EFFECTIVENESS OF THE *RAPID EMERGENCY MEDICINE SCORE* (REMS) *TRIAGE* MODEL IN DETERMINING MORTALITY RISK IN DISASTER AREAS

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Abstract

Indonesia is one of the countries with a high risk of natural disasters with a total of 20,380 cases between 2020-2024. The high number of disasters that occur will have an impact on the high number of casualties that must be handled by medical personnel. In the event of a disaster, the number of health workers is often less than the need to cause an increase in the mortality rate of victims, therefore as an effort to increase the efficiency of the number of health workers to provide treatment, it is necessary to apply triage, one of which is the *Rapid Emergency Medicine Score* (REMS) triage model. The purpose of writing this article is to determine the effectiveness of triage with the REMS model used by medical personnel and volunteers in disaster areas on disaster victims. The method used is a literature review taken from several sources with a limit of 2019- 2024. From the literature review, it is found that the application of the REMS triage model has proven effective during disasters. As during the Covid 19 pandemic, this is because the REMS triage method is simple and fast; flexible and has good prognostic value; and uses Vital Signs (TTV) parameters so that it can be applied to various situations and conditions. REMS is an effective triage model for non-trauma disaster victims.

Keywords: Triage, Disaster, Covid, Medical Personnel

Introduction

Disasters can be defined as a series of events that threaten and disrupt the lives and livelihoods of a community caused by natural, non-natural or human factors. These events can cause loss of life, environmental damage, property loss and psychological effects. Natural disasters such as earthquakes, floods, volcanic eruptions and tsunamis occur most frequently in Indonesia. This is due to Indonesia's geographical and geological location, which is in the tropics in the middle of two oceans and two continents. This is also supported by actual data: from 2020 to 2024 as many as 20,380 natural disaster events occurred in Indonesia according to the Disaster Information Data Indonesia (DIBI). The high number of disaster events in Indonesia will also have a very broad impact, one of which is the high number of casualties that arise during disasters. There are 3 types of disasters that occur in society according to Law Number 24 of 2007. namely natural, non-natural and social disasters.[1]

Natural disasters are events that occur in nature such as floods, earthquakes, landslides, hurricanes, droughts, tsunamis, and volcanic eruptions while non-natural disasters are disasters that do not occur without the contribution of nature such as disease outbreaks and technological failures. then events caused by humans such as social conflicts between community groups are called social disasters. A disaster occurs when the number of victims far exceeds the ability of medical personnel to provide emergency care.[2] In such a situation, hospitals must allocate additional resources to provide care to multiple victims.

In times of disaster, resources such as personnel, equipment, and time are often limited in disaster situations. Triage helps the medical team decide the level of urgency of the patient whether emergency, non-emergency and non-emergency.[3] Medical personnel and volunteers will spearhead the handling of patients in disaster situations, so the knowledge and skills possessed by medical personnel and volunteers related to disaster management will increase the effectiveness of existing services in the hospital. Therefore, it is necessary to use the triage system during disasters by volunteers and health workers on duty to reduce mortality rates in disaster victims[4] . Triage is the initial handling in first aid by selecting or classifying all patients who need first aid and setting priorities for immediate treatment with the concept of rapid and focused assessment using the most efficient human resources, equipment and facilities.[4.] The purpose of triage is to identify patients who need immediate resuscitative measures, assign patients to treatment areas to prioritize in care and to initiate diagnostic or therapeutic measures. Triage has several functions, namely for patient identification and also to determine the level of patient identification based on the level of emergency, one of the triage models is the *Rapid Emergency Medicine Score* (REMS). This model was originally proposed to predict mortality

in non-surgical patients but can also be used for
scoring outcomes in head trauma patients due to disasters and evaluation for Covid 19 patients.[5,6,7] REMS is a very valid score used in predicting mortality in patients with trauma conditions using several parameters and a combination of other scores, namely using seven variables that are easily and quickly obtained in emergency patients, namely age, body temperature, blood pressure, heart rate, respiratory frequency, peripheral oxygen saturation, and level of consciousness.

Based on the description above, this article aims to find out and also dig deeper into the effectiveness of the REMS triage model to reduce the mortality rate of disaster victims in disaster management.

Methods

The method used in this article is a literature review where analysis is carried out from various sources. The literature search was conducted through *google scholar*, *Mendeley*, *Pubmed*, *Sciencedirect*, and *Researchgate* with a range of years between 2019-2024. The keywords used in the literature search were REMS, Disaster, Disaster, Triage, Rapid Emergency Medicine Score.

Results and discussion

The *Rapid Emergency Medicine Score* (REMS) triage method is a scoring system used to predict the mortality rate of non-surgical patients presenting to the Emergency Department (ED).[5,8,9] This triage method is usually performed on patients who are considered critical and emergency. This triage can be used to categorize critical patients in mass causality events such as natural or non-natural disasters that have high mortality rates.[5]

The steps of using REMS are: [10,11]

1. Initial Assessment: Physiological parameters are observed when a new patient arrives to the ED.

   It is done by assessing 6 main parameters in the triage assessment which include age, blood pressure, pulse rate, Glasgow Coma Scale (GCS), and the amount of O saturation.2.
2. Entering parameter interpretations follows the REMS scoring guide table below:[10]

SCORE	0	1	2	3	4	5
AGE	<45		45-54	55-64		65-74
HEART RATE	70-109		55-69 110-139	40-54 140-179	<40	
BREATHING FREQUENCY	12-24	10-11 25-34	6-9	35-49	<6	
BLOOD PRESSURE	70-109		50-69 110-129	130-159	<49 >159	
GLASGOW COMA SCALE	>13	11-13	8-10	5-7	<5	
SATURATIO O^2	>89	86-89		75-85	<75	

Classify patients based on the number of scores obtained to predict mortality in patients when a disaster occurs. Each parameter is given a score based on the value obtained during measurement. After that, the scores of all parameters are summed up to get the total REMS score. The higher the REMS score, the greater the risk of patient mortality.

Example:

If a patient has:

- BP: 115 mmHg (score 2)
- Breathing frequency: 22 times/minute (score 0)
- Heart rate frequency: 120 bpm (score 2)
- GCS: 14 (score 1)
- SpO_2 : 95% (score 0)

Total REMS = 2 + 0 + 2 + 1 + 0 = 5

This indicates the patient has a moderate risk and needs further supervision. By understanding the process and parameters of the triage model, health workers and trained volunteers can reduce mortality rates in disaster victims

Based on the analysis of some of the literature obtained which discusses the accuracy of the REMS triage mode to determine the life expectancy of disaster victims based on the REMS formula and scoring the victim's condition compared to other triage models, it shows that the REMS method is more valid and powerful for victim classification.[6] Then in a study conducted at the emergency room of Dr. Saiful Anwar Hospital by Taufiq et al,2022, REMS showed good predictive ability in predicting the risk of death in trauma patients. REMS is considered more practical and easy to apply because its parameters are often measured in the triage room so that it can be used for various conditions.[11] Then another study conducted by Onlak, et al 2023 discussed the effectiveness of REMS in predicting the mortality of patients with COVID-19 symptoms, REMS showed good sensitivity in predicting 30-day mortality in patients who came to the emergency room with COVID-19 symptoms. In the context of predicting mechanical ventilation and mortality, REMS proved to be accurate, making it a reliable tool in triaging patients with COVID-19 in the ED.[12] Then the discussion regarding the effectiveness of the REMS model triage is also explained in several parts of the journal in the research of nhai hu et al 2020, REMS was found to be the most accurate method for predicting in-hospital mortality in critical patients, such as in the context of earthquakes and COVID-19.[13] In addition to its effectiveness REMS also has several other advantages, namely:

a) **Simple and fast**.[14,15]

   Using easily measurable and commonly available parameters in healthcare facilities such as blood pressure, respiratory frequency, heart rate, oxygen saturation, and level of consciousness (GCS), medical staff can make a quick assessment in the emergency department (ED).

b) **Flexible for non-trauma patients.**[7,16]

   REMS is effective for non-traumatic adult patients, especially those whose conditions are not clinically apparent. It helps detect important conditions in patients who may not show conspicuous symptoms.

c) **Has good prognostic value.**[16,17]

   It has been shown that REMS can accurately predict the risk of patient mortality, especially in the ED. Higher REMS scores are associated with patient mortality risk, which helps in clinical decision-making and patient management in the ED.

d) **No need for laboratory tests.**[14]

   REMS does not require specialized equipment or technology to be applied in various situations and facilities because the data used are important signs that are commonly measured and available in almost all healthcare settings.

e) **Can be used in a variety of acute conditions.**[9,16]

REMS is not limited to specific medical conditions, but can also be used for various types of acute illnesses, such as infections, heart disease, respiratory disorders, etc.

f) **Useful in continuous evaluation.**[5]

During hospitalization, medical personnel can use REMS to track the patient's progress quickly and precisely by taking periodic measurements.

Conclusions

Based on the literature review, it can be concluded that the triage model (REMS) is an effective method in predicting the risk of mortality in patients who experience disasters, both natural and non-natural disasters. Because it uses simple physiological measurements such as blood pressure, heart rate, and level of consciousness, REMS is faster and easier to use.

The model showed better predictive value and was more accurate in a variety of situations, including in patients showing COVID-19 symptoms. REMS is also easy to use in non-trauma adult patients, helps medical personnel choose which treatments are most important in the ED, and improves the efficiency of the triage process. Therefore, by prioritizing more appropriate treatment, the application of REMS can help reduce the mortality rate of disaster victims.

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