

ORIGINAL ARTICLE

NOVEL TECHNIQUE OF MASS TRIAGING OF COVID 19 POSITIVE PATIENT: SABAH EXPERIENCE

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ABSTRACT

Coronavirus disease (COVID-19) is an acute respiratory tract infection caused by SARS-COV-2 and has spread worldwide with alarming speed and led to a significant impact globally. According to the Ministry of Health Malaysia, a total of 12152 patients were COVID-19 positive from 22nd October to 4th of November 2020. Hence, mass triaging kicked in when there were huge casualties, especially in disaster. In this COVID-19 pandemic, the mass triaging concept was applied, only those who needed urgent attention would be admitted to the nearest medical facilities while those asymptomatic would be monitored by medical personnel in their centre and referred for admission if clinically deteriorated. A total of 1627 male patients aged from 15 to 65 years old were involved in this study. All the patients are compulsory to perform "1-minute exercise stress test". Exertional desaturation with a fall of 3% or more in oxygen saturation after the 1-minute exercise, indicating that patient requires an attention on receiving treatment earlier and getting admission for observation. Among 1627 positive patients about 49 were directly admitted to hospital as was detected as stage 3 and above. There were about ten medical personnel involved in the whole mass triaging. The mass triaging was carried out in 5 days, it took 1.64 minutes to screen one patient and it's convenient and fast. Our study showed that the mass triaging technique could be applied in pandemic period to prioritize and expedite the admission process for critically ill patients who will require urgent treatment before they deteriorate further.

Keywords: COVID-19, pandemic, mass triage, 1-minute exercise stress test

INTRODUCTION

Coronavirus disease (COVID-19) is an acute respiratory tract infection caused by SARS-COV-2.¹ It was first reported in Wuhan City, Hubei province, China in December 2019 and was then spread worldwide.² It was labelled as a serious global health threat. COVID-19 pandemic had led to a significant impact globally on healthcare system, economic, educational, social and psychological in the society.^{3,4} In Malaysia, COVID-19 case was first confirmed in the early of February 2020 and it spreads widely which brought in our first Movement Control Order on 18th March 2020.²

Ministry of Health (MOH) Malaysia, recorded a total of 12152 patients was detected to be COVID-19 positive from 22nd October to 4th of November 2020.⁵ Besides, data from the United State-based Johns Hopkins University, Malaysia is currently ranking 29th in the list of countries with the highest number of Covid-19 infections in a two-week period as at 25th January 2021.⁶ In Sabah - part of the east coast of Malaysia, several clusters reported during the third wave of COVID outbreak such as Kepyayan Prison cluster, Immigration Detention Centre (PTS) cluster, Kertang cluster,⁷

Karamunting cluster,⁷ Saga cluster⁷ and Haven cluster.⁷

Clinically, COVID-19 affects not only the targeted organ or system but also multiple body systems including respiratory, enteric, immune and nervous systems.⁸ It can be transmitted by human-to-human via respiratory droplets, in contact with asymptomatic through the aerial droplets or even via faecal-oral route which yet to be proven.⁸ It usually presented with fever, chills, dry cough, runny nose, dyspnoea, sore throat, vomiting, loose stool, lethargy, anosmia and ageusia.⁹

It has 5 stages of disease progression from stage 1 asymptomatic to stage 5 critically ill with multi-organ involvement. Stage 1-2 considered mild disease while stage 3-5 had involvement of major organ which starts with pneumonia. The clinical stage 1 is asymptomatic¹⁰ which means patient has positive Antigen Rapid Test Kit (RTK) or Polymerase Chain Reaction (PCR) without signs and symptoms of COVID. For stage 2 is symptomatic without pneumonia¹⁰, patient will present with fever, URTI symptoms, anosmia, ageusia, GI losses but no evidence of pneumonia on the chest X ray. However, patient with stage 3

considered symptomatic pneumonia¹⁰, as they presented with symptoms and evidence of pneumonia on the chest X ray. In stage 4 we labelled as symptomatic pneumonia which require supplemental oxygen¹⁰ and stage 5 is critically ill with multi-organ involvement.¹⁰ For stage 3 to stage 5 will require admission for further management.

As there has a sudden surge of number of COVID-19 positive patients, they would need few numbers of health care worker to screen through prior to admission either to low risk centre or hospital according to their seriousness of the disease. Traditionally, the whole screen process will start with a proper history taking, physical examination, blood and imaging investigations. It would take at least an hour for one patient to go through the whole screening process prior the decision on admission. The number of COVID-19 positive patients increasing day by day with ongoing sporadic cluster, it will take long time to screen through few thousands positive COVID-19 patient one by one. Patient might progress from stage 1 to higher stage of disease before they manage to be screened by health care worker and admitted to medical centre for proper management.

Hence, mass triaging kick in when there has a huge numbers of casualties especially in disaster. It is a process of prioritizing patients or victims who will be benefit from immediate and life-threatening interventions in the existence of limited medical resources.¹¹ Mass triaging usually carry out in the setting of disaster or mass casualty incidents. With the persistent surge of number of positive COVID-19 patients, the concept of mass triaging can be applied in order to help in prioritizing those who require immediate attention and admission for further management. Mass triaging in field usually will bring back all the alive casualty who needed medical attention according to their urgency of getting treatment and no one will leave behind. In this COVID-19 pandemic, mass triaging concept was applied. Still, only those needed urgent attention will be admitted to the nearest medical facilities. At the same time, those asymptomatic will be monitor by medical personnel in their centre and referred for admission if clinically deteriorate.

METHODS

Triage Officers

Triage officers involved in this study are experienced emergency physicians, certified medical officers, staff nurses and medical assistance.

Equipment

Equipment that needed for the mass triaging includes:

1. Electronic BP machine
2. Pulse oximetry
3. Triage COVID sheet
4. Portable X-ray
5. Portable ultrasound
6. Personal protective equipment such as type c PPE with N95 mask
7. Ambulance for transporting COVID-19 patient

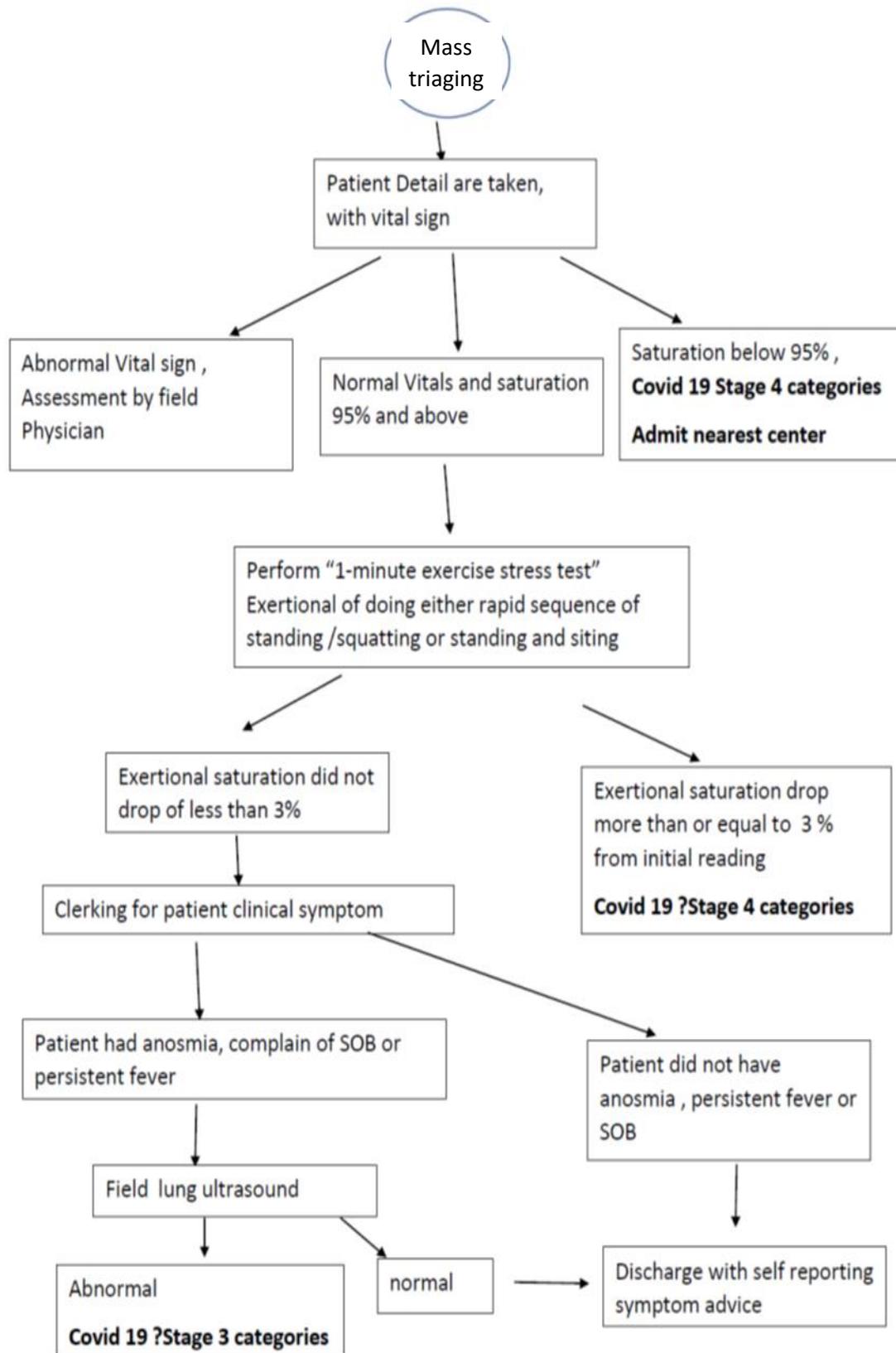
Aim

Our aim for this mass triaging is to safely triage a massive number of COVID-19 positive patients and to detect patients in stage 3-5 that needed prioritization for admission and received urgent treatment.

The massive field triage of COVID-19 patients was held in a big empty open space with the equipment needed. The positive patients were gathered in the place that was assigned waiting for their turn to be screened. The process will start with simple clerking using the triage COVID sheet provided by interviewing patients if they have any symptoms such as fever with chills or rigors, cough, runny nose, gastrointestinal symptoms, anosmia, ageusia and the presence of the warning signs (shortness of breath on exertion, persistent fever or saturation less 95%). Then will take their vital signs; the main indicator will be the oxygen saturation.

In the massive field triaging of COVID-19 patients, one compulsory test is the "1-minute exercise stress test". It is one of the easiest and effective methods for identifying patients who require urgent medical attention and prioritising admission before deteriorating further. It is a simple test with no specific equipment needed, hence patients are only assigned to perform a rapid sequence of squatting/standing in 1 minute. All the patients were asked to perform this test with the monitoring of oxygen saturation with the pulse oximetry before and after the test. Exertional desaturation with a fall of 3% or more in oxygen saturation after the 1-minute exercise, indicating that patient requires an attention on receiving treatment earlier and getting admission for observation.¹²

During the triaging, medical personnel will start with taking the patient's vital signs before the further screening. The vital signs include the patient's blood pressure, heart rate, temperature and saturation of oxygen on room air. If th



Flow Chart 1: The sequences of mass triaging

patient noted to have low blood pressure with tachycardia will proceed with admission to

emergency department for further management and treat the underlying cause. If blood pressure,

heart rate and temperature were normal, the main focus would be on oxygen saturation on room air. Medical personnel will tackle the abnormal vital signs and intervene with necessary treatment if indicated before proceed with the “1-minute exercise stress test”.

If saturation is more than 95%, patient will proceed with a rapid sequence of standing of standing/squatting. If there is a drop of more or equal to 3 % of the initial reading, they will proceed with bedside ultrasound and chest X-ray as they are suspected to be in stage 3 COVID. Those with oxygen saturation less than 95% will be categorized as stage 4. They will be arranged for

direct admission as they will need oxygen supplements and further management in the ward.

Those who have no symptoms were discharged and will be monitored daily. They can self-reporting if there presents symptoms or worsening of symptoms which will require them to be admitted for further management.

RESULTS

A total of 1627 male patient was involved in this mass triaging. They are aged from 15 to 65 years old.

Table 1: The analysis data on average time taken for screening on COVID-19 positive patient (minutes)

Day	1	2	3	4	5	Total
No of patient screened	471	672	125	118	241	1627
No of patient admitted	14	11	1	5	18	49
Average time taken for screening on each patient (minutes)	1.6	1.6	1.6	1.8	1.6	1.64

The mass triaging was carried out in 5 days and the total number of positive patients involved was 1627. Among 1627 positive patients, 49 of them were directly admitted to the hospital as was detected as stage 3 and above. Others were left in the government facilities for daily monitoring and self-reporting to medical personnel if they had persistent symptoms or worsening symptoms. The assigned medical personnel will further evaluate those self-reporting patients and then referred for admission if indicated and if they require further management according to their staging of the disease.

There were about 10 medical personnel involved in the whole mass triaging. The mass triaging was carried out in 5 days. Each session will have five booths with 2 medical personnel at each station. Patients will be assigned to a small group of 10 persons for each session. In each booth, one medical personnel will take the short history on symptoms while another partner will be the one responsible on taking vital signs and instructing them for 1-minute exercise stress test. Subsequently, the following patients will be attending for short history on symptoms while another patient still doing the “1-minute exercise stress test”. It was a continuous process as the patient was attended without any delay in between. The time taken for screening on each patient starts from the short history taking until the end of the 1-minute exercise stress test. In this entire 5 days of mass triaging, it took about average of 1.64 minutes to screen one patient. It is short and fast. The mass triaging had sped up

the whole screening process faster than the traditional process, which will have to go through history taking, physical examination, blood investigation, and radiographic imaging.

DISCUSSION

During this COVID-19 pandemic, mass triaging in the government facilities helped a lot on admission of patient who required urgent treatment. Bed availability in hospital unable to cope with the sudden surge in number of COVID-19 positive patients. Hence, by applying the same concept of mass triaging, which is usually used in the setting of disaster, into this COVID pandemic, it helps solve bed availability issues in hospitals and the limitation on medical supply.

The advantages that can be found in applying mass triaging to this COVID pandemic was it took a shorter time to detect patients which will deteriorate in short period, those require urgent treatment and those already in critical condition. This will speed up the admission process and with early treatment can prevent critically ill patients from deteriorating further.

Besides that, no special equipment or specific location was needed to carry out the mass triaging explained earlier. It can be easily carried out in any limited area with portable BP machine and pulse oximetry. Thus, with limited cost, mass triaging can be carried out to detect the patient who requires urgent treatment and prioritize their admission among many positive patients.

Performing this mass triaging during this pandemic, as there has been no moving of patients out of the government facilities, helped avoid the spread of the COVID virus among the community. After taking the vitals sign followed by the exercise stress test, only those detected to be in stage 3 and above will be prioritized for admission to receive proper treatment earlier.

Even though mass triaging has a lot of advantages in triaging and detecting critical patients who required admission earlier, it has its limitation as it is only applicable for small samples. Besides, as this is the first time applying the mass triaging concept in triaging and detecting critical patients among those positive patients, its effectiveness is still uncertain. As mentioned in the article, one of the triaging processes involved "1-minute exercise stress test", requiring certain level of fitness for the patient to perform it. In the government facilities with hundreds of positive patients, not every one of them is fit for the stress test. Hence, it was modified accordingly to help in completing the triaging process.

In conclusion, our study showed that mass triaging technique could be applied in pandemic period to prioritize and expedite the admission process for critically ill patients who will require urgent treatment before they deteriorate further.

ACKNOWLEDGEMENTS

The authors would like to thank the Director General of Health Malaysia for the permission to publish this paper. We also would like to thank the Emergency department and Clinical Research Centre Hospital Queen Elizabeth.

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