

**A STUDY ON GERIATRIC PATIENTS
ATTENDING EMERGENCY DEPARTMENT
HOSPITAL UNIVERSITI SAINS MALAYSIA**

by

DR AFIFAH SJAMUN SJAHD

**Dissertation Submitted In Partial Fulfillment Of The
Requirement For The Degree Of Master of Medicine
(EMERGENCY MEDICINE)**



UNIVERSITI SAINS MALAYSIA

2017

ACKNOWLEDGEMENTS

Praise to Allah S.W.T, the Most Beneficent, the Most Merciful, whose blessings has helped me throughout the whole study. I would like to express my deepest appreciation to the following individuals for all their efforts in making this study a success:

- Professor Dr Nik Hisamuddin Nik Ab. Rahman, my supervisor, Head of Department of Emergency and Trauma Department, HUSM, for all his guidance from the beginning of this research, until completion of this dissertation.
- Dr Siti Azrin binti Ab Hamid, my co-supervisor, from Unit of Biostatistics and Research Methodology, HUSM, for her patience and guidance especially on statistical analysis.
- All the lecturers of Emergency and Trauma Department, HUSM, who have shared their wisdom, knowledge and support throughout this study.
- All the staffs in Medical Record Office, HUSM, especially Puan Aminah@Kamilah Beran, on all their helps on making this research possible.
- My colleagues and course mates, for their suggestions, concerns and cooperation throughout this study.
- My family, for their unconditional support and understanding, especially my husband and my children for all the sacrifices made.
- All who had put in their efforts in making this study a success. Only Allah could repay all your kindness.

TABLE OF CONTENTS

ACKNOWLEDGEMENTS	ii
TABLE OF CONTENTS	iii
ABSTRAK (BAHASA MALAYSIA)	v
ABSTRACT (ENGLISH)	viii
CHAPTER 1: INTRODUCTION	
1.1 Prevalence of geriatric patients	1
1.2 Burden of increasing prevalence of geriatric patients	2
1.3 Justification of the study	3
CHAPTER 2: STUDY PROTOCOL	
2.1 Introduction	7
2.2 Justification of the study	8
2.3 Literature Review	9
2.4 Objective, Research Questions, Research Hypothesis	12
2.5 Methodology	14
2.6 Gantt Chart	23
2.7 References	25

CHAPTER 3: MANUSCRIPT

3.1	Title page	27
3.2	Abstract	29
3.3	Introduction	31
3.4	Materials and Methods	34
3.5	Results	36
3.6	Discussion	42
3.7	Conclusion	48
3.8	Acknowledgements	49
3.9	References	50
3.10	Guideline / Instructions to authors of selected journal	53

CHAPTER 4: APPENDICES

4.1	Data collection form	62
4.2	Ethical approval letter	65
4.3	Additional tables / graphs	71
4.4	Raw data on SPSS softcopy	71

ABSTRAK

Pengenalan:

Kajian ini bertujuan untuk menentukan perkadaran pesakit geriatrik yang mendapatkan rawatan di Jabatan Kecemasan Hospital Universiti Sains Malaysia (USM) dari Januari 2015 sehingga Mac 2015, purata tempoh kemasukan di dalam wad dan kesan penyakit ke atas pesakit geriatrik yang dimasukkan ke dalam wad di USM. Kajian ini juga bertujuan untuk mencari faktor-faktor yang menyebabkan kematian di kalangan pesakit geriatrik yang dimasukkan ke dalam wad di USM.

Metodologi:

Kajian ini adalah kajian kohort retrospektif, dari Januari 2015 sehingga Mac 2015 di Jabatan Kecemasan Hospital USM. Kesemua pesakit yang berumur 60 tahun dan ke atas yang mendapatkan rawatan di Jabatan Kecemasan Hospital USM dari Januari 2015 sehingga Mac 2015 dimasukkan ke dalam kajian ini. Persampelan rawak sistematik digunakan.. Jumlah kesemua pesakit di dalam kajian ini adalah seramai 209 pesakit. Statistik deskriptif dinyatakan sebagai “cross-table” untuk pembolehubah mutlak manakala min dan sisihan piawai untuk pembolehubah berangka. Pembolehubah mutlak bebas pula dibandingkan dengan menggunakan ujian “Chi Square” atau ujian “Fisher’s exact”. Perbandingan kumpulan telah dilakukan dengan menggunakan ujian “Independent t” atau ujian “Mann Whitney” bagi pembolehubah berangka.

Keputusan:

Seramai 209 orang pesakit geriatrik telah dimasukkan dalam kajian ini. Purata umur (sisihan piawai (SP)) pesakit adalah 68.4 tahun (SP 6.95), dengan julat umur antara 60 tahun sehingga 106 tahun. Lima puluh lapan peratus adalah lelaki, dan 95.7% adalah berbangsa Melayu. Tujuh puluh perpuluhan lapan peratus adalah kes kecemasan; dengan 19.6% adalah kes di zon merah, sementara 51.2% adalah kes di zon kuning. Tiga gejala yang paling biasa dihadapi adalah gejala paru-paru (24.9%), gejala jantung (19.65%) dan gejala gastrousus (12.9%). Daripada 209 pesakit, 95 pesakit (45.5%) dimasukkan ke dalam wad. Purata kemasukan ke dalam wad adalah 8 hari (purata 7.57, SP 12.97). Daripada 95 pesakit yang dimasukkan ke dalam wad, hanya 15 pesakit (15.8%) meninggal dunia di dalam wad. Faktor-faktor yang mempengaruhi kematian pesakit geriatrik di dalam wad adalah jantina pesakit ($p=0.009$), cara ketibaan pesakit ($p=0.001$), tahap kesedaran pesakit semasa ketibaan ($p<0.001$), keadaan pesakit semasa dimasukkan ke dalam wad; sama ada bergantung kepada mesin bantuan pernafasan ($p=0.014$) dan diberi ubat inotropik ($p<0.001$) atau tidak, bacaan pertama nadi pesakit semasa di triaj ($p<0.001$) dan keputusan pertama darah pesakit yang diambil semasa di jabatan kecemasan, iaitu sel darah putih ($p=0.007$), sel darah merah ($p=0.019$), serum laktat ($p<0.001$) dan serum urea ($p=0.036$).

Kesimpulan:

Majoriti pesakit geriatrik ditriaj sebagai kes kecemasan menunjukkan kebanyakan mereka datang dalam keadaan tenat yang memerlukan rawatan segera. Dengan mengetahui gejala yang biasa dihadapi dan faktor-faktor yang mempengaruhi kematian pesakit geriatrik yang dimasukkan ke wad membolehkan kakitangan perubatan di Jabatan Kecemasan supaya lebih menyeluruh dan lebih bijaksana dalam memberi perkhidmatan perubatan yang terbaik.

ABSTRACT

Introduction:

This study aimed to determine the proportion of geriatric patients attending Emergency Department in Hospital Universiti Sains Malaysia (USM) within January 2015 to March 2015, the mean duration of hospital stay and the outcome of the illness in geriatric patients admitted to Hospital USM. This study also aimed to identify the associated factors of mortality in geriatrics patients admitted to Hospital USM.

Methodology:

This study was a retrospective cohort study from January 2015 till March 2015 at Emergency Department Hospital USM. All patients aged 60 years and above attended Emergency Department of Hospital USM from January 2015 until March 2015 were included. Systematic random sampling was used. A total of 209 patients had been included in this study. Descriptive statistics were expressed as cross-tables for categorical variables and as mean \pm standard deviation for numerical variables. Independent categorical variables were compared using Chi-Square test or Fisher's exact test. Paired group comparisons were performed using Independent t-test or Mann Whitney test for numerical variables.

Results:

Total patients included in this study were 209 patients. The mean (standard deviation, SD) age was 68.4 (6.95) years old, with age range from 60 till 106 years old. Fifty-eight percent were male and 95.7% were Malay. Seventy-eight percent were triaged as an emergency; with 19.6% were red zone cases, while 51.2% were yellow zone cases. Three most common presenting symptoms were respiratory symptoms (24.9%), cardiovascular symptoms (19.65%) and gastrointestinal symptoms (12.9%). Out of 209 patients studied, 95 patients (45.5%) were admitted. Mean duration of hospital stay was 8 days (mean 7.57, SD 12.97). Out of 95 patients admitted, only 15 patients (15.8%) died in the ward. Factors associated with mortality in hospitalized geriatric patients were gender ($p = 0.009$), patient's method of arrival ($p = 0.001$), conscious level on arrival ($p < 0.001$), patient's condition when transferring to the ward; either ventilated ($p = 0.014$) and on inotropic agent ($p < 0.001$) or not, patient's first pulse rate taken at triage ($p < 0.001$) and first blood investigations taken in emergency department; white blood cell ($p = 0.007$), hemoglobin ($p = 0.019$), serum lactate ($p < 0.001$) and serum urea ($p = 0.036$).

Conclusions:

Majority of the geriatric patients triaged as emergency cases indicated that they mostly came with ill-conditioned that need to be attended immediately. By knowing the common presenting symptoms and associated factors of mortality in admitted geriatric patients will alert medical personnel in the emergency department to treat this group of patients more thoroughly and judiciously.

CHAPTER 1 : INTRODUCTION

1.1 Prevalence of Geriatric Patients

Ageing can be defined as a biological, sociological, economic and chronological phenomenon (Karim, 1997). Most developed countries have accepted the chronological age of 65 years as a definition of 'elderly' or older person, but this does not adapt well to the situation in developing countries. At the moment, United Nations and Ministry of Health's Malaysia recommends people aged 60 years and above to refer as the elderly or ageing population (Karim, 1997).

In 2015, world population reached 7.3 billion; with 12.3% of it consist of elderly more than 60 years of age. Globally, the number of elderly person more than 60 years old is expected to increase more than double by year 2050 and more than triple by year 2100 (United Nations Department of Economic and Social Affairs Population Division, 2015). Total population of Malaysia in 2016 was estimated at 31.7 million people, and 6 percent represent the elderly population, with an increment of 0.2 percent each year (Department of Statistics Malaysia, 2016). Ageing is a triumph of development. People are living longer because of better nutrition, sanitation, health care, education and economic well-being.

1.2 Burden of Increasing Prevalence of Geriatric Patients

Changing global demography is resulting in older people presenting to emergency departments in greater numbers than ever before (Ellis et al., 2014). They usually present with acute and ill condition and are more likely to be admitted to hospital. Atypical clinical presentation of illness, a high prevalence of cognitive disorders, and the presence of multiple comorbidities complicate their evaluation and management (Samaras et al., 2010) (Nemec et al., 2010).

As Malaysia ages, its health and social care systems will have to adapt to a changing pattern of disease and illness. The health care system in this country is primarily geared towards short term care hospitalization, otherwise the elderly patients usually have multiple chronic diseases that require long term care management and hospitalization (Mafauzy, 2000). A comprehensive restructuring of the health care system is required for Malaysia to handle the rising tides of illness and disability associated with ageing population (Ambigga et al., 2011). Malaysia will need to develop sufficient expertise in acute Geriatric Medicine (Forsyth and Chia, 2009) (Jh, 1997), a specialty that focuses on health care of elderly people, which aims to promote health by preventing and treating diseases and disabilities in older adults.

1.3 Justification of the study

Few studies had been done by other countries regarding geriatric patients attending emergency departments in their hospitals. A retrospective study of common causes of geriatric medical emergencies was done in China. They found out that three most common causes of geriatric emergencies were respiratory disease, cardiovascular disease and neurological disease (Liu et al., 2015). However, in a rural hospital in south-eastern Nigeria, acute malaria, hypertensive crises syndrome, and acute hypertensive heart failure were the three most common causes of geriatric emergencies (Iloh et al., 2012). These differing statistics support the belief that common causes of geriatric emergencies are related to geographic factors and developmental status of the country.

There are also few studies regarding factors affecting mortality in elderly patients admitted to hospital. A study from Italy found out risk factors associated with in-hospital mortality included functional impairment (activities of daily living), medical conditions such as cerebrovascular disease and cancer, and electrolytes abnormalities such as albumin and creatinine (Ponzetto et al., 2003). A study from Turkey concluded that advanced age, poor general status, multiple comorbidities and electrolyte abnormalities were the predictors of mortality (Ayaz et al., 2014).

Recently, a team from University of Malaya Kuala Lumpur did a study on utilisation of the emergency department (ED) by older residents in Kuala Lumpur, Malaysia, compared with younger patients. They made a conclusion that older patients were more likely to attend the

ED and require investigations, procedures and hospital admission (Mokhtar et al., 2015). No proper study was done in Malaysia about demographic data and factors associated with mortality in hospitalised geriatric patients. So by doing this study, we can predict the outcome of geriatric patients once they stepped into our emergency department. This prediction is important so we can treat them thoroughly and systematically.

References :

1. Karim H. The elderly in Malaysia: demographic trends. *Medical Journal of Malaysia*. 1997;52:206-12.
2. United Nations Department of Economic and Social Affairs Population Division. World Population Prospects, the 2015 Revision 2015 [cited 2016 7 November]. Available from: <http://www.un.org/en/development/desa/population/events/other/10/index.shtml>.
3. Department of Statistics Malaysia. Selected Demographic Estimates Malaysia 2016 2016 [cited 2016 2 December]. Available from: <https://www.dosm.gov.my/v1/index.php?r=column/ctHEME>
4. Ellis G, Marshall T, Ritchie C. Comprehensive geriatric assessment in the emergency department. *Clinical interventions in aging*. 2014;9:2033.
5. Samaras N, Chevalley T, Samaras D, Gold G. Older patients in the emergency department: a review. *Annals of emergency medicine*. 2010;56(3):261-9.
6. Nemec M, Koller MT, Nickel CH, Maile S, Winterhalder C, Karrer C, et al. Patients Presenting to the Emergency Department With Non-specific Complaints: The Basel Non-specific Complaints (BANC) Study. *Academic emergency medicine*. 2010;17(3):284-92.
7. Mafauzy M. The problems and challenges of the aging population of Malaysia. *Malaysian Journal of Medical Sciences*. 2000;7(1):1-3.

8. Ambigga KS, Ramli AS, Suthahar A, Tauhid N, Clearihan L, Browning C. Bridging the gap in ageing: Translating policies into practice in Malaysian Primary Care. *Asia Pacific family medicine*. 2011;10(1):2.
9. Forsyth D, Chia Y. How should Malaysia respond to its ageing society. *Med J Malaysia*. 2009;64(1):46-50.
10. Jh P. Geriatric Practice in Malaysia: Issues and Challenges. *Med J Malaysia*. 1997;52(3).
11. Liu H-W, Han L-N, Zhao Y-X, Zhang W. Common causes of geriatric medical emergencies in China. *Journal of geriatric cardiology: JGC*. 2015;12(1):91.
12. Iloh G, Amadi A, Awa-Madu J. Common geriatric emergencies in a rural hospital in South-Eastern Nigeria. *Nigerian journal of clinical practice*. 2012;15(3):333-7.
13. Ponzetto M, Maero B, Maina P, Rosato R, Ciccone G, Merletti F, et al. Risk factors for early and late mortality in hospitalized older patients: the continuing importance of functional status. *The Journals of Gerontology Series A: Biological Sciences and Medical Sciences*. 2003;58(11):M1049-M54.
14. Ayaz T, Sahin SB, Sahin OZ, Bilir O, Rakıcı H. Factors affecting mortality in elderly patients hospitalized for nonmalignant reasons. *Journal of aging research*. 2014;2014.
15. Mokhtar M, Amin M, Pin TM, Zakaria MI, Hair NN, Kamaruzzaman SB, et al. Utilization of the emergency department by older residents in Kuala Lumpur, Malaysia. *Geriatrics & gerontology international*. 2015;15(8):944-50.

CHAPTER 2 : STUDY PROTOCOL

2.1 Introduction

Ageing can be defined as a biological, sociological, economic and chronological phenomenon. Most developed countries have accepted the chronological age of 65 years as a definition of 'elderly' or older person, but this does not adapt well to the situation in developing countries. At the moment, United Nations and Ministry of Health's Malaysia recommends people aged 60 years and above to refer as the elderly or ageing population (Karim, 1997).

WHO mentioned that between 2015 and 2050, the proportion of the world's population over 60 years will nearly double, from 12% to 22%. Increasing number of older adults make them at risk of developing mental or neurological disorders as well as other health conditions such as diabetes, hearing loss, and osteoarthritis (World Health Organization, 2016).

Changing global demography is resulting in older people presenting to emergency departments in greater numbers than ever before (Ellis et al., 2014). They present with greater urgency and are more likely to be admitted to hospital. Atypical clinical presentation of illness, a high prevalence of cognitive disorders, and the presence of multiple comorbidities complicate their evaluation and management (Samaras et al., 2010) (Nemec et al., 2010).

As Malaysia ages, its health and social care systems will have to adapt to a changing pattern of disease and dependency. Malaysia will need to develop sufficient expertise in acute Geriatric Medicine, rehabilitation of older people, as well as infrastructure for home and institutional care. The strengths of comprehensive geriatric assessment need to be emphasised in any education programme, emphasising the importance both of the assessment of complex and often multiple problems in older people as well as the long term management of chronic diseases. It will be essential to educate the public, health professionals and commissioners of services the potential benefits of rehabilitation and focused services for older people. The ability of older people to make functional recovery from a severe illness is important to reduce dependency from other family members or caretakers as well as to reduce health and social care costs to the family or the nation (Forsyth and Chia, 2009) (Jh, 1997).

2.2 Justification of the Study

Few studies have been done by other countries regarding geriatric patients attending emergency departments in their hospitals, and some also discussed factors affecting mortality in hospitalised geriatric patients. This will be the first study done in Malaysia with few added values, whereby the duration of hospital stay of geriatric patients and outcome of every admission will also be studied.

Factors affecting mortality in the elderly patients admitting to our hospitals also need to be studied, as these factors are needed to be emphasised so we can give the best management and treatment to them once they are admitted from the emergency department.

By doing this study, we can predict the outcome of geriatric patients once they stepped into our emergency department. We'll find that out from the symptoms they're complained of, the comorbidities they have, their vital signs on arrival, the septic parameters and blood results. This prediction is important so we can treat them thoroughly and systematically.

2.3 Literature Review

Older patients represent an ever-increasing population in the emergency department. They often present with atypical signs and symptoms and multiple comorbidities that complicate diagnosis at treatment. They are at increased risk of emergency department return visits, hospitalisation and death (Samaras et al., 2010). Thus, a greater knowledge of the atypical presentation of disease, the complex interrelated acute medical and psychosocial issues of the patients, and the appropriate use of available screening and assessment tools can help medical staffs in the emergency department provide high-quality care to this increasing population.

Liu et al (2015) found out that three most common causes of geriatric emergencies were the respiratory disease (26.2%), cardiovascular disease (20.8%) and neurological disease (10.9%), which almost consistent with a previous study from France. However, in a rural hospital in south-eastern Nigeria, the three most common causes of geriatric emergencies included acute malaria (33.8%), hypertensive crises syndrome (19.0%), and acute hypertensive heart failure (18.1%) (Iloh et al., 2012). These differing statistics support the

belief that common causes of geriatric emergencies are related to geographic factors and developmental status of the country.

There are also few studies regarding factors affecting mortality in elderly patients admitted to hospital. Ponzetto et al (2003) found out risk factors independently associated with in-hospital mortality included functional impairment (activities of daily living), medical conditions such as cerebrovascular disease and cancer, and electrolytes abnormalities such as albumin and creatinine. They make a conclusion that a complete functional and clinical evaluation at hospital admission permits identification of patients at higher risk of early and long-term mortality.

Ayaz et al (2014) did a study to investigate the factors affecting mortality in elderly patients hospitalised for nonmalignant reasons and to determine the relation between laboratory parameters measured routinely in clinical practice and in-hospital mortality, as well as to determine the predictors of mortality. They concluded that advanced age, poor general status, multiple comorbidities and electrolyte abnormalities were the predictors of mortality. They noted the most common comorbidities are cardiovascular disease, diabetes mellitus and hypertension. Electrolyte abnormalities such as hypoglycemia, hypoalbuminemia, hyponatremia, hypernatremia and hyperkalemia are associated with increased mortality in the hospitalised elderly patients.

Silva et al (2009) studied the predictors of in-hospital mortality among older patients admitted to a geriatric care unit in Brazil. They made a conclusion that delirium, neoplastic diseases, immobility, congestive heart failure, hypoalbuminemia, high creatinine and advanced age are all highly correlated to the mortality of hospitalised older patients admitted to the geriatric ward. The methodical evaluation of these factors might be useful for therapeutic planning, resource allocation and identification of potential candidates for specific geriatric interventions.

In Malaysia, Karim et al (1997) discussed demographic trends in elderly in Malaysia and health policy implications. The increased ageing population is associated with higher morbidity, higher use of health services (number of visits to doctors and hospitalisation) and greater demand for specialised services. All these factors will lead to an increase in the complexity of health services required and increased expenditure. Many social issues the older person also exist in the community, including family support, work, income, retirement and environmental adaptation to facilitate the disabled and frail elderly. These issues need to be highlighted and try to be resolved to give the best for the elderly as they are part of our community.

2.4 Objective, Research Questions, Research Hypothesis

Research Questions

- 1) What is the proportion of geriatric patients attending emergency department in Hospital Universiti Sains Malaysia?
- 2) What are the mean duration of hospital stay and the outcome of the illness in geriatric patients admitted to Hospital Universiti Sains Malaysia?
- 3) What are the associated factors of mortality in geriatrics patients admitted to Hospital Universiti Sains Malaysia?

Research Hypothesis

Advanced age, length of hospital stay and multiple comorbidities are the associated factors of mortality in geriatrics patients admitted to Hospital Universiti Sains Malaysia.

Objectives

General Objective:

1. To study on geriatric patients attending emergency department in Hospital Universiti Sains Malaysia.

Specific Objectives:

1. To determine the proportion of geriatric patients attending emergency department and admitted in Hospital Universiti Sains Malaysia.
2. To determine the mean duration of hospital stay and the outcome of the illness in geriatric patients admitted to Hospital Universiti Sains Malaysia.
3. To determine the associated factors of mortality in geriatrics patients admitted to Hospital Universiti Sains Malaysia.

Definitions

- **Geriatric patients** = Elderly aged more than 60 years old
- **Duration of hospital stay** = The total days of admission to Hospital USM, including the intensive care unit or general wards
- **Outcome of the illness** = Either patient was discharge alive or death in the ward, not mentioning details about condition upon discharge
- **Mortality** = Death in the ward (within 30 days of admission to Hospital USM)

2.5 Methodology

- **Study design:** Retrospective cohort study
- **Study duration and location:** January 2015 – March 2015, Emergency Department Hospital Universiti Sains Malaysia
- **Study population and sample:**
 - **Reference population**
 - All geriatrics patients in Hospital Universiti Sains Malaysia
 - **Source population**

All geriatrics patients attending emergency department of Hospital Universiti Sains Malaysia
 - **Sampling frame**
- 1) **Inclusion criteria:**
 - Patients aged 60 years and above and attending emergency department of Hospital Universiti Sains Malaysia from January 2015 until March 2015
- 2) **Exclusion criteria:**
 - Missing or incomplete data
 - Patients transferred to other hospital or took At Own Risk (AOR) discharge in the ward
 - Patients died in Emergency Department

- Patients died in the ward after 30 days of admission to Hospital USM

➤ **Sample size calculation**

- Objective 1 & 2: no sample size determination needed as involve descriptive statistics
- Objective 3: Using two proportion formula
- By using PS size calculation software :
- $\alpha = 0.05$, power = 0.8, m = 1
- n = 83

$$n \times 2 = 166,$$

$$20\% \text{ drop out} = 166 + 33.2 = 199.2$$

- sample size = 199
- Need at least 199 patients in this study

➤ **Sampling method**

In this study, systematic random sampling was used as more than 2000 geriatric patients came to ED during the study period. Every 10 geriatric patients visiting ED will be taken 1 for the study. At least 199 patients or subjects will be included in this study.