Stepping up detection, response, preparedness and readiness measures for “COVID-19”- A Pandemic

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ABSTRACT

In a very short period of time, “COVID-19” has seized the consciousness globally by making remarkable changes in our day to day living and has superintended as a public health emergency globally. It has high radar of transmission, affecting an individual at work to frontline workers. The measures and planning for a response plays a key role from drawing up an emergency committee and this follows an equation which broadly deals with epidemiological to clinical history of the patient, management steps from isolation, screening, diagnostic assays for identification and treatment. The application of an organized plan with secure structure aids in better performance, increases efficacy of management and saves time. Also saves time for a health care worker to go through routine levels of channels of administration if already a familiar way of operation is known for such situations. Thus, planning and developing a ‘blueprint of approach’ towards management of patient while facing such situation is a must. This review provides an insight to the measures for detection, response and preparedness of the hospital and health care workers should largely be inclusive of; also highlights the measures to be taken at every step after coming in contact with a positive case of “COVID-19”.

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INTRODUCTION

The mankind needs leadership and solidarity to defeat the corona virus. The corona group of viruses are a large family of viruses of which pneumonia (“COVID-19”) it is a communicable “acute respiratory infection” caused by the corona virus. It is a positive-single-stranded RNA viruses (+ssRNA) with high similarity to bat corona virus introduced to humans for the first time. A defining worldwide crisis has been set in by the corona virus “COVID-19” that humanity has faced since World War II. On 31st December year, 2019, WHO was informed regarding an outbreak where bunch of cases of pneumonia of unspecified origin detected in “Wuhan City, Hubei Province of China”, previously was an unknown virus and now has been named as “2019 Novel Corona virus” (Sohrabi et al., 2020). Corona viruses are a large ménage of viruses; they contain core, the genetic material abutted by an envelope with a construct of protein, which are spike in shape. This gives the virus an outlook of crown, which in language Latin is corona, hence the name. The individual affected by the family of corona virus shows a large set of symptoms ranging from respiratory which includes common cold, pneumonia to gastrointestinal whereas there are corona viruses which are responsible for being a caustic agent for diseases such as SARS-Cov which are severe in its nature of manifestation, first recognized in China,
Figure 1 depicts, (A) Shows the number as well as ratio of patient visits showing fever from January 13 to February 1, 2020. (B) Shows PPE ratio at emergency department of West China Hospital on January 25. (C) The illustration shows measure taken of online clinic triage of West China Hospital. (D) The illustration shows emergency department triage and region segregation, whereas NHC = National Healthcare Commission; T = temperature.

Initially it was identified in set of people with pneumonia who had some relationship with seafood and markets selling live animal, in the city of Wuhan. The disease has since spread from those who came in contact and fell sick to others like a series of chain reaction which included their members of the family and the individuals working at the front line, the healthcare workers. The outbreak has shown a shocking increase in number of cases and the disease has spread within China and also has managed to travel the other countries. The virus is of animal-origin. These viruses can transmit from animals to humans and this is called a “spill over”. It is due to changing structure of genetic material which results into a variant form. Therefore, the chances of transmission increase between humans and animals. For example MERS-COV is due to transmission from camels and civet cats for SARS-COV whereas the pool of “COVID-19” is not known yet (Dhar et al., 2020).

How the virus travels from animals to humans is unknown; the general respiratory disease spread via droplet infection, when a person sneezes or either coughs who has been infected with the virus or comes in contact with the inanimate objects leaving them contaminated becomes a source for the spread. Therefore, it is recommended for them not to attend gatherings of large number. Groups at highest risk are people in proximity with animals, such as live animal stock market vendors and family members and healthcare employees in care of infected people. So, the question arises is how does the disease present in an individual? Symptoms range from mild to severe; a low-grade fever that increases gradually, dry cough and fatigue followed by onset of serious symptoms like difficulty in respiration could be accompanied with shortness of breath, pain in chest, death (Guo et al., 2020).

**An outline of hospital emergency management plan**

In a study conducted at West China Hospital, the team retrospectively analysed by reviewing in depth the number of outpatients in an emergency department on daily basis. They observed a rise in peak from month of January 20 to January 25, concluding a rise of 40% which fluctuated approximately at 30%. Second observation was that personal protective equipment (PPE) including the N-95 respirators and protective eyewear was sufficient only about 15% in the emergency department personnel. However, they achieved zero infection policy by setting up a protocol where they decided to set up an online clinic section for triaging the patient via online consultation free of cost, then a team was assigned for this set of work where they analysed the urgency of the situation reported by the patient, was followed by recommending the non-emergency patients to delay their visit at the hospital or were assigned to the non-covid hospital. The patients who were categorized into low-suspected range were advised self-isolation at their respective residence and high-suspected range patients were given appointments. The first measure helped in alleviation of the overload caused due to the outbreak of the pandemic and also sped up the early detection of potential suspected cases. Meanwhile, a visit triage system and emergency department area separation was made. This was divided into a pre-examination system and emergency department area separation was made. The hospital allotted a separate fever clinic room for suspected cases, also for observation and diagnostic assays like CT examination. The cases which showed positive qRT-PCR (Real-Time Quantitative Reverse Transcription Polymerase Chain Reaction) or CT were strictly isolated into a quarantine ward, whereas those who were excluded were sent to other department for further management. The second measure helped in reducing the cross-infection by limiting the activity of patients as well as personnel working in emergency department. Thirdly, the emergency department was given highest priority. The hospital applied an effective management mechanism, command system which helped in assigning PPE and other needed medical devices on a preferential basis, thus equipping the triage arena and emergency department personnel, arena at high-risk to be met with standardized measures of personal protection, also helped to tackle the non-urgent appointments and surgeries and directed the aid personnel from the other departments to the emergency department.

Overall, this helped in overcoming the limited supply in the hospital and directed them to the staffs that mostly were in need of protection (Cao et al., 2020). The Zhejiang University School of Medicine formulated a screening criterion for suspected “COVID-19”
cases; which is broadly divided into epidemiological history and clinical manifestations.

The epidemiological history was formulated on the basis of their clinical experience.

Broadly, it suggests checking for the following,

**Patients travel history**

To check if he/she has travelled or has history of residence in arenas or countries those are at high-risk within fourteen days, prior to the onset of symptoms.

**Past history**

Check for history of exposure if any to other viruses from the corona virus family for those patients with positive result of NATM within fourteen days, prior to the onset of symptoms.

**Check for disease clustering**

Assessing the incidence of occurrence of the symptoms related COVID-19 in close proximity of time and geographically in respect to patients background meaning to check if two or more cases with symptoms occur at house/workplace/school within two weeks (Liang, 2019) patient

**Clinical manifestations included,**

**Symptoms**

Examine the patient and check if she/he having fever or respiratory findings are conclusive.

**Radiographic investigations**

To examine CT imaging of the patient and look for features of "COVID-19". A radiographic finding suggestive of multiple patchy shadows and interstitial changes set in primary phase of the disease, peculiarity being at border of the lungs. The conditions progress and transform into several opacities which are “ground glass” in appearance. Structure wise may show invasion in both lungs.

**Characteristic feature of the disease**

Patient may exhibit “lung consolidation” along with rare “pleural effusion”.

**Haematological examination report**

Initial onset, white blood cells count (WBC) can be normal or decreased or either can show decreased lymphocyte count.

Suspected case diagnosis for COVID-19: How to filter out from the broad spectrum of symptoms?

1. Patient with one epidemiological and exhibiting two clinical signs.

2. Patient having no travel history, no history of exposure to viruses like SARS Cov-2 in the past but has positive symptoms, radiographic examination and blood report.

3. Patient having no epidemiological history, but meets the criterion, shows one or two clinical signs but cannot be excluded from diagnosis.
via imaging should seek expertise advice (Liang, 2019; Fu et al., 2020)

Screening, Admittance and Excussion critera

1. The healthcare team on duty should have complete knowledge regarding examination of the patient, set of symptoms shown on manifestation of the disease and have skills to screen patients as per screening criteria.

2. Blood examination, particularly “nucleic acid tests (NAT)” will be done on individuals who meet the norms and concludes to be a suspected case.

3. Patients not fitting the criteria without

4. To re-test the patient if tested negative 24 hours later.

5. Results of NAT showing negative, then the patient should be removed from suspected case for “COVID-19” and be discharged.

6. Patients who cannot be held conclusive of “COVID-19” infections along with their clinical signs, advised for to take new set of NAT tests scheduled every twenty four hour until confirmed or excluded.

7. Positive result of NAT of the confirmed cases should be hospitalized to “COVID-19” ward and shall be given treatment based on the state of the patient (Wu et al., 2020).

Prevention and control

“COVID-19” ward space management

1. Health care facilities should set up a fever clinic separated from other rooms with a unidirectional path at the entrance of the hospital clear sign indicative of the same. The movement of individuals to be practiced on three zones and two passages: “a contaminated zone, a potentially contaminated zone and a clean zone provided and clearly demarcated and 2 buffer zones between the contaminated zone and also the potentially contaminated zone”.

2. A separate corridor will be assigned for infected items.

3. Setting a visual area indicating handing over of contaminated objects unidirectional from potential contaminated zone to an isolation ward which is a contaminated zone.

4. To anticipate the infection control technicians will be allotted the task to govern the health work-force putting on and removing the PPE to decrease the chances of contamination.

5. The items which have not been disinfected and are in the contaminated zone that should not be removed.

6. An independent room for examination and assessment should be set up, following a laboratory as well as a monitoring room.

7. A resuscitation room should also be set up.

8. Setting up a pre-examination and triage area which will allow the healthcare staff to perform a preliminary screening.

9. To assign separate diagnosis and treatment zones to symptomatic patients will be led the way to a suspected “COVID-19” zone.

10. Patients having regular fever but no clear travelling history to be directed to a “regular fever patient zone”

“COVID-19”: Risk Analysis Form

WHO has formulated a basic questionnaire for health care staff which enquires about the following data,

1. Demographic details
2. History of contact/exposure
3. Health care activities performed on the patient

(a). Tracheal intubation
(b). Tracheal extubation
(c). Nebulization treatment
(d). Bronchoscopy
(e). Tracheotomy
(f). Cardiopulmonary resuscitation (CPR)
(g). Collection of sample
(h). Accidents while handling any of the above, conclusive of contact with biological secretions or puncture with contaminated object.

Recommendations for HCWs at high chance for infection

1. Those at high risk would be asked to cease all health care interactions with patients for 14 days after the last day of exposure to a confirmed case.
2. They will be tested for “COVID-19” and will be in isolation for fourteen days in the isolation ward.

3. Working at front line and being at high risk of exposure comes along with psychological stress and even burn out stage. Therefore, should be provided psychosocial help.

4. If any of the health care staff confirms to have “COVID-19”, should be provided with compensation in form of salary or extension of contract for the period of quarantine and for the period of disease (Sohrabi et al., 2020; Shah and Farrow, 2020).

Recommendations for HCWs with fewer chances to get infection

1. The HCWs would be asked to self-assess that will embody self-monitoring their body temperature and other symptoms daily for fourteen days after the last day of exposure to a positive case.

2. To inform their own hospital authorized health officer if they develop any symptoms implicative of the disease

3. To reinforce contact measures, droplet measures, standard precautions for procedures casing aerosol generation when in care for all patients with “COVID-19” and also other respiratory diseases and infections.

4. Application of WHO’s “My 5 Moments for Hand Hygiene” (Liang, 2019; D et al., 2020)

Patient management

Patients showing symptoms to practice the following,

1. To wear medical surgical masks.

2. Patients should be the only one allowed to enter in any of zones in order to tackle overcrowding.

3. Time period of the patient’s visit from family and nursing to be reduced or declined to avoid so as to avoid cross infections and additionally to avoid mass gathering.

4. Educating patients as well as their families regarding the disease, how to identify its symptoms and essential preventive actions that can be taken to avoid its deadly progression

5. Patients should be allowed to have communication and interaction via electronic devices as psychosocial support from their loved ones plays a major role in maintaining a healthy state of mind.

6. Spreading knowledge and educating patients about “COVID-19” and how to prevent its further spread.

7. Also teaching the patients and their families regarding proper hand-washing technique, how to cough and also on measures to be taken when quarantined at home (Sifuentes-Rodríguez and Palacios-Reyes, 2020; Awadasseid et al., 2020).

CONCLUSIONS

We have faced a revolutionary ground-breaking global war, human race is facing the combatant, “the novel corona virus”, unmatched, extraordinary in nature. Every health-care worker globally is performing their level best to fight against the war. In order to win, we have to assure that each country is well equipped in experience of science, resources, technology and man power. Let’s lay strong and do our best to eliminate the virus. Today, with unfold of the current scenario, pandemic; these resources are the molecules which complete the chain reaction and are of utmost importance. This disease is new and all the measures from isolation till treatment have been started from scratch. Coming together in this pandemic as a single unit will sail us through. At this moment, regardless of who you are can contribute by sharing experiences, ideas, technology and lessons, is our solely likelihood to come out of this as a warrior. The true medicine for this battle is not isolation, but it is cooperation. It’s just the beginning of war, “COVID-19”: a pandemic.

Conflict of Interest

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