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### RESEARCH ARTICLE

#### SARS-COV-2 AND TUBERCULOSIS CO-INFECTION: AUDIT ON PATIENT EXPERIENCE ON TREATMENT SERVICES AT THE NATIONAL HOSPITAL FOR RESPIRATORY DISEASES- WELISARA, SRI LANKA

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#### Abstract

**Background:** Patients who are well informed and motivated are more likely to utilize health services, thus, it improves adherence to medication. Hence, this audit aimed to improve the patient experience on treatment services at the National Hospital for Respiratory Diseases (NHRD), Welisara, Sri Lanka.

**Methods:** Patients admitted from 15<sup>th</sup> August 2021 to 25<sup>th</sup> February 2022 to the NHRD and diagnosed with COVID-19 and tuberculosis (TB) co-infection were included. Twentytwo (22) process indicators were used and data were collected using a pretested self-administered questionnaire. Sixty-percent of the patients had a good experience for each service received was the standard. Data were presented as frequency distributions and mean with their standard deviation (SD). Informed written consent was obtained prior to the data collection.

**Results:** Out of 60 patients who were diagnosed with SARS-CoV-2 and TB co-infection, 59 were responded (response rate was 98.3%). A majority were males (n=47, 79.7%) and belonged to 41 to 60 age category (n=29, 49.2%). Ten indicators did not meet the standard. The highest experience was shown in perceived waiting time (mean 86.8, SD  $\pm$  8.8) and the lowest experience was shown in perceived time spent with the health care provider (mean 57.9, SD  $\pm$  11.8). More than half (n=31, 52.5%) of the patients reported overall good experiences on treatment services. However, age and gender did not show any significant relationship with the good experience of treatment services received ( $p > 0.05$ ).

**Conclusion:** This audit shows the marginally good experience of treatment services received, but highlight areas such as time to discuss with the doctor, instructions on treatment given by the doctor and information given on available services on continuation of TB treatment are needed much improvement even in the pandemic situation.

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**Introduction:-**

Patient experience is an integral component of the quality of health care services, thus exploring it, is a key step in moving toward patient-centered care. In addition to the clinical effectiveness and patient safety, it is an independent element of the quality of care [1]. Patient experience describes the experience received from the healthcare system during the illness and is defined as the “sum of interactions shaped by an organization’s culture that influence patient perceptions across the continuum of care” [2]. Therefore, patients with good experiences of services tend to comply with the treatment and follow recommendations better than the patients with poor experiences [3]. Thus, exploring it is crucial in the management of patients presented with TB.

It is estimated that 10 million people fell ill with TB globally representing 5.6 million men, 3.3 million women and 1.1 million children. However, in 2020, only 5.8 million patients were diagnosed and it represented a drastic reduction in new case detection compared to 2019. Further, approximately 1.5 million people died from TB in 2020 worldwide, thus, TB is the second leading infectious killer followed by COVID-19 globally [4,5]. TB continues as a public health problem in Sri Lanka and the estimated incidence in 2021, is 64/ 100,000 population. Approximately 9000 cases are reported yearly resulting in a deficit of around 3000-4000 undiagnosed patients in the community. In 2021 only 6,249 new patients were diagnosed and nearly 72% of total TB cases are pulmonary TB (PTB) while 79.6% of PTB are bacteriologically confirmed [6]. Further, undiagnosed patients are a major threat to TB control activities in Sri Lanka as they continue to maintain the chain of transmission, thus, early detection is very crucial in the elimination of TB.

Coronavirus disease-19 (COVID-19) is an infectious disease caused by the severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2) that emerged recently in Wuhan, China, which has spread throughout China and to other countries [7]. As of 11<sup>th</sup> March 2022, there have been 455,573,691 confirmed cases of COVID-19 worldwide and 6,058,078 deaths [8]. Though most SARS-CoV-2 patients reported mild symptoms, elderly patients and patients with underlying comorbidities are at-risk of getting severe infections therefore they require additional care [9]. Further, a study reported that infection with *Mycobacterium tuberculosis*, the pathogen that causes TB, was predisposed to SARS-CoV infection that led to more rapid development of symptoms and cause severe COVID-19 pneumonia [10]. Therefore, it is needed to inform the general population that latent or active TB is a risk factor for COVID-19 and those at-risk group should be advised to seek medical treatment early.

The spread of COVID-19 in Sri Lanka including lockdown period has imposed a potential threat to new TB case findings [11]. Further, patients presented with both COVID-19 and TB have similar symptoms most of the time, therefore, new TB case detection can be missed [12]. Similarly, patients presented with symptoms could be influenced by the previous experience on services obtained to seek treatment over again. Therefore, it is essential to improve the patient experience on treatment services among diagnosed patients with TB and COVID-19 co-infection, which is not explored in Sri Lanka previously.

**Methods:-**

This audit was conducted among patients admitted to NHRD, Welisara, Sri Lanka and diagnosed with COVID-19 and TB co-infection from 15<sup>th</sup> August 2021 to 25<sup>th</sup> February 2022. The NHRD is one of the tertiary hospitals in Sri Lanka with a bed strength of 382 for TB patients and presence of a special ward for multi-drug resistant TB patients [13]. Data were collected using a pre-tested questionnaire which was developed by the principal investigator following a thorough literature survey [14, 15] which included six subscales founded by 22 process indicators. It describes communication with staff (five items); perceived waiting time (two items); perceived convenience on basic amenities (eight items); perceived time spent with health care provider (three items), services received on hospital stay (two items) and services received on discharge (two items). Data were collected on the day of discharge.

The data were analyzed using Statistical Package for Social Science (SPSS) software version 23. The demographic data and other qualitative variables were presented as numbers and percentages. For each indicator mean and SD was calculated and the high score always shows higher experiences. The standard of this audit was set as 60% of the patients admitted to NHRD had a good experience for each service received. Thus, 22 process indicators were used and amalgamated the responses ‘very good’ and ‘good’ to calculate the standard. Next, the total score of each subscale was calculated and set at 100%. The total score showed the normal distribution, thus, the mean score of each subscale was calculated. Based on each mean value, those scoring mean value or above were considered as

having 'good experiences', while others as having 'poor experiences'. For each variable. Fisher's exact test was done to determine the predictors of 'good patient experience' and p-value less than 0.05 was considered statistically significant.

Participation in this audit was voluntary and prior to data collection informed written consent was obtained.

### Results:-

This audit was carried out among 59 patients, giving a response rate of 98.3% (59/60).

#### Socio-demographic and clinical characteristics

The mean age was 54.3 years (SD=12.3). The majority consisted of males (n=47, 79.7%) and belonged to 41–60-year age group (n=29, 49.2%). A majority (n=54, 91.5%) presented with smear-positive pulmonary-TB. However, 3.4% (n=2) presented with reinfection or reactivation, while remaining 96.6% (n=57) were newly diagnosed as TB (Table 1).

**Table 1:-** Socio-demographic and clinical characteristics of the patients admitted to NHRD.

Characteristics	No. (N=59)	%
<b>Gender</b>		
Male	47	79.7
Female	12	20.3
<b>Age category (years)</b>		
24 - 40	9	15.2
41 – 60	29	49.2
>60	21	35.6
Mean 54.3, SD 12.3, Min 24, Max 83		
<b>Status of Disease</b>		
Re-infection	2	3.4
Newly diagnosed	57	96.6
<b>Smear Positive Pulmonary TB</b>		
Yes	54	91.5
No	5	8.5

Table 2 describes the experience of health care services received by in-ward patients. Nearly ninety percent of the patients met the standard in waiting time for the admission from hospital to the ward (n=53, 89.9%) and waiting time for a bed following admission to the ward (n=51, 86.4%). The indicator of time to discuss on available treatment services at hospital reported as 'good' or 'very good' in a lesser number of patients (n=3, 5.1%).

**Table 2:-** Patient experience on treatment services at NHRD (N=59).

Process indicator	Reported patient experiences					
	Very good	Good	Neutral	Poor	Very poor	Mean (SD)
	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	
<b>Communication with staff</b>						
Obtained detailed history of the illness by the treated doctor	14 (23.7)	27 (45.8)	10 (16.9)	8 (13.6)	0 (0.0)	3.8 (0.9)
Provided instruction on treatment by the treated doctor	6 (10.2)	9 (15.3)	5 (8.4)	26 (44.1)	13 (22.0)	2.5 (1.3)
The doctor advised on illness adequately	13(22.0)	33(55.9)	7(11.9)	5 (8.5)	1(1.7)	3.9 (0.9)
Attention from the treated doctors	18 (30.5)	20 (33.9)	4 (6.8)	10 (16.9)	7 (11.9)	2.9 (0.7)
Support from the nursing officers	18 (30.5)	20 (33.9)	19 (32.2)	1(1.7)	1(1.7)	3.9 (0.9)
<b>Perceived waiting time</b>						
Admission from hospital to the ward	28 (47.5)	25 (42.3)	6 (10.2)	0 (0.0)	0 (0.0)	4.4 (0.7)

For a bed (following admission to the ward)	26 (44.1)	25 (42.3)	8 (13.6)	0 (0.0)	0(0.0)	4.3 (0.7)
<b>Perceived convenience on basic amenities</b>						
Facilities at ward	12 (20.3)	22 (37.3)	21 (35.6)	4 (6.8)	0 (0.0)	3.7 (0.9)
Cleanliness of the toilets	7 (11.9)	22 (37.3)	16 (27.1)	12 (20.3)	2 (3.4)	3.3 (1.0)
Cleanliness of the wards including surroundings	14 (23.7)	25 (42.4)	12 (20.3)	7 (11.9)	1 (1.7)	3.8 (1.0)
Cleanliness of the bathrooms	6 (10.2)	20 (33.9)	18 (30.5)	11 (18.6)	4 (6.8)	3.2 (1.0)
Cleanliness of bedlinens	19 (32.2)	24 (40.7)	12 (20.3)	4 (6.8)	0 (0.0)	3.9 (0.9)
Taste of the meals provided by the hospital	6 (10.2)	20 (33.9)	19 (32.2)	13(22.0)	1 (1.7)	3.3 (0.9)
Nutrition requirement of the meals provided by the hospital	11 (18.6)	19 (32.2)	19 (32.2)	8 (13.6)	2 (3.4)	3.5 (1.1)
The restfulness of the ward (amount of peace and quiet)	26 (44.1)	23 (39.0)	8 (13.5)	2 (3.4)	0 (0.0)	4.2 (0.8)
<b>Perceived time spent with health care provider</b>						
Discuss with the doctor	3(5.1)	13 (22.0)	9 (15.3)	22 (37.3)	12 (20.3)	2.5 (1.2)
Discuss the available treatment services during the hospital stay	0 (0.0)	3 (5.1)	7 (11.9)	30 (50.8)	19(32.2)	1.9 (0.8)
<b>Services received on hospital stay</b>						
Co-operation of the healthcare assistants	32 (54.2)	18 (30.5)	2 (3.4)	6 (10.2)	1 (1.7)	4.3 (1.0)
Received treatment on time	28 (47.5)	19 (32.2)	11 (18.6)	1 (1.7)	0 (0.0)	4.3 (0.8)
Explanation of the ward routine and procedures	5 (8.5)	11 (18.6)	8 (13.5)	26 (44.1)	9(15.3)	2.6 (1.2)
<b>Services received on discharge</b>						
Information received on continuation of TB treatment	25 (42.4)	19 (32.2)	12 (20.3)	3 (5.1)	0 (0.0)	4.1 (0.9)
Information received on available services for obtaining TB treatment	13 (22.0)	14 (23.7)	14 (23.7)	14 (23.7)	4 (6.9)	3.3 (1.2)

Table 3 shows the descriptive statistics on six sub-scales related treatment services at NHRD. The highest experiences are shown in perceived waiting time (mean 86.8, SD  $\pm$  8.8) and the lowest experiences are shown in perceived time spent with the health care provider (mean 57.9, SD  $\pm$  11.8).

**Table 3:-** Descriptive statistics on six sub-scales related treatment services at NHRD (N=59).

Subscales	Minimum	Maximum	Mean (SD)
Communication with staff	44.0	84.0	66.3 (8.8)
Perceived waiting time	70.0	100.0	86.8 (8.8)
Perceived convenience on basic amenities	57.5	87.5	72.5 (6.4)
Perceived time spent with health care provider	40.0	86.7	57.9 (11.8)
Services received on hospital stay	30.0	100.0	68.6 (15.6)
Services received on discharge	30.0	100.0	74.2 (15.5)

Less than half of the patients reported good experiences on basic amenities (n=27, 45.8%) and services received on discharge (n=28, 47.5%) (Table 4).

**Table 4:-** Frequency distribution on six sub-scales related treatment services at NHRD (N=59).

Subscales	Good experiences (no., %)	Poor experiences (no., %)
Communication with staff	32 (54.2)	27 (45.8)
Perceived waiting time	36 (61.0)	23 (39.0)

Perceived convenience on basic amenities	27 (45.8)	32 (54.2)
Perceived time spent with health care provider	33 (55.9)	26 (44.1)
Services received on hospital stay	33 (55.9)	26 (44.1)
Services received on discharge	28 (47.5)	31 (52.5)

Both gender ( $p=0.063$ ) and age ( $p=0.342$ ) did not show any statistically significant association with 'good experiences' with the treatment services received at NHRD (Table 5).

**Table 5:-** Factors associated with overall experiences.

Characteristic	Good experiences		Poor experiences		Significance
	No. (n=31)	(%)	No. (n=28)	(%)	
<b>Gender</b>					
Male	23	74.2	24	85.7	p=0.342
Female	8	25.8	4	14.3	
<b>Age category (years)</b>					
24 to 40	7	22.6	2	7.1	p=0.063
41 to 60	11	35.5	18	64.3	
>60	13	41.9	8	28.6	

### Discussion:-

This audit was conducted to improve the patient experience on treatment services at NHRD, Sri Lanka. A majority of the patients had good experiences ( $n=41$ , 69.5%) on obtaining the detailed history of the illness by the treated doctor. It showed that obtaining a medical history can reveal the relevant chronic diseases which could direct the diagnosis of TB in COVID-19 patients. However, the therapeutic instructions were given by the treated doctor did not meet the standard (25.5%) in this audit, which is one of the core clinical competencies in medical practice with the ultimate goal of achieving the best outcome and good patient experiences[16].

Perceived waiting time in this audit reported a higher rate both from hospital to the ward ( $n=53$ , 89.8%) and for a bed ( $n=51$ , 86.4%). It could be due to the fear of potential COVID-19 transmission to other people with prolonged waiting time. Further, prolong waiting time can lead to negative health outcomes such as worsen the condition and one study reported that the quality of healthcare service and related issues such as patient's dissatisfaction due to long waiting time [17]. Similar good experiences on waiting time were reported in a study done in Southern Nigeria (median 3.17) among TB patients before the COVID-19 pandemic. However, we could not find the studies that assessed the patient experience on waiting time in patients with COVID-19 and TB co-infection, therefore conducting studies related to it, is further recommended.

Less than half of the patients reported good experiences related to the convenience on basic amenities ( $n=27$ , 45.8%). Patients with symptoms of TB seek treatment at NHRD which is situated in the suburb of Colombo and it is also a treatment centre for COVID-19 patients in this pandemic era. NHRD is one of the specialized hospitals in Sri Lanka, which is responsible for receiving referral patients all over the country, thus, the type of the conditions to be managed in this hospital could be very serious, which needs specialized service with many services involvement which are found in this hospital only. In addition, NHRD is a government hospital that provides all inpatient and outpatient care free of charge. Thus, due to the high admission rate, the experiences related to the basic amenities could be reported as a lesser value among admitted patients. The possible reason for their complaints is unavailability of clean toilets and good quality accommodation which could be the foundations of psychological satisfaction and it could relate to the healing process. Also, they may be afraid of developing a hospital-acquired infection due to poor sanitation, which may worsen their health condition.

Less than half of the patients ( $n=28$ , 47.5%) reported good experiences on the services received on discharge in this audit. This could be due to the difference in expectations of the patients and priority of patients' required services. Moreover, information and awareness on the disease, prevention, available investigations, treatment and especially side-effects were not always described during the hospital stay and even at discharge, but desired by the patients and very crucial in continuation of treatment for TB. In Sri Lanka the overall treatment success rate was 82.2% in 2020, which was 2% reduction the rate reported in 2019. Therefore, patients need to educate on continuation of TB treatment to prevent treatment failure or occurrence of multi-drug resistance TB [6].

The limitations of this audit are small sample size and patient's experiences were assessed using the self-administered questionnaire which was not validated previously. Other than these limitations, this audit guides the improvement in service delivery at NHRD, Sri Lanka.

### Conclusions and Recommendations:-

Ten process indicators did not meet the standard such as providing instruction on treatment by the treated doctor (n=15, 25.5%), facilities in the ward (n=34, 57.6%), cleanliness of the toilets (n=29, 49.2%), cleanliness of the bathrooms (n=26, 44.1%), taste of the meals provided by the hospital (n=26, 44.1%), nutrition requirement of the meals provided by the hospital (n=30, 50.8%), time to discuss with the doctor (n=16, 27.1%), time to discuss the available treatment services during hospital stay (n=3, 5.1%), explanation of the ward routine and procedures (n=16, 27.1%) and information received at discharge on available services for obtaining TB treatment (n=27, 45.7%).

Infrastructure development in the ward, conducting in-service training on improvement of routine duties at the ward and at discharge are recommended. Staff should be well trained to provide information related to the continuation of TB treatment. In addition, re-audit in three months following these interventions is needed to identify further improvement.

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