A STUDY ON THE DEMOGRAPHIC PROFILES, DISEASE CHARACTERISTICS AND ONE-WEEK OUTCOME OF RED-TAG PATIENTS IN THE EMERGENCY DEPARTMENT, HOSPITAL UNIVERSITI SAINS MALAYSIA

DR. RASHDAN BIN RAHMAT

Dissertation Submitted In

Partial Fulfillment Of The Requirement

For The Degree Of Master Of Medicine

(Emergency Medicine)

UNIVERSITI SAINS MALAYSIA

NOVEMBER 2007

ACKNOWLEDGEMENTS

All praise be to Allah. With His blessings, I finally managed to complete this task.

I would like to convey my deepest gratitude and sincere appreciation to:

- Dr. Nik Hisamuddin Nik Abdul Rahman, Head of Department, Emergency Department, Hospital Universiti Sains Malaysia;
- Dr. Rashidi Ahmad, Lecturer and Emergency Physician, my supervisor who had given his strong support and encouragement throughout the period of completion of this dissertation;
- all the other lecturers / Emergency Physicians of Hospital Universiti Sains Malaysia who helped me throughout my stay during the course;
- all my colleagues and the Master students of Emergency Medicine for their support and help during the course;
- the staff of Emergency Department, Hospital Universiti Sains Malaysia in helping me during the data collection to complete this dissertation;
- last but not least, to my beloved family. To my wife, Dr. Khursiah Daud who has been my inspiration in all the moments that we shared throughout this journey for a better future; thank you for all your support and understanding. To my children, Muhammad Nur Faiz and Nur Farhanah, thank you for understanding the difficulties that both of you have to face for your parent to complete this course of post graduation. To my parents, your prayer and hope have become a reality. May Allah bless our family, InsyaAllah.

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LIST OF ABBREVIATIONS

ACS	=	Acute coronary syndromes
AMI	=	Acute myocardial infarction
CI	=	Confidence interval
CPR	=	Cardiopulmonary Resuscitation
CVA	=	Cerebrovascular accident
DBP	=	Diastolic blood pressure
DKA	=	Diabetic ketoacidosis
ED	=	Emergency Department
EP	=	Emergency Physician
GCS	=	Glasgow Coma Scale
GIT	=	Gastrointestinal tract
HUSM	=	Hospital Universiti Sains Malaysia
HR	=	Heart rate
ICU	=	Intensive care unit
JK	=	Jabatan Kecemasan
MOH	=	Ministry of Health
MVA	=	Motor vehicle accident
NSTEMI	=	Non ST-elevation myocardial infarction
O & G	=	Obstetric and Gynaecology
ORL	=	Otorhinolaryngoscopy
OT	=	Operation theatre
RR	=	Respiratory rate

RTS	=	Revised Trauma Score
SBP	=	Systolic blood pressure
SI	=	Shock Index
STEMI	=	ST-elevation myocardial infarction
UA	=	Unstable angina
WHO	=	World Health Organization

ABSTRAK

Kajian Mengenai Profil Demografi, Sifat Penyakit Dan Kajian Susulan Seminggu Pesakit Yang Ditag Merah di Jabatan Kecemasan, Hospital Universiti Sains Malaysia

PENGENALAN:

Zon merah di Jabatan Kecemasan (JK) berfungsi merawat pesakit yang tenat dan kritikal. Banyak kemajuan telah dicapai bagi menyelamatkan nyawa pesakit yang tenat ini. Walaubagaimanapun, terlalu sedikit data di Malaysia berkenaan kajian tentang ciri-ciri demografi, jenis-jenis penyakit serta kajian susulan ke atas pesakit selepas menerima rawatan di zon merah. Pengetahuan dari kajian ini akan dapat digunakan sebagai panduan di masa hadapan ke arah peningkatan kemampuan petugas di JK semasa mengendalikan kes-kes yang kritikal.

OBJEKTIF:

Tujuan kajian ialah mendapatkan taburan demografi pesakit, jenis kes-kes kritikal yang dirawat di zon merah JK HUSM. Sampel dianalisa seminggu kemudian sama ada hidup atau sebaliknya. Dua jenis skor penilaian iaitu 'Revised Trauma Score' untuk pesakit trauma dan 'Shock Index' bagi pesakit bukan trauma digunakan untuk melihat kaitan antara faktor dan mortaliti.

METODOLOGI:

Kajian prospektif di JK HUSM dijalankan selama 6 bulan bagi mencukupkan saiz sampel (440 pesakit). Data demografi seperti umur, jantina, kaum, sejarah pesakit dan jenis penyakit dianalisa. Selepas seminggu, langkah susulan dijalankan untuk melihat sama ada pesakit hidup atau meninggal dunia.

KEPUTUSAN:

Jumlah sampel ialah 440 pesakit. Pecahan pesakit trauma ialah 23.0%, selebihnya ialah pesakit bukan trauma (77.0%). Purata umur populasi ialah 47.21 +/- 21.78 tahun. Purata umur pesakit trauma ialah 31.61 +/- 21.41 tahun. 67.27% adalah pesakit lelaki dan kira-kira 95.0% ialah pesakit melayu. Pecahan taburan tertinggi di antara disiplin adalah pesakit kategori medikal (58.6%). Pesakit kategori neurosurgikal ialah 25%. Sebilangan besar mangsa trauma dalam sampel ini melibatkan golongan di bawah umur 60 tahun (84.1%). Purata waktu berada di JK ialah 3.92 +/- 1.5 jam. Sejumlah 27 orang telah meninggal dunia. Tujuh orang (1.59% daripada jumlah sampel) ialah pesakit kategori trauma dan 20 orang (4.55%) ialah kategori bukan trauma. Terdapat perbezaan ketara di antara nilai RTS dan kematian di dalam tempoh seminggu selepas dimasukkan ke wad ($p<0.05$, 95% CI: -4.4,-1.0). Terdapat juga perbezaan ketara di antara nilai SI dan kematian di dalam tempoh seminggu selepas dimasukkan ke wad ($p<0.05$, 95% CI: 0.3 – 0.8). Tiada sebarang perbezaan ketara antara purata umur, jantina, purata tempoh menerima rawatan di JK ataupun di wad dengan kematian ($p>0.05$). Juga tiada terdapat perbezaan ketara di antara komponen individu dari RTS (GCS, RR dan SBP) dan SI (HR dan SBP) dengan kematian ($p>0.05$).

KESIMPULAN:

Pesakit di zon merah di JK HUSM terdiri dari pelbagai umur, pesakit dan tahap kritikal. Pesakit kategori medikal adalah yang tertinggi. Kadar kematian pesakit kajian dalam jangkamasa seminggu adalah amat kecil. RTS dan SI berguna bagi menentukan prognosis pesakit trauma dan bukan trauma di JK HUSM.

ABSTRACT

A Study on the Demographic Profiles, Disease Characteristics and One-Week Outcome of Red-Tag Patients in the Emergency Department, Hospital Universiti Sains Malaysia

INTRODUCTION:

The red zone of Emergency Department (ED) provides treatment to critically-ill patients with life-threatening conditions. There have been many improvements achieved in saving the life of the patients. However, very minimal data can be found within Malaysian context regarding the patients' demographic profiles and disease characteristics along with the relationship between the types of illness and their outcomes. Knowledge from this study will serve as a guide on future management of critically-ill patients to improve the quality of services.

OBJECTIVES:

The study was done to obtain the demographic data and disease characteristics of critically-ill patients in ED HUSM red zone. The sample was analyzed a week later. Two scoring systems i.e. the Revised Trauma Score for the trauma patients and Shock Index for the non-trauma patients were used to see the correlation between the factors and the mortality.

METHODOLOGY:

A prospective observational study for a period of 6 months was carried out to achieve the sample size (440 patients). The demographic data in terms of age, sex, race, history of illness and types of disease were analyzed. Follow-up was done a week later to see whether patients were still alive or had succumbed to their illness.

RESULTS:

The sample size was 440 patients. Trauma patients were 23.0%, the rest were non-trauma patients (77.0%). The mean age of the population was 47.21 +/- 21.78. For trauma cases, the mean age for population of patients was 31.61 +/- 21.41 years old. 67.27% were male patients and about 95.0% were Malays. The highest number of patients was in the medical category (58.6%). Neurosurgical cases contributed to 25.0% of the total cases. Most of the trauma cases involved patients less than 60 years old (84.1%). The mean duration of stay in ED was 3.92 +/- 1.5 hours. A total of 27 patients died. Seven (1.59%) of them were trauma patients. There was a significant difference between the RTS value and the mortality within the period of one week (<0.05, 95% CI: -4.4,-1.0). There was also a significant difference between the SI value and the mortality within the period of one week ($p<0.05$, 95% CI: 0.3 – 0.8). There were no significant differences comparing the mean of age, sex, mean duration of ED stay as well as the duration of one-week ward stay with the mortality ($p>0.05$). There were also no significant differences when comparing the individual components of RTS (GCS, RR and SBP) and SI (HR and SBP) with the mortality ($p>0.05$).

CONCLUSIONS:

Patients of red zone of ED HUSM vary in age, illness and their severity. The majority of patients attending the ED HUSM were medical patients. The mortality rate within the period of one week was small. RTS and SI can be used in assessing the prognosis of trauma and non-trauma cases respectively in ED HUSM.

1. INTRODUCTION

The emergency department (ED), sometimes termed the emergency room (ER), emergency ward (EW), accident and emergency (A&E) department or casualty department is a hospital or primary care department that provides initial treatment to patients with a broad spectrum of illnesses and injuries, some of which may be life-threatening and requiring immediate attention (Fromm et al., 1993).

According to Nik Hisamuddin et al. (2005), the concept of emergency medical health care systems in Malaysia has existed since the 1950s. As in other countries in Asia, their functions and important contributions to the overall healthcare system have been much underestimated compared to other specialties. Emergency Medicine is a relatively new specialty still at its infancy but is rapidly expanding in Malaysia. The specialty is being increasingly recognized within the health care system in the country. It follows the Anglo-American model of emergency care, which uses predominantly emergency medical technicians. Other system follows the Franco-German model, which is physician driven. (MacFarlane, 2003).

Patients come to the ED with various complaints regarding their illness, ranging from non-critical cases up to acute, critical and life-threatening conditions which require prompt and rapid as well as straight-to-the-point assessment and management to stabilize and carry out life-saving procedures. All these require an established team work among all the staff working in ED, right from the Emergency Physician (EP) down to the

emergency residents, paramedics, attendants as well as the technicians from the radiology department, laboratories, mortuary etc. Thus, EP has little time to gather additional data, consult with others, or deliberate about alternative treatments. Instead, in emergent situations, there is a presumption for quick action guided by predetermined treatment protocols. (ACEP, 2005).

To date, there is no local data on the effectiveness of the management of critically-ill cases in the red zone of ED that is available to us. In a way to improve the services provided, analysis on the type of cases and the outcomes are required for any decision to be taken in improving the health services, especially in the red zone.

Stabilization of the critically-ill patients are the main stay in treating red zone cases. They are likely to have the best chance for survival when critical care is delivered as expeditiously as possible, regardless of setting (Chalfin et al., 2007). These include administration of drugs, intravenous cannulation and fluids, cardiopulmonary resuscitation (CPR) and intubations and ventilation if required. Further consultations to the respective department for disposition of patients are made after emergency cares have been delivered to the patients.

1.1 THE EMERGENCY DEPARTMENT, HOSPITAL UNIVERSITI SAINS MALAYSIA (ED HUSM)

The Emergency Unit, Hospital Universiti Sains Malaysia (HUSM) was upgraded to a department status in 2003, in parallel with the recognition of Emergency Medicine as a specialty on its own and as a postgraduate master degree pioneered by USM. The department, manned at the current moment by seven emergency physicians, is offering a 24-hour specialist coverage everyday.

The department, as with all other emergency departments around the globe, serves as a crucial and integral link between the community and the hospital. This department is a place where the sick, the wounded, the sexually battered, the depressed, the violent, the confused, the poor, etc, would go when in needs, and where the physicians, nurses and other paramedics staff were trained to treat them in the best possible way, 24 hours a day, 365 days per year.

1.1.1 EMERGENCY ROOM

The Triage Officer will determine the cases based on the complaints and triaged them accordingly. **Red zone** is for patients with critical, unstable, life-threatening and potential life-threatening conditions (Appendix 2). Four beds with complete vital signs monitoring are available in this zone. **Yellow zone** is for patient with semi-critical, non-life-threatening, non-walking or in severe pain. Four beds are available. **Green zone** is for non-critical, walking patient, stable, non-life-threatening or in mild pain. Four beds also available here. Patients presented to ED HUSM; either walk-in cases, ambulance-call

cases or referred from various sources (district hospitals, health clinics or general practitioners) are triaged red if they fulfilled the criteria mentioned. Immediate review by the medical officers on duty with prompt treatment directing at the presenting complaints are carried out without delay. Primary and secondary surveys are carried out followed by identifying of the underlying problems.

In this study, we were focusing on the red zone of ED HUSM – the cases tagged as red, and the discussion relating to it. These included the demographic profiles of patients e.g. age, sex, race and source of referral. The study also looked into the disease characteristics such as the types of illness, interventions given to the patients and their disposition from the ED. Those patients were divided into 2 groups i.e. trauma cases and non-trauma cases and they were analyzed using two scoring systems. Trauma cases were analyzed using the Revised Trauma Score (RTS) whereas non-trauma cases were analyzed using the Shock Index (SI) scoring systems. Follow up of patients, in this study, in determining the mortality of the subjects after being given the acute management in ED, HUSM or after admission to the ward (within period of one week) was done. Period of one week was chosen (and approved by the ethical committee) as during this period, most of the diagnosis of the illness has been established by the managing team in the ward. Furthermore, if shorter duration is chosen, the diagnosis will be lacking as most of the laboratory results as well as the other results e.g. biopsy, culture and sensitivity, reporting of x-rays etc are still pending. Subsequently, if longer duration is chosen, there will be confounding factors such as sepsis or septicemia will affect the patients may and interrupt the outcomes.

We receive and manage more than 200 patients per month in our red zone (Appendix 1). In 2005, motor vehicle accidents (MVA) or road traffic accidents (RTA) were the third principal cause of hospitalization in Malaysian MOH hospitals (MOH health facts, 2006). As Emergency Medicine is still new in Malaysia, a lot more information need to be gathered to give us the idea how cases are being managed in our ED, especially the red zone, as well as the limitations that we face in our daily works to give a proper and effective care to the critically-ill patients. For example, in trauma cases, there is a need to see the distribution of such cases as well as the demographic profiles and their outcomes after being managed in ED before been transferred to the respective wards so that necessary actions can be undertaken in future to give better treatment to improve the outcome.

Importantly, it can give us an idea regarding the underlying problems of cases triaged as RED, whether they are medical, surgical, pediatric, obstetrics, gynecology or others. By knowing this, we can be more prepared in terms of number of staff required, equipments, drugs, even further training of the personnel in the area concerned in handling or managing red zone cases; especially for young staff (James and Bart, 1997). Optimal care can be given efficiently in reducing mortality and morbidity. It can help us in improving the quality of services provided to our patients, thus improving the overall quality of life in our community.

2. LITERATURE REVIEW

Emergency department (ED) was developed during the 20th century, in response to an increased need for rapid assessment and management of critical illnesses as well as due to the reason that the emergency care is rapidly progressing into a more challenging task nowadays. The first specialized trauma care center in the world was opened at the University of Louisville Hospital in 1911 and developed by surgeon Arnold Grishwold during the 1930s and '40s. In some countries, ED has become important entry points for those without other means of access to medical care (Swaminatha, 2000).

The red zone of ED provides initial treatment to critically-ill patients with a life-threatening conditions and requiring immediate attention. They make up a substantial part of some ED patient populations, up to 8% of all patients, and over 25% of those admitted (Fromm et al., 1993).

With regard to this study, there are few things worth discussed here like the triage system, emergency patient care (red zone management) including the patients' demographic profile and the types of critically-ill and life-threatening conditions, EP and staff involved in the patients care, as well as the outcomes of the patients receiving emergency treatment and actions that could be taken to improve the management and care of the patients.

2.1 TRIAGE

Triage is derived from the French word, "trier", meaning "to sort or to choose". It is a dynamic process designed to get the right patient to the right place at the right time with the right care provider. It requires brief clinical assessment that determines the time and sequence in which patients should be seen in the ED or, if in the field, the speed of transport and choice of hospital destination (Robert, 2004). In general, triage can be defined as the prioritization of patient care based on severity of injury/illness, prognosis and the availability of resources (Tintinalli et al., 2004).

Robert (2004) mentioned that the concept of prioritizing patients and providing immediate care to the most seriously injured was practiced in France in the early 1800s. Over the next century, this practice was further developed in armies throughout the world. As a result, many injured persons whose surgery might have been delayed received critical care earlier. During World War I, improved outcomes of some battle injuries were credited to appropriate triage. Thus, triage is one of the first applications of medical care after first aid. He further stressed regarding the triage in ED which occurred sporadically in the early 1900s in crowded inner-city hospital dispensaries. However, it was not widely adapted in ED until the latter half of the century, when organized departments with on-duty EP became a national standard.

Triage may be performed by medical assistants (MA) or nurses at the entrance of ED. They are usually trained in managing emergency cases.

Primary roles of the triage nurse:

- Screening: quick look
- Assessment: focused assessment

The most common triage classification in the United States still involves assigning patients to one of four color-coded categories (red, yellow, green or black), depending on injury severity and prognosis. In addition to the nature and urgency of the patient's systemic condition, triage decisions should be sensitive to factors affecting prognosis, such as age, general health, and prior physical condition of the patient, and the qualifications of the responders and availability of key supplies and equipments (Tintinalli et al., 2004).

Other ED triage system divides patients into at least 3-4 tiers, which is also widely used by the hospitals in the United States (Robert, 2004).

Category I (obvious emergency):

The physician must examine the patient as soon as possible. Case examples include cardiac arrest, acute severe chest pain, massive vomiting of blood, sudden loss of consciousness, and major trauma with hypotension.

Category II (strong potential for emergency):

The patient needs full evaluation and treatment by a physician. Case examples include acute dyspnea, acute abdominal pain, acute chest pain, acute confusion, and severe pain.

Category III (potential emergency):

Consider the possibility of an occult or pending emergency condition. Case examples for this category include abdominal pain, high fever, acute back pain, serious extremity injuries, and large or high-risk lacerations.

Category IV (non-emergent):

These patients' presentation provides no reason to think they have an emergency medical condition or are at risk of developing one. Disorders are chronic, minor, or self-limiting. Case examples include medication refill, acne, mild adult upper respiratory tract symptoms, mild sore throat, blood pressure check, and lumps and bumps.

Other triage systems include the 5-level Canadian system and Simple Triage and Rapid Treatment (START) which categorizes victims based on their ability to walk, their mental status, and the presence or absence of ventilation or capillary perfusion.

Some ED have chosen numbers or colors to designate triage categories (Robert, 2004; Tintinalli et al., 2004). In Malaysia, the hospitals' ED used this type of triage system. ED is divided into three zones – green, yellow and red. Patients are triaged to each zone based on their presenting illness:

a. Green zone – non-critical case
b. Yellow zone – semi-critical case
c. Red zone – life-threatening conditions (see appendix 2)