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Establishment of health care facility at the national hospital for respiratory diseases (NHRD) of Sri Lanka for COVID- 19 infected patients with active tuberculosis

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Abstract
The National Hospital for Respiratory Diseases as the Centre of excellence managing patients with respiratory diseases, planned to start 24 bedded fully functional ward to cater COVID-19 patients co infected with Tuberculosis which are transferred from all the hospitals island wide for the further management. A SWOT analysis was conducted by the team and selected female tuberculosis ward (ward 14) to convert to treat male and female COVID-19 patients co infected with Tuberculosis. There were several issues in the identified ward such as damaged and dysfunctional wash rooms and toilets, old and damaged water pipe lines, need of wall oxygen line system with jumbo cylinders, need of a new concreate pathway for transportation of patients and hospital staff.
A core group consisted with hospital director and other medical specialists guided this project design. This project was started on 02.07.2021 with the support of local community, well-wisher organizations and hospital staff.
Damaged toilets, old pipe lines were repaired, existing building was partitioned with proper isolation facilities, wall oxygen line system was established, constructed a concrete path way, established a patient communication with intercom facilities, CCTV patient monitoring system, established proper zoning system and purified water for staff and patients, accommodation facilities for staff were established. This project was completed within 03 weeks' period. Admissions for this unit was started 13.08.2021.
This project was successfully contributed to manage Covid-19 pandemic in Sri Lanka by providing care for 132 covid-19 patients co-infected with active tuberculosis in nine-month duration.

Keywords: COVID 19 infection, tuberculosis, SWOT analysis

Introduction
Tuberculosis (TB) is a chronic infectious disease caused by Mycobacterium Tuberculosis bacteria (1). The Coronavirus disease (COVID- 19) is a pandemic caused by severe acute respiratory syndrome corona virus 2(SARS-CoV-2) and COVID-19 coinfection with Tuberculosis was observed worldwide. Patients with co – infected COVID- 19 and Tuberculosis are more likely to suffer severe diseases or death than COVID -19 alone (2).
There have been 511,965,711 confirmed cases of COVID-19, including 6,240,619 deaths, reported to WHO. As of 30 April 2022, a total of 11,532,661,625 vaccine doses have been administered (3). Success of treatment depends on availability of proper health care facility with adequate human and physical resources.
Ministry of Health in Sri Lanka carried out several preventive and curative sector strategies to combat COVID -19 infection (4). The ministry of health has initiated conversion of several hospitals such as Colombo East Base Hospital, Base Hospital – Homagama for admitting COVID -19 confirmed patients (5).
The National Hospital for Respiratory Diseases (NHRD) is situated in the Gampaha District about 15km away from the Colombo. This is the main hospital which treated patients with Tuberculosis including Multi-Drug Resistance Tuberculosis. NHRD as the Centre of excellence managing patients with respiratory diseases, COVID-19 patients coinfected with Tuberculosis were transferred from all the hospitals island wide for the further management. Success of treatment depends on availability of proper health care facility with adequate human and physical resources. It was a challenging task in the midst of resource constraints. Considering the epidemiological pattern of COVID -19 infection and Tuberculosis infection, ministry of Health recognized the urgent need of establishing health care facilities where is dedicated for diagnosis, treatment and follow up of patients with COVID- 19 and Tuberculosis co-infected.
NHRD has a dedicated team of professionals three Consultant Respiratory Physicians and Consultant Radiologist including well equipped radiological department NHRD as the Centre of excellence managing patients with respiratory diseases, it should have fully functional ward to cater COVID-19 patients coinfected

with Tuberculosis are transferred from all the hospitals island wide for the further management. The aim of the project was to establish 24 bedded ward to manage COVID -19 and Tuberculosis co-infected patients at NHRD, Welisara

Method

A stakeholder mapping was conducted by the deputy director and following identified as the team i.e., Director, Deputy Director, Consultant Microbiologist, Consultant Respiratory Physicians, Medical Officer – Planning and Quality, Chief Special Grade Nursing Officer and Infection Control Nursing Officer.
A SWOT analysis was conducted by the team and recommendations were proposed accordingly.
Solutions were put into action following a feasibility study

Results

The findings of the SWOT analysis were as follows (Table 1):

Table 1: SWOT Analysis

Strengths	**Weaknesses**
Availability of space to establish treatment unit.	Lack of human resources to mobilize to unit for Patients' care.
All Respiratory Physicians have positive attitude for the changes.	
Opportunities	**Threats**
Strong support for community and hospital staff.	Possibility of project failure due to lack of funds, staff and medical equipment.

The project team selected female tuberculosis ward (ward 14) to convert to treat male and female COVID-19 patients co infected with Tuberculosis after discussing with Consultant Respiratory Physicians in the hospital, they agreed to hand over this ward for the purpose of establishing treatment unit for patients. This was found be practical after a feasibility assessment.
A core group consisted with hospital director, Consultant Microbiologist, three Consultant Respiratory Physicians and Deputy Director guided this project design.

Key issues to be addressed were listed after triangulating ideas of brain storming and direct observations as follows:

- Repairing of damage and dysfunction wash rooms and toilets.
- Repairing of old and damage pipe lines and establishing new water supply to ward.
- Establishing of wall oxygen line system with jumbo cylinders.
- Construction of new concreate pathway for patient's transportation for staff.

For the identified issues, home grown solutions were proposed with assigned responsibilities as follows Table 2

Table 2: Preliminary Issues Identified and the Preliminary Activities conducted at the ward 14

Issues	**Activity to be done**	**Responsibility**
Damaged wash rooms	Repair old wash rooms	Maintenance unit
Old and malfunctioning pipe lines	Repair water lines	Maintenance unit
communication and monitoring method	Establish communication system and CCTV monitoring system	Planning unit
Staff safety- proper zoning system	Establish proper zoning system	Planning unit
Supply of wall oxygen	Establish of wall oxygen line system with jumbo cylinders	Planning unit
Separate pathway for patient transportation and staff access	Construction of new concrete pathway for patient transportation and staff access	Maintenance unit

The ward is planned in such a way to ensure maximum safety for the healthcare staff while being based on international infection disease management principles. As provision of safe care is the one of the most important domains of quality of healthcare (Agency for Healthcare Research and Quality, 2020), The administrative controls include: Management measures that reduce the risk of direct exposure of staff to patients; a safety control and patient communication room with intercom facilities, CCTV patient monitoring system to minimize staff exposure. The environmental controls include: · Physical and mechanical measures taken to reduce infection transmission; all patient entry/exit points, staff entry point to wards and doffing room cubicles protected with a double-door system (when one door is opened the other door closes) to ensure safety.
Well planned and designed zoning which include Zone 1/Green Zone A – staff rest rooms and dining; Zone 1/Green Zone B – Staff working area including control room (Green Zone A and B separated by an inbuilt corridor); Zone 2/Yellow Zone – Staff area is separated from patient area; Zone 3/Red Zone – Patient area which consists of four wards (one female and one male wards) with a total of 24 beds.

This project was started on 02.07.2021 with the support of local community, well-wisher organizations and hospital staff and completed on 13.08.2021 with cost of hundred and fifty thousand rupees. Damaged toilets, old pipe lines were repaired by hospital maintenance unit. The financial support from community. Existing building was partitioned with proper isolation facilities. Oxygen line system was established with the support of community. Construction of concrete path way was done by hospital staff with the support of community. This project was completed within 03 weeks' period. Purified water for staff and patients, accommodation facilities for staff were established.

Medical officers, nursing officers and other health workers were assigned by hospital administration after with Consultant Respiratory Physicians, Administrative Officer and Special Grade Nursing Officers.

Admissions for this unit was started 13.08.2021. The work load in this unit up to date is indicated in table 03.

Table 3: Number of patients served by the month

Month	No. of admitted patients	No. of treated patients	No. of discharged patients
August 2021	10	49	12
September 2021	08	21	11
October 2021	07	11	03
November 2021	-	-	03
December 2021	-	02	01
January 2022	02	10	01
February 2022	01	28	06
March 2022	03	08	-
April 2022	02	03	-
Total	33	132	37

Discussions

It was a well-coordinated project at micro and macro level managing triple constraints in project management (Cost, Scope and Time). As provision of safe care is the one of the most important domains of quality of healthcare (Agency for Healthcare Research and Quality, 2020), to ensure staff safety and patient safety was paramount, hence safe design of the ward was a critical consideration.

The ward was converted based on international infection disease management principles and both administrative (work practice) controls and environmental controls are in place to reduce the risk of direct exposure of staff to patients ensuring staff safety. It was revealed that patients with COVID -19 and Tuberculosis co-infection treated in safe environment with skillful health staff at NHRD ensuring both patients and health staff safety. Since our hospital, this unit accommodates all diagnosed patients with COVID- 19 and Tuberculosis, it gives opportunity to other hospitals in the country to provide satisfactory patient care services without a burden.

Since there are skillful health staff in this hospital it reduces the complications and bad outcomes of the co-infections. It reduces the risk of contamination of health staff in other hospital in the country. Since doctors and all nursing officers using knowledge about tuberculosis cater the services for these patients. Patients receive good quality care. This is the main benefit of this project.

There are some issues during maintaining this unit. Some staff are needed to be allocated daily form other wards in the hospital to minimize spread of infections among them.

Conclusions

The Centre is planned in such a way to ensure maximum safety for the healthcare staff while being based on international infection disease management principles, both administrative (work practice) controls and environmental controls are in place. Both micro and macro level planning and implementation done to complete this project in 3 weeks.

All patients receive best quality care due to availability of human and physical resources with experience. Now the 24 bedded COVID-19 Tuberculosis Management ward is fully This is one and only health facility to accommodate COVID -19 – Tuberculosis co-infection patients in Sri Lanka. This project was successfully contributed to manage Covid-19 pandemic in Sri Lanka by providing care for 132 covid-19 patients co-infected with active tuberculosis in nine-month duration.

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