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Preparing Hospitals in India for Covid-19 Pandemic

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ABSTRACT

Hospitals have an important part in the human health organization to provide necessary treatment for public, mainly in a calamity. During the current outbreak of COVID-19, and its turbulence in giving important needs and supplies will possibly interrupt the providing critical treatment due to not organized health-care capacity. Along with, a greater amount of personnel absence can be predictable. A lack of important kits and materials can lead to restricted supplies to desirable care and have a direct impact on healthcare delivery. Anxiety can lead to possibly hamper recognized operational practices. Also in hospitals well equipped dealing with COVID – 19 pandemic can be a difficulty. In spite of the challenging difficulties and problems expected, the positive and organized execution of important basic and definite arrangements can aid successful hospital-based organization for the period of a speedily progressing epidemic. Hospital emergency preparedness is a constant progression that requires association to the complete nation wide preparedness platform. Several principles and suggestions drawn in this article are general and appropriate to other incidents. The article gives checklist which is proposed to manage current situation by multispectral hospital emergency preparation platforms.



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INTRODUCTION

The severe acute respiratory syndrome corona virus 2 or the 2019 novel coronavirus is showing fast spread to the whole world from its place of first occurrence in Wuhan Town of Hubei Province of China (Wang et al., 2020a). Till 07/04/2020 around 1,381,014 patients of coronavirus disease 2019 (COVID-19, 2020) and 78,269 deaths have

been confirmed (WHO, 2019). Fortunately till now no death has occurred in children (Wang et al., 2020b) Since as we know the spread of virus is fast and its future course is unknown. This article gives a view about the preparedness and infection control measures to be followed for prevention of the spread of disease in hospital environment.

Epidemiology

1st December 2019 in Wuhan, China was reported the first laboratory-test positive patient of COVID 2019. Originally, an epidemic seen in a local Huanan Seafood Market, with at least 41 individuals found infected.

The native health experts stated an “epidemiologic alert” on 31st December 2019, and the area was sealed on 1st January 2020. A group of 59 alleged patients with symptoms were then sent to a selected hospital. 41 patients were positive for the disease when tested by next generation sequencing or real-time reverse transcription-polymerase chain reaction. Of the total 27 patients had visited Huanan

Seafood Market (Jin *et al.*, 2020).

Though, it is a stipulation that the 1st patient on 1st December hadn't shown history of Huanan Seafood Market visit and the consequent patient reported on 10th December, after 9 days. After few days, a group of patients travelled from Wuhan to the whole Hubei province. The first transferred patient was into Thailand on January 13, 2020. So, very fast and global spread of the disease was reported (Xu *et al.*, 2020)

Concerning this on 30th January 2020 an public health emergencies of worldwide concern was delivered by WHO. The preliminary death rates for cases in the hospital were said to be 11%–15%. Hence it can be stated that transmissions can take place via droplets and contact from person to person. This can lead to nosocomial infections in the healthcare personnel hence proper infection control is necessary. (Chan-Yeung and Xu, 2003; Chang *et al.*, 2020; Christian *et al.*, 2019; Yang *et al.*, 2020)

The checklist was established to provide hospital preparedness for the management of COVID 2019 cases.

The essentials defined in it may not be valid to all hospitals and may require modification for the exact types of the hospital, the individual nationwide health organization, legislation and public where the hospital is situated. Essentials to be assessed have been divided as follow

1. Developing a core team and key internal and external contact points.
2. Human, material and facility capability.
3. Communication and data security
4. Hand hygiene, personal protective equipment and waste management
5. Triage, first contact and prioritization.
6. Patient placement, moving of the patients in the facility and visitor access
7. Environmental cleaning

1. The checklist established to provide hospital preparedness for the management of COVID 2019 patients.

a. Core team*

A core team is formed to undertake actions on following events ; team must have a fellow of the hospital organization, the hospital infection control squad, an infectious disease professional, and specialists on behalf of the intensive care unit and emergency room.

1. A standby on behalf of each one of the follow is made.
2. A record is to be maintained having the communication particulars of the core team and standbys.
3. A short and summarizing file telling entirely about roles and duties is organized and made centrally reachable.
4. Every team member is made well-versed and skilled with telling them about their duties. A record is to be maintained having the communication particulars which is centrally reachable
5. A area for assembly of all team members is assigned
6. Ample assembly a menities are made accessible to the core team
7. A system to retain records (e.g. measures, assembly records, teaching resources, etc.) is present.
8. A operation is maintained toward preserving records which are latest along with members well versed on where to get data

b. Key internal contact points*

Key internal contact points to perform various duties are recognized

1. A standby on behalf of each one of the follow is made.
2. A record is maintained having the communication particulars of the core team and standbys.
3. Everyone in the internal contact points are educated and skilled in their part and duties, and records are centrally reachable.
4. Communication records for very hospital membranes are upgraded.

c. Key external contact points*

Key external contact points and their stand by with required communication details are recognized and assembled for easy reachable communication record, as well as member included are informed about it.

A certificate is maintained that shortly illustrates about at what time those communication records must be used.

2. Checklist for human, material and facility capacity

a. Procurement and stock management*

A procurement process to obtain the required supplies and materials is present and it is made active on short communication.

1. Substitute providers are recognized in case key providers do not have supplies (particularly for personal protective equipment)
2. Intermediary stores are maintained of important supplies.
3. A supplies list is maintained and it is frequently seen and updated
4. A list is made for having an update on main materials to evadem is management.

b. Human capacity*

The surge ability of healthcare personnel for triage, emergency room, Intensive care unit, test center, and the accommodations where the cases will be kept has been evaluated

1. The surge capability of non-healthcare personnel has been evaluated
2. Personnel absentees specifically owing to sickening or taking care for sick individuals who is at home, has been taken into account and involved to assess human resource capacity.
3. A machinery to screen supervise absenteeism is present.
4. Plan of action for leave to a personnel having symptoms is present
5. Personnel scheduled for allotment to other place is given information and skilled according to duties of accordance.
6. A machinery for the enrollment, teaching and fast establishment of total essential management requirements along with tools for new personnel on short notification is available in addition to the financial plan.
7. The probability of appointing newly retired personnel, armed medics, academy scholars or helpers has been considered and contacts have been recognized
8. The authorized requests to employ for momentary support are present and preparation aimed data dded team members is intended

9. A strategy is present for avoiding fatigue amongst healthcare and non-healthcare personnel; a determined number of working hours will be ensured, workloads will be equally distributed, relaxation intervals with alterations have been established, a communication is estimation who can to called in case difficulty arises.
10. Psychological care for healthcare personnel has been taken into account
11. Security team is established to maintain the safety of cases, professionals and companions and main materials if required
12. A security to approve the safety and offer management for security events; which consist of accompanying staffs, cases or companions if essential; personnel has been well-versed of the security proposal
13. Potential security threats have been recognized; resources are activated or help from inhabitant authorities have been made ready.

c. Facility and material*

The large facility capacity, comprising the greatest quantity of Intensive care units beds and mechanical ventilators has been deliberated

1. There is a strategy made to observe bed possession (with the overall cases in quarantine), the amount of accommodation allotted for isolation, and the amount of accommodation that can be possibly taken for isolation
2. The over-all cases in quarantine, once the quantity touches a assured limit, cause initiation to convert normal accommodation to isolation accommodation; the capability for co-hosting cases of the similar illness has been considered
3. The quantity and place for probable beds to be reallocated as isolation places and a design to move the non-isolated cases to another accommodation has been developed.
4. Every personnel know the causes and processes to transform normal place to isolation place.
5. The cause for transferring cases to new health centers or home care are recognized, and the personnel and other centers are made alert
6. The present supplies and the predictable surplus requirements for various situations have been predicted.

7. Storing amenities for added supplies have been recognized and they fulfill entire requirement by means of maintaining heat, moisture, cold-chain, logistics, etc.
8. Added spaces to be converted to waiting accommodation have been recognized; the number of cases that will be using these spaces has been predicted
9. If feasible, access to distinct toilets and drinking water cooker is obtained for cases in the waiting and emergency rooms
10. Satisfactory supplies for isolation units and intensive care units is present, and sterilization techniques are available for non-single-use materials
11. An sufficient quantity of personal protective equipment of all sizes is accessible for health-care personnel and dusting personnel
12. A appropriate quantity of cleansing and disinfection products is present to be in effect against coronaviruses.
13. An ample amount of containers for contagious discarded product is present.
14. Techniques for the handling of an improved quantity of contagious discarded product is present
15. A technique for the management ready of an escalated amount of dead cases is present
16. The capability to control a possible rise in the amount of dead cases is considered, and an additional supply of body bags is present
17. An added room has been recognized that can be considered as a morgue, if essential, and where the custody of the bodies will be confirmed
18. There is a strategy made to confirm that tools are in complete function and can be speedily exchanged when required

d. Laboratory capacity*

An in-house messages policy is recognized with strong connections to let quick message to all staff and cases

1. Measures are in present to connect clearly to hospital staff, healthcare and non-healthcare personnel; this process tells all evidence on the outburst, the condition in the hospital, procedures, guidelines for consuming personal protective equipment, defensive and protection

measures, alterations in the processes, and any other facts connected to the incidence.

2. A machinery is present to confirm that message to the staff and patients/visitors is checked for fidelity before released

3. Checklist for training procedures

a. Training*

A strategy for teaching various skills to members is present, like recent skills to be taught to members before coming to work

1. All files are given access by keeping then available for all members
2. Preparation tools have been established, precisely to monitor : Hand and respiratory hygiene -personal protective equipment usage: times when to use contacts -protecting data of cases -responses given- case descriptions-report of cases -re-allocation of patients in isolation - absenteeism rule along with actions to take for members giving signs-safety strategy-files and training materials location.
3. Every personnel is given information and skilled for above given situations
4. Healthcare personnel have been taught to reduce the definite threats linked to the managing of suspicious or definite COVID-19 cases
5. Non-healthcare personnel have been given training to reduce the definite threats linked to their occupations, in specifically related to the cleansing of areas suspected or confirmed COVID-19 cases are present.
6. All personnel have been educated for wearing personal protective equipment and files to be maintained following it's usage.

4 . Checklist for hand hygiene, PPE, and waste management

a. Hand hygiene*

1. Bottles containing alcohol-based hand sanitizers are made available to members along with cases, mainly in waiting zones, response places, investigation places, along with places to remove personal protective equipment.
2. Hand washes and paper hand wipes made accessible in adequate amounts besides every hand basin

3. A system is present to keep check and restock essentials
4. Guidelines to follow right hand hygiene measures have been taught to everyone

b. Personal Protective Equipment*

1. The requirement for personal protective equipment has been assessed
2. Insufficient quantity of Personal Protective Equipment for safety is made accessible in various dimensions.
3. A document listing all present dimensions and expiry dates of the supplied personal protective equipment has been gathered and maintained.
4. Healthcare personnel and housework personnel have been taught in wearing and removing personal protective equipment

c. Waste management*

1. The quantity of containers for contagious discarded material is adequate for large volume
2. There are no-touch containers to discard of tissues used by cases in waiting and triage places.
3. There is a system available to discard large volume of contagious products.

5. Checklist for triage, first contact and prioritization

a. General*

1. Processes to isolate all aged patients from the other cases and isolation measures are recognized.
2. Measures for patient prioritization (e.g. triage, discharge norms, causes to delay optional hospitalizations) are present and have been informed to all personnel responsible
3. Processes are present to clean public zones and tools that can be used by non-suspected or confirmed cases.

b. Tele-triage*

1. A tele-triage scheme to triage cases before arriving in hospital is present: facilities are present in case of potential patients; these facilities can also be used to manage the coming of cases to the hospital if essential

2. The residents have been informed about the tele-triage facilities of the hospital.

c. First contact at the hospital*

1. Signs and information are shown at the entry and in waiting places which offer Q&As about COVID-19, hand hygiene and respiratory hygiene
2. Hand hygiene supplies and respiratory hygiene materials are offered to personnel and cases
3. Quick checks at entrance to the emergency area, triaging of alleged patients, and severity valuation measures are present.
4. The hospital could offer an choice for cases to wait in their vehicle as an alternative to waiting area (in case they are healthy enough to do so); this also involves a scheme to call them in
5. Every emergency are a personnel are informed about substitute zones to be transformed into waiting area when a definite amount of cases has been found.
6. A protocol is recognized to tell the cases with alleged COVID-19 about definite measures

6. Checklist for patient placement, moving of the patients in the facility, and visitor access

a. Patient placement*

1. If clinic shows capacity for negative pressure accommodations then greatest amount of cases that can be kept is assessed.
2. Determined number of accommodations that can be transformed into isolation accommodations has been estimated-Determined number of cases that can be co hosted in isolation accommodations and quantity of possible isolation accommodations has been planned
3. A strategy is present that shows the conditions that would cause the conversion of normal accommodations into isolation accommodations and also the direction in which this procedure would be carried out; this contains a strategy to re-allocate cases, enable their quick discharge as soon as their medical condition allows for it, or treat cases at home
4. The personnel know the strategy and have been skilled accordingly, e.g. how to use personal protective equipment, are aware with protocols and new duties that they may be given to them, etc.

5. Airborne infection isolation accommodations have been verified and specialized for their efficiency
6. Personal protective equipment, for aerosol-generating techniques are there in enough quantities and sizes so they can be used in the isolation accommodations when applicable.
7. Only a restricted number of personnel are allowed to entire the isolation accommodations; they have been taught accordingly. Personnel who have right of entry to isolation accommodations are tracked and records are kept. A record of all personnel who have right of entry to isolation accommodations is maintained so that all personnel movements can be recorded.
8. Personnel with right of entry to isolation accommodations should be limited to decrease the probability of spread a mid other cases
3. Personal protective equipment are accessible for companions; ways for put on and take off are present.
4. A skilled healthcare personnel is accessible to check the accurate put on and take off of personal protective equipment
5. All companions are educated about self-monitoring for acute respiratory symptoms as defined in the guidelines
6. A record of all companions that arrived an isolation accommodation is maintained

7. Checklist for environmental cleaning

a. Room cleaning*

A method has been made for the cleansing of the accommodations on a consistent basis and when necessary; cleansing after a case discharge is also followed by this procedure

b. Moving patients in the facility*

1. The transfer of cases in the hospital is restricted to carry out essential processes
2. A surgical mask is worn by the isolated case when he/she is transferred inside the hospital
3. The best ways for transferring patients within the hospital have been recognized; personnel have been educated

c. Moving patients in the facility*

All healthcare personnel organizing, transporting, and accepting cases are alert of the situations of these cases and have been taught in all important measures to be taken , e.g. where to find personal protective equipment and how to use it

d. Visitor access*

Indications outside the ward tell all companions about signs of acute respiratory infections; if possible, companions are tested for signs in advance to enter hospital

1. Guidelines are given for the right of entry of companions to the hospital and to the isolation accommodations with alleged or confirmed patients
2. Hand hygiene procedures are explained to the companions in advance entering and after leaving the isolation accommodations

1. Applicable products for the clean sing and disinfection of the surfaces, equipment and medical kits are available
2. Personal protective equipment for the cleaning personnel are available in different sizes
3. Clean sing personnel have been taught on all relevant measures, e.g. contact times for the different products, the correct use of personal protective equipment and self- monitoring of symptoms. They are aware of the method to follow if they develop symptoms
4. A record of cleansing personnel that have cleaned isolation accommodations is preserved

*(Euro surveillance editorial team - 2020)

Checklist for preparedness in intensive care units ,problems and solutions for COVID 2019

Problems

Infection control**

Principles

1. Averting of contamination between healthcare personnel.
2. Training about personal protective equipment and using power-driven respirators for air purification
3. Facility to provide to distinct groups(childbearing female having respiratory illness of acute form ,who is in labor)

4. Improved investigation meant for preventing contamination in healthcare personnel.
5. To follow a proper hand hygiene methods by everyone
6. Vigorous screening and management of people coming in area.

Solutions

1. A devoted register to separate “clean” in addition separation teams, to offer for replacements.
2. Facility of unsoiled scrubs to healthcare wear into be foreduty; followed by showering services after the shift ends .
3. Training on PPE and using power-driven respirators for air purification specifically for quarantine group.
4. Permit quarantine groups for a 2-week no duty time, subsequently.
5. Compulsory recording of two times regular temperature monitoring by all healthcare personnel.
6. Before hand statement for absence and foreign tours by healthcare personnel.
7. Screening questions are frequently restructured as case descriptions change with time, particularly for identified bunches of contamination in the public
8. Facility of temperature scanners at the entrance for recording fever
9. Preserving a hospital guest register to provide contact finding and action recording of established cases

Problems

Dissemination of information to healthcare personnel**

Principles

1. Strong organization of distribution of data
2. Email and meetings solely are inadequate to carry out Critical alterations on the ground
3. Medical considerations of positive patients in the ICU community

Solutions

1. Using safe and accepted platforms (official email and messaging applications for notifying several assemblies and groups of fast developing workflows and strategies)

2. Using safe videoconferencing applications for carrying out inter institution and inter-department meetings and educational sessions and conducting medical considerations of patients and exchanging experiences

Problems

Resus citation an dcode blue response***

Principles

1. Make availability of clear instructions on PPE using power-driven respirators for air purification in wards and normal wards during resuscitation
2. Make availability of inter professional simulation of resuscitation situations or suspected or confirmed cases

Solutions

1. Repeated rehearsal with PPE and using power-driven respirators for air purification to recognize benefits breaches in the wards and organize teams for similar situations
2. Recreation of inadequate group fellows per situation, for instance, 4 fellows per team, to permit adaptation of healthcare personnel. to achieve resuscitation in smaller groups
3. Lists of medicines to be prepared and pre-arranged trolleys for apparatus, for incubation, line setting and other procedures, for reducing chaos and improve efficacy
4. New techniques for enhancing interacting in the course of resuscitation, like use of a written “Call Airway Team” card in case of challenging incubation, use of a white board and using walkie-talkies to communicate to faculty outside the room.

Problems

Advanced ICU Services**

Principles

1. Offering strong thresholds for shifting of declining cases
2. Providing effective as well as harmless transfer of ICU bronchoscopy

Solutions

1. Quick shifting of worsening cases is advised.
2. Facility of onsets for allocation and workflows for centers

- Using disposable bronchoscopes for bronchoscopy and percutaneous tracheostomy Problems

Psychological stress and burnout of healthcare personnel**

Principles

- For offering support emotionally, boosting and gratitude to healthcare personnel
- Reducing discouragement of healthcare personnel by ill-informed members of the public

Solutions

- Exceptional facility of foods and drinks to improve self-confidence
- Facility to provide timely reports on the current conditions and position by the management and organizations.
- Repeated inspiration to healthcare personnel by divisional heads and senior leaders, letting staff to stay involved
- Suitable articles and aspiring news of front line staff
- Suitable media reporting of healthcare personnel at the front line to rise empathy and decrease stigmatization

** (Liew *et al.*, 2020)

*** (Dhar *et al.*, 2019)

DISCUSSION

Healthcare personnel are at highest risk from danger of infection of COVID 2019. In the severe acute respiratory syndrome corona virus 2 outbreak of 2002, healthcare personnel counted for 21% of those suffered. The doctor who first informed about the virus has passed away. Up to 10% of the reported cases in China and up to 9% of all cases in Italy have been among healthcare worker. It is imperative to guard healthcare personnel to guarantee continuousness of treatment and to check spread of contamination to new cases (Jin *et al.*, 2020). Since COVID-19 spreads as a droplet pathogen, patients should be located in separate rooms. With 0.05% sodium hypochlorite the rooms and surfaces and equipment should be frequently disinfected. During aerosol generating procedures such as intubation, suction and tracheostomies care should be taken to prevent airborne transmission. All contacts including healthcare workers should be

checked for occurrence of symptoms of COVID 2019. Patients can be discharged from isolation once they are afebrile for at least 3 days and have two consecutive negative molecular tests at 1 day sampling interval (Chang *et al.*, 2020)

CONCLUSIONS

This study shows a complete view about the preparedness and infection control measures to be followed for prevention of the spread of disease in hospital environment. So far, utmost studies have focused on the epidemiology and potential causes. Though, studies exploring prevention and control measures have begun to gradually increase. Government agencies have quickly incorporated recent scientific findings into public policies at the community, regional, and national levels to slow down and/or prevent the further spread of the COVID-19. We mention that more research to deliver effective and consistent methods to achieve this kind of public health emergency in both the short term and long-term.

Conflict of Interest

None.

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