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THE LONG-TERM IMPACT ON PATIENTS WITH MDR-TB USING THE SAINT GEORGE'S RESPIRATORY QUESTIONNAIRE

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ABSTRACT

Background: Multidrug-resistant tuberculosis (MDR-TB) continues to be a global health catastrophe. This prospective study examines the subjective impact of the disease as experienced by patients using the Saint George's Respiratory Questionnaire. Methodology: The study involved 244 patients diagnosed with drug-sensitive and drug-resistant pulmonary tuberculosis over a 10-year years. These patients were administered the Saint George's Respiratory Questionnaire, which was evaluated in comparison between the two groups to determine the progressive impact of disease in patients with MDR-TB compared to patients with drug-sensitive tuberculosis (DS-TB). Results: The analysis showed that patients with MDR-TB had statistically significantly higher symptomatic activity and impact scores compared to patients with drug-sensitive tuberculosis. Conclusions: The results suggest that patients diagnosed with MDR-TB at different stages of disease progression need urgent attention from healthcare providers.

Keywords: Multidrug-resistant tuberculosis, Saint George's Respiratory Questionnaire, Koch's bacilli

INTRODUCTION

Multidrug-resistant tuberculosis (MDR-TB) continues to be a global health catastrophe. This disease is challenging to control therapeutically but can be cured with the right choice of treatment regimen (1). In early 2021, the World Health Organization (WHO) published a report on the epidemiology of MDR-TB, concluding that MDR-TB remains a significant risk for morbidity and mortality worldwide (2). MDR-TB can be categorized into pre-extensively drug-resistant TB (pre-XDR-TB) and, finally, TB resistant to all priority A drugs and fluoroquinolones (XDR-TB) based on antimicrobial susceptibility. Unfortunately, these infections are increasingly difficult to eradicate and have a negative prognosis for the further course of the infected patients (3).

Over time, the negative impact of respiratory disease on an individual's quality of life has been increasingly recognized, and patient-reported health status is a predictive marker of other outcomes, including mortality, hospitalizations, and readmissions for various lung diseases (4, 5). Among the many questionnaires developed, the Saint George's Respiratory Questionnaire (SGRQ) is one of the most widely used questionnaires to assess the subjective impact of the disease by analyzing the progression of

symptoms, activity, and the effect of the disease on life (6).

Currently, there is little research on the subjective analysis of the symptoms, activity, and impact experienced by patients with drug-susceptible tuberculosis (DS-TB) and MDR-TB, especially in areas with high epidemiology of infection, which includes our country, Romania.

Our study aimed to assess and compare the mental health status of patients with drug-sensitive TB and MDR-TB as evaluated by the Saint George's Respiratory Questionnaire (SGRQ) in the Dobrogea region, Romania.

Matherial and methods

A prospective cross-sectional observational study was conducted over approximately ten years, from 2010 to 2020, in the Romanian region of Dobrogea, an area with a high incidence of Mycobacterium tuberculosis infections. The approval of the ethics committee was required to conduct the study. The 244 subjects were patients hospitalized at the Clinical Pneumology Hospital of Constanța and patients from the territorial specialty outpatient clinic who were diagnosed positive by sputum testing for Koch's bacilli. Based on the results obtained, further genetic tests were performed to determine chemosensitivity to certain drugs, and the patients were then divided into two groups: 149 (66.51%) in the drug-sensitive tuberculosis group and 75 (33.48%) in the pre-XDR-TB and XDR-TB multi-resistance group. Depending on which group they belonged to, the subjects were dynamically monitored by repeating sputum examinations, taking biological samples to rule out any side effects after treatment, and taking chest X-rays, with the therapeutic approach adjusted accordingly.

After completion of treatment, the quantification of subjective morbidity was essential for evaluating the clinical management of patients diagnosed with tuberculosis. Therefore, the simplified version of the SGRQ, translated and validated in Romanian, was the main instrument used in the study. It is a self-administered questionnaire with 50 questions mainly related to three domains: Symptomatology (8 items), Activity (16 items) and Impact (26 items). The symptom domain includes eight questions about the disease state, such as cough, excessive sputum production, and dyspnea. The activity domain can be divided into two main groups: seven variables on activities that cause breathing difficulties and nine on activity limitations. In the impact domain, the 26 questions mainly relate to the Impact of the disease on social and emotional functioning. The scores of the variables in each domain were summed, and the final product represents a percentage of the overall deterioration in quality of life, with higher scores indicating a lower quality of life.

This study aimed to determine the subjective effects on patients diagnosed with drug-susceptible and MDR tuberculosis and then to compare these results according to the stage of the disease. The statistical analysis was performed using the SPSS program. The mean and standard deviation were used for numerical variables, while the number and percentage were used to describe qualitative variables.

Results

The study cohort consisted of 244 patients diagnosed with tuberculosis, 33.48% with MDR-TB and 66.51% with drug-sensitive tuberculosis, with a mean age of 52 years. Regarding the distribution by environment and gender, 82 male patients (67.2%) and 40 female patients (32.8%) were from urban areas, while 74.5% of males and 25.5% of females were from rural areas.

Statistical differences were observed in the confirmation of HIV infection, with 218 patients (97.3%) testing negative and 2.7% testing positive. In terms of disease progression, 118 patients with drug-sensitive TB (79.2%) and 56 patients with MDR-TB (75.7%) were declared cured after treatment, 14.8% with drug-sensitive TB and 1.4% with MDR had completed treatment, 1.3 % with non-MDR and 12.2 % with MDR discontinued treatment, 1.3 % with non-MDR and 2.7 % with MDR were lost to follow-up, and finally 3.4 % with drug-sensitive TB and 8.1 % with MDR were declared deceased.

Symptom Score

For the symptom score, the mean score was statistically significantly lower for non-MDR-TB

patients compared to MDR patients (p<0.001), with a mean difference of 22.5 points and a 95% confidence interval for the difference between 19.9 and 25.1 points.

Table 1- SGRQ – Symptom Score

Status MDR	Non-MDR	MDR	Total
N	149	75	224
Mean	42.08	64.59	49.62
SD	9.22	9.456	14.12
Median	42.05	64.43	46.76
Range	48.47	43.98	61.19
Minimum	23.7	40.91	23.7
Maximum	72.17	84.89	84.89

Regarding the distribution of the data, it should be noted that two groups of symptom score values are more frequent in MDR patients, namely 55-59 points and 65-69 points. A frequency peak in the range of 35-39 points was observed in non-MDR patients.

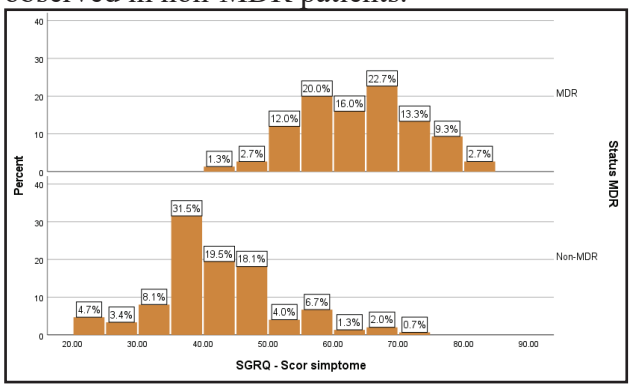


Figure 1 Distribution of TB and MDR-TB patients by symptom score

Activity Score

Regarding the activity component score, significantly lower values were observed in non-MDR patients (p<0.001).

Table 2 SGRQ – Activity Score

Status MDR	Non-MDR	MDR	Total
N	149	75	224
Mean	41.52	70.26	51.14
Std. Deviation	18.02	23.79	24.25
Median	37.15	80.40	43.97
Range	74.41	76.63	88.54
Minimum	6.21	18.12	6.21
Maximum	80.62	94.75	94.75

Regarding the distribution based on the score obtained, it can be seen that in MDR patients, the highest percentage of patients have high scores (about 50% have scores above 80). In contrast, the SGRQ activity score in non-MDR patients has lower values, distributed approximately evenly between 10 and 70 points.

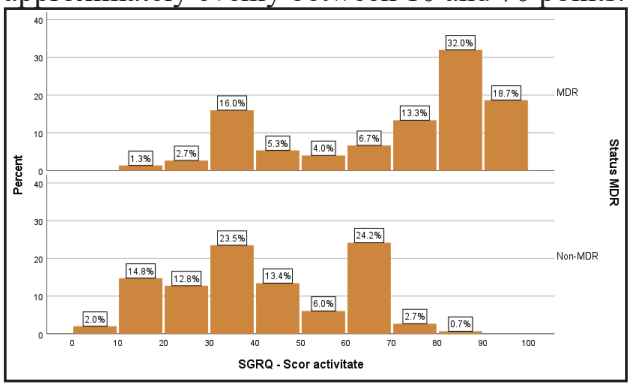


Figure 2 *Percentage distribution of TB and MDR-TB patients in terms of activity score*

The comparison of the ranks (the data are not normally distributed) shows that the SGRQ activity score has a significantly lower mean rank in non-MDR patients (88.92 vs. 159.35).

Impact Score

Lower values are also observed for non-MDR patients in the SGRQ impact score, although the differences are smaller, at an average of 6.04 points.

Table 3 SGRQ – Impact Score

Status MDR	Non-MDR	MDR	Total
N	149	75	224
Mean	33.09	39.14	35.11
Std. Deviation	15.88	17.60	16.68
Median	37.67	42.29	38.10
Range	95.13	80.74	95.13
Minimum	1.98	10.09	1.98
Maximum	97.11	90.83	97.11

Figure 3 shows the distribution of patients according to the study group and the impact score of the SGRQ questionnaire. In the non-MDR patients, the majority of patients have scores below 60 but above 40. In the MDR patients, the distribution is more even, with two frequency peaks for scores between 10 and 19 points and 40-49 points, respectively.

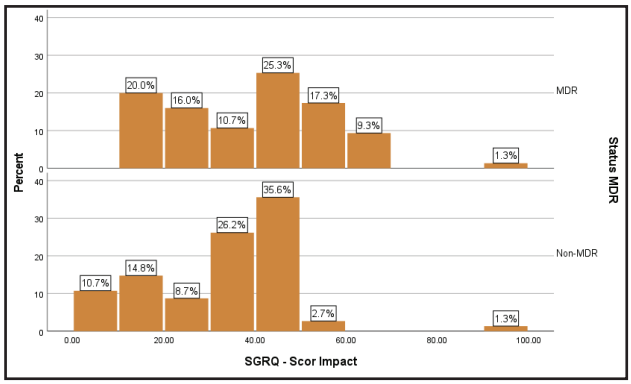


Figure 3 Percentages of patients with drug-sensitive TB and MDR-TB regarding the impact of the disease on patients' lives

Therefore, the non-parametric Mann-Whitney U test was used for the comparison. The mean rank was lower in non-MDR patients, indicating that non-MDR patients tend to have lower scores. The difference is statistically significant (p=0.003)

Table 4 SGRQ Impact Score Mean Ranks analysis

	Status MDR	N	Mean Rank	Sum of Ranks
SGRQ - Scor Impact	Non-MDR	149	103.29	15389.50
	MDR	75	130.81	9810.50
	Total	224		

Total Score

For the total score, non-MDR patients had a significantly lower mean (37.14 ± 12.98) than MDR patients (52.8 ± 14.05), with a median of 40.6 and 55.29, respectively.

Table 5 SGRQ – Total Score

Status MDR	Non-MDR	MDR	Total
N	149	75	224
Mean	37.1426	52.8002	42.3851
Std. Deviation	12.97962	14.04171	15.23432
Median	40.6277	55.289	43.0253
Range	75.94	65.91	77.13
Minimum	12.03	23.26	12.03
Maximum	87.97	89.17	89.17

Most non-MDR patients had a total score between 40 and 49 points (41.6%), while among MDR patients, the highest percentages, around 30%, were observed for scores between 50 and 59 or 60-69 points.

The data distribution deviates significantly from a normal distribution; therefore, we used the Mann-Whitney U test for comparison. The result of the rank analysis shows significantly lower statistical values for non-MDR patients (p<0.001)

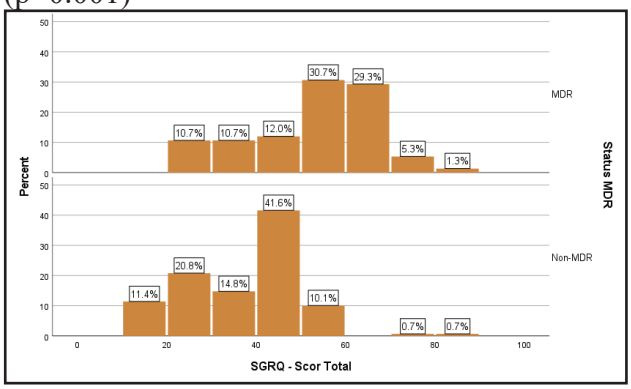


Figure 4 The percentages of total score of patients with TB and MDR-TB

Table 6 Test Statistics Mann Whitney U

	SGRQ - Scor Total
Mann-Whitney U	2214.000
Wilcoxon W	13389.000
Z	-7.370
p value	<0.001

Discussion

This study is one of the few studies conducted in the literature to analyze the effects of drug-susceptible and MDR tuberculosis on patients using the St. George questionnaire. A similar follow-up study conducted by Bandyopadhyay et al. showed that a negative score for symptomatology, activity, and impact was statistically significantly higher in patients diagnosed with MDR-TB than in patients with drug-sensitive TB. A similar finding was elaborated by Dhingra et al. in Thailand, who showed that the median score was higher in patients treated for MDR-TB and lowest in patients with drug-sensitive TB. These results reflect the need for social support and effective management of treatment failure patients (6, 7).

As observed in our study, patients diagnosed with MDR-TB have a much higher disease activity, with a score of over 80% in over 50% of participants. The same is true for the symptom component, where the mean score was statistically significantly lower for non-MDR-TB patients compared to MDR patients (p<0.001).

Although these instruments are essential

for clinical investigations, they are demanding and often require qualified medical personnel. They have unproven value for routine clinical care. Unfortunately, this study has several significant limitations (3). In settings with limited medical resources, patients often only have access to primary health care once their clinical condition becomes severe due to the disease or adverse drug reactions, so they may quickly abandon treatment. The results are similar to the study conducted by Obaseki et al. in Nigeria in 2013, where they concluded that individuals from disadvantaged backgrounds in the study group had a high score after applying the SGRQ questionnaire, suggesting that the disease has an overwhelming impact. They experience more severe symptoms (7, 8).

In addition, the timing of the questionnaires' administration was inconsistent, so the subjects could not be assessed at "important" time points but only after the treatment was completed, which led to slight deviations in the time variability.

The analysis of the data described above shows that a multidisciplinary committee is needed, with the involvement of a psychologist being significant for patients diagnosed with tuberculosis, especially with MDR-TB. For this reason, the implementation of programs to monitor the mental state of patients at high risk of experiencing the disease more intensely is necessary.

Conlcusion

The low quality of life of patients at the beginning and even at the end of treatment in those diagnosed with MDR-TB with unfavorable outcomes after using the SGRQ requires urgent attention from healthcare providers to achieve improvement in symptomatology, activity, and disease impact in the different phases of treatment. To date, tuberculosis treatment has focused exclusively on medication and not on psychosocial support. Such initiatives will improve treatment adherence.

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