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## **Mass Casualty Management in Divisional Hospitals in Kandy District Srilanka**

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## SUMMARY

A Mass Casualty is defined as an event that overwhelms the local healthcare system, sometimes the number of casualties exceeds the local resources sometimes. Mass casualties result in loss of many lives and disruption of the function of communities. Therefore, all the hospitals must have a dedicated system to manage them. A descriptive cross-sectional study was carried out among Heads of Institutes, selected health staff in Type A Divisional Hospitals in Kandy District Sri Lanka, and the readiness of those institutes were assessed by using the Accident and Emergency Policy of Sri Lanka. By results, the most of hospitals (57%) had disaster management plans and disaster management committees, but no single plan had an involvement of external resource people and has revived during the last one-year period. Interestingly 86% of hospitals had standard operation procedures to manage a mass casualty incidence. However, simulation drills had not been conducted in any of the institutes. About 80% of the participants were aware of the risk of natural disasters of their areas. All most all the hospitals had majority of basic facilities as recommended by the accident and emergency policy, but some critical facilities were not available. Divisional Hospitals of the district have various management issues which affect the mass casualty management. The knowledge and awareness of the studied staff members was not so satisfactory. It may also affects the mass casualty management. In this research, a in depth data collection by heads of institutes was not done, and higher-level healthcare managers such as regional directors and provincial directors were not included. Those were some limitations. With the results, conducting disaster management training to primary care health staff, allocating a budget and resource persons to support those hospitals are recommended.

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## CHAPTER 1

### INTRODUCTION

The terms disaster and mass casualty incident are often used interchangeably but describe different entities. Both imply a discrepancy between the number of victims and the treatment capacity of the community. A mass casualty incident (MCI) is more limited in scope. The number of casualties in an MCI may strain the hospital or receiving facility, but resources are sufficient to cope without outside support. In a disaster, the casualty burden will exceed local capabilities and on-site resources, necessitating support from the outside. A disaster is a catastrophic event that disrupts the societal or community infrastructure to such a degree that extraordinary means are necessary to cope (Hammond J, 2005). Though, Mass Casualty Incident (MCI) is defined as an event that overwhelms the local healthcare system, sometimes the number of casualties exceeds the local resources and capabilities in a short period (Denolf and Khawaji, 2022). Therefore, whatever the definition, MCIs as similar as disasters challenge local healthcare facilities and, potentially, therefore can quickly exceed local capacities.

Any MCI can exhaust available resources within very short time for not only the MCI but the normal day-to-day works also of the hospital. Therefore, every hospital should prepare a surge plan which shows the maximum capacity that can be handled in an emergency (Denolf and Khawaji, 2022).

The World Health Organization (WHO) has implemented a risk-reduction and emergency preparedness plan for the health sector and a community capacity development to assess emergency preparedness for mass casualty incidents (MCIs).

Mass casualties result in the loss of many lives and disruption of the functioning of communities. If there is a MCI management plan in the hospitals, deaths, injuries, diseases, disabilities, psychosocial problems and other health impacts can be avoided or reduced (Denolf and Khawaji, 2022). The health consequences of a MCI range from minor physical trauma and acute disease to long term emotional trauma. In addition, MCIs increase morbidity and mortality associated with chronic diseases and acute infections.

Divisional Hospitals, one of primary health care institute very close to the community, would be the first institution which respond to and are affected by MCI as they have limited amount of resources (Centre for Excellence in Disaster Management and Humanitarian assistance, 2021). Therefore, these hospitals should be well prepared to face MCIs. The District of Kandy is vulnerable due to various natural disasters hence MCIs as its geological position consists mostly of hilly areas, size of the district is comparatively large, and high rain fall.

Further, incidences of landslides, availability of many dams around and, recently reported tremors in areas where main reservoirs are situated, and repeated vehicular accidents urge the readiness of MCIs of the District.

The Joint Commission on Accreditation of Healthcare Organizations (JCAHO) defines a disaster as something that not only disrupts patient care but also Increases demands upon the institution's services and disrupts the environment of care. As a consequence, the very philosophy of medical care may be altered.

In an emergency, instead of the concentration of available resources devoted to the needs of an individual patient, it must focus doing the greatest good for the majority- (Hammond J, 2005). The international community has placed disaster risk reduction at the centre of sustainable development (UNESCAP, 2017).

The Hyogo framework for action (HFA) 2005-2015 and its successor, the Sendai framework for action (SFA) 2015-2030, highlight the importance of ensuring the resilience of critical infrastructure such as hospitals by undertaking disaster risk reduction actions. The SFA has a direct link to health. It promotes the safety of health facilities (IFRC, 2015). The World Health Organization (WHO) has published a number of safe hospital reports and toolkits. It defines safe hospitals as health facilities whose services remain accessible and functioning at maximum capacity and within the same infrastructure during and immediately following disasters, emergencies or crises (WHO, 2008). The WHO Safe Hospital Initiative (SHI) concept meant to be adopted by hospitals globally to ensure the structural integrity and functionality of health facilities under disaster situations (WHO, 2015). In addition, it argues that making healthcare facilities safe and resilient is a very cost effective investment compared to spending on reconstruction after a disaster event (WHO, 2008).

### **1.1 Sri Lankan Preparedness for MCIs**

Sri Lanka has increased efforts to build a multi hazard disaster management infrastructure since the 2004 Indian Ocean Tsunami which has led to reforms the national disaster management act, the establishing the National Council for Disaster Management (NCDM) and its operative office, and the Disaster Management Centre (DMC).

Main activities of the DMC are Research and Development, disaster mitigation, planning, preparedness, dissemination of early warning for vulnerable populations, and emergency response.

Additionally, coordination of relief and post - Disaster activities in collaboration with other key agencies are also done by the MDC (Centre for excellence in Disaster Management and Humanitarian Assistance, 2021).

There are also disaster management committees at District, Divisional and Grama Niladhari wasams levels across the country. In the event of a disaster, emergency Operations are established to coordinate all response agencies to minimize the adverse effects of disaster (Centre for excellence in Disaster Management and Humanitarian Assistance, 2021).

## **1.2 Hospital Preparedness**

Improving hospital preparedness requires an assessment of the country's current health system capacity, readiness and preparedness. A variety of assessments tools exist to assess the preparedness of hospitals, total health system and the capacity of the health system., However none are entirely suitable for health care system MCI, because regular drills to the hospital mass casualty management system to sustain the practice are the most important (Wuthisuthimethawee, Rojsaengroeng, and Krongtiravate , 2021).

## **1.3 Rural hospital mass casualty preparedness**

The rural hospitals tend to have less capacity and resources than their urban and sub urban counterparts and therefore maybe more vulnerable. It's believed that there has been adequate focus on MCI preparedness outside the urban areas (Institute of Medicine, 2006). However, the risk perception among the responsible people is one of main contributing factor of adequate preparedness.



Sometimes it has been noticed that risk perception is not as greater in rural communities than their urban and sub-urban counterparts. However rural communities have unique characteristics that pose unprecedented challenges such as MCI. Since rural areas can also be targets of disasters and hence MCI further exploration of the risk perception is necessary (Institute of Medicine [IOM], 2006). The World Health Organization (WHO) has published a number of safe hospital reports and toolkits. It defines safe hospitals as health facilities whose services remain accessible and functioning at maximum capacity and within the same.

The commonest mass casualties in the world are Active shooting incidents, Terrorist attacks, Explosions, Natural disasters such as hurricanes, tornado, tsunami, volcano eruptions, Multi vehicle accidents, Mass transit mishaps like bus toppling, train derauling etc. Common mass casualties in Sri Lanka are floods, Road traffic accidents, landslides. Many research have been done regarding mass casualty management. Lot of improvement have been made. Many tools have used to improve this.

## **1.4 OBJECTIVES**

### **1.4.1 General Objective: -**

- To assess the capacity to manage mass casualty incidents in selected Divisional Hospitals of Kandy district.

### **1.4.2 Specific Objectives: -**

- To assess the facilities of hospitals to support the management of Health Care related issues in a mass casualty incidence.
- To describe management issues in relation to mass casualty management in DHs.
- To assess the knowledge and awareness of selected hospital staffs on basic management of mass casualty management.



## CHAPTER 2

### LITERATURE REVIEW

The terms disaster and mass casualty incident are often used interchangeably but describe different entities. Both imply a discrepancy between the number of victims and the treatment capacity of the community (Hammond J, 2005).

A Mass Casualty Incident (MCI) is more limited in scope. The number of casualties in a MCI may strain the hospital or receiving facility, but resources are sufficient to cope without outside support (Hammond J, 2005). In a disaster, the casualty burden will exceed local capabilities and on-site resources, necessitating support from the outside (Hammond J, 2005). Sometime, a disaster may be a catastrophic event that disrupts the social or community infrastructure to such a degree that extraordinary means are necessary to cope (Hammond J, 2005). The Joint Commission on Accreditation of Healthcare Organizations (JCAHO) defines a disaster as something that not only disrupts patient care but also increases demands upon the institution's services and disrupts the environment of care, and as a consequence, the very philosophy of medical care may be altered. As an example, instead of the concentration of huge amount of resources devoting to the needs of an individual patient, the focus becomes doing the greatest good for the majority of victims (Hammond J, 2005).

There are many evaluation checklists and tools to assess the preparedness of a hospital. One such tool is the Hospital Safety Index (HSI), which measures a hospital's operational capacity in disaster and emergency.

Research's which have been conducted in difficult parts of the world shows that the healthcare is not well equipped, trained to tackle or handle the disaster (Mohamed Mojtahedi, Riza Yosia et al, 2021).

A study done in Matara, Sri Lanka shows that the basic facilities are not adequate to handle the emergency and they found many gaps in the health sector such as basic knowledge and skills of doctors and nurses to response emergencies, most of the hospitals do not have mass casualty and evacuation plans. Further, budgetary allocation for the uplifting of the facilities is not (Nimali Lakmini Munasinghe and Kenichi Matsui, 2019).

A research done in Turkish Hospitals clearly states that the importance of preparedness and the availability of facilities and identifying hospitals with a low level of preparedness is very essential for disaster preparedness (Miguel Ortiz-Barrios, Muhammet Gal et al 2020).

A concept analysis conducted by Griffith University Australia, stressed on using a comprehensive solution- based strategy which emphasised on training, retraining, capacity building and more drills and in create basic facilities and making the facility friendly to high influx of people. When the attributes is extended beyond the normal operational level or capacity, the effectiveness and capacity of other facilities is likely to be limited (Neeraj Pawar, Raghvendra Gumashta, 2022).

Another study conducted in Thailand regarding the Hospital Preparedness using a tool which has been developed by researchers observed that 80% of hospitals were prepared and the rest (20%) was not prepared, and they concluded that the result was satisfied ( Wuthisuthimethawee and Khorram- Manesh, 2021).

In Iran, research was conducted to assess the hospital preparedness on chemical incidents because chemical incidents are among the most frequent technological disaster in the area. Therefore, doing research about geographical specific disasters is beneficial. However, based on the results, researchers observed that there was no comprehensive tool for assessing hospital preparedness in MCIs such as chemical incidents (Teymouri, Zareiyani et al, 2022).

An Ethiopian research which assessed the providing services availability of the infrastructure in emergency care facility showed that most of the regional and district hospitals nurses and doctors didn't have a satisfactory training on emergency care, and 70% of the hospitals didn't have a standardized guideline for Mass casualty incidents (Firew, Mishra, 2022).

A group of researchers in Central Saudi Arabia also concluded that education, training and monitoring of the hospital staff to face a mass casualty incident were unsatisfactory (Abdullah *et al*, 2017).

#### Management issues in hospitals in managing mass casualty incidents

Disaster impair people of any area in the world at any time. Disaster occur in various frequencies. The hospital may receive an early warning sometimes regarding a disaster e.g.: hurricanes, floods. Hospital as the main place to face the effects of disaster, hence they must be ready to face a disaster (Azarmi *et al.*, 2021).

Hospital managers play a crucial role in managing the effects of disaster effectively. The main management issue is the preparedness of hospitals. Results of multiple studies show that the lack of preparedness is a very big challenge for the hospitals.

For example the hospitals involved in providing relief for the injured in the earthquake in Iran in 2017, the hospitals faced a major challenge in preparedness, and 40% 60% preparedness was concluded as moderate level preparedness (Bazyar and Pourvakshoori, 2020).

Frequent evaluation and monitoring can identify the needs, weakness and proper planning can improve the response and service of the hospital. The health care provider should collect the required data in the field of disaster and arrange the necessary planning. A research study by Environmental Research and public health identified some challenges, issues when managing mass casualty incidents. A crisis management review was implemented on lessons learned or experiences and the results were analysed. The main challenge was dealing with uncertainty, unpredictability and unexpected consequences. Unreliable, unconfirmed information made decision making more challenging. In the studies conducted all most all the studies there was a mismatch between the contingency planning and reality. For example stretchers and blankets were the most used and requested equipment after the terrorist attack in Norway. But the stored equipment was mainly surgical equipment (Karin Hugelius, Julia Becker, 2020).

Another very common problem with the management of mass casualty incidents was the communication problem. If the communication fail, it challenges the crisis response. Common communication failures are lack of proper information system, language barriers, and difficult interpretations. Communication problem effects both the medical response and also strategic decisions (Kenneth *et al.*, 2013).

Another research found another management problem that is the categorization of patients after a mass casualty Triage is a key management challenge.

As there not field triage in most of the time, patients' care can be affected. Therefore, availability of standard triage system in the hospitals closed by the high risk area is very important. Additionally, proper documentation of the patents are also important (Bashir *et al*, 2018).

#### Knowledge/ Awareness of Staff to Manage Mass Casualty Incidents

Mass casualty incidents are low frequency, high risk events that disrupt day to day activities. The day to day management activities are not sufficient to effectively manage Mass Casualty incidents. A project was done to gain insight of the staff and their concern for MCI. The project concluded importance of staff experience, simulation training and preparedness which would be very useful for emergency response (Mary E. Moran, Jacob R. Zimmerman, 2021).

In America a study was conducted to assess the familiarity, knowledge of Nurses to respond to a disaster the study concluded that the nurses lack knowledge, skills and ability to respond adequately in a disaster (Natareno, Kathleen, 2018).

A study was conducted in Mosul in Iraq to assess the knowledge, Attitudes and Practice of Nurses towards preparedness of Disaster Management in Emergency. It was a cross sectional study which consisted of a questionnaire with 04 sections. The results stated that the awareness or knowledge of nurses was high with a neutral level of attitude and also disaster preparedness level was satisfactory (Nasir M. Younis, Mahmood M. Ahmed *et al*, 2020).

A study was conducted in Teaching Hospitals in Brisbane, Australia evaluating effect of Mass Casualty simulation on the change in participants assessed skills, confidence and knowledge in responding to Mass Casualty Incidents.

The study supports simulation usage improves the staff self-efficacy and perceived preparedness through increasing self-assessed knowledge, skills and confidence to manage a Mass Casualty Incident ( Amy L Sweeney, Yuet L Lui *et al*, 2021).

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## **CHAPTER 3**

### **METHODOLOGY**

#### 3.1 Study Design

A descriptive cross-sectional study was carried out among Heads of Institutes, Doctors, and selected staff members of Type-A Divisional Hospitals of Kandy District. The 1<sup>st</sup> objective was assessed by a check list adapted from the accident and emergency policy, Standard Equipment in Level 4 Divisional Hospitals. The 2<sup>nd</sup> objective was done by a self-administrator questioner to the heads of institute and the 3<sup>rd</sup> Objective was also done by a self-administered Questionnaire. Both questions were adapted by Pan American Health Organization (PAHO) Health Assessment Sector Self-Assessment tool for Disaster Risk Reduction and were validated in Matale District among 3 selected hospitals among selected staff members, and adjustments were done accordingly.

#### 3.2 Study setting

This study was carried out in total 14 Type A Divisional Hospitals in Kandy District. Those hospitals have total number of 502 permanent staff members.

#### 3.3 Study Period

1<sup>st</sup> of March 2021 to 31<sup>st</sup> of Jan 2022-

### 3.4 Study Population

There were two study populations. The 1<sup>st</sup> one was all the heads of institutes, and the 2<sup>nd</sup> one was medical officers and nursing officers of the hospitals.

### 3.5 Sample Size Calculation

As all the heads of institutes were taken to the objective 2, there was no sample size. For the 3<sup>rd</sup> objective, considering the feasibility of the study, as a purposive sample, 1/4<sup>th</sup> of the total 502, staff members were taken. Then the sample size was 125. Thereafter, considering the Doctor: nurse ratio, of the staff, 33% of doctors and 66% of nurses were selected.

### 3.6 Sampling technique

Out of the total sample, a quota was allocated to each hospital proportionate to the total number of selected staff members in each hospital. Then the quota of each hospital was divided among doctors and nurses to 1:3 ratio (33% - 66%). Thereafter, the required number of staff members in each category was selected randomly using the staff registers available at the office.

### 3.7 Study instruments and variables

The 1<sup>st</sup> objective was done by a check list prepared from the facility list which has been recommended in the Accident and Emergency policy for Level 4 or emergency rooms in divisional hospitals.

The 2<sup>nd</sup> objective and the 3<sup>rd</sup> Objective were done by self-administered Questionnaires. The questions adapted by the Pan American Health Organization (PAHO) Health Assessment Sector Self-Assessment tool for Disaster Risk Reduction, and the questionnaire was validated in 3 selected Hospitals in Matale District and adjustments were made according to pretest results.

### 3.8 Data Collection

The study was commenced after getting approval from relevant officers. Principal investigator and a trained team of medical officers as data collectors visited the hospitals with the permission of the heads of institutions. Data of heads of institutes were conducted by the principal investigator, and other data collectors helped to other data collection.

### 3.9 Data Processing

The principal investigator carefully checked the filled questionnaire before data entry into devices. SPSS version 26 statistical software was used to perform statistical analysis on the data.

### 3.10 Data Analysis

#### 3.11 Inclusion exclusion criteria

All the very recently attached (less than 6 months) staff members were excluded from the study.

#### 3.12 Ethical clearance

Ethical clearance was granted by the ethic review committee of the PGIM.

## CHAPTER 4

### RESULTS

Table 1: Distribution of the study participants by their job category

No: of Doctors (%)	No: of Nurses (%)
42 (33.33%)	84 (66.67%)

n = 126

Out of total participants, 42 (33.3%) were doctors and the rest were nurses 84 (66.67%).

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**Describing the management issues in relation to MCI management**

Table 2: Preparedness of the hospital for mass casualty incidences

Character	Number (%) of hospitals available	Number (%) of hospitals not available
Availability of disaster management plan	8 (57.14)	6 (42.85)
Availability of Health sector Disaster Management committee	8 (57.14)	6 (42.85)
Inclusion of committee members from private health sector and commoners	0 (0)	14 (100)
Revision of plan within last year	0 (0)	14 (100)
Revision of plan within last 5 years	2 (13.72)	12 (86.28)
Multi hazard or not	14 (100)	0 (0)
Inclusion of sub plans	0 (0)	14 (100)

Out of total hospitals studied, 8 (57%) had disaster management plans and health sector disaster management committees. However not a single hospital has outside members in those committees. Not a single hospital has reviewed their plans during last one year, but 2 hospitals have reviewed their plans during the last 5 years period. Interestingly, all hospitals have multi hazard plans, but there were no sub plans.

Table 3: Availability of Standard Operation Procedure

Available (%)	Not Available (%)
12 (86.28%)	2 (13.72%)

Standard Operation Procedure was available in 12 (86%) of the hospitals and was not available in 2 (14%) hospitals.

Table 4: Conduction of simulation drill within the last year

Conducted (%)	Not conducted (%)
2 (13.72%)	12 (86.28%)

Conduction of simulation drill was done in 2 (13.72%) hospitals and not done in 12 (86.28%) hospitals.

Table 5: Recipient of Disaster Management Training

Received (%)	Not Received (%)
0 (0)	14 (100%)

Disaster management training was not done by any of the hospitals.

Table 6: Availability of specific budget line to carry out Disaster Management Activity

Available (%)	Not Available (%)
2 (13.72%)	12 (86.28%)

A specific budget line was available in 2 (13.72 %) of hospitals and 12 (86.28%) and didn't have a budget line.

**Knowledge and awareness of staff members on basic management of MCIs**

Table 7: Awareness of what natural disasters the area is prone to

Aware (%)	Not Aware (%)	Significance
101 (80.1%)	25 (19.8%)	Z= 0.0001; p > 0.05 Significant

Awareness among staff members, 101 (80.1%) were aware about what natural disasters the area was prone to and 25 (19.8%) were not aware. It is Significant

Table 8: Awareness of a Disaster Plan in the hospital

Aware (%)	Not Aware (%)	Significance
58 (46.03%)	68 (53.96%)	Z = -0.8000; p > 0.05 Not Significant

Awareness of a Disaster plan in the hospital was 58 (46.03%) and 68 (53.96%) were not aware. Which is not significant.



Table 9: Recipient of Training in Disaster Management

Received (%)	Not received (%)	Significance
36 (28.57%)	90 (71.42%)	Z = 0.04200; p > 0.05 Significant

Training in Disaster management, 36 (28.57%) had received and 90 (71.42%) had not received. Which is significant.

Table 10: Participation in a drill

Participated (%)	Not Participated (%)	Significance
6 (4.76%)	120 (95.23%)	Z = 30.20; p > 0.05 Significant

Members who had participated in a drill was 6 (4.76%) and 120 (95.23%) had not participated. Which is significant.

Table 11: Permanent position in Disaster Management Committee

Permanent (%)	Not Permanent (%)	Significance
28 (22.22%)	98 (77.77%)	Z = 0.5600; p > 0.05
		Significant

Nearly 28 (22.22%) had a permanent position in the Disaster Management Committee and 98 (77.77%) did not have a permanent position. Which is significant.

Table 12: Carrying out Lessons learned exercises

Carried out (%)	Not Carried out (%)	Significance
0 (0)	126 (100%)	Significant

Lessons learned out exercises was not carried out in any of the hospitals. Which is very significant.

Table 13: Availability of an established unit and support staff for Health Sector

Available (%)	Not Available (%)	Significance
23 (18.25%)	103 (81.75%)	Z = 0.6400; p > 0.05 Significant

Established unit and support was available in 23 (18.25%) of hospitals and 103 (81.75%) didn't have. Which is significant.

Table 14: Contribution to the identification of training needs.

Contributed (%)	Not contributed (%)	Significance
7 (5.55%)	119 (94.44%)	Z = 0.0900; p > 0.05 Significant

Contribution to the identification of training needs was 7 (5.55%) and 119 (94.44%) did not contribute. Which is significant.

Table 15: Addressing of Structural and non-structural safety improvement plan

Addressed (%)	Not addressed (%)	Significance
16 (12.69%)	110 (87.30%)	Z = 0.7400; p > 0.05 Significant

Structural and nonstructural safety improvement plan was addressed by 16 (12.69%) and 110 (87.30%) did not address. Which is significant.

Table 16: Availability of Protocols to share data

Available (%)	Not Available (%)	Significance
2 (1.58%)	124 (98.41%)	Significant

Protocols to share data 2 (1.58%) had and 124 (98.41%) didn't have protocols to share data. Which is significant.

Table 17: Readiness to participate in National emergency response or disaster

Ready (%)	Not Ready (%)	Significance
36 (28.57%)	90 (71.42%)	Z = 0.4300; p < 0.05
		Not Significant

Nearly 36 (28.57) were ready to participate in National Emergency response or disaster and 90 (71.42%) were not ready. Which is not significant.

Table 18: Opinion on training in emergency response and disaster preparedness should be mandatory for all health professionals.

Mandatory (%)	Not Mandatory (%)	Significance
126 (100%)	0 (0%)	Significant

Training in emergency response and disaster preparedness should be made mandatory was approved by all most all the participants. Which is significant.

Table 19: Opinion on overall and situational risk awareness of Mass casualty

Incidents/disaster need to be high in health professionals.

Need to be high (%)	Need not be high (%)	Significance
126 (100%)	0 (0)	Significant

All most all the members approved that the overall and situational risk awareness of Mass Casualty incidents need to be high in health professionals. Which is significant.

Table 20: Confidence level in recognizing difference in health assessment.

Confident (%)	Not confident (%)	Significance
36 (28.52%)	90 (71.42%)	Z = 0.4200; p < 0.05
		Not Significant

Confidence level in recognizing difference in health assessment, 36 (28.52%) were confident and 90 (71.42%) were not confident. Which is not significant.

Table 21: Participation in the management of disaster/mass casualty cases.

Participated (%)	Not Participated (%)	Significance
10 (7.94%)	116 (92.06%)	Z = 0.1200; p > 0.05
		Significant

Nearly 10 (7.94%) of the participants had participated in a disaster/ mass casualty case and 116 (92.06%) had not participated. Which is significant.



**Assessing the facilities of hospitals to support the management of MCI**

**Table 22: Standard Equipment’s in District Hospitals (Level 4)**

Table 22 is annexed as annexure 4.

The table assessed the availability of Standard equipment should be available in Divisional Hospitals. Many hospitals had most of the equipment’s. The invasive equipment’s were not available.

**4 STANDARD EQUIPMENT IN DISTRICT HOSPITALS (Level 4)**

<u>Equipments</u>	DH Akurana	DH Akumbura	DH Deltota	DH Galagedara	DH Kadugannawa	DH Katugasthota	DH Madulake	DH Mampitiya	DH Menikhana	DH Pussellawa	DH Tiththapajjal	DH Udumbura	DH Waldegama	DH Marussana
Multi Para Monitors % channels for resuscitation & 3 Channels for observation area	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Nebulizers	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Defibrillators with Pacing facilities	✓	✓	✓	✓	✓	✓	x	✓	x	✓	✓	x	✓	✓
ECG Machines	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Resuscitation Beds	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Beds	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Trolleys	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
IV Cannula / Transfusion sets	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Suction Device	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Oral, Nasal Airways/ET Tubes	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Cricothyroidotomy insertion sets	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Cervical Collar	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Sterile Dressings	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Splinting Materials	✓	x	✓	✓	✓	x	x	x	✓	✓	✓	x	x	✓
NG Tubes	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
IC Tubes	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Pulse Oximeter	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Spinal Boards	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Multi Parameter Monitor	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Endo: Tracheal Sets	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Laryngoscope	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Thromboelastometry	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Ambu with Mask – Adult & Pediatric	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Venturi Masks	✓	✓	x	x	x	✓	x	✓	x	✓	✓	x	x	x
BP Apparatus (Invasive)	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Venus Cut Down Set	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Oxygen Cylinder with regulator	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ET Tubes	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Non Rebreathing Masks	✓	x	✓	x	✓	x	✓	x	✓	✓	✓	✓	✓	✓
Peak flow meter	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Results	22/30	21/30	21/30	20/30	21/30	21/30	20/30	21/30	19/30	22/30	22/30	19/30	20/30	21/30



## CHAPTER 5

### DISCUSSION

As the table 2 shows, out of 14 hospitals studied, 8 (57%) hospitals have Disaster Management Plans. A study done in Ethiopia, the preparedness level was less than 50% (Samuel *et al*, 2023). Comparatively our level is comparatively higher, but it must be sure to upgrade the system, and made available disaster management plans in almost all the divisional hospitals. All the hospitals which had a Disaster Management plan, had Disaster Management committees as well. However, all the disaster management committee had members of the hospitals, but not outside members available. It is very useful if the outside stakeholders are involved because the hospital can get support from them such as financially and essential drugs, and some other resources. A study done in Pakistan shows that the Government of Pakistan got the help from International relief agencies, as external members, International NGO's and local NGO's in its relief and rescue operations and showed good results (Ikram Shah *et al*, 2022). As the above research with their experiences, they included external peoples in to the national disaster management organization. It paved a way to avoid duplication, wastage of resources and reaching out to the communities in a timely manner. The research assessed whether the plan was reviewed within the last one year or not. None of the hospitals had reviewed the plan within the last one year. However, 2 hospitals have revived their plans within the last 5 years.

In a personal discussions of the principal investigator between some of heads of institutes revealed that, some of them haven't an idea about the importance of the reviewing, and others said that they haven't capable resource persons to review it.

Next it was assessed whether the existing plan was Multi hazard. Interestingly, almost all the hospitals had multi hazard plans. The purpose of a multi hazard plan is to increase the resilience to all disasters using a comprehensive disaster management plan, approach. The availability of sub plans was also assessed, but none of the hospitals had a sub plan. Which is very significant. The purpose of a sub plan is to outline an emergency communication plan and area specific emergency preparedness to the staff.

Table 03 assessed the availability of a standard operation procedure, and 12 (86.28%) had standard operation procedures, and 2 (13.72%) had not standard operation procedures. It's important to have a standard operation procedure. The standard operation procedure provides guidelines for hospitals to manage Mass casualty incidents in an organized and efficient manner. Standard operation procedure is required for effective response. The fact that a hospital has prepare a standard operation procedure, doesn't automatically result in effective management of Mass casualty incidents (Bruria Adini *et al*, 2007).

In the assessment of the conduction of simulation drill (Table 4), during the last year period, only 2 (13.72%) hospitals had conducted a simulation drill. That is very significant. It's very important to have simulation drills frequently. To assess the preparedness of the hospitals to encounter mass casualty incidents, to identify shortcomings and to improve the existing one for the timely need. A study done in Australia concludes that use of simulation drills improves staff self-efficacy and preparedness through an increase in self-assessed knowledge, confidence and skill to manage Mass Casualties (Amy L Sweeny *et al*, 2021).

Table 05 assessed whether the hospital received any disaster management training. None of the hospitals had received disaster management training.

It's statistically significant. The reason would be the health sector exhausted with the management of Covid 19 for the past 1 to 2 years. A study done in Iran concluded that the disaster management training helps in increase in knowledge, attitude and practices of staff members which results in change in performance to manage Mass Casualty Incidents (Samaneh Mirzaei *et al*, 2018).

The availability of a specific budget line was also assessed (Table 06), to carry out Disaster Management activity. Only 2 (13.72%) hospitals had a specific budget line and 12 (86.28%) didn't have a specific budget line. Specific budget line is important to increase welfare by increasing the national savings, reducing exposure to risk and promoting mitigation process (Marvin Phaup, 2010).

The staff member's awareness of natural disasters that their area is prone to was taken into consideration (Table 07), 101 (80.1%) were aware and 25 (19.8%) were not aware. It's important to be aware of the natural disasters that the area is prone to. Natural disaster awareness and education plays an important part in prevention of natural disasters. If applied in an earlier stage it will yield positive results and reduce consequences with the preparedness (Panic Milena *et al*, 2013).

The next was participants' awareness of a disaster management plan in the hospital (Table 08). About 58 (46.03%) were aware and 68 (53.96%) were not aware. Which is not significant. It's important that the staff become aware of the disaster management in the hospitals, because in a study conducted in Saudi Arabia concluded that the staff got confused when there was an emergency situation. The members who were confident had an experience in shelters and disasters (Ahmed Ali Shammah, 2015).

When consider Disaster management Training, 36 (28.57%) has received a training and 90 (71.42%) had not received a training in disaster management (Table 09). Which is very significant. It's very important to have training in disaster management. The hospital staff have a critical obligation to prepare, response and manage to minimize morbidity and mortality resulting from mass casualty incidents (Jeremy, Richard and Gowing, 2021). The most important part in disaster management is make sure that the patients are properly taken care of including their diagnosis, treatment and follow up. For this it's important to have a training in disaster management (Kathy and Wood, 2018).

Regarding disaster management drills, 6 (4.76%) had participated in a drill and 120 (95.23%) had not participated and it very significant (Table10). It's important to have drills conducted and participation is important. To be aware on how to manage mass casualty incidents. Disaster management drills promote effective disaster management and places them within the context of preparedness activities. In a drill planning, training adequacy, exercising, teamwork are explicated (Peterson and Perry, 1999). Afterwards it was assessed (Table 11), whether the staff member had a Permanent position in the Disaster Management committee and 28 (22.22%) had a permanent position and 98 (77.77%) didn't have a permanent position. Which is significant. Incident management systems and disaster planning committee facilitate the maximal use of their resources by coordinating, communication, commanding and management of controlling the incidence and tracking of cases (Nayani *et al.*, 2023).

None of the members had carried out lessons learned exercises (Table 12). Lessons learned exercises is the International Preparedness and response to Emergencies & Disaster conduct conferences bi-annually in order to share insights and lessons learnt from different crisis. It shares lessons learned from emergency preparedness and response to disaster situations. It provides platform for exchange of experiences, to improve networking among healthcare professionals (Adini *et al.*, 2016).

Availability of an established unit and support staff for health sector was assessed and 23 (18.25%) said it's available and 103 (81.75%) stated it's not available (Table 13). Which is significant. An effective teamwork can immediately and positively affect patient safety and outcome. An effective unit and teamwork are an essential tool for constructing a more effective and patient centred healthcare delivery system (Amir and Babiker, 2014).

The contribution of staff members to the identification of training needs and 7 (5.55%) had contributed and 119 (94.44%) had not contributed and it's significant (Table 14). Identifying what factors encourage participants in disaster preparedness training can help healthcare workers and hospitals create targeted training and educational materials for a better response to disasters in hospitals in the future (Balut *et al.*, 2022).

In the addressing of structural and non-structural safety improvement plan, 16 (12.69%) had addressed and 110 (87.30%) had not addressed (Table 15), which is significant. It's important to address safety improvement plans. Safety and risk reduction is mainly used to reduce the risk level. Structural would be the buildings, other elements of the building, architectural utilities would be considered as non-structural (Saeed and Fallah-Aliabadi, 2020).

The availability of protocols to share data (Table 16), 2 (1.58%) members said available and 124 (98.41%) stated that protocols are not available to share data which is significant. Information sharing is important. There are numerous benefits of timely access to information in emergencies and disasters. This helps in mitigation, planning, preparedness, and recovery phase in disasters. As a result, the outcome in disaster management will improve (Arnold *et al.*, 2004).

Readiness to participate in National emergency response or disaster was assessed and 36 (28.57%) were ready and 90 (71.42%) were not ready, which is significant (Table 17). The principal investigator when inquired from the members who were not ready to participate in national emergency stated that the main reason was lack in confidence and no proper training to manage mass casualties. A study done in Saudi Arabia evaluated the perception of preparedness and willingness to work during disaster and emergencies, the results showed that participants willing to work unconditionally during disasters and emergencies based on the type of condition. The willingness, success depends on the individual's perception about disaster, institutional and individual preparedness, experience of previous incidents (Sultan *et al.*, 2020).

The Opinion on training in emergency response and disaster preparedness should be mandatory for all health professionals and all most all had the opinion that training in emergency response and disaster preparedness should be mandatory (Table 18). Situational risk awareness of mass casualty incidents/disaster need to be high in health professionals and almost all accepted that it should be high in health professionals (Table 19). As health professionals are the main stakeholders in managing the mass casualty incidents/disasters.

A study was conducted on staff perspective of mass casualty incidents and it demonstrated the importance of staff experience related to Mass casualty incidents which may be useful for future training and emergency response planning (Moran *et al.*, 2021).

Nearly 36 (28.52%) were confident in recognizing difference in health assessment and 90 (71.42%) were not confident in recognizing difference in health assessment (Table 20). A study was conducted in Israel, the results revealed that confidence in the availability of health services positively correlated with community resilience (Cohen *et al.*, 2019). It was assessed whether the participants had participated in the management of disaster/mass casualty incidents and only 10 (7.94%) had participated and 116 (92.06%) had not participated (Table 21). Participation in a disaster/ mass casualty gives an experience in managing future incidents in a better way. From real experience, many things can be learnt, many lessons. Distribution of resources, training needs, what changes should be made structurally and non-structurally. Which will result in a better outcome in disaster management.

The availability of Standard equipment in District Hospitals (Level 4). Most of the equipment were available, except the few invasive equipment. Basic management of Mass casualty incidents can be managed, but not in large scale. The equipment were not in high standard condition.

## CONCLUSION

As the conclusion, almost all the hospitals had the basic facilities but some of invasive equipment were not available. The facilities are not sufficient to manage a Mass casualty Incident. Majority of hospitals had Disaster Management plans and a Disaster Management Committees.

Almost all the hospitals had a Standard operation procedure, but drills were not done. No disaster management training had been given majority staff members. As the heads of institutes, hospitals have various mismanagement issues.

Majority of staff were aware of the disasters the area was prone to, and nearly 50% knew there was a disaster management plan in the hospital, about 20% had a permanent position in the disaster management committee. Lessons learned exercises had not been conducted in any of the hospitals. Few hospitals had an established unit and support health staff. Minimal contributed to the identification of training needs. Therefore, knowledge and awareness of the selected health staff about the mass casualty incidence were poor.



## LIMITATIONS

- Detailed data couldn't be collected. Data was collected quantitatively, not qualitatively.
- Data was not collected from other stakeholders like the PD and RD.

## RECOMMENDATIONS

- Inform the heads of institutes about the importance of Disaster Management plan and its proper functioning, and keeping it updated.
- Get the support, help of the PD and RD in developing and proper functioning of MCI management system.
- Arrange staff awareness and training frequently.

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## Annexures 7

### 1 Consent Form

#### Title of the Research Project

Mass Casualty Management in Divisional Hospitals in Kandy District

To be completed by the participant (Please tick the appropriate box)

Yes No

1. Have you read the information sheet? (Please keep a copy for yourself)
2. Have you had an opportunity to discuss this study and ask any questions?
3. Have you had satisfactory answers to all your questions?
4. Have you received enough information about the study?
5. Do you understand that you are free to withdraw from the study at any time, without having to give a reason and without affecting your future medical care?

6. Sections of your medical notes, including those held by the investigators relating to your participation in this study may be examined by other research assistants. All personal details will be treated as strictly Confidential. Do you give your permission for these individuals to have access to your records?
  
7. Have you had sufficient time to come to your decision?
  
8. Do you agree to take part in this study?
  
9. 9 Who explained you about the study?

Signature of the participant:

Date:

Full Name:

.....  
.....

To be completed by the investigator/ person obtaining consent  
I have explained the study to the above participant and he/ she has indicated her willingness to take part in this study.

Signature of Investigator:

Date:

Full Name:

## 2 QUESTIONNAIRE

### Questions for Head of Institution

#### **Question 1: Assess the preparedness of the hospital for Mass Casualty Management by the Head of Institute**

1. Has a Health Sector Disaster management plan been developed?  
● Yes  ● No
2. Does the plan include a Health Sector Disaster Management Committee?  
● Yes  ● No
3. Does the membership of the committee include members of the private health sector and the commoners?  
● Yes  ● No
4. Was the plan reviewed within the last year?  
● Yes  ● No
5. Was the plan revised within the last 5 years?  
● Yes  ● No
6. Is the plan multi hazard?  
● Yes  ● No
7. Does the plan include various sub plans?  
● Yes  ● No
8. Is there a standard operation procedures for response?  
● Yes  ● No
9. Was a simulation exercise and/or drill conducted within the last year?  
● Yes  ● No

10. Do the relevant receive Disaster Management training?

- Yes  ● No

11. Is there a specific budget line to carry out Disaster Management activity?

- Yes  ● No

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### Questions for Staff members

#### **Question 2 : Assess the knowledge of the Health Staff members on Mass Casualty Management**

1. Do you know what natural disasters the area is prone to?  
● Yes  ● No
2. Are you aware that there is a Disaster management plan in the hospital?  
● Yes  ● No
3. Have you got a training in Disaster management?  
● Yes  ● No
4. Have you ever practiced it or participated in a drill, if Yes, when?  
● Yes  ● No
5. Do you have a permanent position in the Disaster Management committee? If yes Full time or par time?  
● Yes  ● No
6. Does the unit carry out lessons learned exercises?  
● Yes  ● No
7. Is there an established unit and support staff for Health sector Disaster management?  
● Yes  ● No
8. Do you contribute to the identification of training needs?  
● Yes  ● No
9. Have structural and non-structural issues addressed in the safety improvement plan?  
● Yes  ● No
10. Are there protocols for sharing data?  
● Yes  ● No

11. Do you feel prepared to participate in national emergency response or disaster?

- Yes  ● No

12. Do you think training in emergency response and disaster preparedness should be mandatory for all health professionals?

- Yes  ● No

13. Do you think overall and situational risk awareness of Mass Casualty incident/disaster need to be high among health professionals?

- Yes  ● No

14. In case of disaster do you feel confident in recognizing difference in health assessment?

- Yes  ● No

15. Have you ever participated in the management of disaster/mass casualty cases?

- Yes  ● No





### 3 Information Sheet

#### **Mass Casualty Management in Divisional Hospitals in Kandy District**

I, Dr. M F M Fazly, the PG trainee – following MSc in Medical Administration in Post graduate institute of Medicine would like to invite you to take part in a research project titled “Mass Casualty Management in Divisional Hospitals in Kandy District.”



#### **1. Purpose**

To assess the capacity to manage mass casualty incidents in selected Divisional Hospitals of Kandy district.

#### **2. Voluntary participation**

Your participation in this study is voluntary. You are free to not participate at all or to withdraw from the study at any time despite consenting to take part earlier. There will be no loss of medical care or any other available treatment for your illness or condition to which you are otherwise entitled. If you decide not to participate or withdraw from the study you may do so at any time.

### **3. Duration, procedures of the study and participant's responsibilities**

This study will be conducted over a period of 2 months from November - December 2021. If you volunteer to participate in this study, we will ask you to do the following:

- a. We will ask you to take part of the study once over the course of a total of about 15 – 20 minutes.
4. You will need to answer each question in the questionnaire, which will be given and facilitated by principal investigator. You must provide your honest and accurate ideas in your mind to these questions.

Participation in this study may benefit health system by contributing to enhance the quality of the care and improvement of current system.

### **5. Risks, hazards and discomforts**

There are no potential or actual risks, hazards and discomforts of participating in this survey

### **6. Reimbursements**

You will not be paid any sum of money for participating in this study

### **7. Termination of study participation**

You may stop participating in this study at any time (with no penalty or effect on medical care or loss of benefits). Please notify the investigator as soon as you decide to withdraw your consent.

### **8. Confidentiality**

Confidentiality of all records is guaranteed and no information by which you can be identified will be released or published. These data will never be used in such a way that you could be identified in any way in any public presentation or publication without your express permission.

## 9. Clarifications

If you have questions about any of the tests / procedures or information please feel free to ask any of the person listed below.

Dr M F M Fazly

No: 454/12A, Piachaud Gardens, Kandy

Tel No: 077 3799198

Email: fazfazly@gmail.com

If you have any clarification, concerns, or complaints related to this research project, you may contact the Ethics Review Committee, Postgraduate Institute of Medicine, University of Colombo. ERC Office Address: Ethics Review Committee, Postgraduate Institute of Medicine, University of Colombo, 160, Prof. Nandadasa Kodagoda Mawatha, Colombo 07. Telephone:

0112-689266 (between 9am and 4pm on working days)

Email: [erc@pgim.cmb.ac.lk](mailto:erc@pgim.cmb.ac.lk)



**4 STANDARD EQUIPMENT IN DISTRICT HOSPITALS (Level 4)**

<u>Equipments</u>	DH Akurama	DH Akumbura	DH Delota	DH Gaggedara	DH Kadugama wa	DH Katagashota	DH Madulkale	DH Mamphiya	DH Menkhinna	DH Pussellawa	DH Thidhapajjala	DH Udumbura	DH Watigama	DH Marasana
Multi Para Monitors % channels for resuscitation & 3 Channels for observation area	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Nebulizers	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Defibrillators with Pacing facilities	✓	✓	✓	✓	✓	✓	✗	✓	✗	✓	✓	✗	✓	✓
ECG Machines	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Resuscitation Beds	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗
Beds	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Trolleys	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
IV Cannula / Transfusion sets	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Suction Device	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Oral, Nasal Airways/ET Tubes	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Cricothyroidotomy insertion sets	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗
Cervical Collar	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Sterile Dressings	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Splinting Materials	✓	✗	✓	✓	✓	✗	✗	✗	✓	✓	✓	✗	✗	✓
NG Tubes	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
IC Tubes	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗
Pulse Oximeter	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Spinal Boards	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Multi Parameter Monitor	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Endo: Tracheal Sets	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗
Laryngoscope	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Thromboelastometry	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗
Ambu with Mask – Adult & Pediatric	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Venturi Masks	✓	✓	✗	✗	✗	✓	✗	✓	✗	✓	✓	✗	✗	✗
BP Apparatus (Invasive)	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗
Venus Cut Down Set	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗
Oxygen Cylinder with regulator	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ET Tubes	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Non Rebreathing Masks	✓	✗	✓	✗	✓	✗	✓	✗	✓	✓	✓	✓	✓	✓
Peak flow meter	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗
Results	22/30	21/30	21/30	20/30	21/30	21/30	20/30	21/30	19/30	22/30	22/30	19/30	20/30	21/30

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