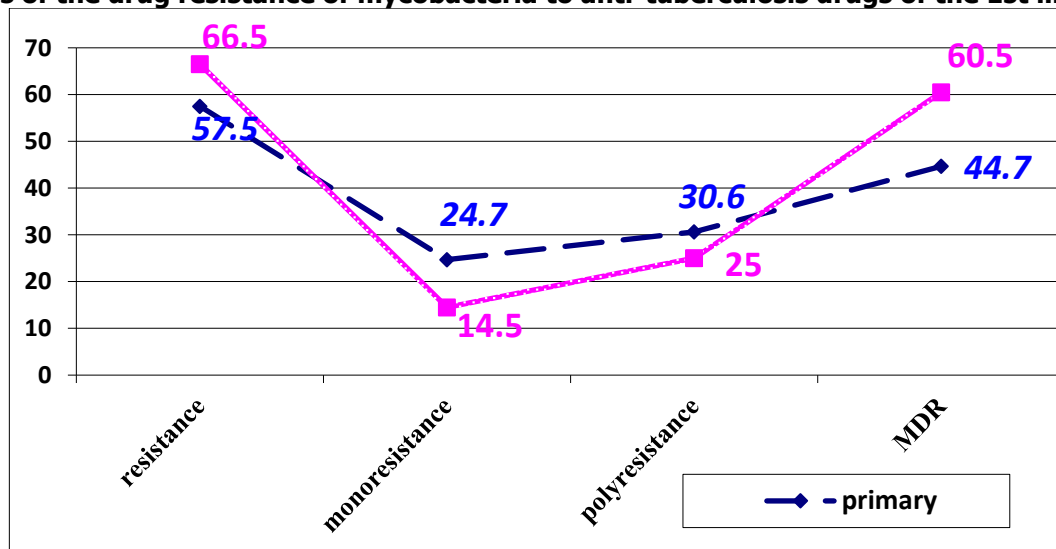
**RESEARCH RESULTS.**

Analysis of anamnestic and epidemiological data made it possible to establish that 98 (21.8%) patients among the surveyed contingent had contact with tuberculosis in the focus of infection.

The method of inoculation of Mycobacterium tuberculosis (MTB) was detected in all 449 patients, of which 285 (63.5%) were found to be resistant to one or more drugs. Primary drug resistance was detected in 85 (57.5%) patients, repeated DR - in 200 (66.5%).

When analyzing resistant strains of MBT, it was found that 50 (17.5%) were mono-resistant, 76 (26.7%) strains of MTB were poly-resistant, i.e. resistant to at least two anti-tuberculosis drugs and 159 (55.8%) were multi-resistant. (fig. 2).

**Analysis of the drug resistance of mycobacteria to anti-tuberculosis drugs of the 1st line Fig . 2**



Mono-resistance among newly diagnosed patients is due to high resistance to streptomycin (tab. No. 2), which is apparently associated with the widespread use of streptomycin in institutions of the general medical network.

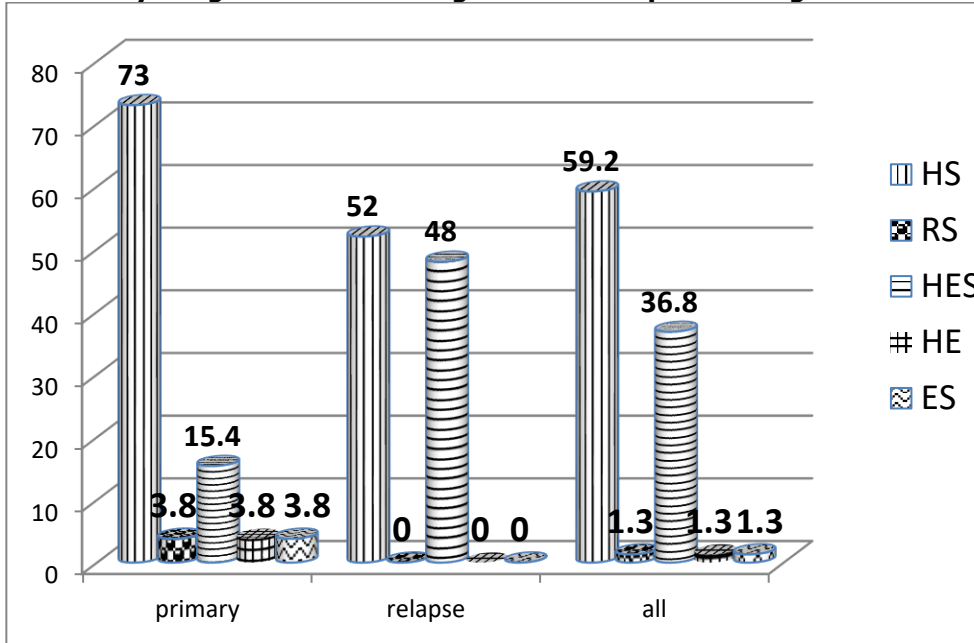
Among repeated patients, the main percentage of resistance is formed by streptomycin and isoniazid.

**Monoresistance among tuberculosis patients tab. №2**

	Total patients		S		H		R		E	
	number	%	n	%	n	%	n	%	n	%
<b>Primary</b>	21	42	16	76.2	3	14.3	1	4.7	1	4.7
<b>Repeated</b>	29	58	18	62	10	34.5	1	3.4	0	0
<b>Total</b>	50	100	34	68	13	26	2	4	1	2

Among poly-drug resistant forms, drug resistance to HS was most often noted - in 73 (96.0%) of 76 patients, and in 28 of these cases it was combined with resistance to ethambutol ( Fig . 2 ) .

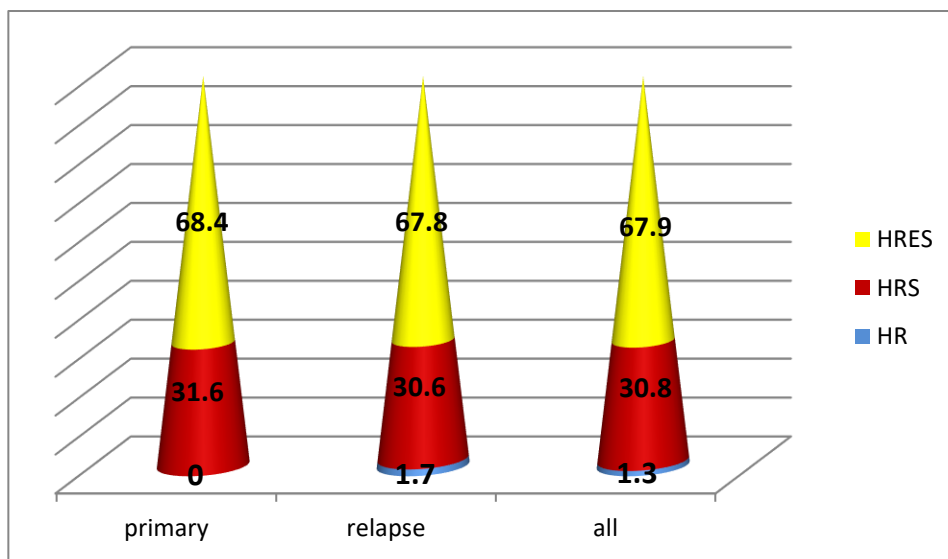
**Poly-drug resistance among tuberculosis patients Fig . No. 2**



Most of the isolated MTB strains, despite the fact that the patient was detected for the first time or re-treated, had drug resistance simultaneously to 3 or even 4 drugs (Fig. No. 3). Most often, resistance to the main most effective chemotherapeutic agents was noted: streptomycin, isoniazid, rifampicin - in 49

patients (30.8%) and streptomycin, isoniazid, rifampicin and ethambutol - in 108 (67.9%) patients. Such a high percentage of drug resistance of mycobacteria significantly complicates the selection of adequate chemotherapeutic regimens and is very unfavorable in prognostic terms.

**Multidrug resistance among tuberculosis patients fig. 3**



To characterize the characteristics of the mycobacterial population and the degree of treatment effect on it, a correlation analysis of the

massive bacterial excretion and the rate of MBT growth in the course of intensive chemotherapy was carried out. In 296 (65.9%), i.e. In more than half of



the patients under observation, a massive increase in MBT was obtained with the primary culture. The massiveness of growth in most observations correlated with the growth rate. So, the duration of the growth of mycobacteria with their massive isolation ranged from 20 to 30 days and averaged  $27.8 \pm 3.4$  days. At the same time, with poor growth, there was a clearly pronounced tendency of slow growth: the growth of mycobacteria visible to the eye appeared on nutrient media 31-85 days after sowing (on average,  $67.6 \pm 5.2$ ).

Analysis of the massiveness and growth rate of mycobacteria in the course of massive combined anti-tuberculosis therapy showed that already after 7-10 days of chemotherapy, there is a pronounced decrease in the massiveness of the mycobacterial population excreted by patients and a sharp slowdown in its growth rates. Under the influence of chemotherapy, the rapidly growing part of the mycobacterial population loses its ability to grow on nutrient media, and only in more distant periods it is possible to obtain the growth of a microbial population that is scarcer in quantitative terms and retains its viability.

Thus, the growth rate of MTB on nutrient media, studied in the dynamics of chemotherapy, is a kind of control and prognostic indicator in assessing the effectiveness of chemotherapy.

These data indicate a high prevalence of multidrug-resistant MTB among the surveyed contingent of patients and indicate their great epidemiological danger.

General practitioners and especially phthisiatricians should remain highly alert about the possibility of such an infection and maximize its early detection and treatment. It is very important to actively identify patients with multidrug resistance in risk groups, especially among the homeless, refugees, as well as those who were in direct contact with patients who excrete multidrug-resistant MTB. The treatment prescribed for such patients must be strictly controlled.

#### **CONCLUSIONS:**

1. A high percentage of primary drug resistance was established: MBT with multidrug resistance were identified in 38 (44.7%) previously untreated patients.

2. Most of the isolated strains of mycobacterium had drug resistance simultaneously to 3-4 drugs. Most often, resistance to the main most effective anti-tuberculosis drugs was noted: isoniazid, rifampicin, streptomycin.

3. Multidrug-resistant MBT accounted for 26.7% among the cultures of mycobacteria, which indicates the difficulty of selecting an adequate chemotherapeutic tactics.

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