



## Strategic Management of COVID 19 Pandemic; Response and Preparedness in Sri Lanka

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**ABSTRACT:** Serious pandemic of COVID -19 a highly contagious respiratory disease caused by the Severe Acute Respiratory Syndrome Corona Virus 2, which was first discovered in December 2019 in the city of Wuhan. This highly infective SARS-CoV-2 virus is spreading from person to person through close contact, and the common symptoms include fever, cough and shortness of breath while muscle pains, loss of smell and taste, diarrhea, abdominal pain and throat ache are other symptoms, which have frequently recorded. This serious pandemic of COVID -19 has threatening lives of people and claimed 682,421,707 patients and 6,819,238 deaths worldwide to date of 19<sup>th</sup> March 2023. The first COVID-19 case in Sri Lanka on 27<sup>th</sup> January 2020, who was a 44 year old female tourist from Hubei Province China, and the first local case was reported on 11<sup>th</sup> of March 2020, who was a travel guide.

Aim of this article is to describe the effectiveness of COVID-19 response and preparedness especially on patient care management. A descriptive study was conducted through Key Informant Interviews, data gathering through desk review of records and reports published. Multi strategic approach that was used in the Sri Lankan health sector to combat COVID – 19 pandemic. Strategies done were; system development (curative and preventive services), infrastructure development and improvement of facilities, staff wellbeing and protection, continuation of normal patient care services, intersectoral coordination and collaboration, special projects in relation to COVID – 19 pandemic, leadership and governance, supervision and monitoring, and public / community empowerment. These strategies has reflected in managing COVID – 19 pandemic and similar strategies with modification can be implemented in future pandemic situations. Further, it is recommended to do in-depth studies to understand the interventions done in specific areas, effectiveness of interventions, and gaps of intervention done and to mitigate the gaps for better response system in order to build a resilient health system.

**KEY WORDS:** COVID – 19, Health System Improvement, Strategic Management.

### INTRODUCTION / BACKGROUND

Serious pandemic of COVID -19 a highly contagious respiratory disease caused by the Severe Acute Respiratory Syndrome Corona Virus 2, which was first discovered in December 2019 in the city of Wuhan, the capital of Hubei province in China, and threatened the lives of people all over the world causing immense socio-economic impact (Ahn *et al.*, 2020). Nearly 229 Countries and Territories around the world were affected in many ways (Worldometer, 2023). This serious pandemic of COVID -19 has so far surpassed all the technologies advanced by man threatening lives of people and claimed 682,421,707 patients and 6,819,238 deaths worldwide to date of 19<sup>th</sup> March 2023 (Worldometer, 2023).

On the date of 19<sup>st</sup> of December 2022, Sri Lanka has faced for three COVID 19 waves and claimed 671,756 patients as well as 16,808 deaths reported from the date of discovery of the first COVID19 case in Sri Lanka on 27<sup>th</sup> January 2020 (Health Promotion Bureau, 2022). Considering this highly critical scenario, the World Health Organization declared a Public Health Emergency of International Concern (PHEIC) on 30<sup>th</sup> January 2020 and subsequently on 11<sup>th</sup> of March 2020 declared a global pandemic situation (World Health Organization Sri Lanka, 2020).



## ABOUT THE DISEASE

This highly infective SARS-CoV-2 virus is spreading from person to person through close contact. The common symptoms include fever, cough and shortness of breath while muscle pains, loss of smell and taste, diarrhea, abdominal pain and throat ache are other symptoms which have been frequently recorded. The COVID-19 has been known to infect all ages and has shown to be particularly severe in elderly and in patients with underlying co morbidity conditions (Wang *et al.*, 2020). Even though 85% of the infected are asymptomatic or manifest a mild form of disease, 15% seems to develop the severe form of disease with 5% requiring ventilator support (Wang *et al.*, 2020). Mortality rates have manifested great variation from country to country. While some countries has shown death rates as high as 20%, it remains as low as 1% in some countries. Most ventilated patients worldwide seem to have high mortality (Roser Max, Ritchie Hannah, Esteban Ortiz-Ospina, 2020).

## The Sri Lankan situation

Sri Lanka's response to COVID 19, preceded the discovery of the first COVID-19 case in Sri Lanka on 27<sup>th</sup> January 2020, who was a 44 year old female tourist from Hubei Province China (Wickramaarachchi, Perera and Jayasinghe, 2020). This discovery was made owing to the prompt and timely response of the Ministry of Health which had already instructed the Quarantine Unit of the Bandaranaike International Airport to screen passengers for symptoms (Epidemiology Unit, 2020). By the first week of March 2020, a mandatory quarantine period of 14 days was imposed on all passengers arriving from Iran, Italy, South Korea and India which were the highly affected countries at that time (Epidemiology Unit, 2020). The first local case was reported on 11<sup>th</sup> of March, who was a travel guide with an exposure history to a group of tourists from Italy (Epidemiology Unit, 2020). The first COVID – 19 related death was reported on 28<sup>th</sup> of March, who was a resident of Marawila in Chillaw district and having renal impairment with other comorbidities (Director General of Health Services SriLanka, 2020; Reuters Staff, 2020).

## The role and strategies of the Ministry of Health in COVID-19 response and preparedness

Ministry of Health Sri Lanka played the main role in planning, guiding, coordinating, facilitating and supervision to COVID-19 response and preparedness in Sri Lanka based on the vested power and authority of Quarantine Act 1897. Based on the observations in other countries where the infection ran an unbridled course, the prevention strategy was to maintain the epidemiological curve below the health system capacity. While much emphasis was placed on public health mechanisms aimed at prevention, surveillance, contact tracing and isolation, Ministry of Health attended to rearrange and improve the curative sector as well.

The responsibility of Ministry of Health was exercised with assistance of preventive sector especially Epidemiology Unit, Quarantine Unit, Health Education Bureau, Medical Service, Laboratory Service, and Disaster Management Unit, utilizing the well-established preventive and curative systems. While Epidemiology unit was responsible for planning on prevention of disease, surveillance, contact tracing etc., Medical Service was responsible for managing curative sector for patient Care Management in this crisis-situation.

## AIM

Aim of this article is to describe the effectiveness of **COVID-19 response and preparedness** especially on patient care management.

## OBJECTIVE AND METHODOLOGY

Objective of this study was to assess the effectiveness of the COVID-19 response and preparedness strategies adopted by the Ministry of Health especially towards curative patient care management. A descriptive study was conducted with both qualitative and quantitative components. Qualitative component was carried out through Key Informant Interviews and quantitative component was done based on data through desk review of records and reports published.

## RESULTS AND DISCUSSION

### Main Challenges encountered in the curative sector were,

- Establishing measures for prevention of spreading of infection to other patients at OPD, Clinics and wards from COVID 19 affected patients,



- Establishing measures for standard care management of COVID 19 affected patients,
- Maintaining normal patient care services including emergencies,
- Necessary infrastructure development for COVID 19 Patient Care Management – building, structural changes for isolation and treatment facilities, lab facilities, equipment, medicine and consumables as well as human resource etc.,
- Protecting staff safety through providing suitable PPE and educating staff □ Prevention of COVID infected patients from stigma.

The Medical Service undertook multiple strategies, which is categorized as followed: Infrastructure Development, Human Resource Management, Training and Education on COVID 19, guidance to hospitals and other sectors on prevention and management as well as to prepare necessary protocols, provision of equipment and consumables including PPE, monitoring and supervision, coordination of relevant experts, managing COVID patients with providing a bed for each patient, and mobilizing and transportation of patients into a suitable level of care as well as to ICUs / HDUs when necessary, lab sector development in relation to COVID 19, Identification and coordination of external fund sources, donors and assistance of tri forces, provision of assistance for the preventive sector when necessary etc.

**Effectiveness of COVID-19 response and preparedness especially on curative care management was assessed based on management measures undertaken in relation to following selected criteria;**

1. System development in relation to COVID 19 management,
2. Infrastructure development and improvement of facilities in hospitals and Treatment Centres,
3. Maintenance and improvement of supportive services,
4. COVID 19 patient management; mobilization, managing of patients including critical patients,
5. Protection of staff safety through education and provision of adequate PPE and staff welfare,
6. Maintaining normal patient care services and follow up services of chronically ill patients,
7. Inter sectoral coordination; relevant experts, supportive sectors / stakeholders (tri forces etc.), external fund sources, projects of donations and new innovations,
8. Leadership, team building, and Human Resource Management,
9. Monitoring and supervision,
10. Public empowerment; awareness, sensitizing and guiding,

It has shown that main role in planning, guiding, coordinating, facilitating and supervision to the COVID-19 response and preparedness in Sri Lanka carried out by Ministry of Health under vested power and authority of Quarantine Act 1897.

## **1. System Development with coordination of relevant experts; Technical / Professional groups on strategic planning on COVID patient care management and preventive management**

### **Preventive management:**

From the outset, a national program for COVID – 19 response and preparedness launched to prevent the spread of the disease in Sri Lanka. The strategies adopted by the health sector to prevent and control the disease in the first wave were able to reduce the spread of the disease and the number of deaths. The main purposes of the first wave of strategies were to prevent the pandemic entering the country and to isolate patients if they somehow entered. At this point, there was only little knowledge on accurate diagnosis of the disease and the mode of transmission of the disease in the world, therefore, the health sector was responding with the experience of pre-existing global pandemic scenarios. The preventive strategy was mainly focused to maintain the epidemiological curve below the health system capacity placing much emphasis on public health mechanisms aimed at prevention, surveillance, contact tracing, and isolation (preventing the spread by testing the patients and treating in isolation, quarantine of traced contacts together with health promotion and awareness on preventive measures such as distancing, hand washing, wearing facial mask, prevent gathering and surveillance etc.). It was a major challenge to prepare guidelines, prepare the health institutions with modified system and processes and prepare infrastructure accordingly. But with all preventive and control measures COVID second wave invade the country. During this period, virology studies have been identifying the behavior of the virus, mode of transmission and its adverse



complication to human body. Meanwhile many countries experimenting the vaccines and they were in different stage of development. Group isolation practiced at the first wave were eased as home isolation firstly 14 days then reduced up to 10 days (in 2<sup>nd</sup> wave) then to 7days (in early 3<sup>rd</sup> wave) and 4 days after introduction of vaccines in late phase of 3<sup>rd</sup> wave or latter stage of 3<sup>rd</sup> wave. Following completion of vaccine 3<sup>rd</sup> dose, isolation was discontinued.

### **Curative Patient Care management**

System changes and guiding directions, protocols and treatment guideline preparation and revisions for COVID patient care management and prevention of spreading as well as norms for distribution of equipment / Personal Protective Equipment (PPE) / Human Resources have been attended with the assistance and collaboration of clinical and technical experts. Main strategies in curative sector were; establishing measures in system and infrastructure development for prevention of spreading of infection to other patients at OPD, Clinics and Wards from COVID 19 affected patients. Measures taken for standard care management of COVID 19 affected patients as well as focused on prevention from stigma, and maintaining normal patient care services including emergencies. Necessary Infrastructure development for COVID 19 Patient Care Management done through building and structural changes for isolation and treatment facilities, lab facilities. Provided necessary equipment, medicine, consumables, human resource etc., as well as protecting staff safety through providing suitable PPE and educating staff. This was a good example for strategic management.

During the first wave, main hospitals were selected one per district, where these hospitals were prepared as isolation centres for patients with suspected symptoms and 10 hospitals as treatment centres island wide. However, Out Patient Departments of all health care institutions were prepared with strategies to prevent spreading of infection to others; fever corner and triage area. Building, rearranging, and modifications were done with provision of necessary equipment in relation to the following areas: triaging facilities, isolation facilities, treatment facilities, ICU facilities, and lab testing facilities. All nine (9) Provincial Director of Health Services (PDHS) and Twenty Six (26) Regional Director of Health Services (RDHS) were informed to identify, prepare facilities, and train staff at least one Base Hospital (Secondary Care Hospital) and one Divisional Hospital (Primary Care Hospital) per district.

During the second wave, many patients were asymptomatic, hence, treatment facilities were improved utilizing many Divisional Hospitals (Primary Health Care hospitals) as well as nonhealth institutions like training centres converting as Intermediate Care Treatment Centers for which health staff mobilized by nearby hospital and distant supervision done by allocated consultants, while normal patient care was not compromise in main hospitals. Hospitals were arranged for COVID patient management in three levels. Level I was the Intermediate Care Treatment Centers to manage asymptomatic patients while symptomatic patients managed in Level II hospitals (Secondary Care Base Hospitals). Specially arranged Level III higher centres managed COVID – 19 patients with complications and also patients who need ICU care and other special care; Surgical care, Dialysis care, Obstetric care, and Psychiatric care etc. All hospitals were requested to develop isolation wards / units and a place to keep diagnosed patients until they transfer to a treatment centers. All major hospitals up to base hospitals were requested to develop / share facilities to manage complication such as surgical emergencies, obstetrics and dialysis of suspected or diagnosed patients with COVID 19. Also for the need of segment of society, some hotels were converted in to treatment centers (Level-1) linked with private hospitals.

Then, during the third wave, huge sudden influx of patients were flooded mostly symptomatic and also with complications. Then almost all hospitals were open for COVID – 19 patient management by allocating general wards with special preparation. Even in intermediate care centres, symptomatic patients were managed even with normal flow oxygen for mildly Oxygen desaturated patients. All major hospitals above base hospitals were continued to develop / share facilities to manage complication such as surgical emergencies, obstetrics, and dialysis of suspected or diagnosed patients with COVID 19. In the peak of 3<sup>rd</sup> wave, many new ICU / HDU and dialysis facilities were developed. In order to cope up with unbearable number of patients to main hospitals, different new strategies were adopted; introducing triage for COVID patients at main hospitals and transferring and managing patients with less complications in affiliated step down hospitals also managing asymptomatic patients in newly introduced Home Based Care system in which patients were monitored distantly for 10 days period over the phone and digitally by a specially trained medical team even with specialist cover since even asymptomatic patients could develop Oxygen desaturation or other complication at any time during the infected period. High demand for high flow machines, ventilators, BIPAP and CPAP machines, monitors and



pulse oxymeters, Bedside Oxygen concentrators, digital BP apparatuses and many other equipment provided in addition to donations obtained from well-wishers, individuals, and organizations. Preparedness on Oxygen production and availability was managed successfully even with import based on proposed projections. Necessary plans, procedures and protocols were prepared with the assistance of expert panels from relevant universities, institutes, and colleges.

## **2. Infrastructure development and improvement of facilities in hospitals and Treatment Centres and maintenance and improvement of supportive services** Health sector has to face many challenges in this unpredictable situation.

1. Selection of hospitals for hospitalization of patients showing symptoms and isolation.
2. Set up facilities to quarantine the exposed people both local as well as international travelers
  - Providing beds, medical equipment and other infrastructure to those hospitals
  - Deploying staff, providing personal protective equipment needed to ensure staff safety.

Proportionate development and managing of treatment facilities addressing Coverage / Availability / Accessibility / Affordability and Specialization was successful.

Infrastructure development was aimed at building rearranging and modifications with necessary equipment in relation to the following areas: triaging facilities, isolation facilities, treatment facilities, ICU facilities and testing facilities etc. Bed capacity was increased at level I (Intermediate Care Centers), II (Symptomatic COVID – 19 patients with Oxygen need), III (Critically ill COVID – 19 patients for management of COVID – 19 patients. At the same time, number of High Dependency Unit (HDU) Beds and Intensive Care Units (ICU) Beds were increased to manage the critically ill COVID – 19 patients. These increases were done in phase wise in 1<sup>st</sup>, 2<sup>nd</sup>, and 3<sup>rd</sup> waves to accommodate all the patients without compromising the routine day to day patient care.

## **Maintenance and Improvement of supportive services, Improvement of lab service and managing medical supplies**

At the beginning, there were limited number of government laboratories, which could perform PCR testing. This was identified immediately and increased the PCR testing capacity in the government sector by providing PCR machines, needed other equipment reagents etc., to perform PCR testing. The PCR testing capacity was adequately fulfilled, and all the reagents and logistics were supplied adequately without any delays. During this period, the antigen test kits introduced and supplied adequately to hospitals. Usage of antigen guided by the clinicians to avoid missing cases and used appropriately. PCR testing was given priority, and antigen negative patients were monitored and some negative highly suspicious cases were directed for PCR testing for confirmation without missing any cases. In addition, other basic testing facilities such as hematological and Bio-chemistry testing were increased to match the demand of the other testing. Supply chain management on PPE, Masks and other protective equipment were carried out without interruption for quality patient management as well as for staff protection.

## **3. COVID 19 patient management; mobilization, managing of patients including critical patients**

Initially several hospitals were designated for COVID – 19 patient management and these were designated as mildly symptomatic, moderately symptomatic, and severe symptomatic patients. Then these hospitals were expanded to all 26 district covering the entire districts in Sri Lanka. According to the patient load number of beds, HDU beds and ICU beds were expanded. During the 2<sup>nd</sup> wave, patients have to be mobilized from hospitals to treatment centres even crossing districts and provinces based on the availability of treatment beds for which transportation was supported by forces. During the 3<sup>rd</sup> wave, most of patients was be managed within their own province or district and even later stages at their own homes. Coordination of Suwasariya pre hospital ambulance service helped for smooth transportation of patients to hospitals and quarantine centers and they arranged successfully.

## **4. Protection of staff safety through education and provision of adequate PPE and staff welfare**

Regular health education programmes were conducted to educate the staff for protection and better handling the COVID – 19 patients. Staff were provided with PPE adequately ensuring their safety. Staff welfare was done through providing transport facilities, special place to stay without going home, and also given supportive services to affected staff.



## 5. Maintaining normal patient care services and follow up services of chronically ill patients

Different strategies had to be adopted by the Medical Services to overcome challenge of achieving successful COVID – 19 patient care management while maintaining normal patient care services. Sometimes, routine surgeries and procedures were rescheduled in order to manage with staff safety (1<sup>st</sup> wave) and preserve Oxygen for critical patients (3<sup>rd</sup> wave), but managing all emergencies and essentials care services continued considering patient benefit, preventing avoidable deaths, and complications. Also non-communicable disease follow up patients were managed through mobile clinic / mobile dispensaries as well as delivery of drugs for NCD patients through postal, by Public Health Inspectors (PHIs), Public Health Midwives (PHMs) or other methods, and patient guidance through several national free information hotlines; 1999, 1390, 247 etc. Normal patient care was not compromised until 3<sup>rd</sup> wave when unbearable patient influx was occurred. With the experience many patients as asymptomatic. Treatment facilities improved utilizing many divisional hospitals as well as non-health institutions converting as level I treatment centers - Intermediate care centers with allocated health staff. Even 3<sup>rd</sup> wave, facilities for COVID patient care management were enhanced gradually with least affect to normal patient care.

## 6. Inter sectoral coordination; relevant experts, supportive sectors / stakeholders ( tri forces etc.), external fund sources, projects of donations and new innovations

Intra and inter sectoral collaboration and coordination of external fund sources, donors, development partners such as WHO, ADB, World Bank, UNICEF and assistance of tri forces was another responsibility done appropriately. Another important task, which was done, is to handle donations, related projects, and new-innovation.

## 7. Projects done in Medical Services related to COVID management

1. Conducting Distance Learning Training Programme for hospital staff on COVID management,
2. Project to expand ICU capacity for COVID management in collaboration with private telecommunication partner (involvement of private sector),
3. Communication improvement project for COVID management through Tele conferencing / Tele consultation with private telecommunication partner (involvement of private sector),
4. Marquee construction project for maintaining social distancing at crowded OPDs and clinics (involvement of private sector),
5. Project to establish BLS2 safety labs for COVID management hospitals with Asian Development Bank (ADB),
6. ICU improvement project for COVID management with UNICEF,
7. Improvement and introduction of new technologies in Medical Service,
8. Home Based Care for COVID 19 asymptomatic and mildly symptomatic patients with private telecommunication companies, private banks, professional associations, professional colleges, and College of Family Physicians (involvement of government and non-governmental organization),
9. Call Centre for COVID patients / post COVID patients as well as for public
10. Media Programme (involvement of private sector)
11. HIUS ( Health Information Updating System) database to gather information on hospital COVID patients, curative care institutional requirement and utilization
12. Development of institutional Oxygen Utilization Mobile App
13. Donations of Drugs, Reagents, Equipment, etc., from the well wishers

## 8. Leadership, Team Building, and Human Resource Management (Human resource management; developing norms, mobilization, training and education mainlining staff safety)

Adequate number of staff in relevant categories [Medical Officers (MOs), Nursing Officers (Nos), and Minor staff) were managed to be mobilized from other hospitals / units according to the norms for COVID – 19 management identified for each care level. All health workers in preventive and curative sectors; both COVID – 19 and non COVID – 19 hospitals and other health related services were built their capacity through online trainings using prepared audio-visual materials on COVID – 19 patient care management,



proper use of Personal Protective Equipment (PPE), executing services in a COVID – 19 setting etc. ICU training given to the nursing officers currently working in other units to enhance ICU trained nursing cadre. Training on ICU Management and Emergency Care Management was arranged for MOs and NOs in all levels. Staff safety was ensured through protection by immunizing and providing Personal Protective Equipment and other facilities adequately. One of the Background reasons for the success is Team Building was, attending through leadership and motivation programmes, guidance, facilitation, managing and handling difficulties / grievances, moral support, providing staff benefits, appreciations with achievements and their appreciable contribution, awareness and attitude development. .

## 9. Monitoring and supervision

Arrangement and conducting of video conferencing with relevant hospitals and isolation / treatment centers was used to help, guide, motivate, and monitor the care providers. Each hospital reported the information on above thereby keeping a clear focus on the situation of health facility and their performance. Initially collection of needed information from focal point of hospitals gathered by daily telephone calls, but in the later stage, it was arranged through an online updating database system. Thereby, requirement analysis and prediction, facility readiness with adequate capacity of the COVID – 19 isolation and treatment centers, mobilization of patients, supply requirements to centers and their performance as well as follow up of adherence to issued guidelines etc. were monitored stringently. Preparedness on Oxygen production and availability even with imports was managed successfully based on proposed projections.

## 10. Public empowerment; awareness, sensitizing and guiding

Videos for public awareness was produced and disseminated to government and public offices. Media campaigns, FAQs platforms and 1999, 1390 and 247 as well as mass media hot line were the measures for providing guidance to the public.

## CONCLUSIONS AND RECOMMENDATIONS

Multi strategic approach was used in the Sri Lankan health sector to combat COVID – 19 pandemic and the areas were, System Development (curative and preventive services), Infrastructure development and improvement of facilities in hospitals and Treatment Centres, maintenance and improvement of supportive services, active case management, staff wellbeing and protection, continuation of normal patient care services, intersectoral coordination and collaboration, special projects in relation to COVID – 19 pandemic, Leadership and Governance, Supervision and monitoring, and public / community empowerment. This was a good learning experience in managing a pandemic. Similar strategies can be implemented with modification in future pandemic situations. Further, it is recommended to do in-depth studies to understand the interventions done, effectiveness of interventions, gaps of intervention done and to mitigate the gaps for better response system in order to build a resilient health system.

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*Cite this Article: Panapitiya PWC, Ranasinghe GSP, Dilrukshi DARK, Gunasena BAHM, Fernando GHS (2023). Strategic Management of COVID 19 Pandemic; Response and Preparedness in Sri Lanka. International Journal of Current Science Research and Review, 6(11), 7046-7053*