

**ACUTE ABDOMINAL PAIN AND POTENTIAL LIFE-
THREATENING OUTCOME IN ADULT PATIENTS
PRESENTING IN EMERGENCY DEPARTMENT HOSPITAL
UNIVERSITI SAINS MALAYSIA**

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TABLE OF CONTENTS

ACKNOWLEDGEMENTS.....	2
LIST OF TABLES & FIGURES.....	6
LIST OF SYMBOLS, ABBREVIATIONS OR NOMENCLATURE.....	6
ABSTRAK (BAHASA MALAYSIA).....	7
ABSTRACT (ENGLISH).....	9

CHAPTER 1: INTRODUCTION

1.1 Background.....	11
1.2 Literature Review.....	12
1.3 Problem Statement and Study Justification	14
1.4 Benefit of this study	15
1.5 Research Questions	15
1.6 Research Objectives.....	16

CHAPTER 2: STUDY PROTOCOL

2.1 Conceptual Framework.....	17
2.2 Study Design.....	17
2.3 Study Duration.....	17
2.4 Study Area.....	17
2.5 Study Population.....	17
2.6 Inclusion and exclusion criteria.....	17
2.7 Sampling method and sample size calculation.....	18
2.8 Operational Definition.....	19

2.9	Data Collection.....	21
2.10	Data Analysis.....	21
2.11	Data Entry.....	24
2.12	Statistical Analysis.....	24
2.13	Dummy Table.....	25
2.14	Ethical Consideration.....	27
2.15	Flow Chart.....	28
2.16	Gantt Chart.....	29
2.17	References.....	30
2.18	Appendix: Data Collection Form.....	32

CHAPTER 3: MANUSCRIPT

3.1	Title Page.....	34
3.2	Abstract.....	36
3.3	Main Text	
3.3.1	Introduction.....	38
3.3.2	Methods.....	39
3.3.3	Results.....	40
3.3.4	Discussion.....	42
3.3.5	Conclusion.....	46
3.4	References.....	47
3.5	Tables.....	51
3.6	Journal format.....	56

CHAPTER 4: APPENDICES

4.1	Data Collection Form.....	69
4.2	Appendix A: Ethical Approval Letter.....	70
4.3	Appendix B: Consent from Hospital Director.....	73
4.4	Raw Data of SPSS (Soft Copy).....	69

LIST OF TABLES

1. Table 1 : Demographic characteristics, presentation, and investigation in ED for acute abdominal pain51
2. Table 2: Final diagnosis of acute abdominal pain presented in ED.....53
3. Table 3 : Simple logistic regression for factors associated with potentially life-threatening acute abdominal pain.....53
4. Table 4 : Multiple logistic regression for factors predictive of potentially life-threatening acute abdominal pain.....55

LIST OF ABBREVIATIONS

ED	Emergency Department
AAP	Acute abdominal pain
CT	Computerized Tomography
US	Ultrasound
ECG	Electrocardiograph

ABSTRAK

Pengenalan

Sakit perut merupakan antara sebab utama kehadiran pesakit ke Jabatan Kecemasan di hospital. Tujuan kajian ini adalah untuk mengetahui kriteria kejadian sakit perut akut di jabatan kecemasan, kekerapan keadaan yang berpotensi menyebabkan kematian dan menganalisa faktor yang berkaitan.

Kaedah Kajian

Kami menganalisa secara retrospektif rekod kehadiran pesakit untuk sakit perut akut dari kalangan pesakit yang berumur 12 tahun ke atas dari Januari hingga Mei 2018 di Jabatan Kecemasan Hospital Universiti yang terletak di Pantai Timur Malaysia. Sejumlah 390 pesakit telah dipilih secara rawak.

Keputusan

Sejumlah 335 pesakit telah dipilih dalam kajian ini. Purata umur adalah 39.23 ± 16.42 tahun. Kebanyakannya adalah wanita (52.8%), Melayu (95.25%) dan datang dalam masa 24 jam dari simptom (50.4%). Kekerapan kejadian sakit perut akut yang berpotensi menyebabkan kematian adalah 26% ataupun 87 orang daripada 335 pesakit. Diagnosis yang paling kerap bagi kejadian ini adalah radang appendik akut (55.2%) diikuti dengan radang kantung hempedu (11.5%) dan kehamilan di luar rahim (6.9%). Faktor prediksi sakit perut akut yang berpotensi menyebabkan kematian adalah seperti berikut; sakit pada bahagian bawah kanan perut (AOR 11.8, 95% CI 3.89 hingga 36.34, $p < 0.001$), bahagian atas kanan perut (AOR 6.29, 95% CI: 1.61 hingga 24.67, $p = 0.008$), sakit keseluruhan bahagian perut (AOR 6.28, 95% CI 1.39 hingga 28.43, $p = 0.017$), hilang selera makan (AOR 7.64, 95% CI 1.85 hingga 31.55, $p = 0.005$), denyutan jantung laju (AOR 7.64, 95% CI 1.4 hingga 9.93, $p = 0.008$), demam (AOR 2.8, 95% CI 1.05 hingga 7.44, $p = 0.039$), aras darah putih yang tinggi (AOR 3.34, 95% CI 1.44 hingga

8.7, $p=0.006$) dan aras darah merah yang rendah (AOR 18.26, 95% CI 2.45 hingga 136, $p=0.005$).

Kesimpulan

Sejarah pesakit dan pemeriksaan fizikal yang menyeluruh seperti lokasi sakit, hilang selera makan, denyutan jantung laju dan demam serta pemeriksaan makmal untuk melihat kadar darah putih yang tinggi dan anemia dapat membantu dalam menilai sakit perut akut yang berpotensi menyebabkan kematian ini di jabatan kecemasan.

Kata kunci: sakit perut akut, jabatan kecemasan, berpotensi menyebabkan kematian.

ABSTRACT

Background

Abdominal pain is one of the most common reasons for patient visits to the emergency department (ED). We aim to study the presentation of acute abdominal pain (AAP) in ED, the prevalence of potentially life-threatening AAP, and its associated factors.

Methods

This was a retrospective medical record review of ED visits for AAP among patients aged ≥ 12 years old from January to May 2018 at our suburban, academic tertiary centre ED in the east coast of Malaysia. A total of 945 cases were identified and 390 cases were selected by simple randomization.

Results

A total of 335 patients were included in the analysis. The mean age was 39.23 ± 16.42 years. The majority were female (52.8%), Malays (95.2%), and came within 24 hours of the symptom (50.4%). The prevalence of potentially life-threatening AAP was 26% or 87 out of 335 patients. Its most frequent diagnosis was acute appendicitis (55.2%) followed by acute cholecystitis (11.5%) and ectopic pregnancy (6.9%). Factors predictive towards potentially life-threatening AAP were right iliac fossa pain (AOR 11.8, 95% CI 3.89 to 36.34, $p < 0.001$), right hypochondriac pain (AOR 6.29, 95% CI: 1.61 to 24.67, $p = 0.008$), generalized abdominal pain (AOR 6.28, 95% CI 1.39 to 28.43, $p = 0.017$), loss of appetite (AOR 7.64, 95% CI 1.85 to 31.55, $p = 0.005$), tachycardia (AOR 7.64, 95% CI 1.4 to 9.93, $p = 0.008$), fever (AOR 2.8, 95% CI 1.05 to 7.44, $p = 0.039$), leucocytosis (AOR 3.34, 95% CI 1.44 to 8.7, $p = 0.006$) and low haemoglobin level (AOR 18.26, 95% CI 2.45 to 136, $p = 0.005$).

Conclusion

A comprehensive history and clinical examination such as location of pain, loss of appetite, fever and tachycardia combined with laboratory testing to look for leucocytosis and anaemia may facilitate effective assessment in detecting potentially life-threatening AAP in ED.

Keywords: *acute abdominal pain, emergency department, potentially life-threatening*

CHAPTER 1: INTRODUCTION

1.1 Background

Abdominal pain is one of the most common reasons for patient visits in the emergency department (ED) of tertiary care hospitals. Acute abdominal pain (AAP) is defined by pain arising from the abdominal area, of non-traumatic origin with a maximum duration of five days (Gans *et al.*, 2015a).

It is the most common surgical emergency, one of the most common reasons for referral to an emergency department (ED) and the most common cause for hospital admissions (Trentzsch *et al.*, 2011).

Assessment of patients with abdominal pain in the ED can be challenging and is based on patient history, combined with clinical, laboratory and radiological evaluation. Beside that differential diagnosis in such cases is broad because of the wide spectrum of possible underlying pathologies.

Evaluation of acute abdominal pain (AAP) in emergency department maybe difficult and timely. Emergency physicians must consider several diagnoses and complete patient evaluation after taking into account all available clinical, laboratory and radiologic findings, in an attempt to reduce morbidity and mortality especially in life-threatening abdominal pain.

It is worth noting that certain populations, such as elderly and immunocompromised patients can present with atypical signs and symptoms, and therefore evaluation of abdominal pain in these patients can be more difficult (Cooper *et al.*, 1994).

In Malaysia, sociodemographic of patient with abdominal pain presented to emergency department is very hard to precisely quantify because of the paucity of data. The aim of this study is to record data from patients with acute abdominal pain who presented to ED of

Hospital Universiti Sains Malaysia, in an attempt to determine associates factors for life-threatening abdominal pain patient.

1.2 Literature Review

Acute abdominal pain (AAP) is one of the most common complaints leading people to the Emergency department. There are few literatures used definition of acute abdominal pain as pain of non-traumatic origin with a maximum duration of 5 days (Cervellin *et al.*, 2016) (Laméris *et al.*, 2009) (Caporale *et al.*, 2016). Few studies had described the prevalence of acute abdominal pain in general and analyse its main clinical features and outcome. Most of the studies related with acute abdominal pain aim to more specific diagnosis of abdominal pain and focus on specific population such elderly, children and pregnant women.

A study done in 2016 showed the epidemiology and the outcomes of acute abdominal pain in adult population admitted to emergency department (Cervellin *et al.*, 2016). They analysed five thousand three hundred and forty cases of acute abdominal pain retrospectively and scrutinized repeated ED admission for AAP within 5 and 30 days. Another group also done a retrospective study on AAP but they analysed its main clinical features such as clinical presentation, imaging procedures and treatments given in the emergency department (Caporale *et al.*, 2016). A prospective study done at a Greek University Hospital was aimed to investigate predictive factors for admission to the hospital in patient who presented to the ED with AAP as the main symptom (Velissaris *et al.*, 2017). They investigate all the clinical, laboratory and imaging procedures and analysed the predictive factors between admitted and not admitted patients to the ward. Another study by (Laméris *et al.*, 2009) which done to identify an optimal imaging strategy for the detection of urgent condition in patient with AAP. This prospective and

multicentre study classified urgent and non-urgent acute abdominal pain and investigated an optimal imaging strategy.

For patient demography, most of the studies found that higher age group and female gender contribute to more ED visiting with acute abdominal pain and more hospital admission rate. In the Greek University Hospital in 2017, they found that 65.6% of admitted patients were females and mean age was 51.5 years old (Velissaris *et al.*, 2017). Similar finding from a university hospital in Italy found that 50.6% of patients admitted to their wards were females with median age was 57 years old (Caporale *et al.*, 2016). However, study done by (Laméris *et al.*, 2009) found that there were no significance differences in terms of age and gender related to the urgent condition of the abdominal pain. This interesting finding definitely warrants for a further study. Unfortunately, there was no data on the demography of AAP patients in Malaysia's population.

With regard to the factors associated with life threatening abdominal pain, there is no study correlates with this outcome. Study done by (Velissaris *et al.*, 2017) investigated predictive factors for admission. They found that, most of their patients have pain onset within 24 hours prior to arrival in the ED (62.4%), moderate pain intensity (44.8%) and the most common pain location was epigastrium in 39.2% of cases, followed by diffuse pain in 18.4% and right upper abdominal quadrant pain in 15.2%. Vomiting was the most common symptom in 32.8% of patients, whereas diarrhoea was present in 16%, constipation in 12 %, fever in 18.4% and loss of appetite in 21.6% of patients. This study also found that patient admitted to hospital had significantly higher incidence of vomiting and fever compare to patients not admitted. Admitted patient also had higher frequency of tachycardia, diarrhoea and anorexia but differences were not significant. They concluded their findings regarding predictive factors for

hospital admission were higher age, higher White Cell count and C-Reactive Protein and also have abnormal imaging findings (Velissaris *et al.*, 2017). Their statistical analysis showed that abnormal imaging findings and elevated serum CRP level were significant factors predicting hospital admission.

Compare to study by (Caporale *et al.*, 2016), most of their patients presented with AAP came with symptoms of vomiting (36%), followed by regurgitation (18%) and dysuria (13%). The most common location of abdominal pain was right upper quadrant in 69.5% of cases followed by right lower quadrant and left upper quadrant. However, they are not correlate these factors with any outcomes of the patients.

1.3 Problem Statement and Study Justification

1. Acute abdominal pain (AAP) is one of the most complaints leading people to the Emergency Department (ED) and consumes a lot of affords and time to diagnose it. Despite the relatively high frequency, abdominal pain may be a symptom of a serious underlying disease and the differential diagnosis in such cases are very broad because it involves a wide spectrum of possible underlying pathologies. Other than that, it also a particular area of risk for Emergency Physician because several abdominal conditions can present with uncommon of unusual presentation which leads to misdiagnosis and delayed appropriate management especially involves with life threatening condition of abdominal pain.
- 2 Although there were already a few studies venturing into these issues, the study involving Malaysia population is still not available. A study done in 2017 by Greek University Hospital; which was done to investigate predictive factors for admission to hospital in

patients who presented to ED with abdominal pain as a main symptom. Despite that, there were no study correlates factors associates with the life-threatening abdominal pain in the first ED presentation.

- 3 Different centres have different limitation and population hence may yields different results from the previous studies.

1.4 Benefit of This Study

1. Results from this study can be used as a guide for the treating doctors in emergency department to anticipate and detect the ‘Red Flag’ of the associated factors which related with possible life-threatening condition of patient presented with abdominal pain in ED.
2. Results from this study can also help the doctors to look for any possible of misdiagnosis and delayed of management due to wide variables of symptoms involve with acute abdominal pain.
3. The ‘Red Flag’ or significant characteristic and associated factors that related to the life-threatening outcome of abdominal pain can be use by the emergency doctors to decide on the disposition of the patient.

1.5 Research Questions

1. What are the sociodemographic characteristic and presentation of adult patients with abdominal pain attending emergency department HUSM?
2. What are the prevalence of life-threatening abdominal pain in adult patient?

3. What are the factors associated with life-threatening abdominal pain in adult patients?

1.6 Research Objectives

General

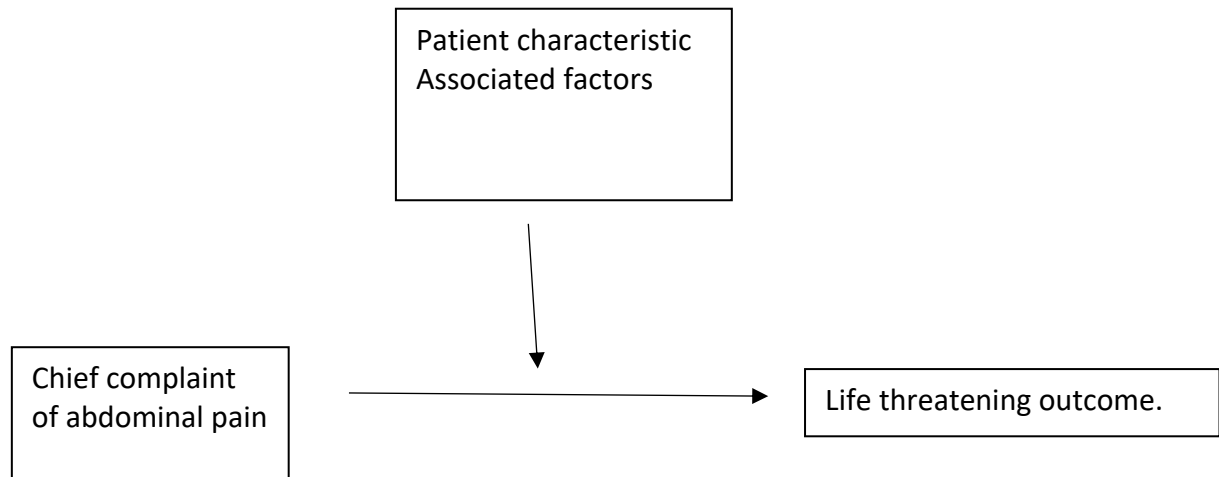
To study on acute abdominal pain and potentially life-threatening outcome in adult patients presented in emergency department HUSM.

Specific

1. To determine the sociodemographic characteristic and presentation of adult patients with abdominal pain attending emergency department HUSM.
2. To determine the incidence of potentially life-threatening abdominal pain in adult patient presented in emergency department HUSM.
3. To determine the factors associated with potentially life-threatening abdominal pain in adult patients presented in emergency department HUSM.

CHAPTER 2: STUDY PROTOCOL

2.1 Conceptual Framework



2.2 Study design

Retrospective observational study

2.3 Study duration

Between 1st September 2018 and 31 Mac 2020.

2.4 Study area:

Emergency Department Hospital Universiti Sains Malaysia (HUSM) Kubang Kerian,
Kelantan

2.5 Study population

2.5.1 Reference population - all acute abdominal pain in adult patients who presented to
emergency department in Kelantan.

2.5.2 Source population: all acute abdominal pain in adult patients who presented to emergency department Hospital Universiti Sains Malaysia (HUSM).

2.5.3 Study participants: all adult patients who presented to emergency department HUSM with chief complain of acute abdominal pain from 1st January 2018 to 31st May 2018 and fulfil the inclusion and exclusion criteria.

2.6 Inclusion and Exclusion Criteria

2.6.1 Inclusion criteria

- Adult patient age 12 years old and above.
- Patient presented to ED with chief complaint of abdominal pain within 5 days duration.

2.6.2 Exclusion criteria

- Referred case from other hospital or centre. This is because the initial assessment of patient has been done and manage by medical officer from the initial centre; so, the associated factors upon presentation to ED HUSM will be subjective and limited to the referral centre initial assessment and resources.
- Traumatic abdominal pain.

2.7 Sampling method and Sample Size

Sample size is calculated using single proportion formula. Urgent abdominal pain occurs in about 65% of the population (Laméris *et al.*, 2009) .

The following formula was used :

$$\text{Sample size, } n = \frac{Z^2 P(1-P)}{d^2}$$

Z = Z statistic for level of confidence

P = expected prevalence

d = precision

Taking the Z score as 1.96 (for 95% confidence level), expected prevalence of life-threatening abdominal pain is about 65% and precision of 0.05, the sample size was calculated to be 350.

Considering drop-out rate of 10%, total sample required, N, was calculated:

$$\begin{aligned} N &= 350 + 10\% \text{ drop-out rate} \\ &= 389 \sim 390 \end{aligned}$$

Therefore, total sample required was 390 subjects.

Samples will be selected using simple random sampling method. Patient age 18 years old and above registered in emergency department with chief complain of acute abdominal pain will be list out from the Emergency Department HUSM census database from 1st January 2018 to 31st May 2018. Patient's ID from the registry will be randomize using Random Number Generator; 390 sample will be randomly selected.

2.8 Operational definition

2.8.1 Acute abdominal pain (AAP):

AAP is defined as pain of non-traumatic origin with a maximum duration of 5 days.
(Gans *et al.*, 2015b)

2.8.2 Life threatening abdominal pain.

Potentially life-threatening abdominal pain are defined by combination of the aetiologies and was summaries in the Table 1 (Laméris *et al.*, 2009) (Ooi and Manning, 2004).

Table 1: Potentially life-threatening aetiology of abdominal pain.

Potentially life-threatening causes of abdominal pain	
Intra-abdominal	• Hepatobiliary sepsis • Acute appendicitis • Acute diverticulitis • Bowel obstruction • Acute cholecystitis • Acute pancreatitis • Perforated viscus • Bowel ischemia • Acute peritonitis • Abscess (intraperitoneal, retroperitoneal, hepatic, tubo-ovarian). • Urological disease (renal and ureteral stones with obstruction, hydronephrosis and pyelonephritis) • Gynaecological disease (Ectopic pregnancy, ovarian torsion, pelvic inflammatory disease, bleeding or rupture ovarian cyst)
Extra-abdominal	• Acute myocardial infarction (AMI) • Lower-lobe pneumonia. • Basal pulmonary embolism. • Diabetic ketoacidosis. • Systemic lupus erythematosus (SLE) vasculitis.

2.9 Data Collection

Eligible subjects will be identified from the emergency department registry book for the study period between 1st January 2018 and 31st May 2018. Each subject will be assigned with a unique study ID to maintain patient's confidentiality with a separate list of names containing relevant identification data and will be only held available to the investigator and his team. Randomization of the study ID will be done by using randomizer to get sample size required. Medical record will be traced in the record unit by the investigator and relevant data will be extracted into the data collection form in Appendix 1.

Information on sociodemographic characteristic and associated factors related to this study will be extracted by the investigator from the case notes. All information uses in this study is retrieved from patient's records based on assessment and interpretation of the person attending the patient.

The patient final outcome will be determined within 30 days of the first presentation with acute abdominal pain and the outcome is related with the patient first presentation.

2.10 Data Analysis

2.10.1 Independent variables

1) Sociodemographic characteristic:

- Gender:
 - Male
 - Female
- Age group.
- Race

- Malay
- Chinese
- Indian
- Others

2) Underlying medical illness :

- Diabetes
- Hypertension
- Ischemic heart disease
- Stroke
- Anaemia
- Previous abdominal surgery

3) Time of presentation:

- Morning: 8am to 2.59pm
- Afternoon: 3pm to 9.59pm
- Night: 10pm to 7.59am.

4) Duration of the symptoms:

- 24 hours prior to arrival in the ED.
- Within last 1 to 5 days
- More than 5 days.

5) Location of the pain (9 Quadrants):

- Epigastrium
- Right hypochondriac

- Left hypochondriac
- Right lumbar
- Umbilical
- Left lumbar
- Right iliac fossa
- Hypogastric
- Left iliac fossa
- Generalized

6) Pain intensity: Base on Numeric Rating Pain Scale

- Mild: 1 – 3
- Moderate: 4 – 6
- Severe: 7 – 10

7) Associate signs and symptoms:

- Vomiting
- Diarrhoea
- Constipation
- Loss of appetite
- Fever.
- Tachycardia.

8) White Cell Count:

- Normal / High

9) Haemoglobin:

- Normal / Low

10) Platelet:

- Normal / High

11) Adjunct Investigation: Investigation was done or not done and any positive finding from the investigation based on interpretation of the person attending the patient in the patient records.

- Chest X-ray
- Abdominal X-ray
- Bedside US abdomen
- Electrocardiogram

12) Primary team consultation.

2.10.2 Dependent Variables

Potentially life threatening abdominal pain.

2.11 Data Entry

Data will be entered and analysed using Statistical Package for Social Science (SPSS) version 24 for Mac OS

2.12 Statistical Analysis

For the 1st and 2nd objectives, descriptive statistic will be used.

For 3rd objective, multiple logistic regression will be applied.

Statistical significance is defined as a P value of < 0.05