

A STUDY ON FACTORS INFLUENCING WAITING TIME FOR
ADMISSION AT OBSERVATION WARD, EMERGENCY
DEPARTMENT HOSPITAL UNIVERSITI SAINS MALAYSIA, KUBANG
KERIAN, KELANTAN

By

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LIST OF ABBREVIATIONS

A&E	Accident and Emergency
ACEP	American college of Emergency Medicine
AM	Latin word- ante meridiem, referring to morning shift (7am – 2pm)
ED	Emergency Department
EDHUSM	Emergency Department Hospital Universiti Sains Malaysia
EDOU	Emergency Department Observation Unit
EDOW	Emergency Department Observation Ward
EP	Emergency Physician
<i>et al</i>	and others (et alii)
HUSM	Hospital Universiti Sains Malaysia
MO	Medical Officer
ON	Night
OU	Observation Unit
OW	Observation Ward
PM	Latin word- post meridiem, referring to working shift (2 pm- 9 pm)
SPSS	Statistical Package for Social Sciences

ABSTRAK

Kajian terhadap faktor-faktor yang mempengaruhi masa untuk memasuki wad yang diarahkan di Wad Pemerhatian, Jabatan Kecemasan, Hospital Universiti Sains Malaysia, Kubang Kerian, Kelantan.

Pengenalan: Limpahan pesakit merupakan salah satu masalah kepada Jabatan Kecemasan. Di Amerika Syarikat dilaporkan terdapat peningkatan sebanyak 1% kunjungan pesakit di Jabatan Kecemasan setiap tahun. Wad pemerhatian merupakan salah satu alternatif untuk mengurangkan limpahan pesakit di Jabatan Kecemasan. Pesakit diberi rawatan klinikal di Jabatan Kecemasan dan mereka akan ditentukan untuk memasuki wad atau dibenarkan pulang. 30% pesakit dalam ward pemerhatian diarahkan untuk memasuki wad. Kajian ini dilakukan khususnya untuk pesakit yang akan memasuki wad.

Objektif: Untuk mengkaji jangkamasa menunggu dari masa diarahkan kemasukan wad sehingga pesakit dimasukkan ke wad. Jika terdapat kelewatan, kajian dibuat bagi mengenalpasti faktor-faktor yang mempengaruhi jangkamasa menunggu untuk kemasukan ke wad seterusnya mengenalpasti hari dan masa purata kelewatan masuk wad. Selain itu, kajian ini juga melihat kesan mudarat kepada pesakit dari segi keterukan penyakit atau kematian.

Tatacara kajian: Kajian prospektif yang dikendalikan di Wad Pemerhatian Jabatan Kecemasan dilakukan dengan mengumpul data berterusan dari Mei 2012 hingga Oktober 2012. Subjek kajian ialah semua pesakit yang perlu dimasukkan ke wad dari Wad Pemerhatian Jabatan Kecemasan. Masa untuk kemasukan wad bermula apabila arahan kemasukan wad dikemukakan oleh doktor yang merawat sehingga pesakit dimasukkan ke dalam wad. Sebab-sebab penangguhan pesakit untuk dimasukkan ke

wad direkodkan. Kelewatan pesakit memasuki wad dikira apabila jangkamasa masa menunggu untuk kemasukan lebih dari 3 jam. Analisis data dilakukan menggunakan SPSS versi 20.0.

Keputusan: Seramai 764 pesakit untuk kemasukan ke wad direkodkan sepanjang tempoh kajian. Purata umur mereka adalah 37 tahun. Majoriti pesakit adalah lelaki dan terdiri dari kaum Melayu. Majoriti kemasukan ke wad berlaku pada hari bekerja dan paling ramai pada hari Selasa secara keseluruhannya. Ini mungkin dipengaruhi hari pembelajaran pada hari Selasa menyebabkan taburan pesakit menunggu keputusan darah di EDOW meningkat. Kemasukan wad paling tinggi pada waktu malam. Majoriti pesakit dimasukkan ke wad yang di arahkan kurang dari 3 jam menunggu. Purata masa diambil untuk kemasukan wad ialah 56.61 (77) minit. Sebab untuk kelewatan bagi kemasukan ke wad adalah seperti masalah pengurusan katil, kekurangan staf, pertukaran shift, wad sibuk, atau masa menunggu rekod pesakit yang lama. Daripada 764 pesakit, 3 pesakit telah dibawa keluar ke bilik rawatan, seorang ke zon merah dan 2 orang pesakit lagi dihantar ke zon kuning. Melalui analisa, hari bekerja menunjukkan tiga kali kebarangkalian untuk lewat kemasukan ke wad lebih dari 3 jam (OR 3.08; 95% CI: 1.27, 7.47; $p = 0.013$) manakala shift pagi menunjukkan lima kali kebarangkalian lewat kemasukan ke wad lebih dari 3 jam (OR: 5.84; 95% CI: 1.59, 21.49; $p = 0.008$).

Rumusan:

Faktor utama yang menyebabkan kelewatan kemasukan ke wad adalah hari bekerja dan shift pagi.

Kata kunci: jangkamasa menunggu, faktor faktor yang menyebabkan kelewatan, kesan kepada pesakit.

ABSTRACT

A study on factors influencing waiting time for admission at Observation Ward, Emergency Department HUSM, Kubang Kerian, Kelantan.

Introduction: Overcrowding is one of the major problems in Emergency Department. In USA it was reported that there was an increase by 1% of emergency patients yearly. Observation ward is one of the buffer systems in reducing overcrowding in Emergency Department. Patients kept in observation ward for assessment and progression of treatment and later were categorized into those who could be discharged or those for admission. 30% of our patients from observation ward were due for admission and this study focused on this group of patients.

Objectives: The length of stay from the decision for admission until patient admitted to respective ward and factors influencing length of stay and delay before admission among those patients were identified. Outcome of the patients in term of morbidity and mortality while waiting for admission were studied.

Methods: This prospective study was conducted in EDOW HUSM by collecting continuous data over 6 months from May 2012 to October 2012. All patients who were treated in observation ward Emergency Department and decided for admission to the respective ward during the study period were included. Decision for admission was considered the moment the respective doctor ordered for patient admission. Reasons for delay in admitting patient once ordered were documented. Prolonged length of stay in this study means the patients stayed more than 3 hours at EDOW after being ordered for admission. A cross sectional study was conducted through review of data collected. Data analysis was done using SPSS version 20.0.

Result: 764 patients were due for admission to the respective wards. The mean age was 37 year old, with predominantly Malay and male gender. Majority of the admissions occurred on weekdays and highest on Tuesday. This might be influenced by teaching day on Tuesday leading to an increase in the number of patients waiting for laboratory results in EDOW. Numbers of admission were highest during night shift. Majority of the patients admitted within less than 3 hours with mean of stay 56.61 (77) minutes. Reasons for late admission were identified as bed problem, staff problem, working shift transition time, ward busy or waiting for patients' old files. Out of 764 patients, 3 patients were transfer out back to treatment area, one to red zone and another two cases to yellow zone. Through multiple logistic regression analysis, significant associated factors identified for waiting time more than 3 hours were non-holiday or weekdays (OR: 3.08; 95% CI: 1.27, 7.47; $p = 0.013$) and morning shift (OR:5.865 %CI: 2.637, 13.047; $p = 0.000$).

Conclusion: The main factors associated with prolonged EDOW stay were weekdays and morning shift.

Keywords: length of stay, factors delay, outcome

CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION OF EMERGENCY DEPARTMENT OBSERVATION

WARD HUSM

Kelantan is one of the states in Malaysia. It is located in the north-east of Peninsular Malaysia. The capital is Kota Bharu and the total population was 1.6 million in 2011 (**Department of Statistics, 2011**).

Hospital Universiti Sains Malaysia (University Science of Malaysia Hospital) which located about 10 minutes drive from Kota Bharu, is one of the well-known tertiary care teaching hospital in Kelantan. It provides an extensive range of treatment and specialist services. This hospital also provides critical care services.

The emergency department of Hospital Universiti Sains Malaysia (EDHUSM) is located in the east wing of ground floor in the main hospital building. Annually it receives approximately 55,000 patients with increasing numbers every year. It provides medical treatment facility specializing in acute care of patients who presents without prior appointment and operates 24 hours a day. EDHUSM consists of triage area, three categories of treatments area: life threatening/immediate (priority one-red zone), urgent/semi-urgent (priority two-yellow zone) patients, non-urgent patients (priority three-green zone), and one observation ward.

Observation ward is an extension of emergency services. It provides continuous patient management to better define the patient's diagnosis and reduces costs and prevents inappropriate patients' admission and dispositions. In other words, the ultimate goal of observation ward is to improve the quality of medical care of patients

through extended observation and treatment, while reducing inappropriate admissions and health care costs (American College of Emergency Physician, 1988).

EDOW HUSM was set up in year 2000 and acted as a buffer system to reduce overcrowding in EDHUSM. It operates 24 hours. It consists of 8 beds, 4 extension beds equipped with portable monitors, computer with internet access, radiography online access to review, prescription online and resuscitation equipment. From a study done by Abu Yazid in 2005 states that there were three categories of patients who require OW care:

1. For diagnosis- those that await investigation results for diagnostic evaluation.
2. For treatment- those that require short course of treatment or performance of procedures
3. For reviewing- those that await to be reviewed by medical officers from other departments.

Each patient in EDOW still under specific ED medical officer in charge until patient is discharged or admitted. It has registered nurse responsible to manage the patients throughout their stay in observation ward. This ward is under the supervision of the Emergency Physicians.

From the study of Kolb et al., 2008, observation unit as a buffer concept to reduce ED overcrowding because of stress in patient unit, which causes a back-up in ED, eventually becomes relieved by having to handle fewer patients. In addition, observation patients no longer cause traffic jams along the admission track from the ED to in patient ward. The result showed the observation unit was able to shorten waiting time by 31%, which significantly reduced the backlog to inpatient and ED.

For flow of patient upon arrival and registration at EDHUSM, patients are assessing in the triage room and categorized into three triage categories: life

threatening/immediate (priority one – red zone), urgent/semi-urgent (priority two – yellow zone), and non urgent patients (priority three- green zone). Usually priority one – red zone patient’s group will be admitted directly to the ward and bypass observation ward. For priority two and three groups of patients after being treated and diagnosed can be divided into discharge or warrant admission whether to respective ward or observation ward. In observation ward they will be further evaluated whether need to be discharged or admitted to the ward as inpatient. (Refer Appendix: A)

From the study of Abu Yazid, 2005 in EDOW 26.6% of pediatric patients will be admitted and 26.6% adult patients will be admitted. Even though the percentage is not so much, but still delay in admission will lead to problems as EDOW consists of only eight beds. This can become a burden to nurses and medical officers involve. Most of the time patients and relatives misunderstood the delay as emergency department management problem. Prolonged waiting times lead to public dissatisfaction . The “queuing theory” states that increased utilization leads to increased numbers of people waiting in queue and increase waiting time for new clients Therefore the newcomers’ patients are known to leave without waiting to be seen. Moreover, it has been shown that timely care leads to improved patient health outcome (Forster, 2003).

This study was conducted at ED HUSM and its aim was to carry out a data on waiting time from decision to admit to admission in the ward. Factors contributing to patient care delay were identified. Besides the outcome of patients who involve in back log was also identified. An attempt was made to identify factors involved in delayed admission. Hopefully, by overcoming it can decrease length of stay and thus improve ED patient care deficiency.

1.2 RATIONALE / JUSTIFICATION OF THE STUDY

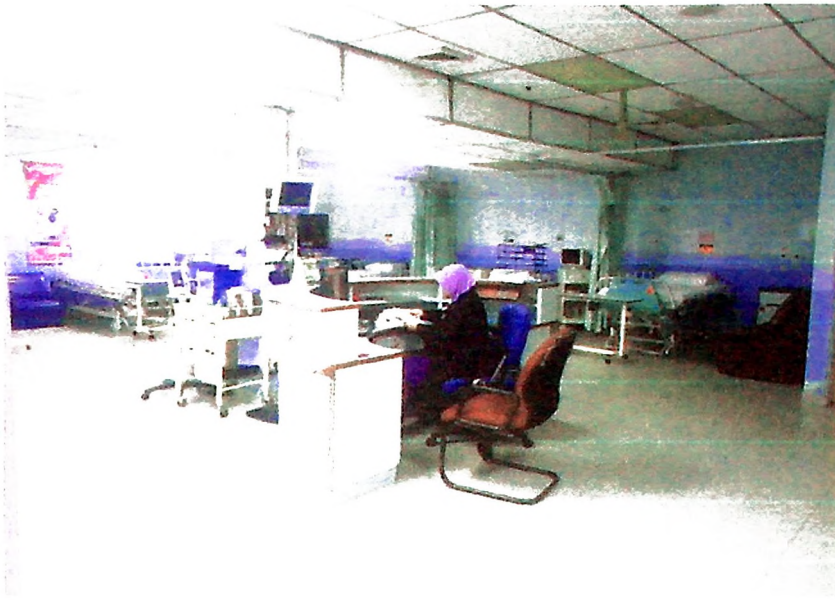
- 1.2.1 To overcome overcrowding at ED as there is increasing trend in number of patient visiting ED yearly
- 1.2.2 Lack of data regarding the causes of access block and patient's outcome at EDHUSM
- 1.2.3 To evaluate the impact on patient as waiting not only decreases patient satisfactions but also potentially causes adverse clinical outcomes.
- 1.2.4 To improve the ED system on better managing capacity.

1.3 RESEARCH QUESTIONS

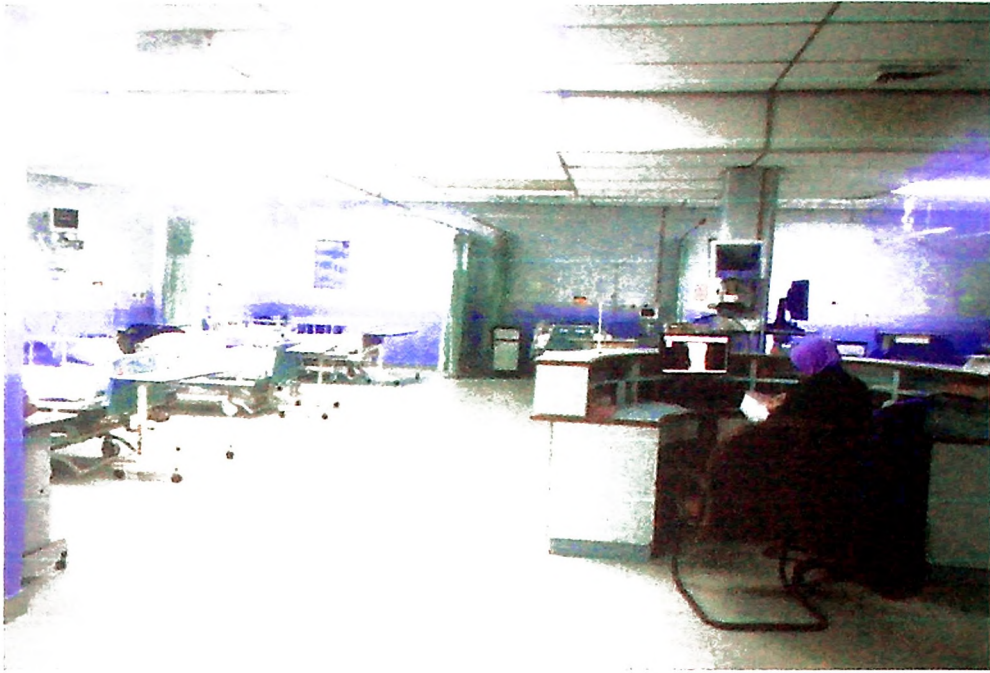
- 1.3.1 What is the mean waiting time from decision to admit by MO to admission?
- 1.3.2 What are the contributing factors to the delay in admission from observation ward EDHUSM?
- 1.3.3 Is there any relationship between length of stay at observation ward EDHUSM and outcome of the patient?



Picture 1: Entrance to Observation Ward HUSM



PICTURE 2: One staff nurse in charge of monitoring and serves medication to patient in Emergency Department Observation Ward HUSM per shift.



PICTURE 3: Emergency Department Observation Ward HUSM consists of 8 beds, 4 extension beds equipped with portable monitors, computer with internet access, radiography online access to review, prescription online and resuscitation equipment.

CHAPTER 2

LITERATURE REVIEW

2.1 Background of observation ward

An article published by (Observation unit study, clinical epidemiology & Healthy Service Evaluation Unit 2001) stated that idea of observation medicine has attracted significant attention in the published literature since the Nuffield Provincial Hospital Trust Review of short stay unit determine that short stay observation beds were essential for good casualty departments' in 1960.

In guideline from the British Association of Accident and Emergency Medicine (BAEM) were published in 1989 stated that the OW was an essential part of every accident and emergency department and suggested provision of one bed per 5,000 new attendances (Good acre , BAEM, 1998).

2.2 Evolution of Emergency Medicine

Earlier Observation unit medicine was known as Emergency Department Observation Unit (EDOU). It was a dedicated area under the direction of ED where patients were managed to determine the need for admission. Observation and assessment wards allow patients to be observed on a short-term basis and permit patient monitoring and/or treatment for an initial 24–48 hour period. The crucial concept for this unit was mainly to determine whether patients need to be admitted or discharge as outpatient. Therefore, the observation unit helps to avoid unnecessary admission.

At the 1997 ACEP observation services section national conference, noted commonly used names included EDOU (31%), Clinical Decision Unit (27%), Rapid Diagnostic and Treatment Unit (17%), Chest Pain Evaluation Unit (1%), Short Stay Unit (5%), Clinical Decision and Treatment Unit (7%) and Extended Evaluation Unit (7%). From M Cooke 2002, emergency observation wards, admission wards, and assessment wards as terms have been used variably in the literature. Formal name designation reflects the preference of the individual institution however the service provided remains the same.

2.3 Types of observation service

2.3.1 Numerous clinical problems have been successfully managed in observation units. All of these problems are characterized by having a reasonably low likelihood of admission as well as by the need for additional time before a decision regarding disposition can be made (Klein and Patterson, 1991).

2.3.2 There is no specific classification used to group the diagnosis. Klein has classified condition for which observation services may be useful as follows:

- i. Diseases likely to respond to a brief course of therapy, which then can be modified so that treatment can be continued at home (e.g. status asthmaticus, gastroenteritis, and mild dehydration).
- ii. Illness of uncertain severity seriousness, which are expected to rapidly evolve and fully declare themselves (e.g. hydrocarbon poisoning that is asymptomatic, mild group).

- iii. Undiagnosed condition undergoing lengthy testing which, if normal will result in discharge (e.g. a suspected ingestion awaiting toxicology test result, acute cerebella ataxia, low to moderate risk chest pain).
- iv. Problems needing prolonged observation that should resolve within 12 to 24 hours (e.g. a child who has been over sedated for a laceration repair, a postictal state).
- v. Rare postoperative cases (e.g. following anesthesia for removal of an esophageal foreign body).
- vi. Social service situations requiring additional time to be worked out (e.g. an abused child awaiting placement).

2.3.3 According to Cooke, 2002

Table 1 A summary of the benefits of an assessment/admission ward with respect to certain groups of patients

First author (year)	Patient group	Summary of benefits gained from presence of an assessment / admission ward
Khan, SA (1997)	Elderly	Short stay ward can reduce some patients stay in hospital and reduce demand for in-patient places. Increased level of care for elderly patients.
Beattie, TF (1993)	Children	Children get comfortable beds more quickly. Improved awareness of simple pathology.
Biddulph, J (1984)		Most children admitted to an observation unit were sent home without requiring hospital treatment. Observation easier and more efficient than if admitted fully to hospital.
Ryan, J (1996)	Self Harm	Most patients discharged next day without need for further follow up. Potential cost savings made.
Jones, A (1995)	Head injuries	Observation ward offers safe and monitored area for recovery. Few patients require admission to other wards

Brown, SR (1994)		Number of inappropriate discharges decreased.
Gouin, S (1997)	Asthma	An observation unit lowered the hospitalization rate for children with asthma, yet there was an increased rate of repeat visits to the ED.
Willert, C (1997)		Holding room therapy for childhood status asthmaticus is beneficial both medically and cost wise.
Hutchins,CJ (1978)	Gynaecology patients	Of 408 patients admitted to one gynaecological unit, 56% were in hospital for less than 6 hours and a further quarter did not require hospital admission. Full staffing of a unit could release a number of beds for other selected work.
Gaspoz, JM (1994)	Chest pain	Short stay units prevent unnecessary long stays in hospital, and are safe and cost effective.
Goodacre, SW (2000)		There is insufficient evidence to say that an observation unit will improve outcomes if clinical practice is good. Not proven to be financially beneficial in the UK yet.
Henneman, PL (1989)	Abdominal Conditions and trauma	Abdominal trauma and negative diagnostic peritoneal lavage can be safely managed in an observation unit.
Conrad, L (1985)	Abdominal conditions and	Patients with initial negative test results can be evaluated in observation units.
Israel, RS (1991)	trauma	72% of patients treated for pyelonephritis were successfully managed on an observation ward and were discharged early.

2.3.4 Efficacy of OW

Studies of EDOW performance often use clinical indicator of efficacy, such as the percentage of EDOW patients admitted or hospitalized and length of stay in the EDOW (Bentman A, 1993, Brillman L et al, Grall L, 1997, Graff LG et al 1988). Therefore, such indicators were used in this study.

2.3.5 Rate of hospitalization

There is no clearly established standard for admission rate from an ED observation unit.

Sixty to ninety percent of patients can be expected to be discharged home without hospitalization after their observation period (American College of Emergency Physicians: Emergency Department Observation Units. *Ann Emerg Med* 17:95-96, 1988, Andelman RP 1998, Bakker AJ et al., 1993, Bentman A 1993, Brillman L et al., 1995, Burke V et al., 1996, DeHart KI, 1998, Ellrodt AG et al., 1995).

Therefore, the selected and efficacy cutoff point for average inpatient admission rate from the ED observation unit of less than 30% or in other word ;a discharge rate of 70% or greater was used in the study based on Zalenski et al., (1997).

2.3.6 There is no clearly established efficacy standard for length of stay in an EDOW setting. Observation status lengths of stay of 24 to 48 hours are allowed by third-party payers, such as Medicare (Farkouh ME et al., 1998, Graff LG, 1993).

2.3.7 There are many emergent conditions that often are not successfully treated in the ED but can be successfully treated with an additional 10 to 15 hours in an EDOW.

2.4 Cost Effective

Table2 Cost effectiveness studies of assessment/admission wards in emergency medicine

First author (year)	Country	Patient group studied	Main conclusions
DeLeon, 1989	US	Chest pain	Use of the chest pain evaluation unit resulted in an 80% reduction in cost of ruling out acute myocardial infarction for patients not admitted to a coronary care unit.
Zwicke, 1982	US	Asthma	Use of an ED observation unit is less expensive than admission with the mean observation unit stay being 34% of the cost incurred for a hospital admission.
Brillman,1994	US		The use of an observation unit in the ED does not produce cost savings. Patients that would have been discharged home from the ED were sent to the unit therefore not reducing overall costs.

Henneman, 1989	US	Abdominal trauma	Evaluation of the use of 12 hours monitoring in an ED observation unit in the management of 230 patients. Selected patients can be managed cost effectively with a potential saving of more than \$51000.
Gaspoz, 1994	US	Myocardial infarction	Examined the cost benefits of a new short stay unit for low risk patients who may be admitted to a hospital to rule out AMI. Concluded that a coronary observation unit may be a cost effective alternative to current triage strategies for patients with a low risk of acute myocardial infarction admitted from the emergency department.

2.5 Observation ward as one of buffer to overcome overcrowding at Emergency Department

Unfortunately, ED overcrowding is a common medical care issue in the United States and other developed nations (Kolb et al., 2008). This problem has been recognized since the early 1990s (Andrulis et al., 1991). ED overcrowding is believed to be systemic problem (Schneider et al., 2001). Overcrowding occurs when there are more patient than staff, treatment beds and waiting times exceed reasonable periods. Crowding typically involved the following patients: those waiting for ED admission, those being monitored in non-treatment areas, and those awaiting transfer to the inpatient unit (IU). Often, the direct consequence of crowding is placing a hospital on diversion status (Kolb et al, 2008).

There are three areas which impact the patient flow in an ED: influx, throughput and outflux (Kolb et al, 2008). The influx into the ED has risen because there are more elderly patient needing emergency medical treatment (Cowan and Trzeciak, 2005). Concerning throughput, a number of potential factors have become the focus of research such as the ED layout to shorten the walking distance and promote communication (Miro et al., 2003).

With regard to outflux, major cause of ED overcrowding is when patients who need further treatment in a hospital cannot leave the ED because the inpatient ward is not ready to take them (Rathlev et al., 2007).

Concerning this, (Kolb et al., 2008) investigated under which specific conditions patient backlog between ED and inpatient unit (IU) actually occurs. It was found that backlog is a function of the variable 'IU utilization' and the variable 'coupling between the ED and IU'. These findings have implications for guiding a hospital's effort to optimize its system.

Some measures have been suggested to reduce the IU backlog effect.

- Accelerating the admission process between the ER and IU's ward (Yancer et al., 2006)
- Using hallways of inpatient wards to place boarding patients (Green, 2007).
- Observation units, which are units that hold patient with stay times of less than 24 hours, have been implemented successfully to reduce IU coupling but the degree of organizational improvement is unclear (Richardson, 2006).

From the study by Kolb et al., 2008, **observation unit** as a buffer concept to reduce ED overcrowding because of stress IU, which causes a back-up in ED, eventually becomes relieved by having to handle fewer patient. In addition, observation patients no longer cause traffic jams along the admission track from the ED to IU ward. The result showed the observation unit was able to shorten waiting time by 31%, which significantly reduced the backlog to IU and ED.

Not every patient who seeks treatment at the Emergency Department requires observation ward admission. Basically, those who require short- term investigation to determine the severity of their illness or those who respond to short- course therapy are suitable patients. Few literature stated that with this criteria of admission, 80% of them will be discharged from hospital after their stay in an OW, while the remainder will require transfer into a ward bed for on-going care (Observation Unit Study, Clinical Epidemiology & Health Service Evaluation Unit 2001).

According to National Health Services (NHS), patient total time in Emergency and Trauma Department (ETD) will be no more than four hours including the time

from decision to admit (DTA) to leaving Emergency and Trauma Department. (Proudlove et al., 2003).

The ability to move patients with a DTA out of ETD depends on the ability of the hospital ward to accommodate them. According to National Audit Office (NAO), this movement is normally the responsibility of the bed management function.

From research, data from South Manchester University Hospitals NHS Trust (SMUHT), the difference in levels of backlog across the days of the week is statistically significant ($p < 0.001$ on analysis and Kruskal-Wallis), and the distinction between Monday to Thursdays, and Fridays to Sundays is clear visually and statistically significant ($p > 0.1$ from Kruskal-Wallis for within groups and $p < 0.001$ from Mann-Whitney for between groups). The results showed that each week, Sundays generally have the highest numbers of patient in the bed pool and the highest numbers of patients waiting in ETD in the next morning (Proudlove et al., 2003).

There are present of characteristic and cyclical pattern of large backlog (or queues) of patient waiting in ETD with a DTA at the start of the day, with the situation being worst early in the week. This is due to insufficient empty beds available overnight and this is exacerbated by less active bed management by night staff.

In study on 1779 patients who presented to the ED at Mater Dei Hospital, Malta under 'a time and motion study of patient' revealed a major bottleneck identified was waiting times for inpatient admission (Azzopardi et al., 2011).

From the study by Harris et al, 2009 for boarding time, bed capacity, nurses are significant factor however for doctors it was insignificant. (Cowan and Trzeciak, 2005)

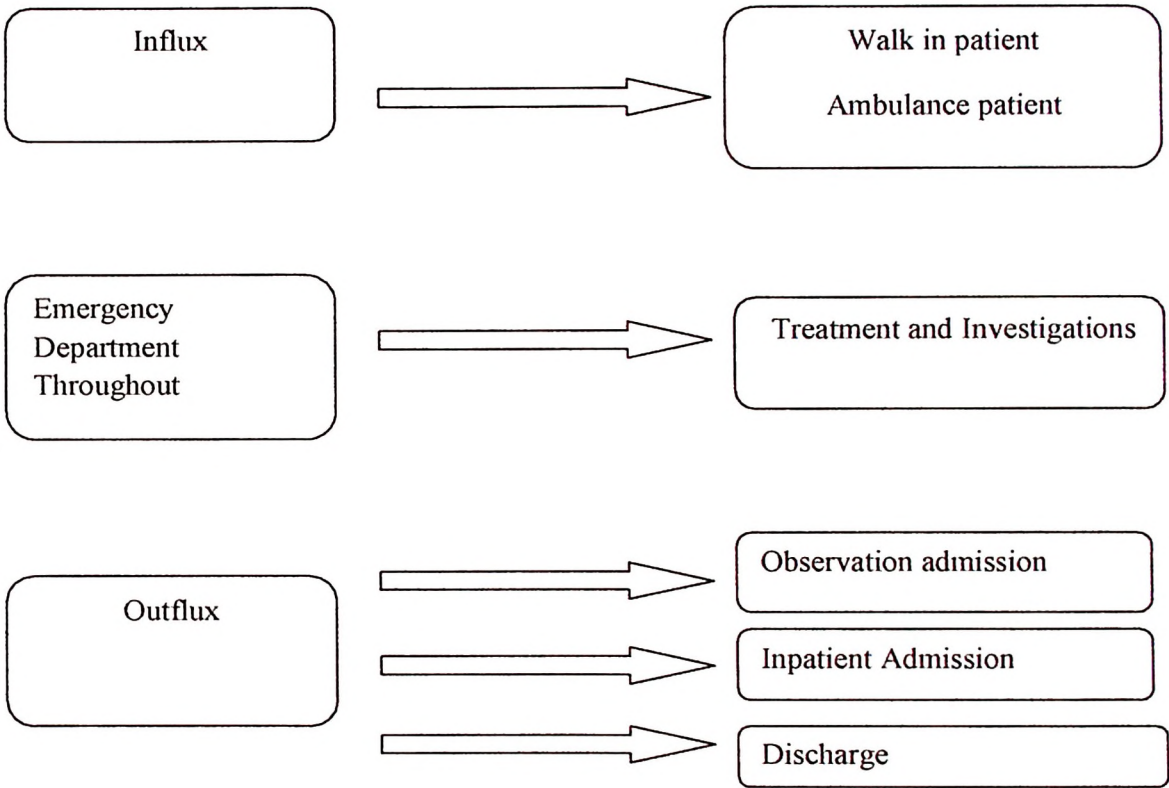
The causes and consequences of Emergency Department boarding inpatients may be the most important determinant for immediate research and operational strategies to alleviate Emergency Department crowding (Noriszura, 2009).

ED overcrowding and delays in ED throughput have several important consequences such as boarding of admitted patients in the ED, longer hospital stays, the inability of patients to gain access to appropriate hospital beds, lost of opportunities to treat patients due to ambulance diversion, and “left without being seen” (LWBS) (Huang et al., 2010). According Huang et al, 2010 admission delay cause potential health and economic impact.

A recent study to validate a measure of ED overcrowding based on the number of patients receiving treatment (occupancy) noted a trend toward increased inpatient mortality at 10 days in patients presenting at times of ED overcrowding. One of confounders of overcrowding is access block (Richardson, 2006).

In EDHUSM, total waiting time for admission is already counted daily by nurses in charge. Delayed admission is categorized when the time taken for boarding is more than 3 hours. Most of the time the goal is achieved, however there are still lack of data for real reason of delayed admission. Even though there are not many cases but it may be significant to improve our quality of service. The “queuing theory” states that increased utilization leads to increased numbers of people waiting in queue and increase waiting time for new clients (Forster, 2003).

Figure 2.1: Conceptual Flow of Emergency Department and Observation Ward



CHAPTER 3

OBJECTIVES

The objectives of this study are as follows:

3.1 General Objectives

To study on socio demographic pattern of patient's delay in admission from EDOW to general ward and its associate factors.

3.2 Specific Objectives

3.2.1. To determine the mean of waiting time in EDOW before admission.

3.2.2. To describe on socio demographic pattern of patient delay in admission from EDOW.

3.2.3. To determine the associate factors of patient delay in admission and their outcome.

3.3 Hypotheses

3.1 The average waiting time in the Observation ward HUSM is 3 hours from DTA to leaving ED

3.2 Insufficient empty bed occur early in the week or overnight

3.3 There is cyclical pattern for large queue of patient waiting in ED with DTA

3.4 Longer waiting time can cause adverse outcome to patient.

CHAPTER 4

METHODOLOGY

4.1 Study Design

This prospective study was conducted in the teaching hospital observation ward of Emergency Department, HUSM Kubang Kerian, Kelantan by filling specific data form design for this study.

4.2 Study Duration

This study was conducted for 6 months from May 2012 till October 2012.

4.3 Study Approval

This study was undertaken as a dissertation study under the Department of Emergency Medicine Hospital Universiti Sains Malaysia and approved by the department board review and hospital ethics committee on the 19th January 2013 (reference USMKK/PPP/JEPeM [211.3.(11)]).

4.4 Study Population

- All patients admitted, diagnosed and treated in Observation ward during study period

4.5 Inclusion Criteria

- All patients decided for admission to the respective ward from observation ward Emergency Department.

4.6 Exclusion Criteria

- Patients who refused for admission / at own risk discharge.

HUSM is regional tertiary referral center especially for Kelantan State. It is also a teaching institution involving undergraduate medical students and residency based specialty training in many fields including Emergency Department. Yearly total

numbers of patient attended at ED increasing in trends with an attendance rate of 50,000-60000 per year. Thus access block can impair in patient flow of management.

Emergency department provides management for Emergency cases 24 hours a day 7 days a week. The cases it managed ranged from resuscitation to cool cases like upper respiratory tract infection. The staffs' works 3 shifts a day;

- AM shift (0700-1400)
- PM shift (1400-2100)
- ON shift(2100-0700)

EDOW HUSM located at the back of treatment bay (red zone, yellow zone, and green zone) and it provides services for patients who require less than 24 hours of inpatient care. It is under responsibilities of doctors and nurses according to the shifts.

Thus, it provide high efficacy in managing various type of patients, some of which may be discharged and others may be hospitalized. There is no clearly established standard for admission or hospitalization rate from an EDOW. Based on literature review shows an efficacy cutoff point for average inpatient admission rate from the EDOW of less than 30%. Admission or hospitalization rates in this range have been reported for other conditions in both observational studies and prospective randomized studies comparing inpatient and EDOW care (Gomez et al.1996, Mc Dermott et al. 1997, Ross et al. 2001)

Throughout all patients in EDOW around 30% need hospitalization. In our study, those who will hospitalize were selected as our samples. Patient data entry was started once decided by respective medical officer to be admitted. Patient's data included registration number, age, sex, diagnosis on admission, decided time of admission, admission time, duration of waiting time, causes of delay in admission,

whether bed full, not enough staff, other reasons, and outcomes to patient whether admit to the ward or transfer back to treatment zone EDHUSM.

In EDOW HUSM, total waiting time for admission is already counted daily by nurses in charge. Delayed admission is categorized when the time taken for boarding is more than 3 hours. However there is no clearly established efficacy standard for duration of waiting time to admit in an EDOW setting. According to Azzopardi, 2011-89 minutes come out as standard deviation for patient waiting to leave ED after decision to be admitted. According to National Health Services (NHS), patient total time in Emergency and Trauma Department (ETD) will be no more than four hours including the time from decision to admit (DTA) to leaving Emergency and Trauma Department. (Proudlove et al.2003). From a study by Martin *et al*, 2011 mean time from a bed request to exit of emergency department was 3 hours. A length of stay less than 3 hours was selected because it is consistent with existing literature and local practice at EDHUSM.

4.7 Ethical Consideration

Ethical approval was obtained from the Hospital Universiti Sains Malaysia Research and Ethics committee. Owing to the nature of audit and the fact that there was no direct contact with patients, the Ethics Committee seemed it unnecessary to obtain written informed consent from the patient. No individual name will be used for data collection and all the data will be confidential.

Descriptive statistics and 95% confidence intervals (CIs) were generated, and histogram of duration of waiting time to admit will be constructed for each group. The sample sizes of 334 subjects were calculated as below: