20 JAN 2003

FACTORS ASSOCIATED WITH PEPTIC ULCER IN THE ELDERLY

Lt. YAOWAPA KONGMUN

With compliments
of
บัณฑิตวิทยาลัย มหาวิทยาลัยมหิดล

A THESIS SUBMITTED IN PARTIAL FULFILLMENT
OF THE REQUIREMENTS FOR
THE DEGREE OF MASTER OF SCIENCE
(EPIDEMIOLOGY)
FACULTY OF GRADUATE STUDIES
MAHIDOL UNIVERSITY
2002

ISBN 974-04-2656-5
COPYRIGHT OF MAHIDOL UNIVERSITY

TH
Y25
2002
c.2

Copyright by Mahidol University

Thesis
Entitled

FACTORS ASSOCIATED WITH PEPTIC ULCER IN THE ELDERLY

Yaowapa Kongmun.
.....
Lt.Yaowapa Kongmun
Candidate

Prasert Assantachai
.....
Assoc.Prof.Prasert Assantachai,
M.D.(Hons), F.R.C.P.(London)
Major-Advisor

Sathaporn Manatsathit
.....
Assoc.Prof.Sathaporn Manatsathit,
M.D., DTM&H, M.R.C.P.(UK)
Co-Advisor

Kamol Udol
.....
Lect.Kamol Udol,
M.D.(Hons), M.Sc.(Clin Epidemiol)
Co-Advisor

Rassmidara Hoonsawat
.....
Assoc.Prof.Rassmidara Hoonsawat,
Ph.D.
Dean
Faculty of Graduate Studies

Surapol Suwanagool
.....
Prof.Surapol Suwanagool,
M.D., M.P.H., F.A.C.P.
Chair
Master of Science Programme
in Epidemiology
Faculty of Medicine, Siriraj Hospital

Copyright by Mahidol University

Thesis
Entitled

FACTORS ASSOCIATED WITH PEPTIC ULCER IN THE ELDERLY

was submitted to the Faculty of Graduate Studies, Mahidol University
For the degree of Master of Science (Epidemiology)

on
29 October, 2002

Yaowapa Kongmun.
.....
Lt.Yaowapa Kongmun
Candidate

.....
Assoc.Prof.Prasert Assantachai,
M.D.(Hons), F.R.C.P.(London)
Chair

.....
Assoc.Sathaporn Manatsathit,
M.D., DTM&H, M.R.C.P.(UK)
Member

S.Surangsrirat
.....
Col.Surapon Surangsrirat,
M.D., DTM&H(Bangkok), F.R.C.P.(T)
Member

Kamol Udol
.....
Lect.Kamol Udol,
M.D.(Hons), M.Sc.(Clin Epidemiol)
Member

.....
Assoc.Prof.Rassmidara Hoonsawat,
Ph.D.
Dean
Faculty of Graduate Studies
Mahidol University

P. Sakol
.....
Prof.Piyasakol Sakolsatayadorn,
M.D., F.R.C.S.T.
Dean
Faculty of Medicine, Siriraj hospital
Mahidol University

Copyright © Mahidol University

ACKNOWLEDGEMENT

This thesis had been accomplished by the collaboration of many wonderful persons. I would like to express my sincere gratitude and deep appreciation to Assoc.Prof.Prasert Assantachai, my principle supervisor, for his guidance, invaluable advice, supervision and encouragement throughout my study. He has never lacked of kindness and support. I am equally grateful to Assoc.Prof.Sathaporn Manatsathit and Lect.Kamol Udol, my associate supervisors, for their constructive comments, supervision and encouragement. I am very grateful to Asst.Prof.Sucheera Phattharayuttawat, Department of Psychiatry, Faculty of Medicine Siriraj Hospital, for kindly granting me permission to use her instrument of the Thai Stress Test in the study and for prompt responses just in time when help was needed. I would also like to thank Col.Surapon Surangsrirat for his invaluable advice and support in the defense of this thesis.

I am most grateful to official and staff at gastrointestinal endoscopic section, Siriraj Hospital and Phramongkutklao Hospital for great assistance and wonderful friendship. I would like to thank Lt.Col.Prem Kengchon and Dr.Montarop Yamabhai for their advice regarding my English language usage as well.

Moreover, I would like to specially thank my colleague at Neurosurgical Nursing Department, Phramongkutklao Hospital, Miss Sinee Yamabhai and my friends, who are the most important person for me, for their great encouragement. Last but not least, I am forever grateful to my family who always gives me moral support and financial assistance for my educational opportunity.

Lt. Yaowapa Kongmun

Copyright by Mahidol University

4337381 SIEP/M : MAJOR : EPIDEMIOLOGY ; M.Sc. (EPIDEMIOLOGY)
KEY WORDS : RISK FACTORS / PEPTIC ULCER / ELDERLY

Lt.YAOWAPA KONGMUN: FACTORS ASSOCIATED WITH PEPTIC ULCER IN THE ELDERLY. THESIS ADVISORS: PRASERT ASSANTACHAI, M.D.(Hons), F.R.C.P.(London), SATHAPORN MANATSATHIT, M.D. DTM&H, M.R.C.P.(UK), KAMOL UDOL, M.D. (Hons), M.Sc. (Clin Epidemiol) 113 p. ISBN 974-04-2656-5

A case-control study was conducted in order to determine possible risk factors for peptic ulcer in the elderly aged 60 years or older, who underwent panendoscopic examination at Siriraj Hospital and Phramongkutklao Hospital between September 7 and December 31, 2001. The total number of subjects was 212. There were 106 cases of peptic ulcer and 106 controls who did not have peptic ulcer. Data were analyzed by descriptive statistics, chi-square test, univariate analysis and multivariate analysis by means of multiple logistic regression, all of which were done through the SPSS/PC+ application.

There were 91 men (42.9%) and 121 women (57.1%) with a mean age of 69.15 years. Multiple Logistic Regression Analysis was applied to calculate adjusted odds ratios (OR_{adj}). The significant risk factors were NSAIDs use (OR_{adj} = 4.21, 95% confidence interval, CI = 2.16 – 8.21, *p-value* < 0.001), cigarette smoking (OR_{adj} = 3.60, 95% CI = 1.05 – 12.36, *p-value* = 0.042) and history of peptic ulcer (OR_{adj} = 3.15, 95% CI = 1.51 – 6.58, *p-value* = 0.002).

The findings of this research show some significant risk factors associated with peptic ulcer in the elderly and provide useful background knowledge for prevention and control of peptic ulcer in the elderly.

Copyright by Mahidol University

4337381 SIEP/M : สาขาวิชา : วิทยาการระบาด ; วท.ม. (วิทยาการระบาด)

ร.ท.หญิง เยาวภา คงมั่น : ปัจจัยที่มีความสัมพันธ์ต่อการเกิดแผลเป็ปติดในผู้สูงอายุ (FACTORS ASSOCIATED WITH PEPTIC ULCER IN THE ELDERLY). คณะกรรมการควบคุมวิทยานิพนธ์ : ประเสริฐ อัสสันตชัย, M.D. (Hons), F.R.C.P. (London), สถาพร มานัสสถิตย์, M.D. DTM&H, MRCP (UK), กมล อุดล, M.D. (Hons), M.Sc. (Clin Epidemiol) 113 หน้า. ISBN 974-04-2656-5

การศึกษาชนิด case-control study นี้มีวัตถุประสงค์เพื่อศึกษาความสัมพันธ์ระหว่างปัจจัยส่วนบุคคล ปัจจัยด้านพฤติกรรมอนามัย ปัจจัยด้านการเจ็บป่วย ปัจจัยด้านจิตสังคมกับการเกิดแผลเป็ปติดในผู้สูงอายุ โรงพยาบาลศิริราชและโรงพยาบาลพระมงกุฎเกล้า ระหว่าง 7 กันยายน ถึง 31 ธันวาคม พ.ศ. 2544 กลุ่มตัวอย่างที่ศึกษา คือ ผู้สูงอายุที่ได้รับการส่องกล้องตรวจระบบทางเดินอาหาร จำนวน 212 ราย ได้แก่ กลุ่มที่ได้รับการส่องกล้องตรวจระบบทางเดินอาหารพบว่ามีแผลเป็ปติด (แผลกระเพาะอาหาร แผลลำไส้เล็กส่วนต้น หรือทั้งสองอย่างรวมทั้ง erosion healing ulcer และ bleeding ulcer) จำนวน 106 ราย และกลุ่มเปรียบเทียบคือ ผู้สูงอายุที่ได้รับการส่องกล้องตรวจระบบทางเดินอาหารไม่พบแผลเป็ปติด จำนวน 106 ราย วิเคราะห์ข้อมูลโดยใช้สถิติเชิงพรรณา การทดสอบค่าไคสแควร์ (Chi-square test) การวิเคราะห์ตัวแปรเดี่ยว และการวิเคราะห์ตัวแปรเชิงซ้อนโดยการใช้ Multiple logistic regression โดยการคำนวณหาค่าอัตราเสี่ยงสัมพัทธ์ (odds ratio, OR) และดูนัยสำคัญทางสถิติโดยใช้ ค่าความเชื่อมั่น 95 เปอร์เซ็นต์ (95% confidence interval, CI)

ผลการศึกษาพบว่า กลุ่มศึกษาเป็นเพศชายร้อยละ 42.9 และเพศหญิงร้อยละ 57.1 อายุเฉลี่ย 69.15 ปี เมื่อวิเคราะห์ตัวแปรเชิงซ้อน (multiple logistic regression) โดยควบคุมอิทธิพลของปัจจัยอื่นๆ พบว่าปัจจัยเสี่ยงที่มีความสัมพันธ์ต่อการเกิดแผลเป็ปติดในผู้สูงอายุ คือ การรับประทานยาแก้อักเสบที่ไม่ใช่สเตียรอยด์ (OR_{adj} = 4.21, 95% CI = 2.16 – 8.21, *p-value* < 0.001), การสูบบุหรี่ (OR_{adj} = 3.60, 95% CI = 1.05 – 12.36, *p-value* = 0.042), ประวัติการเป็นแผลเป็ปติด (OR_{adj} = 3.15, 95% CI = 1.51 – 6.58, *p-value* = 0.002)

ผลการศึกษาครั้งนี้ให้ความรู้เกี่ยวกับปัจจัยเสี่ยงของการเกิดแผลเป็ปติดในผู้สูงอายุที่จะทำให้ประชาชนมีความระมัดระวังต่อการได้รับปัจจัยเสี่ยงข้างต้นและสามารถนำไปใช้ในการป้องกันและควบคุมโรคแผลเป็ปติดในผู้สูงอายุ

Copyright by Mahidol University

CONTENTS

		Page
ACKNOWLEDGEMENT		iii
ABSTRACT		iv
LIST OF TABLES		viii
CHAPTER		
I	**INTRODUCTION**	1
	1. OBJECTIVES	5
	2. VARIABLE OF THE RESEARCH	6
	3. DEFINITION	8
II	**LITERATURE REVIEW**	12
	1. THE ELDERLY	12
	2. PEPTIC ULCER	22
	3. CONCEPTURL FRAMWORK	45
III	**MATERIALS AND METHODS**	46
	1. RESEARCH DESIGN	46
	2. STUDY POPULATION	46
	3. STUDY SAMPLE	46
	4. SAMPLE SIZE ESTIMATE	47
	5. MATERIALS	48
	6. DATA ANALYSIS	50

Copyright by Mahidol University

CONTENTS (CONTINUED)

		Page
IV	**RESULTS**	52
	1. DEMOGRAPHIC CHARACTERISTICS	52
	2. PANENDOSCOPIC EXAMINATION DATA	58
	3. UNIVARIATE ANALYSIS	62
	4. MULTIVARIATE ANALYSIS	71
V	**DISCUSSION**	73
VI	**CONCLUSION**	85
REFERENCES		87
APPENDIX		97
BIOGRAPHY		113

Copyright by Mahidol University

LIST OF TABLE

Table	Page
1. Number and percentage of cases and controls by demographic characteristics	55
2. The data of panendoscopic examination	60
3. The association between personal factors and peptic ulcer in the elderly by Univariate Analysis	63
4. The association between health behavior factors and peptic ulcer in the elderly by Univariate Analysis	66
5. The association between physical factors and peptic ulcer in the elderly by Univariate Analysis	69
6. The association between psychosocial factor and peptic ulcer in the elderly by Univariate Analysis	71
7. The association between factors and peptic ulcer in the elderly by Multivariate Analysis	72

Copyright by Mahidol University

CHAPTER I

INTRODUCTION

Rationale and background

The progresses in socioeconomic and technological development combined with successful medical services and family planing have resulted in decline of mortality and fertility rates. These changes have significant impact on the size and age structure of the population. The reduction in fertility rate results in the decreased number and proportion of children, whereas the decrease in mortality rate leads to increased longevity of population. Thus the proportion of the elderly increases (1). From the national survey of population and housing census by National Statistic Office in Thailand in 1980, the number of the elderly was 2.4 million or 5.4% of all population. The number of the older population has grown steadily from about 4 million or 7.4% in 1990 to 5.7 million or 9.4% in 2000 (2). As for the estimated number in 2010, the proportion of the elderly will increase to 10.8% of the population (3). The growing numbers and proportion of the elderly combined with rapid socioeconomic and cultural changes can lead to serious problems in the years ahead. A decline in physical, mental, and social function in the elderly should account for a higher risk of sickness and disability (4). In a survey of health status of the Thai elderly in 1992 conducted by Ministry of Public Health and National Statistic Office, it was found that the most common physiologic disturbances among the elderly are

Copyright by Mahidol University

musculoskeletal diseases, respiratory diseases, gastrointestinal diseases, and cardiovascular diseases (5,6).

Peptic ulcer is a common disease in Thailand. Estimates of frequency of peptic ulcer disease in the United States vary from 3.5 to 7.5 million people annually (7), Bockus estimated that approximately 10% were male. In the United Kingdom, Jones estimated that approximately 9.6% of males aged 45-54 years old and 6.1% of females aged 55-64 years old have peptic ulcer (8). In Thailand, about 98,630 people have peptic ulcer (gastric or duodenal ulcer), and the mortality rate is 177.6 per 100,000 persons in the year 2001 as reported by the Ministry of Public Health (9).

Peptic ulcer is a defect in the gastrointestinal (GI) mucosa extending through the muscularis mucosae which contacts the gastric juice (7,8,10,11). So peptic ulcer can occur in the lower end of the esophagus and anywhere in the duodenum (12). Peptic ulcer usually refers to gastric or duodenal ulcer (13). The cause of peptic ulcer is not at all clear but is believed to be gastroduodenal mucosal injury resulting from an imbalance between the factors that damage the mucosa and those that protect it (8,13,14). One of the risk factors associated with peptic ulcer is low economic status and associated malnutrition, leading to low resistant muscosa and freguent recurrence of ulcer and poor healing. Low economic status also causes stress to the person, the same holds true for occupations associated with mental stress such as executive, banker, and accountant, precipitating the stomach to secrete more acid and gastric juice. Personal habits such as cigarette smoking, alcohol drinking, and NSAIDs use slow the healing process (15). Cigarette smoking can cause peptic ulcer (16) as the incidence increases with an increase in pack-year of cigarette smoking (17). Alcohol causes acute gastric mucosal injury and erosion (18). Aspirin is the first non-steroidal

Copyright by Mahidol University

anti-inflammatory drugs (NSAIDs) used for nearly 100 years. At present it is widely used as analgesic in arthritis treatment, and for ischemic heart disease (IHD) (19). NSAIDs are known to damage the gastric mucosa, in part via a direct local irritant effect. NSAIDs may also cause direct topical damage by disrupting the hydrophobic mucus gel layer in the stomach, which normally minimizes contact between the gastric mucosa and the gastric content (20). This effect suppresses the synthesis of gastric prostaglandin that inhibits gastric acid secretion and promotes mucosal resistance. A history of NSAIDs use is commonly obtained from elderly patients with peptic ulcer disease (13,18,19,21,22). Persons who have parent with peptic ulcer have more parietal cell mass than general population leading to more acid in gastric antrum and duodenal ulcer (15). Arid. et al first observed an increased frequency of blood group O in patients with duodenal ulcer compared with that of the normal population. Individuals with blood group O have 30% to 40% greater frequency of duodenal ulcer than that of other blood groups (18,23). In addition, the widespread acceptance of *H. pylori* infection as an important factor in the pathogenesis of peptic ulcer disease (especially duodenal ulcer) (24) has been recognized. The incidence of *H. pylori* infection is 81% in peptic ulcer patient (25). Finally, peptic ulcers are associated with other diseases such as chronic obstructive pulmonary disease (COPD), arthritis, IHD, and diabetes mellitus (DM) (23).

Patients presenting with classical symptoms of peptic ulcer disease will have epigastric burning pain occurring one hour after meal or on an empty stomach. Pain frequently awakens patients at night (26). They would have relapses lasting several weeks and remissions in several months (8). Absence of abdominal pain is confirmed in approximately 30% of elderly patients with peptic ulcer disease (27).

Copyright by Mahidol University

The complications of peptic ulcer are hemorrhage, perforation, and obstruction. Bleeding, the most common complication accounts for 25% of all patients. After one episode of bleeding the risk of rebleeding is about 40% from peptic ulcer. The manifestation of slow, chronic bleeding includes iron-deficiency anemia, fatigue and occult blood in the stool. In patients with acute hemorrhage may be present with hematemesis, melena or hemotochezia (26). The hemostatic mechanisms will stop the bleeding in 80% of patients with ulcer (28). Emergency problem for bleeding carries a 6.7% mortality rate in the patients (29). In the elderly, there are 20 times death rate than the younger age group (28). Perforation of stomach and small intestine as a severe complication of peptic ulcer disease occurs in 5-10% of the cases. The characteristic feature of perforation is the sudden onset of severe epigastric pain; other symptoms include nausea, vomiting, pallor, tachycardia, diaphoresis, but rarely hypovolumic shock (26). Mortality rate of peptic ulcer perforation is 6.5% (30). Gastric outlet obstruction complicates peptic ulcer disease in 5% of patients, generally occurring in those with a long history of disease.

The impact of peptic ulcer is not only illness but also expenses. The direct costs of disease include medication, hospital visits as well as indirect cost such as opportunity cost, leisure time cost and diminished quality of life. The annual cost of medical cares for peptic ulcer disease approaches 100 million baht (31). Peptic ulcer disease is a serious public health problem in Thailand because of its frequency, chronical characteristics, and complications (32). The morbidity and mortality from peptic ulcer remain high. Morbidity rate is 101-203 per 100,000 person-year. Mortality rate is 0.52-2.46 per 100,000 person-year (33). Many studies found that age is also related to peptic ulcer (25,34,35,36). Most peptic ulcer patients are the elderly (37).

Copyright by Mahidol University

Hospitalization rate in the elderly has been increasing than in the younger (38). Therefore, the investigators intended to study risk factors associated with peptic ulcer in the elderly. It was believed that knowledge obtained from this study should lead to better development of strategies for screening and planning in the prevention of peptic ulcer disease in the elderly.

Research question

Are personal factors, health behavior factors, physical factors, and psychosocial factors associated with peptic ulcer in the elderly?

General objective

To study factors associated with peptic ulcer in the elderly

Specific objectives

To study the extent and direction of association between the following factors and peptic ulcer in the elderly:

1. Personal factors i.e. sex, age, past occupation, income, adequacy of income, and blood group.

2. Health behavior factors such as cigarette smoking, alcohol drinking, tea and coffee drinking, spicy food intake, and NSAIDs use.

3. Physical factors such as *H. pylori* infection, diabetes mellitus, chronic obstructive pulmonary disease, ischemic heart disease, arthralgia, other underlying diseases, history of peptic ulcer, parental history of peptic ulcer, and instrumental activity of daily living.

Copyright by Mahidol University

4. Psychosocial factors i.e. stress.

Hypothesis

1. Sex, age, past occupation, income, adequacy of income, and blood group are related with peptic ulcer in the elderly.

2. Smoking, alcohol drinking, tea and coffee drinking, spicy food intake, and NSAIDs use are positively associated with peptic ulcer in the elderly.

3. *H. pylori* infection, diabetes mellitus, chronic obstructive pulmonary disease, ischemic heart disease, arthralgia, other underlying disease, history of peptic ulcer, parental history of peptic ulcer, and instrumental activity of daily living are associated with peptic ulcer in the elderly.

4. Stress is positively associated with peptic ulcer in the elderly.

Variables of the research

1. Independent variables

- Sex
- Age
- Past occupation
- Income
- Adequacy of income
- Blood group
- Cigarette smoking
- Alcohol drinking
- Tea drinking
- Coffee drinking

Copyright by Mahidol University

- Spicy food intake
- NSAIDs use
- *H. pylori* infection
- Diabetes mellitus
- Ischemic heart disease
- Chronic obstructive pulmonary disease
- Arthralgia
- Other underlying diseases
- History of peptic ulcer
- Parental history of peptic ulcer
- Instrumental activity of daily living
- Stress

2. Dependent variable
   - Peptic ulcer

Scope of the research

The study was a hospital-based, case-control study. Study subjects were the elderly aged 60 years or older who underwent panendoscopic examination at Siriraj Hospital and Phramongkutklao Hospital between September 7 and December 31, 2001.

Copyright by Mahidol University

Definitions

1. The elderly means an individual who is 60 years old or older, both male and female.

2. Peptic ulcer is defect in gastrointestinal mucosa extending through the muscularis mucosae which contacts the gastric juice. So peptic ulcer can occur in the lower end of the esophagus and anywhere in the duodenum as well as in the stomach.

3. Peptic ulcer patients are patients who have peptic ulcers documented from panendoscopic examination performed by a gastroenterologist.

4. Age is calculated from the present year minus year at birth.

5. Income is amount of money (baht) that the respondent earns in each month.

6. Blood group refers to ABO blood group which was obtained from previous physical examination and is categorized into A, B, AB, and O. If the respondents are not sure of or do not know their blood group, the data is recorded as unknown.

7. Cigarette smoking is defined as smoking $\geq$ 1 cigarette per day until the diagnosis of peptic ulcer. It is divided into no smoking and smoking. Persons who had quitted smoking for at least 1 month were included in no smoking group. The number of cigarette per day and frequency is recorded.

8. Alcohol drinking is defined as drinking alcohol $\geq$ 60 cc. per day until the diagnosis of peptic ulcer and is divided into non-drinking and drinking. Persons who had quitted drinking for at least 1 month were included in non-drinking group. The amount of alcohol drinking is also recorded.

9. Tea and coffee drinking means drinking of tea or coffee $\geq$ 1 cup per day until the diagnosis of peptic ulcer and is divided into non-drinking and drinking. Persons who had quitted drinking for at least 1 month were included in non-drinking.

Copyright by Mahidol University

The number of cups per day/ week/ month and duration of tea and coffee drinking are recorded.

10. History of underlying disease refers to history of underlying disease of the respondents and is categorized into no underlying disease, ischemic heart disease, diabetes mellitus, chronic obstructive pulmonary disease, and arthritis. The number of years of underlying disease and other diseases is recorded.

11. Activities of daily living is measured by instrumental activity of daily living questionnaire that measures activities of daily living during the previous 3 months. It is a rating scale that is composed of 16 items. Weights of 1, 2, 3 and 4, respectively, were assigned to responses, "can do without difficulty," "can do with difficulty but without help," "can do only with help," and "unable to do," and these weights were cumulated into 16-64 scores. The 75 percentile is used to discriminate between the lower ability ($\geq$ 75 percentile) and the good or moderate ability to perform activity of daily living ($<$ 75 percentile).

12. History of NSAIDs use refers to the intake of non-steroidal anti-inflammatory drugs such as aspirin, diclofenac, indomethacin, piroxicam, and others. Dose (mg/day) and duration of use were recorded. Persons who had stopped taking NSAIDs for at least 3 months were included in non-NSAIDs use.

13. History of peptic ulcer is defined as history of patient having a previous diagnosis of peptic ulcer, either by clinical, panendoscopy, or upper GI-study (Ba-study), more than 1 year before enrollment into this study.

14. Parental history of peptic ulcer means having or not having parents with peptic ulcer.

Copyright by Mahidol University

15. *H. pylori* infection is proved by campylobacter like organism test (CLO test).

16. Stress is measured by Thai stress test (TST) questionnaire. It is a two dimensional rating scale that is composed of 24 items-- 12 negative and 12 positive. The negative items were items 1-12, and positive items were items 13-24. Weights of 0, 1, and 3, respectively, were assigned to responses, "never," "sometimes," and "often," and these weights were cumulated into negative and positive scores, ranging from 0 to 36 for each negative and positive scales. The following matrix in Table shows how the two types of score are then combined to form the Index of TST. Separate scores of negative scales and positive scales, respectively, are combined to form the Index.

Table 1 Matrix Table for the Index of TST

Negative Scale Scores (Sum of Items 1-12)	Positive Scale Scores (Sum of Items 13-24)				
	12-36	9-11	6-8	3-5	0 - 2
0 – 1	1	2	3	4	5
2 – 3	2	3	4	5	6
4 – 5	3	4	5	6	7
6 – 7	4	5	6	7	8
8 – 36	5	6	7	8	9

Copyright by Mahidol University

The Distribution of the Sample of the Index of TST

Scoring Group	Stress indicator
1	Excellent mental health
2, 3, 4	Normal mental health
5, 6	Mild stress
7, 8, 9	Stressful

The Matrix Table for the Index of TST is used to divide subjects into 9 scores. The distribution of scores 1, 2-4, 5-6, and 7-9, respectively, are assigned to "excellent mental health," "normal mental health," "mild stress," and "stressful."

Copyright by Mahidol University

CHAPTER II

LITERATURE REVIEW

The purpose of this research was to study factors associated with peptic ulcer in the elderly. Current theories and research have been reviewed as follows:

1. The elderly and their changes
2. Peptic ulcer
3. Research

The elderly

In the United States of America, the elderly refers to the persons who are 65 years old or more, but in Thailand the elderly refers to the persons who are 60 years old or older (39).

The National Institution on Aging has divided old age into two groups. The first group is "the Young Elderly" meaning the elderly aged between 60-74 years. The second group is "the Old Elderly" meaning the elderly aged 75 years or more (40).

Aging changes

There are two categories of physiologic aging changes in the elderly:

Copyright by Mahidol University

1. Physical change

Respiratory system

In the elderly, maximal inspiratory pressure (MIP) decreases with age; however, this measurement is made at residual volume (RV), which increase with age, so respiratory muscles are shorter and less efficient as RV increases. The static elastic recoil of the lung clearly decreases with aging, making the lung easier to expand toward total lung capacity (TLC). This reduction of elastic recoil tends to decrease TLC; however, the chest wall becomes stiffer with aging, and its inward elastic recoil is increased as the lungs expand, so a maximal inspiratory effort is not able to achieve a higher lung volume even though the lungs themselves have become easier to expand (41).

Gastrointestinal system

The oral cavity serves two essential functions in human physiology: the production of speech and the initiation of alimentation. Discussion of the status of the oral cavity during aging must consider the impact of any disturbance of these functions on the elderly individual's life. The loss of teeth has long been associated with aging. Tooth loss is attributed to two major etiologic processes: dental caries and periodontal disease (42).

Age-associated changes in the anatomy of the esophageal body appear to be minimal. The number of myenteric neurons in the esophagus decreases with age. Gastric acid secretion in humans thus appears to change little with normal aging, unless there is evidence for coexistent gastric pathology. Aging is associated with a number of diverse effects on the large intestine including alterations in mucosal cell growth, differentiation, metabolism, and immunity. Several disorders are more

Copyright by Mahidol University

commonly observed in the elderly, including colon cancer, diverticulosis, and altered bowel habit. Epidemiologic studies indicate that fecal incontinence is a common complaint among the elderly. Several studies have examined whether structural or functional changes occur in the aging liver. In healthy subject, liver size, blood flow, and perfusion decrease by 30 percent to 40 percent between the third and 10^{th} decade (43).

Cardiovascular system

Age-related anatomic changes occur in the myocardial collagen and in the conduction system. Collagen becomes more plentiful, and it increases the stiffness of the heart. These changes reduce ventricular diastolic compliance more than systolic contractility, and they may affect impulse transmission. Myocardial deposition of lipid substances is also common. Selerodegenerative changes develop in the conduction system with patchy fibrosis, a loss of myofibers, and an increase in the elastic tissue in the His-Purkinje network. The number of pacemaker cells in the sinoatrial node decreases with age. These anatomic findings explain, in part, the increased prevalence of high ventricular filling pressures, fascicular block conduction disturbances, and sinus node dysfunction in the elderly (44).

Musculoskeletal system

Skeletal calcium losses are a universal concomitant of aging and reflect an imbalance of bone remodeling, with osteoblastic bony resorption exceeding osteoblastic new bone formation. After about age 30 when peak skeletal bone mass has been achieved, resorption begins to exceed formation with subsequent skeletal calcium losses and decline in bone density (45).

Copyright by Mahidol University

Aging of cartilage is associated with specific biochemical change. The content of water decreases-a finding that is in contrast to the increased water content of osteoarthritic cartilage. Total proteoglycan content remains unchanged, but both composition and structure of the proteoglycan molecule undergo alterations. Chondroitin sulfate content decrease, while keratan sulfate content increase. The cell density is lower in adult than in young cartilage, but the cell count alters little in aging articular cartilage once adulthhood is reached.

With age, joints become increasingly congruent in shape. The basis for this increase in congruity is unknown, but it may be due to a progressive diminution in blood flow at the osteochondral junction, with a consequent decrease in the rate of remodeling at this site (46).

Urinary system

The normal adult kidney weighs 150 to 200 g at age 30 years. There is a gradual decrease in mass with aging so that by age 90 the average weight has fallen 20 to 30 percent, to 110 to 150 g. Concomitantly, the renal size decreases. Several changes occur in the vasculature of the aging kidney. In the cortex, both the afferent and efferent arterioles atrophy in a parallel manner, resulting in a bloodless glomerulus. The tubules also undergo changes with aging. The number and length of proximal tubules decrease, whereas tubular diverticula become common in the distal nephron.These diverticula may be the progenitors of the common simple cysts seen in the aged kidney (47).

Decreased bladder capacity and a delayed micturition reflex create problems for the elderly in urinary frequency, urgency, and nocturia. Urinary retention is more prevalent among the elderly. Incontinence is not a normal outcome of aging although

Copyright by Mahidol University

many postmenopausal women experience stress incontinence caused by a weakening of the pelvic. A majority of older men have some degree of prostatic enlargement, which increases urinary frequency. Most of this hypertrophy is benign, but it produces a greater risk of malignancy (48).

Endocrine system

Pituitary

Both anatomic and histologic changes in the pituitary gland have been described with aging. By age 80, the weight of the adenohypophysis is approximately 25% from its peak of 400 mg during young adulthood. With age, there is a reduction in blood supply, a higher percentage of cells that are chromophobic and basophilic, and a relative decrease in acidophilic cells. A higher number of adenomas and colloid-filled cysts have also been described during later life.

The half-life of ACTH, adrenocorticotropin hormone, was reported by Friedman et al. to increase slightly with age, there is no increase in circulating level or response of ACTH to stimulation as demonstrated by the metyrapone stimulation test. The ability to secrete growth hormone in response to arginine stimulation or postsurgical stress also appears to be preserved throughout life as a function of normal aging.

Thyroid

The thyroid gland becomes relatively smaller, lower lying, and retrosternal with age. There is an increase in interfollicular fibrotic tissue and the development of both macronodules and micronodules. Follicles appear distended and are lined by flattened follicular cells. Large vacuolated thyrotrophs, a decrease in blood supply, and fibrolymphocytic infiltration are also more commonly noted.

Copyright by Mahidol University

Serum levels of free L-thyroxine (T_4) remain constant throughout life, as do levels of free triiodothyronine (T_3). However, the half-life of serum T_4 increases with age from an approximate value of 4 days during youth to 7 days during young adulthood to 9.3 days during later life.

Serum TSH dose not change with normal aging. Despite this, many more older person will have elevated serum TSH levels because of a higher incidence of primary failure of the thyroid gland, resulting in hypothyroidism or subclinical hypothyroidism.

Adrenal

The adrenal glands have more fibrous tissue with aging. Although there is a decrease in the secretion of cortisol by the zona fasciculata, there is no change in the circulating levels of corticosteroids because of reduced clearance. The adrenal glands maintain their ability to respond to ACTH by increasing level of cortisol.

Aldosterone secretion has been reported to decrease with age, though the clinical significance of this report remains unknown.

Ovary

Perhaps one of the best-studied changes accompanying the aging process is the decline in ovarian function that accompanies aging. This change has clearly been shown to have physiologic effects, most notably on the cardiovascular system and the skeleton.

Testis

There is general decline in mass and weight of the testicles with age. The tubules undergo some atrophy, and the intertubular spaces become more fibrous.

Copyright by Mahidol University

Leydig cells decline, and there is an increase in tubular wall size, compromising the ability of the tubules to conduct spermatogenesis.

Diabetes mellitus is perhaps the most common endocrine problem affecting the elderly, with 40% of all diabetic individuals being over the age of 65 (49).

Neurological system

Structural changes in both neurons and glial cells occur during usual aging. These changes include nerve cell death, dendritic retraction and expansion, synapse loss and remodeling, and glial cell reactivity. Many structural changes that occur in the brain with aging result from alteration in cytoskeletal proteins and the deposition of insoluble proteins such as amyloid in the extracellular space. Alterations in the cellular signaling pathway that control cell growth and motility may contribute to both adaptive and pathological structural changes in an aging brain.

As in other organ system, vessels that supply blood to the brain are vulnerable to age-related atherosclerosis and arteriosclerosis. These change render blood vessels susceptible to occlusion or rupture, which can manifest as stroke, a major cause of disability and death in the elderly population (50).

Skin and subcutaneous tissue

Epidermis

Even without any damage to the skin by physical element, the skin will change and age intrinsically. The epidermal thickness and its rate ridge pattern decrease with aging. The keratinocytes are smaller and have a lower proliferation rate. These changes cause the skin to be sensitive to minor trauma and to heal more slowly.

Copyright by Mahidol University

Dermis

The dermis will lose approximately 20% of its thickness, causing the skin to fell thin and become transparent. This thinning is due largely to the loss of proteoglycan and, to a lesser extent, collagen. The elastic fibers thicken and fragment; there is a reduction in the capillary network, which contributes to granual atrophy of the skin and which may be partly responsible for the decreased inflammation and rate of healing with injury seen in elderly skin. Finally, the size and number of fibroblasts are reduced.

Subcutaneous fat

The underlying subcutaneous fat also thins with age. It cannot adequately carry out its role of protecting the internal structures from trauma and cold. Many elderly people frequently feel cold due, in part, to this loss of protection.

Appendages

One of the first and most noticeable changes during aging is hair loss. Graying of hair is considered synonymous with aging. By age 50 years, approximately half of all body hairs are gray. This is due to loss of melanocytes and melanocytic function in the hair bulb. The rate of growth of the nail plates also diminishes with age. Some nails become thin and brittle, while others, especially the toenails, become thick and dystrophic. Sebaceous glands do not decrease in size with age but actually undergo hypertrophy on the back and face in many elder people (51).

Sensory organs system

Declines in sensory functions begin by the fourth decade, but vary widely depending on the individual and the particular sensory process. Stimulation thresholds

Copyright by Mahidol University

increase. Visual and hearing deficits are the most apparent losses and can affect safety and social interactions.

Eye

Functionally, as one becomes elderly, one's vision decreases. This is due to a decrease in the translucency of the human lens and decrease in size of the pupil so that less light enters the eye. It is intereasting to note that a decrease in the size of the pupil (miosis) to some degree compensates for the loss of near vision (accommodation) that accompaines aging. The visual field appears to constrict as one becomes elderly.

The orbital fat decreases, resulting in slightly sunken orbits (enophthalmos). Although there is less orbital fat, what there is may prolapse, creating "bag" that are especially prominent beneath the eyes. Because the lids are flaccid, they may turn in (entropion) and the lashes may touch the cornea, causing irritaition. The lids may also turn away from the globe (ectropion) contributing to the dryness of the eye that is normally present in the elderly. The cornea may acquire a ring of peripheral lipid deposits (arcus senilis), identified by a clear area between the ring and the sclera. Corneal sensation decrease, and the cornea loses some of its transparency (52).

Ear

Auditory changes are frequently found in the elderly as the prevalence of hearing loss increases with age. Beginning in middle age and advancing, degeneration of organ of corti can result in sensory presbycusis. A symmetric, bilateral, high frequency hearing loss is characteristic of advancing age (53).

Copyright by Mahidol University

Tongue

In late life approximately one third the number of taste of buds per papilla remain, which causes the taste threshold to increase. The receptors for sweet and salty flavors are affected most, and food distastes can result (48).

Nose

In aging the nose loses its internal moisture and capability, as there is decreased mucus production. The most significant nasal finding in age patient is the increased fragility and sclerosis of blood vessels, contributing to epistaxis. Olfactory perception is more vulnerable to loss with aging, and retronasal olfactory function suffer the most (54).

2. Psychosocial and behavior change

Psychosocial and behavior changes do occur with decline of body that makes the elderly feel worthless. In addition, the elderly are retired from work and social role that can also be causes of anxiety in the elderly (55).

Personality

There is no stereotypic profile of an older person. Their basic psychological characteristics will remain with them throughout their lives resulting in diversity in psychological status in advanced age. Personality changes in old age can be associated with physical or mental health problem (48).

Memory

Long-term memory for information not used on a daily basis can be slowed with age, now considered to be more related to a lack of use of this function than a normal consequence of aging; the use of memory aids (mnemonic devices) can

Copyright by Mahidol University

improve some age-related memory problems. Poor health status can threaten both long- and short-term memory (48).

Attention span

Older adults are more easily distracted by stimuli, and less able to retain information longer than 45 minutes (decreased vigilance performance). Normal aging does not cause disorientation, loss of language or calculation abilities, poor judgment, or any other type of mental dysfunction. Signs of poor cognitive function signal a physical or mental health problem and warrant a thorough evaluation (48).

The change of physiologic and psychosocial in the elderly leads to many adaptations for living with happiness (56).

Peptic ulcer

The term peptic disease refers to disorders of the upper gastrointestinal tract caused by action of acid and pepsin such as lower esophagus, stomach, duodenum (8,18,26). It is called based on the site of ulcer (8), normally referring to gastric ulcer and duodenal ulcer (13). The cause of peptic ulcer is not at all clear but is believed to be gastroduodenal mucosal injury resulting from an imbalance between the factors that damage the mucosa and those that protect it (8,14,18).

Aggressive factors

1. Acid-Pepsin

Acid-Pepsin not only helps digest but also damages gastric and duodenal mucosa. Over secretion of HCl and pepsin causes peptic ulcer (26).

Copyright by Mahidol University

- Acid secretion is derived from parietal (oxyntic) cell in parietal cell mass of gastric. The function of parietal cells is to secret HCL by Gastrin, Histamine and Vagal stimulation enters Gastrin receptor, H_2-receptor, and Acetycholine (Muscarinic) receptor flows through gastric lumen into Cl^-pumping, Proton pump. This process uses energy from H^+/K^+ ATP ase (8).

- Pepsin secretion is derived from chief cells that secret pepsinogen which is then transformed to active pepsin by HCL in suitable pH (1.2-2.4.) (8).

2. Stress and gastric secretion

Stress can stimulate hypothalamus entering pituitary gland and makes it secrete ACTH that stimulates adrenal cortex to secrete adreno-corticoids to increase gastric acid secretion and pepsin (8).

Defensive factors

1. Gastric mucosa barriers have 2 phases:

- Soluble phases are discovered in gastric juice.

- Insoluble mucus gel layer is glycoprotein that has beneficial protective effects directly on gastric mucosa from acid. Normally it is around 2 mm dense and it can be overly dense when stimulated by prostaglandin E (PGE) and lightly when received aspirin, nonsteroidal antiinflammatory drugs (NSAIDs) and *H. pylori* that break the barrier. When the barrier is broken, the sticky mucus gel layer is decreased and hydrogen (H^+) ions are diffused rapidly back into the mucosa (18).

2. Local mucosal blood flow

The gastric mucosa has a rich blood supply consisting of arborizing mucosal capillaries that traveres the glandular layer of the stomach (57). The blood supply and

Copyright by Mahidol University

vascular architecture of the lesser curvature of stomach are different from those of the antrum and posterior wall. On the lesser curvature, mucosal arteries originate directly from the left gastric artery and not from a network of vessels in the submucosa (23). When something decreased lesser curvature blood flow that happen ischemic, which results in localized necrosis, ulcer formation happens (8).

3. Mucosal resistance

Mucosal resistance depends on nutrition. Research in rats found that gastric resistance to acid-pepsin will improve if increased protein in rats food (8).

4. Instrinsic mechanism

- Antrum is a controller of acid secretion by changing gastric pH. For example antrum well stops secreting acid when pH is low.

- Duodenal brake is a mechanism to inhibit gastric acid secretion. Many duodenal brake in duodenum. For instance, as when duodenum receives lipid, it stimulates enterogastrone hormone that inhibits histamine, gastrin stimulation and gastric secretion. Other hormones also inhibit acid secretion, such as secretin that inhibits pure gastrin and cholycystokinin that have two effects. It is a weak stimulant of basal secretion in low dose and strong competitive inhibitor of gastrin (8).

5. Gross anatomy

Junction area between esophagus - stomach, body - antrum or antrum - duodenum will be wear and tear more than other areas. Therefore, it can change to peptic ulcer easily (14).

6. Prostaglandins (PG)

Particularly the E and I series, prostaglandins are synthesized abundantly in the mucosa of the stomach and duodenum. They are known to stimulate secretion of

Copyright by Mahidol University

both mucus and bicarbonate and to maintain mucosal blood flow. So it have beneficial protective effects called "cytoprotection" (58). PGE_2 and product of PGI_2 can protect ulceration from aspirin or other nonsteroidal anti-inflammatory drugs (8).

7. Growth factor

Factors that promote growth and proliferation of the gastric mucosa include peptides as epidermal growth factor (EGF), transforming growth factor-α, fibroblast growth factors, gastrin, somatostatin, and prostaglandins as well as nongastrointestinal hormones such as growth hormone and thyroxine. These growth factors may represent important elements of mucosal defense (18,23).

8. *Helicobacter pylori*

H. pylori is a gram-negative spiral bacterium found in association with gastric epithelium especially at antrum. It is accepted as a major cause of chronic type B gastritis in the human, and type B gastritis is closely associated with peptic ulcer, particularly gastric ulcer (23). Smith and Oderla indicated that *H. pylori* can induce gastrin release that stimulates gastric hypersecretion. They also found that *H. pylori* eradication leads to decreased plasma gastrin level but with no change of gastric secretion (8).

Peptic ulcers are caused by an imbalance between the factors that damage the mucosa and those that protect it (59). Factors associated with peptic ulcer are as follows:

1. Economic status and occupation

2. Individual habits such as heavy smoking, alcohol drinking, and NSAIDs use

3. Heredity and blood group

Copyright by Mahidol University

4. *H. pylori* infection

5. Other diseases such as diabetes mellitus, chronic obstructive pulmonary disease, ischemic heart disease, arthralgia

Symptoms and signs

Important symptom of peptic ulcer is visceral abdominal pain (26). Characteristic ulcer pain is rhythmic, periodic, and chronic. It is usually well localized at the epigastric area (59) but peptic ulcer in the elderly approximately 30% is painless (27). The elderly may have only discomfort or dyspepsia (8). Nausea and vomiting rarely occur in patients with uncomplicated benign gastric ulcer (57) vomiting may occur with duodenal ulcer (59).

Classic symptoms of peptic ulcer consist of:

- Abdominal pain localized to the epigastric area when empty or after meal
- Nocturnal pain (awakening pain)
- Relieved by a dose of antacid
- In duodenal ulcer patients, the pain is relieved by ingestion of food but in gastric ulcer patients it is increased.
- Peptic ulcer patients experience symptoms 3-4 times per year.

Diagnosis

The diagnostic modalities that used when suspicion of peptic ulcer are given in the following:

Copyright by Mahidol University

1. X-ray has 70-80% of sensitivity to detect peptic ulcer by single contrast and 90% in double contrast. X-ray examination can give fault negative by 32% and fault positive by 8-21%.

2. Upper Gastrointestinal Endoscopy (panendoscopy) can detect peptic ulcer that is more than 0.5 cm in size (18). In addition, biopsy and cytologic specimens can be obtained from the ulcer crater at endoscopy (57).

3. *H.pylori* are examined by histology, CLO (Campylobacter like organism) test, culture, serology, and urea breathe test.

Treatment

The cause of peptic ulcer is poorly understood even if it is studied widely. It is incurable, therefore, conservative treatment is used such as acid-pepsin reduction and mucosal barrier promotion. The aim of treatment is to relieve symptoms, promote ulcer healing, prevent recurrence of ulcer, and protect complications (18).

1. Physiological stomach rest regimen

1.1 Mental rest

1.2 Physical rest

1.3 Physiological rest

Advising patients eating small meals at frequent intervals. If patients have symptoms or active bleeding, liquid diet or soft diet must be taken (8) and should be follow there:

a. Avoid sizable meal

b. Avoid spicy foods

c. Restricted Alcoholic beverages and coffee

Copyright by Mahidol University

d. Stop smoking

2. Drug therapy

The objective of medical therapy is to restore the equilibrium between aggressive factor and the defensive mechanism of the gastric mucosa (26).

Antacids

Antacids have been given primarily for neutralize the gastric acid and maintains the pH of the gastric content at a level high enough that pepsin is inactivated.

Ideal antacid have the following characteristics:

- Cheap
- Give fast effects
- Give long – time effects
- Dissolution or does not absorb in blood circulation which increase side effect.
- Good taste

The most widely used antacid compounds are magnesium hydroxide and aluminum hydroxide have in ratio 1:2 (8,26). Liquid preparations are probably more efficacious than tablet forms (26).

Antisecretory drugs

1. H_2 receptor blocker; cimetidine, ranidine, and famotidine have been used in patients worldwide. These agents are specific antagonists that inhibit acid secretion by blocking histamine H_2 receptors at the parietal cell.

2. Anticholinergic drugs

Copyright by Mahidol University

- Non-selective anticholinergic. Such as Banthine and Probanthine have severe side effects.

- Selective anticholinergic. Such as pirenzepine which is a more specific inhibitor of the cholinergic receptor on the parietal cell, has been found to be effective in healing duodenal ulcers with modest cholinergic side effects.

3. Gastrin receptor antagonist

Blockade of the gastrin receptor by the weak competitive inhibitor proglumide has been investigated in the treatment of peptic ulcer disease.

4. H^+, K^+ ATP ase pump inhibitor

Omeprazole is effective in healing duodenal ulcer.

Cytoprotective drugs

1. Cytoprotective agent. These drugs interact with necrotic protein in the ulcer base forming a shield over the ulcer crater. There are drugs in this category: Carbenoxolone, Colloidal, Bismuth compound, Sucralfate, and ctraxate.

2. Cytoprotective-antisecretory. Prostaglandin analogues inhibit gastric acid production, stimulate mucosal secretion of bicarbonate and mucus, and help preserve mucosal blood flow. Such as misoprostol, are most effective in preventing recurrence of gastric ulcers.

3. Surgical Treatment

The overall incidence of surgery for peptic ulcer was deminished, but peptic ulcer continues to be an important clinical problem in gastrointestinal surgery.

The indications for surgical management of peptic ulcer are the following (26):

Copyright by Mahidol University

1. Intractability or recurrent ulcer diathesis

This refers to patients who have recurrent or non healing ulcers despite appropriate medical therapy or patients who developed ulcerations on maintenance treatment.

2. Hemorrhage

Surgery may be indicated either because of uncontrolled massive hemorrhage on a single occasion or because of recurrent GI bleeding from ulceration. Hematemesis, melena, or hematochezia will be presented by the time of admission.

3. Perforation

Perforation is a severe complication of peptic ulcer. The most common presentation is an abrupt onset of severe abdominal pain; other symptoms include nausea, vomiting, pallor, tachycadia, diaphoresis, but rarely shock. The pain typically begins in the epigastrium and rapidly spreads throughout the abdomen. The patient typically appears acutely and seriously ill. Low right abdominal quadrant pain may become severe because of gravitational flow of gastric contents along the right paraspinal "gutter" to the pelvis.

4. Gastric outlet obstruction

Chronic PU result in obstruction. The stenosis varies due to fibrosis and edema around the ulcer, and to spasm. Clinically are vomiting, weight loss, dehydration, alkalosis, sodium and potassium depletion.

Factors associated with peptic ulcer

The cause of peptic ulcer is not well understood but likely multifactorial (60). The incidence of peptic ulcer disease has increased, particularly in the elderly (36).

Copyright by Mahidol University

In this study, factors associated with peptic ulcer in the elderly are classified into 4 major groups. Personal factors consist of sex, past occupation, income, adequacy of income, and blood group. Smoking, alcohol drinking, tea and coffee drinking, spicy food intake, and NSAIDs use are included in health behavior factors. Physical factors consist of *H. pylori* infection, diabetes mellitus disease, chronic obstructive pulmonary disease, ischemic heart disease, arthralgia, other underlying disease, history of peptic ulcer, parental history of peptic ulcer, and instrumental activity of daily living. Stress is psychosocial factors. The reviewed literature shows that these factors are either associated or are not associated with peptic ulcer:

Sex

Peptic ulcer occurs in males more often than in females (26).

- Kuansathapornthavee S, et al. (31) studied factors influencing health behavior in 150 peptic ulcer patients at Ramathibodi Hospital, Mahidol University. In this study, it was found that 72% of the patients were male, and sex was a factor that made peptic ulcer patients have different health behavior.

- Intharanukulkit O. (61) studied the health behavior in 120 peptic ulcer patients and found that the proportion of male was greater than that of female, and sex was associated with health behavior in peptic ulcer patients.

- Meeprasert M. (62) studied self-care of 40 peptic ulcer patients at Sukhothai Hospital. The majority of sample were male (75%).

- Kitikun P. (28) studied bleeding peptic ulcer in Cholburi Hospital. A prospective study of 414 bleeding peptic ulcer patients indicated that the sample

Copyright by Mahidol University

consisted of more male (n = 278) than female (n = 136). The ratio of male-female was 2.04: 1.

- Tungsithichoke L and Punawakul S. (32) studied peptic ulcer and risk factors at Pichit Hospital. A sample 157 patients consisted of 110 males and 47 females. The male- female ratio was 2.34: 1.

- Israngkoon na ayuthaya A. (30) studied mortality rate and perforated peptic ulcer in elderly patients and younger patients in Phayao Hospital. A prospective study of 167 patients with perforated peptic ulcer showed that more than half of the subjects aged over 70 years old were male.

- Schoon IM, et al. (36) studied 1,402 cases of peptic ulcer in Gothenburg in 1985. The study found that the majority of the patients (53.28%) were male, whereas the minority (46.72%) were female. The proportion of male: female was 1.14: 1.

- Bobadilla J, et al. (63) studied incidence of peptic ulcer at the Instiyuto Nacional de la Nutricion "Salvador Zubiran," a prospective study of 1,123 patients. It was found that the male-female ratio was 1: 1.

- Watanabe Y, et al. (64) conducted an epidemiological study of peptic ulcer disease among Japanese and Koreans in Japan. The study showed that male gender was a statistically significant risk factor with gastric ulcer OR = 2.16 (95% CI = 1.58-2.95) and duodenal ulcer OR = 3.23 (95% CI = 2.21-4.74). In addition male gender was a statistically significant risk factor for duodenal ulcer (OR_{adj} = 2.30, 95% CI = 1.52-3.50) but not gastric ulcer.

- Everhart JE, et al. (34) studied an incidence and risk factors for self-reported peptic ulcer disease in the United States. The study found that sex was not associated with peptic ulcer.

Copyright by Mahidol University

LIBRARY AND INFORMATION CENTER MAHIDOL UNIVERSITY

- Schlemper R, et al. (65) studied risk factors of peptic ulcer disease in Dutch and Japanese populations. It was found that sex was not associated with peptic ulcer.

Occupation

Some occupations such as executive, banker, and accountant have more stress, leading stomach to secret acid and gastric juice. Some occupations may result in different meal times that can cause peptic ulcer easily (15).

- Kuansathapornthavee S, et al. (31) studied factors influencing health behavior in peptic ulcer patients and showed that a number of the sample were employees (28.6%). While a smaller group of sample were government officers (22%).

- Inthraranukulkit O. (61) studied the health behavior in 120 peptic ulcer patients and found that most of them were employees.

- Tuchsen F, et al. (66) studied employment status, non-daytime work and Gastric Ulcer in men. It was found that non-daytime work in men was association with gastric ulcer.

- Schlemper RJ. et al. (65) studied risk factors for peptic ulcer disease: different impact of *Helicobacter pylori* in Dutch and Japanese populations. It was found that occupation was not associated with peptic ulcer.

Income

A low economic people have poor nutrition that causes frail mucosa leading to easy recurrence of ulcer and slowly healing ulcer. Peptic ulcer disease is found often in low economic status people (14,65).

Copyright by Mahidol University

1125797145

- Kuansathapornthavee S, et al. (31) studied factors influening health behavior in peptic ulcer patients and showed that most of the subjects had an income of 1,000-2,000 baht/month (24.6%) and 2,001-3,000 baht/month (20.6%).

- Intharanukulkit O. (61) studied the health behavior in 120 peptic ulcer patients and found that the sample had average income of more than 4,000 baht/month.

- Meeprasert M. (62) studied self-care of 40 peptic ulcer patients at Sukhothai Hospital. The majority of sample had income of more than 4,000 baht/month (75%).

- Everhart JE, et al. (34) studied incidence and risk factors for self-reported peptic ulcer disease in the United States. It was a survey conducted in 42,392 general population and it showed that low income was a risk factor of peptic ulcer.

Blood group

Schlemper RJ, et al. (65) stated that blood group was a risk factor for peptic ulcer. Incidence of duodenal ulcer increased with patients who have blood group O (14).

- Wachirawat W (67) studied influences of life-style factor, hostility, chronic stressors, and *H. pylori* infection on peptic ulcer disease at Siriraj hospital. A sample of 140 patients consisted of 70 case and 70 control. Among the case, 29 patients or 41.1% had blood group O. However, blood group O was not associated with peptic ulcer (OR = 1.54, 95% CI = 0.8-3.5).

Copyright by Mahidol University

Cigarette Smoking

Smoking inhibits prostaglandin E synthesis and reduces prostaglandin E_2 in gastric mucosa resulting in decrease gastric mucosal defense mechanisms (68). It is a risk factor for peptic ulcer and their complications, impairs ulcer healing, and promotes recurrences. Evidence shows that the ulcer risk with smoking correlates with the quantity of cigarettes smoked (17,20). More importantly, the mortality rate of peptic ulcer in smokers is more than in non-smokers (18).

- Tungsithichoke L and Punawakul S. (32) studied peptic ulcer and risk factors at Pichit Hospital. A sample of 157 patients consisted of 79 peptic ulcer patients and 78 non-peptic ulcer patients. The study found that smoking had a statistically significant association with peptic ulcer (OR = 2.22, *p-value* = 0.0258). The association was dose dependent--smokers smoking lower than 10 cigarettes per day had lower chance of peptic ulcer than smokers smoking more than 10 cigarettes per day. The prevalence of peptic ulcer increased when smoking more than 20 years.

- McIntosh JH, et al. (19) studied smoking, nonsteroidal anti-inflammatory drugs, and acetaminophen in gastric ulcer. It was found that smoking was significantly associated with incidence of peptic ulcer.

- Johnsen R, et al. (35) studied etiology of peptic ulcer: a prospective population study in Norway. It was found that cigarette smoking was related to peptic ulcer.

- Kato I, et al. (17) conducted a prospective study of gastric and duodenal ulcer and its relation to smoking, alcohol, and diet. This study found that the risk of both gastric and duodenal ulcers increased with increasing pack-year of cigarette smoking.

Copyright by Mahidol University

- Ostensen H, et al. (69) studied association between smoking, alcohol, coffee, and familial factors and peptic ulcer disease. It was found that smoking habits appeared to have some relationship or even played etiologic roles in the development of peptic ulcer disease, at least in the northern part of Norway.

- Adami HO, et al. (70) studied risk factor for prepyloric and duodenal ulcer. The study showed that the odds ratio with 95% CI in smokers versus non-smokers was 2.9 (95% CI = 1.7-5.0). A trend emerged in relation to the daily number of cigarettes, with an OR of 4.1 (95% CI = 2.2-7.5) for those smoking more than 10 cigarettes and what about OR of those smoked < 10 cigarettes/day.

- Watanabe Y, et al. (64) carried out an epidemiological study of peptic ulcer disease among Japanese and Koreans in Japan. It was found that cigarette smoking significantly increased the risk for both gastric ulcer (OR = 3.10, 95% CI 1.2-4.6) and duodenal ulcer (OR = 1.9, 95% CI 1.2-2.9).

- Everhart JE, et al. (34) studied an incidence and risk factors for self-reported peptic ulcer disease in the United States. The study found that smoking had no statistically significant association with incident peptic ulcer, but it was statistically significantly associated with chronic active ulcers.

- Schlemper RJ, et al. (65) studied risk factors for peptic ulcer disease: different impact of *Helicobacter pylori* in Dutch and Japanese populations. It was found that smoking was not statistically significantly associated with peptic ulcer.

Alcohol drinking

Although it is well established that alcohol causes acute gastric mucosal injury (17,20), its etiologic role in peptic ulcer has been controversial (20).

Copyright by Mahidol University

- Watanabe Y, et al. (64) conducted an epidemiological study of peptic ulcer disease among Japanese and Koreans in Japan. It was found that daily alcohol consumption had a statistically significant association with gastric ulcer (OR = 1.78, 95% CI = 1.29-2.44), but it was not statistically significantly associated when multivariate logistic regression was conducted.

- Tungsithichoke L and Punawakul S. (32) studied peptic ulcer and risk factors at Pichit Hospital. It was found that among 19 drinking patients, there was no association between peptic ulcer and alcohol.

- Wachirawat W. (67) studied influences of life-style factor, hostility, chronic stressors, and *H. pylori* infection on peptic ulcer disease at Siriraj Hospital. It was found that alcohol drinking was not associated with peptic ulcer.

- Kato I, et al. (17) conducted a prospective study of gastric and duodenal ulcer and its relation to smoking, alcohol, and diet. The study showed that alcohol intake was not associated with either type of ulcer.

- Ostensen H, et al. (69) studied smoking, alcohol, coffee, and familial factors: an association with peptic ulcer disease, a clinically and radiologically prospective study. It was found that alcohol drinking was not associated with peptic ulcer.

- Adami HO, et al. (70) studied risk factor for prepyloric and duodenal ulcer. The study showed that consumption of alcohol was not related with peptic ulcer.

- Schlemper RJ, et al. (65) studied risk factors for peptic ulcer disease: different impact of *Helicobacter pylori* in Dutch and Japanese populations. It was found that there was no significant association of ulcer disease with the level of alcohol consumption.

Copyright by Mahidol University

Tea and coffee drinking

Tea and coffee stimulate acid secretion and increase dyspepsia (4).

- Schlemper RJ, et al. (65) studied risk factors for peptic ulcer disease: different impact of *Helicobacter pylori* in Dutch and Japanese populations. It was found that duodenal ulcer disease was associated with coffee consumption only among the Dutch.

- Watanabe Y, et al. (64) conducted an epidemiological study of peptic ulcer disease among Japanese and Koreans in Japan. It was found that coffee consumption had a statistically significant association with duodenal ulcer (OR = 1.57, 95% CI = 1.11-2.22), but it was not statistically significantly associated when multivariate logistic regression was conducted.

- Tungsithichoke L and Punawakul S. (32) studied peptic ulcer and risk factors at Pichit Hospital. The study found that tea and coffee consumption was not associated with peptic ulcer.

- Wachirawat W. (67) studied influences of life-style factor, hostility, chronic stressors, and *H. pylori* infection on peptic ulcer disease at Siriraj Hospital. The study showed that caffeine consumption was not associated with peptic ulcer.

- Ostensen H, et al. (69) studied smoking, alcohol, coffee, and familial factors: an association with peptic ulcer disease. a clinically and radiologically prospective study. It was found that coffee drinking was not associated with peptic ulcer.

- Adami HO, et al. (70) studied risk factor for prepyloric and duodenal ulcer. The study showed that the risk of peptic ulcer was virtually unrelated to consumption of coffee.

Copyright by Mahidol University

- Kato I, et al. (17) conducted a prospective study of gastric and duodenal ulcer and its relation to smoking, alcohol, and diet. The study found that coffee or tea consumption was not associated with peptic ulcer.

Spicy food intake

- Watanabe Y, et al. (64) conducted an epidemiological study of peptic ulcer disease among Japanese and Koreans in Japan. It was found that spicy food intake had a statistically significant association with duodenal ulcer (OR = 1.57, 95% CI = 1.10-2.23), but it was not statistically significantly associated when multivariate logistic regression was conducted.

- Wachirawat W. (67) studied influences of life-style factor, hostility, chronic stressors, and *H. pylori* infection on peptic ulcer disease at Siriraj Hospital. The study showed that spicy food intake was unrelated to peptic ulcer.

NSAIDs use

NASIDs cause damage to gastric mucosa by suppressing the synthesis of gastric prostaglandin. Prostaglandins regulate several components of the mucosal defense system including mucus and bicarbonate secretion and mucosal blood flow (13,20). NSAIDs can also cause duodenal lesions as well as gastric lesions although these tend to occur less frequently (8). Epidemiologic study showed that NSAIDs use increased incidence of peptic ulcer, especially in the elderly (19).

- Tungsithichoke L and Punawakul S. (32) studied peptic ulcer and risk factors at Pichit Hospital. The study found that use of aspirin was associated with peptic ulcer (OR = 3, *p-value* = 0.029).

Copyright by Mahidol University

- McIntosh JH, et al. (19) studied smoking, nonsteroidal anti-inflammatory drug, and acetaminophen in gastric ulcer, a study of asssociations and of the effect of previous diagnosis on exposure patterns. The study found that in new cases, odds ratio of gastric ulcer were 5.0 for daily aspirin using and 2.3 to 5.4 for daily anti-arthritic drug using.

- Seinela L and Ahvenainen J (71) studied peptic ulcer in the very old patients. It was found that peptic ulcer was a common endoscopic finding in patients aged 80 years or over. Aspirin users are also at an increased risk of ulcer disease compared to non-users.

- Everhart JE, et al. (34) studied incidence and risk factors for self-reported peptic ulcer disease in the United States. It was found that participants who reported musculoskeletal pain or headache characteristic of NSAIDs use were associated with peptic ulcer.

- Griffin MR, et al. (72) studied nonsteroidal anti-inflammatory drug use and increased risk for peptic ulcer disease in elderly persons. The study showed that NSAIDs use was associated with peptic ulcer in the elderly (OR = 4.1, 95% CI = 3.5-4.7).

- Schlemper RJ, et al. (65) studied risk factors for peptic ulcer disease: different impact of *Helicobacter pylori* in Dutch and Japanese populations. It was found that NSAIDs was not associated with peptic ulcer.

- Wachirawat W. (67) studied influences of life-style factor, hostility, chronic stressors, and *H. pylori* infection on peptic ulcer disease at Siriraj Hospital. The study showed that 2 peptic ulcer patients used NSAIDs, while none in the control group no used NSAIDs. Thus, the association could not be calculated.

Copyright by Mahidol University

History of peptic ulcer

- Voskuyl AE, et al. (73) studied risk factor for serious upper gastrointestinal events in patients with possible or definite rheumatoid arthritis. It was found that history of peptic ulcer was a risk factor for upper gastrointestinal events (symptomatic gastric or duodenal ulcer, perforation, or bleeding).

- Garcia Rodriguez RL and Jick H (74) studied risk factor for upper gastrointestinal bleeding (UGIB) and perforation. It was found that pervious UGIB was the single most important predictor of UGIB.

Family history of peptic ulcer

Persons whose parents have peptic ulcer may have more parietal cell mass at birth than do other people, resulting in more gastric acid secretion. Consequently duodenal ulcer can develop more easily (15). Studies showed that 20-50% of duodenal ulcer patients with family history of peptic ulcer and their offspring have tripple chances for duodenal ulcer than other persons but not for gastric ulcer. The person who had family history of gastric ulcer in first degree relatives were 3 times more likely to have gastric ulcer when compared to those without the family history of gastric ulcer (18).

- Meeprasert M. (62) studied self-care of 40 peptic ulcer patients at Sukhothai Hospital. The majority of sample had no family history of peptic ulcer (87.5%).

- Wachirawat W. (67) studied influences of life-style factor, hostility, chronic stressors, and *H. pylori* infection on peptic ulcer disease at Siriraj Hospital. The results showed that peptic ulceration was associated with family history of peptic ulcer (OR = 2.4, *p-value* < 0.03).

Copyright by Mahidol University

- Johnsen R, et al. (35) studied etiology of peptic ulcer: a prospective population study in Norway. It was found that family history of peptic ulcer is a risk factor for peptic ulcer.

- Ostensen H, et al. (69) studied smoking, alcohol, coffee, and familial factors: an association with peptic ulcer disease, a clinically and radiologically prospective study. Statistically significant increased occurrences of peptic ulcer were found in relatives of patients with either gastric or duodenal ulcer, compared with the control group.

- Schlemper RJ, et al. (65) studied risk factors for peptic ulcer disease: different impact of *Helicobacter pylori* in Dutch and Japanese populations. It was found that family history of ulcer disease was a significant and independent risk factor for peptic ulcer.

H. pylori infection

In 1983, Warren and Marshall described organisms in gastric mucosa of patients with gastritis. By light microscopy this organism resembled *Campylobacter jejuni* but was located in the stomach. It was named *Campylobacter pyloridis*. The original *Campylobacter pyloridis* organism recently has been renamed *Helicobacter pylori* (57). *H. pylori* is 0.5-3 μ spiral gram-negative bacteria that grows in the mucus layer of human stomach (13). Epidemiologic observations showed that the prevalence of *H. pylori* infection varies in different parts of the world. *H. pylori* is found, in about 20% of young people, depending upon their socioeconomic position and general levels of sanitation, whereas it is found in about 75 to 80% of those over 65. This increased prevalence of *H. pylori* with age, and its familial and social associations, suggest that

Copyright by Mahidol University

it spreads by person-to-person contact (75, 76). A study showed *H. pylori* infection in 81% of peptic ulcer patients (25).

- Uthaisangsuk W. (76) studied *Helicobacter pylori* infection in peptic ulcer disease. It was found that among the total sample of 210 patients, 50% of duodenal ulcer and 65.2% of gastric ulcer had *H. pylori* infection.

- Schlemper RJ, et al. (65) studied risk factors for peptic ulcer disease: different impact of *Helicobacter pylori* in Dutch and Japanese populations. It was found that *H. pylori* serology was positively associated with peptic ulcer (OR_{adj} = 8.8, 95% CI = 1.9-4.0).

- Seinela L and Ahvenainen J (71) studied peptic ulcer in the very old patients. It was found that *H. pylori* infection was a risk factor for peptic ulcer in the elderly.

- Kemppainen H, et al. (77) studied characteristics of *Helicobacter pylori*-negative and positive peptic ulcer disease. The study found that peptic ulcer disease of elderly people is mostly negative for *H. pylori* infection.

- Wachirawat W. (67) studied influences of life-style factor, hostility, chronic stressors, and *H. pylori* infection on peptic ulcer disease at Siriraj Hospital. The results showed that 43 peptic ulcer patients had *H. pylori* infection, but *H. pylori* infection was not associated with peptic ulcer.

Copyright by Mahidol University

Underlying disease

- Everhart JE, et al. (34) studied incidence and risk factors for self-reported peptic ulcer disease in the United States. The study showed that diabetes was associated with peptic ulcer.

Stress

The mechanisms linking psychologic factors to ulcer disease are unclear. Vagal stimulation is believed to stimulate secretion of acid by stress (26). Acid secretion is increased in high stress patients (14). However, the etiologic role of stress in peptic ulcer remains elusive. Studies on the relationship between psychologic factors and peptic ulcer have concentrated on eventful stresses in life and personality trait, but the results varied (20).

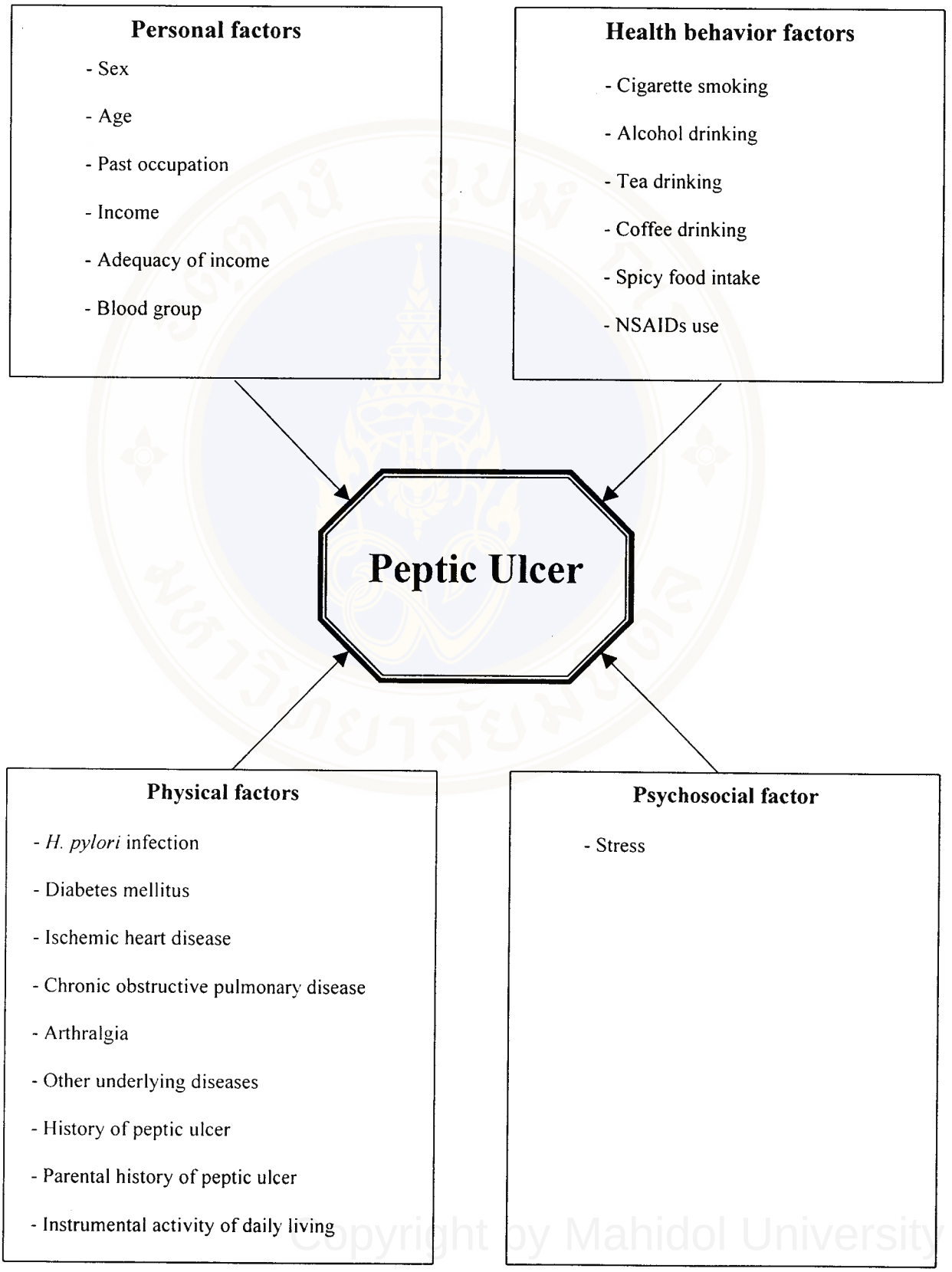
- Meeprasert M. (62) studied self-care of 40 peptic ulcer patients at Sukhothai Hospital. The study found that 75% of the subjects had some stress in their work.

- Wachirawat W. (67) studied influences of life-style factor, hostility, chronic stressors, and *H. pylori* infection on peptic ulcer disease at Siriraj Hospital. The results showed that peptic ulceration is associated with chronic stressors (OR = 2.9, 95% CI = 1.3-6.5, *p-value* = 0.01).

- Adami HO, et al. (70) studied risk factor for prepyloric and duodenal ulcer. The study showed that stress is not associated with peptic ulcer.

Copyright by Mahidol University

Conceptual Framework



Copyright by Mahidol University

CHAPTER III

MATERIALS AND METHODS

Research design

The study was a hospital-based, unmatched case-control study.

Study population

The study population was patients 60 years old or older who underwent panendoscopic examination at Siriraj Hospital and Phramongkutklao Hospital between September 7 and December 31, 2001.

Exclusion criteria of the sample

The patients with the following characteristics were excluded from the study:

1. Patients who did not want to participate in this study.
2. Patients who could not communicate verbally.
3. Patients who had definite mental disorders such as aggression and depression.
4. Patients who had gastric and duodenal cancer.
5. Patients who had gastric and duodenal mass.
6. Patients who had esophageal varices.

Copyright by Mahidol University

Sampling method

The sample was divided into two groups:

1 Case group

The cases were patients 60 years old or older with peptic ulcer (ulcer, healing ulcer, bleeding ulcer, or erosion of stomach and duodenum) as diagnosed by panendoscopy.

2 Control group

The controls were patients 60 years old or older without peptic ulcer diagnosed by panendoscopy. There were more eligible controls than cases. They were randomly selected to form the final control group with equal number to the case group.

Sample size estimate

The sample size was calculated by using the following Schlessman 1982's (78) Case-control formula. and the ratio of case to control population used was 1:1.

$$n = \frac{\left[z_{\alpha/2}\sqrt{2p(1-p)} + z_{\beta}\sqrt{p_1(1-p_1)+p_2(1-p_2)}\right]^2}{(p_1-p_2)^2}$$

$$p = \frac{(p_1 + p_2)}{2}$$

$$p_1 = \frac{(OR)p_2}{(OR)p_2 + (1-p_2)}$$

n = Sample size of each group

OR = Odds ratio

Zα/2 = Standard value from Z table at type I error of α (0.05) = 1.96

Copyright by Mahidol University

$Z\beta$ = Standard value from Z table at type II error of β (0.20) = 0.84

P = Average exposure rate in case and control

P_1 = Average exposure rate in case

P_2 = Average exposure rate in control

In this study, 95% confidence level and 80% power of test were set. The sample size was based on Tungsittichoke L's study conducted at Pichit Hospital (32). It showed that use of aspirin and cigarette smoking were associated with peptic ulcer. When the sample size was calculated by the above formula and when the various risk factors from literature review were taken into account the sample size in each variable was shown as follows:

Variable	OR	P_1	Sample size (n)
1. Aspirin use	3.00	0.46	59.9
2. Cigarette smoking	2.22	0.48	105.8

According to the sample size table, cigarette smoking was found to require the largest sample size. The calculated number of the sample size was 106 cases in each group, the total population of the study was 212.

Materials

A questionnaire was designed based on the conceptual framework. It was verified by specialists and improved before using.

Part 1 General data consisted of 3 parts:

1.1 Demographic data such as sex, age, marital status, past occupation, income, and blood group.

Copyright by Mahidol University

1.2 Health behavior data such as smoking, alcohol drinking, coffee and tea drinking, spicy food intake,and NSAIDs use.

1.3 Panendoscopic data such as indications and results of panendoscopic examination. results of *H. pylori* test and biopsy.

Part 2 Thai Stress Test (TST)

The Thai Stress Test (TST) was developed by the Department of Psychiatry, Faculty of Medicine, Siriraj Hospital. The sample comprised 800 subjects aged between 12 and 60 years old or older from the two main groups: 400 normal and 400 psychiatric patients. The Thai Stress Test could statistically significantly discriminate between the people with a mental disorder and normal people. Alpha coefficient of the TST total test is 0.84.

Part 3 Instrumental activity of daily living

Instrumental activity of daily living is transformed from Survey in Europe on Nutrition and the Elderly. a concerted Action (SENECA) (79). It is a rating scale that is composed of 16 items.

Data collection

The questionnaire was pretested at Siriraj Hospital and Phramongkutklao Hospital for comprehensibility, and was revised before using in the present study. Data were collected between September 7 and December 31, 2001. The samples were interviewed one by one by the researcher before undergoing the panendoscopic examination.

Copyright by Mahidol University

Content validity

The content validity of the questionnaires was checked by Assoc.Prof. Prasert Assantachai, Assoc.Prof. Sathaporn Manatsathit, and Lect. Kamol Udol, to ensure that they fulfilled the objectives of the study.

Reliability

The reliability of the questionnaires was calculated by Cronbach's alpha method (SPSS/PC). The reliability of the Thai Stress Test (TST) was 0.66, and that of the instrumental activity of daily living was 0.97.

Data analysis

The data analysis was performed on a microcomputer using the SPSS/PC program. Association was considered statistically significant if two tailed *p-value* < 0.05.

1. Descriptive statistics

Descriptive statistics were presented by means of frequency, percentage, means, and standard deviation.

2. Analytic statistics

2.1 Univariate analysis

Odds ratio, 95% confidence interval, and *p-value* from Pearson's chi-square were used to compare each of the independent risk factors. This analysis was for testing size and direction of relationships between factors and peptic ulcer in the elderly.

Copyright by Mahidol University

2.2 Multivariate analysis

The study could not show the relationship because the confounders could not be controlled. Therefore, this study tried to reduce the confounders by using multiple logistic regression and controlling all confounders.

This study was based on multivariate analysis.

Copyright by Mahidol University

CHAPTER IV

RESULTS

Data were collected from Siriraj Hospital and Phramongkutklao Hospital. The total number of the patients who were eligible and agreed to participate in this study was 212 (142 at Siriraj Hospital and 70 at Phramongkutklao Hospital). There were 106 cases and 106 controls.

The studied results will be presented as follow:

1. Demographic characteristics
2. Panendoscopic examination data
3. Comparison of characteristics of variables which are associated with peptic ulcer in the elderly between case and control (Univariate Analysis)
4. Comparison of characteristics of variables which are associated with peptic ulcer in the elderly by controlling other confounders (Multiple logistic Regression Analysis)

1. Demographic characteristics (Table1)

1.1 Hospital

There were 212 patients. The majority of cases and controls were patients at Siriraj Hospital (62.3% and 71.7%). There was no statistical difference between cases and controls regarding the hospital where they were enrolled.

Copyright by Mahidol University

1.2 Types of patient

Types of patient were divided into outpatient and inpatient. The majority of cases and controls were out patient (72.6% and 83.0%). Case and control were not statistically different regarding types of patient.

1.3 Sex

Cases and controls in general were not different with regard to sex distribution. Females comprised more than half of the study subjects (54.7% of cases and 59.4% of controls). Male to female ratio of both groups were similar (1: 1.2 and 1: 1.5).

1.4 Age

The largest age-group of cases and controls was the 60-69 years age group (64.1% and 60.4% respectively) and the second largest age-group was the 70-79 years age group (25.5% and 34.0% respectively). The smallest age-group of cases and controls was the 80 years or more age group (10.4% and 5.6% respectively). The mean age of cases was 69.62 years (SD = 7.35). The mean age of controls was 68.67 years (SD = 7.14). Age distribution and mean age were not difference between cases and controls.

1.5 Marital Status

The majority of cases and controls were living with their spouses (61.3% and 71.7%). Marital status was not different between cases and controls.

1.6 Past occupation

The largest group of cases were unemployed (24.5%). The second largest group were government officer (21.7%). The third largest group were employee (18.9%). The largest group of controls were government officer (27.4%). The second

Copyright by Mahidol University

largest group were unemployed and merchant (21.7%). The third largest group were agriculturist (17.9%). Distribution of past occupation was not different between cases and controls.

1.7 Education level

Most cases and controls achieved primary school (53.8% and 44.3%). A smaller group of cases and controls achieved secondary school (15.1% and 28.3%). The smallest group of both groups achieved diploma (6.6%). Cases and controls were not different with regard to education level.

1.8 Income

The majority of cases and controls had income of less than 5,000 baht/month (57.6% and 49.0%). The minority of cases and controls had income 10,000-14,999 baht/month (9.4% and 10.4%). Cases had income between 0 and 100,000 baht/month. The mean income of cases was 8,017.9 $\pm$ 14,785.1 baht/month and the median was 3,000 baht/month. Controls had income between 0 and 82,000 baht/month. The mean income of controls was 8,245.2 $\pm$ 11,800.5 baht/month and the median was 5,000 baht/month. There was no difference between cases and controls in terms of income distribution and mean income.

1.9 Adequacy of income

The majority of cases and controls had sufficient income (49.0% and 56.6%), fewer with insufficient income (36.8% and 30.2%). The smallest group had some savings (14.2% and 13.2%). The distribution of adequacy of income was not statistically different between cases and controls.

Copyright by Mahidol University

1.10 Blood group

The majority of cases (27.4%) had blood group O and the minority (26.4%) did not know their blood group. The majority of controls (47.1%) did not know their blood group and the minority (23.6%) had blood group O.

1.11 Activity of daily living (ADL)

Cases had ability to perform ADL scores between 16 and 64 points. The mean ADL scores ± SD of the cases was 28.03 ± 15.01 points. Controls had ability to perform ADL scores between 16 and 61 points. The mean ADL scores ± SD of the controls was 25.64 ± 12.03 points.

Table 1 Number and percentage of cases and controls by demographic characteristics.

Variables	Cases N = 106		Controls N = 106		*p-value***
	Number	%	Number	%	
Hospital					
Siriraj	66	62.3	76	71.7	0.144
Phramongkutklao	40	37.7	30	28.3	
Types of patient					
OPD	77	72.6	88	83.0	0.069
IPD	29	27.4	18	17.0	

** *P-value* from chi-square

Copyright by Mahidol University

Table 1 Number and percentage of cases and controls by demographic characteristics (continued).

Variables	Cases N = 106		Controls N = 106		*p-value***
	Number	%	Number	%	
Sex					
Male	48	45.3	43	40.6	0.488
Female	58	54.7	63	59.4	
Age					
60-69	68	64.1	64	60.4	0.237
70-79	27	25.5	36	34.0	
≥ 80	11	10.4	6	5.6	
Mean ± SD	69.62	± 7.35	68.67	±7.14	0.339#
Marital status					
Those living with their spouses	65	61.3	76	71.7	0.109
Those not living with their spouses	41	38.7	30	28.3	
Past occupation					
Unemployed	26	24.5	23	21.7	0.208
Government officer	23	21.7	29	27.4	
Employee	20	18.9	8	7.5	
Agriculturist	17	16.0	19	17.9	
Merchant	17	16.0	23	21.7	
Others	3	2.9	4	3.8	

** *P-value* from chi-square # *P-value* from t-test

Copyright by Mahidol University

Table 1 Number and percentage of cases and controls by demographic characteristics (continued).

Variables	Cases N = 106		Controls N = 106		*p-value***
	Number	%	Number	%	
Education level					
No education	15	14.1	12	11.3	0.231
Primary	57	53.8	47	44.3	
Secondary	16	15.1	30	28.3	
Diploma	7	6.6	7	6.6	
Bachelor's degree or higher	11	10.4	10	9.5	
Income (baht/month)					
< 5,000	61	57.6	52	49.0	0.655
5,000 - 9,999	18	17.0	23	21.7	
10,000- 14,999	10	9.4	11	10.4	
≥ 15,000	17	16.0	20	18.9	
Mean ± SD	8,017.9 ±14,785.1		8,245.2 ±11,800.5		0.902#
Min-Max	0-100,000		0-82,000		
Median	3,000		5,000		
Adequacy of income					
Insufficient	39	36.8	32	30.2	0.523
Sufficient	52	49.0	60	56.6	
Some saving	15	14.2	14	13.2	

** *P-value* from chi-square # *P-value* from t-test

Copyright by Mahidol University

Table 1 Number and percentage of cases and controls by demographic characteristics (continued).

Variables	Cases N = 106		Controls N = 106		*p-value***
	Number	%	Number	%	
Blood group					0.025
Not know	28	26.4	50	47.1	
A	17	16.0	13	12.3	
B	23	21.7	14	13.2	
AB	9	8.5	4	3.8	
O	29	27.4	25	23.6	
ADL					
Min-Max	16-64		16-61		
Mean ± SD	28.03 ± 15.01		25.64 ± 12.03		

** *P-value* from chi-square

2. Panendoscopic examination data (Table 2)

2.1 Indication of panendoscopy

The largest group of cases had panendoscopic examination due to gastrointestinal hemorrhage (30.7%). The second largest group were examined because of abdominal pain (24.6%), and the third largest group had abdominal pain with gastrointestinal hemorrhage (13.1%). The largest group of controls had abdominal pain (39.4%) as an indication for panendoscopy. The second and third

Copyright by Mahidol University

largest groups had panendoscopic examination due to gastrointestinal hemorrhage (15.6%) and heartburn (14.7%) respectively.

2.2 Results of the examination

Most of cases (74.3 %) had ulcer, while 25.7% had erosion. The major site of ulcer and erosion were the stomach (65.5% and 82.8%), the second most frequent site of ulcer and erosion was the duodenum (33.3% and 17.2%). Only few subjects had ulcer or erosion at the esophagus (1.2% and 0%). The findings in controls were categorized as normal, inflammation, and others (32.4%, 50.5%, and 17.1%). The major site of inflammation was the stomach (82.1%), the second most frequent site of inflammation group was the duodenum (12.5%).

2.3 Tissue biopsy

Most cases and controls did not have tissue biopsy (70.8% and 95.3%).

2.4 Campylobacter like organism test (CLO test)

The majority of cases and controls did not have CLO test (51.9% and 81.1%). Among those in whom CLO test was done, positive result was found in 29.4% of cases and 10.0% of controls.

Copyright by Mahidol University

Table 2 The data of panendoscopic examination

Variables	Cases (N = 106)		Controls (N = 106)	
	Number	%	Number	%
Indication				
Abdominal pain	28	24.6	43	39.4
Gastrointestinal hemorrhage	35	30.7	17	15.6
Abdominal pain with gastrointestinal hemorrhage	15	13.1	11	10.1
Heartburn	8	7.0	16	14.7
Anemia	12	10.5	6	5.5
Dysphagia	1	0.9	5	4.6
Follow up	10	8.8	5	4.6
Other	5	4.4	6	5.5
Results				
Normal	0	0	36	32.4
Abnormal				
- Inflammation	0	0	56	50.5
- Esophagitis	0	0	3	5.4*
- Gastritis	0	0	46	82.1*
- Duodenitis	0	0	7	12.5*

* % of inflammation ** % of erosion ❖ % of ulcer ❖❖ % of CLO Test

Remarks: number in each column may be not total to N because the patients may have more than one symptom.

Copyright by Mahidol University

Table 2 The data of panendoscopic examination (continued)

Variables	Cases (N = 106)		Controls (N = 106)	
	Number	%	Number	%
Results				
- Erosion	29	25.7	0	0
- Esophageal erosion	0	0	0	0
- Gastric erosion	24	82.8**	0	0
- Duodenal erosion	5	17.2**	0	0
- Ulcer	84	74.3	0	0
- Esophageal ulcer	1	1.2❖	0	0
- Gastric ulcer	55	65.5❖	0	0
- Duodenal ulcer	28	33.3❖	0	0
- Other	0	0	19	17.1
Tissue biopsy				
Not done	75	70.8	101	95.3
Done	31	29.2	5	4.7
CLO Test				
Not done	55	51.9	86	81.1
Done	51	48.1	20	18.9
- Positive	15	29.4❖❖	2	10.0❖❖
- Negative	36	70.6❖❖	18	90.0❖❖

* % of inflammation ** % of erosion ❖ % of ulcer ❖❖ % of CLO Test

Remarks: number in each column may be not total to N because the patients may have more than one symptom.

Copyright by Mahidol University

3. Association between variable and peptic ulcer in the elderly (Univariate Analysis)

3.1 Personal factors (Table 3)

Sex

Sex was not statistically significantly associated with peptic ulcer in the elderly (*p-value* = 0.488).

Age

The study showed that increasing of age was not statistically significantly associated with peptic ulcer in the elderly (*p-value* = 0.237).

Past occupation

Past occupation was divided into 3 groups; employee and agriculturist group, unemployed group, and government officer and merchant group. The group of employee and agriculturist comprised 34.9% of the cases and 25.5% of the controls. The unemployed group comprised 27.4% of the cases and 25.5% of the controls. The group of government officer and merchant comprised 37.7% of the cases and 49.0% of the controls. The past occupation was not significantly associated with peptic ulcer in the elderly (*p-value* = 0.202).

Income (baht /month)

Income was divided into 2 groups using the median income of the sample as the cut off point: less than 3,500 bath/month and 3,500 baht/month or more. The majority of cases (53.8%) had income of less than 3,500 bath/month, whereas the majority of controls (55.7%) had income of 3,500 baht/month or more. Income per month was not significantly associated with peptic ulcer in the elderly (*p-value* = 0.169).

Copyright by Mahidol University

LIBRARY AND INFORMATION CENTER MAHIDOL UNIVERSITY

Adequacy of income

Most of cases and controls had sufficient income (63.2% and 69.8%). A smaller group of cases and controls had insufficient income (36.8% and 30.2%). Adequacy of income was not significantly association with peptic ulcer in the elderly (*p-value* = 0.308).

Blood group O

The control group had higher proportion of blood group O than did the case group (44.6% and 37.2%). No association was found between blood group O and peptic ulcer in the elderly (*p-value* = 0.385).

Table 3 The association between personal factors and peptic ulcer in the elderly by Univariate Analysis.

Personal factors	Cases (106)		Control (106)		OR	95%CI	*p-value***
	Number	%	Number	%			
Sex							
Male	48	45.3	43	40.6	1.21	0.70-2.09	0.488
Female*	58	54.7	63	59.4			
Age							0.237
≥ 80	11	10.4	6	5.6	1.73	0.60-4.94	
70-79	27	25.5	36	34.0	0.71	0.39-1.29	
60-69*	68	64.2	64	60.4			

* Reference group

** *P-value* from chi-square

Copyright by Mahidol University

Table 3 The association between personal factors and peptic ulcer in the elderly by Univariate Analysis (continue).

Personal factors	Cases (106)		Control (106)		OR	95%CI	*p-value***
	Number	%	Number	%			
Past occupation							0.202
Employee and Agriculturist	37	34.9	27	25.5	1.78	0.94-3.40	
Unemployed	29	27.4	27	25.5	1.40	0.72-2.72	
Government officer and Merchant*	40	37.7	52	49.0			
Income							
< 3,500	57	53.8	47	44.3	1.46	0.85-2.51	0.169
≥ 3,500*	49	46.2	59	55.7			
Adequacy of income							
Insufficient	39	36.8	32	30.2	1.37	0.76-2.39	0.308
Sufficient*	67	63.2	74	69.8			
Blood group O							
Yes	29	37.2	25	44.6	0.73	0.37-1.48	0.385
No*	49	62.8	31	55.4			

* Reference group

** *P-value* from chi-square

Copyright by Mahidol University

3.2 Behavior factor (Table 4)

Cigarette smoking

The majority of the sample were categorized as non-smoking (89.6% in case group and 96.2% in controls group). A small proportion of cases and controls group still smoked cigarette (10.4% and 3.8% respectively). Cigarette smoking was not significantly associated with peptic ulcer in the elderly (*p-value* = 0.061).

Alcohol drinking

Most of the cases and controls group did not drink alcohol (96.2% and 92.5%). A small proportion of the cases and controls group still drank alcohol (3.8% and 7.5%). There was no significant association between alcohol drinking and peptic ulcer in the elderly (*p-value* = 0.235).

Tea drinking

The majority of cases and controls group did not drink tea (79.2% and 74.5%). A small proportion of cases and controls group still drank tea (20.8% and 25.5%). There was no significant association between tea drinking and peptic ulcer in the elderly (*p-value* = 0.415).

Coffee drinking

The majority of cases and controls group did not drink coffee (66.0% and 68.9%). About one-third of cases and controls group still drank coffee (34.0% and 31.1%). Coffee drinking was not significantly associated with peptic ulcer in the elderly (*p-value* = 0.660).

Copyright by Mahidol University

Spicy food intake

A smaller proportion of cases had spicy food than did the controls.(42.5% in case group and 54.7% in control group). No significant association was found between spicy food intake and peptic ulcer in the elderly (*p-value* = 0.074).

NSAIDs use

Most of the cases and controls group did not used NSAIDs (57.5% and 84.0%). A smaller proportion of the cases and controls group used NSAIDs (42.5% and 16.0%). This study found that the elderly who had NSAIDs use were 3.86 time to develop peptic ulcer when compared to the elderly who did not use NSAIDs (*p-value* < 0.001).

Table 4 The association between health behavior factors and peptic ulcer in the elderly by Univariate Analysis.

Health behavior	Cases (106)		Control (106)		OR	95%CI	*p-value***
	Number	%	Number	%			
Cigarette smoking							
Yes	11	10.4	4	3.8	2.95	0.91-9.60	0.061
No*	95	89.6	102	96.2			
Alcohol drinking							
Yes	4	3.8	8	7.5	0.48	0.14-1.65	0.235
No*	102	96.2	98	92.5			

* Reference group

** *P-value* from chi-square

Copyright by Mahidol University

Table 4 The association between health behavior factors and peptic ulcer in the elderly by Univariate Analysis (continue).

Health behavior	Cases (106)		Control (106)		OR	95%CI	*p-value***
	Number	%	Number	%			
Tea drinking							
Yes	22	20.8	27	25.5	0.77	0.40-1.46	0.415
No*	84	79.2	79	74.5			
Coffee drinking							
Yes	36	34.0	33	31.1	1.14	0.64-2.02	0.660
No*	70	66.0	73	68.9			
Spicy food intake							
Yes	45	42.5	58	54.7	0.61	0.36-1.05	0.074
No*	61	57.5	48	45.3			
NSAIDs use							
Yes	45	42.5	17	16.0	3.86	2.02-7.37	< 0.001
No*	61	57.5	89	84.0			

* Reference group

** *P-value* from chi-square

3.3 Physical factors (Table 5)

H.pylori infection

There was no significant difference between *H.pylori* infection and peptic ulcer in the elderly (*p-value* = 0.123).

Copyright by Mahidol University

Underlying disease

The majority of cases and controls had hypertension (39.6% and 37.7%). A smaller proportion of the cases and controls had diabetes mellitus (27.4% and 19.8%). There was no statistically significant association between underlying disease (diabetes mellitus, ischemic heart disease, COPD, arthralgia, and hypertension) and peptic ulcer.

History of peptic ulcer

History of peptic ulcer in the case group was more common than in the control group (30.2% and 13.2%). In this study, the elderly who had history of peptic ulcer were 2.84 times more likely to have peptic ulcer when compared to those without the history of peptic ulcer (*p-value* = 0.003).

Parental history of peptic ulcer

This study found that there was no significant association between parental history of peptic ulcer and peptic ulcer in the elderly (*p-value* = 0.269).

Activity of daily living (ADL)

Ability to perform ADL was classified into low and moderate or good according to the score from ADL questionnaire, using the score at 75th percentile (36 points) as a cut-off point. The result found that most of cases and controls had moderate or good ability (71.1% and 77.4%). A smaller proportion of cases and controls had low ability (28.3% and 22.6%). There was no significant association between ADL and peptic ulcer in the elderly (*p-value* = 0.344).

Copyright by Mahidol University

Table 5 The association between physical factors and peptic ulcer in the elderly by Univariate Analysis.

Physical factors	Cases (106)		Control (106)		OR	95%CI	*p-value***
	Number	%	Number	%			
***H. pylori* infection**							
Positive	15	29.4	2	10.0	3.75	0.77-18.21	0.123[#]
Negative	36	70.6	18	90.0			
Diabetes mellitus							
Yes	29	27.4	21	19.8	1.52	0.80-2.89	0.196
No*	77	72.6	85	80.2			
IHD							
Yes	18	17.0	14	13.2	1.34	0.63-2.87	0.443
No*	88	83.0	92	86.8			
COPD							
Yes	5	4.7	3	2.8	1.70	0.40-7.30	0.721[##]
No*	101	95.3	103	97.2			
Arthralgia							
Yes	14	13.2	16	15.1	0.86	0.40-1.86	0.694
No*	92	86.8	90	84.9			

* Reference group

** *P-value* from chi-square

[##] *P-value* from Fisher's exact test

Copyright by Mahidol University

Table 5 The association between physical factors and peptic ulcer in the elderly by Univariate Analysis (continue).

Physical factors	Cases (106)		Control (106)		OR	95%CI	*p-value***
	Number	%	Number	%			
Hypertention							
Yes	42	39.6	40	37.7	1.08	0.62-1.88	0.778
No*	64	60.4	66	62.3			
History of Peptic ulcer							
Diagnosed by							
-History of GI hemorrhage	5	15.6	2	14.3			
-X-ray or panendoscopy	5	15.6	7	50.0			
-Both	22	68.8	5	35.7			
Yes	32	30.2	14	13.2	2.84	1.41-5.72	0.003
No*	74	69.8	92	86.8			
Parental history of peptic ulcer							
Yes	5	4.7	9	8.5	0.53	0.17-1.65	0.269
No*	101	95.3	97	91.5			
ADL							
low	30	28.3	24	22.6	1.35	0.73-2.51	0.344
Moderate or good*	76	71.7	82	77.4			

* Reference group

** *P-value* from chi-square

P-value from Fisher's exact test

Copyright by Mahidol University

3.4 Psychosocial factors (Table 6)

Stress

Stress was categorized into 3 levels, based on TST index. Most cases and controls had excellent and normal stress level (71.7% and 76.4%). Smaller proportion of cases and controls had mild stress level (16.0% and 17.9%). The smallest proportion of cases and controls had stressful level (12.3% and 5.7%). There was no statistically significant association between stress and peptic ulcer in the elderly (*p-value* = 0.241).

Table 6 The association between psychosocial factor and peptic ulcer in the elderly by Univariate Analysis.

Psychosocial factors	Cases (106)		Control (106)		OR	95%CI	*p-value***
	Number	%	Number	%			
Stress							0.241
Stressful	13	12.3	6	5.7	2.31	0.84-6.38	
Mild stress	17	16.0	19	17.9	0.95	0.46-1.97	
Excellent and normal*	76	71.7	81	76.4			

* Reference group

** *P-value* from chi-square

4. The association between factors and peptic ulcer in the elderly by Multivariate Analysis (Table 7).

To adjust for possible confounding factors, multiple logistic regression by Forward Stepwise Method (LR) was performed to calculate adjusted OR of possible

Copyright by Mahidol University

risk factors determined by previous univariate analysis. Variables with *p-value* less than 0.1 were entered into the logistic model to find adjusted effects (OR). This study found that three risk factors (NSAIDs usage, cigarette smoking, and history of peptic ulcer) had significant association with peptic ulcer in the elderly. This model has *p-value* less than 0.001.

Table 7 The association between factors and peptic ulcer in the elderly by Multivariate Analysis.

Factors	β	S.E.β	Adjusted OR	95%CI (OR)	*p-value*✣
NSAIDs use	1.44	0.34	4.21	2.16-8.21	< 0.001
Cigarette smoking	1.28	0.63	3.60	1.05-12.36	0.042
History of peptic ulcer	1.15	0.38	3.15	1.51-6.58	0.002

constant = -0.7281

✣ *P-value* from Wald test after multiple logistic regression used

Copyright by Mahidol University

CHAPTER V

DISCUSSION

Methodological critique of the study

1. Research design

This study was a hospital-based, unmatched case-control study. To examine the possible relation of an exposure to a certain disease, the researcher identified a group of individuals with that disease (called cases), and for the purposes of comparison, a group of people without that disease (called controls) were also selected (80). The advantages of a case-control design are chiefly logistical. In particular, a rare disease and those with long latency periods can be studied efficiently. In general, the sample size required for a case-control study tends to be smaller than that would be needed for an alternative design such as a cohort study. As a result, the expense of conducting a case-control study is substantially less than the cost of a cohort study (81).

However, case-control studies are much more susceptible to various forms of biases (82), which can be categorized into three general types: selection bias, information bias, and confounding bias (83). There are also many limitations because it is a retrospective study. For example, the process of subject selection in a case-control study precludes the estimation of risk (or rate), and risk ratio therefore cannot be calculated directly from case-control data (81). Case-control studies are usually restricted to a single outcome of interest and are not efficient for studying rare

Copyright by Mahidol University

exposure (82). The reason a case-control study was selected in this study is restrictions in time and budget of the study.

In which newly diagnosed cases and controls are sampled from a source population, is used quite commonly. It is called a population-based study because cases and controls are sampled from a defined population. Other types of case-control studies differ from the population-based study primarily in the way the samples of cases and controls are selected. Variations include the use of prevalent rather than incident cases and sampling of controls from a readily available, convenient group such as hospital inpatients.

The hospital-based case-control study is used so often that it is worth mentionied here. In this type of study, the investigator typically selects cases from persons admitted with the disease of interest to a particular hospital or hospitals and controls from persons admitted with other conditions. The hospital-based case-control studies are easier and quicker to conduct than population-based studies, since cases and controls are identified efficiently. As a consequence, this may be less expensive. Furthermore, the collection of exposure information from medical records and biologic markers is easier in the hospital environment. Subjects in the hospital are more accessible for interview than persons in the community. However, hospital-based studies are susceptible to distorted results (81).

The objective of this study was to study factors associated with peptic ulcer in the elderly. The population was patients 60 years old or older who underwent panendoscopic examination at Siriraj Hospital and Phramongkutklao Hospital. Therefore, it was a hospital-based case-control study. However, there were several

Copyright by Mahidol University

other selection criteria that may have helped to reduce this type of distortion which have previously been discussed in Chapter III.

2. Selection of cases and controls

One of the first steps in a case-control study design is to identify and select cases, a step that also determines the source population. The next key step is to identify and select controls (81). The target population was the elderly and the source population was the patients 60 years old or older who underwent panendoscopic examination at Siriraj Hospital and Phramongkutklao Hospital. Siriraj Hospital and Phramongkutklao Hospital were selected because they were among the largest hospitals in Thailand, so there were enough number of samples. Thus, the study settings were not randomly selected. Rather, they were purposefully selected. Therefore, the results of the present study might not be generalizable to all elderly patients with the same condition.

Selection of cases

The number of cases with peptic ulcer in this study was selected by purposive sampling because specialist diagnosed the condition. There were restricted cases in this study that fitted the inclusion and exclusion criteria (p. 46-47). First, the cases were patients 60 years old or older with peptic ulcer (ulcer, healing ulcer, bleeding ulcer, or erosion of gastric and duodenum) as diagnosed with panendoscopy. Second, the patients could communicate verbally and were willing to respond to the questionnaire. Third, the patients having definite mental disorders such as aggression and depression were excluded from the study because they could not answer the questionnaire properly. Moreover, the patients who had gastric and duodenal cancer or

Copyright by Mahidol University

mass were excluded. Cancer caused by multifactorial, so they had many exposures. Lastly, some patients who had esophageal varices that often occur in alcoholic cirrhosis patients were excluded since they may have too much alcohol exposure and may have distorted the findings of the study if they had been included in this study.

Selection of controls

A fundamental conceptual issue relating to selection of controls is whether the controls should be similar to the cases in all respects other than having the disease in question, or whether they should be representative of all persons without the disease in the population from which the cases are selected (80). This study used hospital controls because the cases were obtained from hospitals. The controls were patients 60 years old or older without peptic ulcer from panendoscopy. The normal aging controls were not selected because it could not be confirmed that they were actually without peptic ulcer without panendoscopy.

3. Bias

Bias has been defined as "any systematic error in the design, conduct or analysis of study that results in a mistaken estimate of an exposure's effect on the risk of disease" (80). Biases can be categorized into three general types: selection bias, information bias. and confounding bias (83).

Selection bias

Selection bias occurs in the design stage of studies. It sometimes occurs during the execution of a study when some subjects and not others are included. An error in the estimation of effect happens when characteristics of the subjects selected for study are systematically different from those of the target population.

Copyright by Mahidol University

Selection bias usually occurs in case-control studies when the selection of cases and controls is based on different criteria related to exposure (83). If the admission rates of exposed and unexposed cases and controls differ, their relative odds of exposure to the putative cause will be distorted in hospital-based studies (85). It was called admission rate (Berkson) bias.

Information bias

Information bias can occur when the means for obtaining information about the subjects in the study are inadequate. As a result, some of the information gathered regarding exposures and/or disease outcome is incorrect (80). The most common or important types of information bias include interviewer (intrainterviewer and interinterviewer) bias, questionnaire bias, recall bias, diagnotic suspicion bias, and exposure suspicion bias (83). In this study, knowledge of the indication of panedoscopy of patients such as history gastrointestinal hemorrhage may influence assessment of exposure (exposure suspicion bias). More ever, face-to-face interviews can underestimate some behaviors such as mental status compared with self-administered questionnaire. Measures to prevent information bias in this study were (1) pre-testing the questionnaire several times and carefully phrasing it to avoid leading questions, and (2) having only one interviewer fill out all questionnaires before the patients were examined with panendoscopy.

Confounding bias

Confounding is essentially a mixing of effects that occurs when a factor (confounder) associated with the exposure of interest is also associated with development of the disease or outcome of interest independently of exposure (83). Generally, the list of potential confounders in a study is limited to established risk

Copyright by Mahidol University

factors for the disease of interest. There are two accepted methods for dealing with potential confounders. The first is to consider them in the design of the study by matching the potential confounder or restricting the sample to limited levels of the potential confounder. The other method is to evaluate confounding in the analysis by stratification, or by using multivariate analysis techniques such as multiple logistic regression (81). The multiple logistic regression analysis yielded more reliable results as the effects of confounding factors were controlled. The multiple logistic regression was used in this study.

4. Limitations of this study

1. This study was based on a hospital based, unmatched case-control design because of the limited time and budget. As the controls were the who were scheduled for panendoscopic examination at Siriraj and Phramongkutklao Hospital and did not have peptic ulcer, the exposures of interest among these controls might differ from those of the elderly who did not have peptic ulcer in general who were not examined by panendoscopy. For example, the proportion of NSAIDs users among the controls in this study might be higher than that of the elderly who did not have peptic ulcer in general because having a history of NSAIDs use might prompt the attending psysician to order panendoscopy in patients with chronic abdominal pain although, this symptom might not be caused by peptic ulcer.

2. Some patients were not tested with CLO test to identify *H. pylori* infection because the cost of CLO test is so expensive that patients with a low income cannot afford the examination. Thus, a verification of exposure in case group and control group was different and might cause bias in this study. CLO test was not put

Copyright by Mahidol University

into the logistic model to find adjusted effects because the sample size with this regard was inadequate.

3. In this study, blood group was collected by interview without actual examination. Underreporting of blood group might lead to an underestimation of relationship between blood group and peptic ulcer in the elderly.

Comparison with other studies

Multivariate logistic regression analysis was conducted to control the effect of confounders. It was found that NSAIDs use, having history of peptic ulcer, and cigarette smoking are independently associated with peptic ulcer in the elderly.

NSAIDs use

This study confirmed that NSAIDs use is strongly associated with peptic ulcer in the elderly. It was included in first model of multiple logistic regression by Forward Stepwise Method (LR). The adjusted OR for NSAIDs use were 4.21 (95%CI = 2.16-8.21). This finding is consistent with that of previous epidemiologic studies (71, 72). For example, Seinela, L and Ahvenainen, J (71) studied peptic ulcer in the very old patients and found that aspirin users are at an increased risk of ulcer disease. Griffin, MR, et al. (72) studied nonsteroidal anti-inflammatory drug use and increased risk for peptic ulcer disease in elderly persons. The study showed that NSAIDs use is associated with peptic ulcer in the elderly (OR = 4.1, 95% CI = 3.5-4.7). Furthermore, there are also many other studies which discovered that NSAIDs use is associated with peptic ulcer (19, 32, 34). In contrast, some authors have reported that NSAIDs use was not associated with peptic ulcer (65, 67). The difference of the study

Copyright by Mahidol University

design, characteristics of samples, and definition of case and control can explain the lack of significance of this association in the following studies:

Schlemper, R J. et al. (65) studied risk factors of peptic ulcer disease in Dutch and Japanese. Study population consisted of healthy employees who did not often use NSAIDs; this in contrast to hospital patients in whom the association of NSAIDs use with ulcers has become apparent.

Wachirawat W (67) used a case-control design similar to the present study. The definition of the cases was endoscopically diagnosed patients with peptic ulcer or peptic perforation. The controls were patients with other diseases or blood donors, which is different from the controls used in this study. In other words, there is a difference in characteristics of the samples in these two studies. In Wachirawat's study, the age of the patients ranged from 15 to 89 years with the mean age of 46.50 years (SD = 16.16) and the majority of the study population were male (77.1%). In contrast, the population of this study was the patients who were 60 years old or older and the proportion of female was slightly higher than that of male (57.1%). The elderly women are more likely to have multiple joint involvement (48) and NSAIDs is used in the treatment.

Nonsteroidal anti-inflammatory drugs (NSAIDs), including aspirin, are among the most widely used drugs in the world. There are approximately 111,400,000 NSAID prescriptions in the United States (84), and 3 million people take NSAIDs daily (7). The prevalence of at least once-weekly NSAIDs use among people 65 years old or older has been reported to be as high as 70% (84). NSAIDs are effective for the treatment of pain, inflammation, and fever. Besides, aspirin is increasingly used for prophylaxis of vascular events. The main factor that limits the use of NASIDs is their

Copyright by Mahidol University

gastrointestinal toxicity (77). NASIDs damage the gastric mucosa by suppressing the synthesis of gastric prostaglandin. Prostaglandins regulate several components of the mucosal defense system including mucus and bicarbonate secretion and mucosal blood flow (13,20). Epidemiologic studies have shown that NSAIDs use increases incidence of peptic ulcer, especially in the elderly (19).

Cigarette smoking

In this study, cigarette smoking was found to be associated with peptic ulcer in the elderly according to the multivariate analysis (OR_{adj} =3.60, 95% CI=1.05–12.36, p-value = 0.042). The result agrees with several studies (17, 19, 32, 35, 64, 69, 70) which found that cigarette smoking was associated with peptic ulcer. However, the result was inconsistent with that of a previous study by Schlemper, et al (65), which studied risk factors of peptic ulcer disease, particularly different impacts of *Helicobacter pylori* in Dutch and Japanese populations. It reported that cigarette smoking is not associated with peptic ulcer.

This difference may be due to many factors such as study design, criteria to select target population, and exposure measurement. The study of Schlemper was a cross-sectional study. Cigarette smoking habit may have been deliberately changed because of concerns over dyspeptic consequences, leading to a reversal of the association as shown in other studies. In this study subjects were identified as cases and controls after the researcher had interviewed them, which was in contrast to that of Schlemper's study. Thus, the researcher did not know the status of the sample population at the start of the study, and the information bias from interviewer bias would be reduced.

Copyright by Mahidol University

How cigarettes exert their detrimental effects is not known. However, smoking has been shown to: 1) decrease pancreatic secretion of bicarbonate; 2) decrease mucosal blood flow; 3) decrease mucosal prostaglandin synthesis; 4) decrease the effectiveness of H_2 blockers; 5) speed gastric emptying; and 6) increase duodenogastric reflux. Cigarette smoking is an important factor in ulcer occurrence, recurrence, healing, and complications (7).

History of peptic ulcer

The finding of this study revealed that history of peptic ulcer was significantly associated with peptic ulcer in the elderly both in univariate analysis (crude OR = 2.84, 95% CI = 1.41 – 5.72, *p-value* = 0.003) and multivariate analysis (OR_{adj} = 3.15, 95% CI = 1.51- 6.58, *p-value* = 0.002). This finding is consistent with that of previous epidemiologic studies (73, 74). For example, Voskuyl AE, et al. (73) studied risk factor for serious upper gastrointestinal events in patients with possible or definite rheumatoid arthritis. It was found that history of peptic ulcer was associated with upper gastrointestinal events (symptomatic gastric or duodenal ulcer, perforation, or bleeding). Garcia RL and Jick H (74) studied risk factor for upper gastrointestinal bleeding (UGIB) and perforation. It was found that pervious UGIB was the single most important predictor of UGIB (relative risk 13.5, 95% CI = 10.3-17.7).

Frequent recurrences (both symptomatic and asymptomatic) are part of the natural history of peptic ulcer. About 60–90% of ulcer patients experience another episode within one year and almost 100% within two or three years after the previous ulcer has healed. Patients who have a high risk of ulcer recurrence are those with a

Copyright by Mahidol University

history of ulcer complications, frequent recurrence, refractory ulceration, cigarette smoking, NSAIDs use, and age more than 60 years (18).

***Helicobacter pylori* infection**

H. pylori infection is found everywhere in the world (76), especially in developing countries and among black populations (18). The prevalence of *H. pylori* infection is 30-80% in adults. About 81% of patients with peptic ulcer are infected with *H. pylori* (25). *H. pylori* infection is detected initially by Campylobacter like organism (CLO) test. In this study, only 71 subjects (33.5%) were tested with CLO test to identify *H. pylori* infection. It might be that they do not have indication to test with CLO test. In other words, the cost of CLO test is rather expensive (200 baht), so the patients with a low income cannot afford the examination.

Of these patients, 29.4% of cases and 10% of controls were tested positive for *H. pylori.* This finding is consistent with that of the studies of Kemppainen H, Raiha I, et al. (77) and Seinela L and Ahvenainen J (71) in that *H. pylori* infection was not associated with peptic ulcer in the elderly in univariate analysis. The *H. pylori* infection was not put into the model of multiple logistic regression because the samples of CLO test were inadequate; thus, it may have distorted the results of the study.

Stress

Although stress may aggravate the pain or indigestion associated with an ulcer, scientists have not yet been able to determine whether stress is an important factor in causing ulcer. In this study, stress was not associated with peptic ulcer in the

Copyright by Mahidol University

elderly. The result was inconsistent with that of a previous study by Wachirawat W (67), which studied influences of life-style factor, hostility, chronic stressors, and *H. pylori* infection on peptic ulcer disease at Siriraj Hospital. The study showed that chronic stressors is associated with peptic ulcer (OR = 2.9, 95%CI = 1.3-6.5). These differences in result might be because the instrument to measure stress in this study differed from that study.

Parental history of peptic ulcer

Parental history of peptic ulcer was not associated with peptic ulcer in the elderly. The result was inconsistent with several studies (35, 65, 67, 69). This difference might be explained by different definitions of family history of peptic ulcer; this study included only parental history of peptic ulcer whereas family history of peptic ulcer, including that of parents, grandparents, siblings and offspring, were used in other studies.

Copyright by Mahidol University

CHAPTER VI

CONCLUSION AND RECOMMENDATION

Study summary

The risk factors of peptic ulcer in the elderly include NSAIDs use (OR_{adj} = 4.21, 95% CI = 2.16 – 8.21, *p-value* < 0.001), cigarette smoking (OR_{adj} = 3.60, 95% CI = 1.05 – 12.36, p-value = 0.042), and history of peptic ulcer (OR_{adj} = 3.15, 95% CI = 1.51 – 6.58, p-value = 0.002).

Recommendation based on study result

The results of this study demonstrate factors associated with peptic ulcer in the elderly. The patients should be informed of the knowledge concerning the disease itself as well as appropriate healthcare necessary to avoid these risk factors confirmed by the study. More specific recommendations are the following:

1. When using non steroidal anti-inflammatory drugs (NSAIDs) to treat aches and pains, it is very important to use these as prescribed by physician. Do not use NSAIDs unless really necessary. Elderly patients who have to take NSAIDs should take the drug not exceeding the prescribed dose. Symptoms which require early follow up include vomiting, severe abdominal pain, and melena.

2. Reduce or stop cigarette smoking. Smoking increases the risk of peptic ulcer

Copyright by Mahidol University

3. If a patient has had an ulcer it is always important to be followed up by a physician ensure to healing and to monitor for recurrence.

Recommendation for future study

1. This kind of study should be repeated in other hospitals. This study enrolled patients at Siriraj Hospital and Phramongkutklao Hospital so the result might not apply to other groups.

2. Further studies to determine the risk factors associated with gastric ulcer and duodenal ulcer, separately should be carried out..

3. The further study in types of food factors associated with peptic ulcer should be done.

Copyright by Mahidol University

REFERENCE

1. ศิริวรรณ ศิริบุญ. ประมวลประเด็นการวิจัยเกี่ยวกับผู้สูงอายุในด้านต่างๆ. กรุงเทพมหานคร: งานส่งเสริมการวิจัยและตำรา กองบริการการศึกษา มหาวิทยาลัยมหิดล; 2538.

2. สำนักงานสถิติแห่งชาติ สำนักนายกรัฐมนตรี. รายงานสำมะโนประชากรและเคหะ[Online]. กรุงเทพมหานคร: สำนักงานสถิติแห่งชาติ; 2543. Available from: http://www.nso.go.th/eng/stat/poph/popt2.htm [Accessed 2001 May 28].

3. กรมประชาสงเคราะห์ กระทรวงแรงงานและสวัสดิการสังคม สมาคมพฤฒาวิทยา และเวชศาสตร์ผู้สูงอายุไทย. สู่วัยสูงอายุด้วยคุณภาพ. การประชุมวิชาการว่าด้วยผู้สูงอายุ. 22-24 พฤศจิกายน 2542. โรงแรมปริ้นซ์พาเลซ:โรงพิมพ์แห่งจุฬาลงกรณ์มหาวิทยาลัย; 2542.

4. จรัสวรรณ เทียนประภาส , พัชรี ตันศริ. การพยาบาลผู้สูงอายุ. พิมพ์ครั้งที่ 3,กรุงเทพมหานคร: โรงพิมพ์รุ่งเรืองธรรม; 2536.

5. จันทร์เพ็ญ ชุประภาวรรณ, บรรณาธิการ. การสำรวจสุขภาพประชากรวัย 50 ปีขึ้นไป ประเทศไทย ปี พ.ศ. 2538. กรุงเทพมหานคร: บริษัทดีไซร์จำกัด; 2540.

6. Woo J, Ho SC, Chan SG, Yu AL, Yuen YK, Lau J. An estimate of disease burden and some economic consequences among the elderly Hong Kong population. J Epidemiol Community Health 1997;51:486-89.

7. Branch MS, Brazer SR, Taylor IL. Peptic ulcer disease. In:Gitnick G, editor. Priciple and parctice of gastroenterology and hepatology. 2nd ed. Connecticut (U.S.): Appleton & Lange; 1994. p. 141-157.

8. อุกฤต เปล่งวานิช, อรพรรณ ชินะภัค, บรรณาธิการ. Gastroenterology. พิมพ์ครั้งที่ 2, กรุงเทพมหานคร: สำนักพิมพ์กรุงเทพเวชสาร; 2536.

9. สำนักนโยบายและแผนสาธารณสุข สำนักงานปลัดกระทรวง กระทรวงสาธารณสุข. สถิติสาธารณสุข[Online].กรุงเทพมหานคร:กระทรวงสาธารณสุข; 2543. Available from: http://www.moph.go.th/ops/bhpp/be12.htmlhttp [Accessed 2001 June 15].

Copyright by Mahidol University

10. Powell LW, Piper DW. editors. Fundamentals of gastroenterology. 5th ed. Sydney: McGraw-Hill Book; 1991.

11. Sleisenger MH, Fordtran JS, editors. Gastrointestinal disease. 5th ed. Pennsylvania: W. B. Saunders; 1993.

12. Morson BC. Colour atlas of gastrointestinal pathology.1st ed. Oxford: Oxford University Press; 1981.

13. ธีระ ศิริสินธนะ, วรวิทย์ เลาห์เรณู, อรรถวุฒิ ดีสมโชค. ฟื้นฟูวิชาการอายุรศาสตร์เชียงใหม่ 2543. เชียงใหม่: หจก. ธนบรรณการพิมพ์; 2543.

14. สุชา คูระทอง, สวัสดิ์ หิตะนันท์, เกรียงไกร อัครวงศ์, ทองดี ชัยพานิช, บรรณาธิการ. วิวัฒนาการในโรคระบบทางเดินอาหาร 4. กรุงเทพมหานคร: สำนักพิมพ์กรุงเทพเวชสาร; 2529.

15. วีกิจ วีรานุวัตติ์. ประสบการณ์ในการรักษาแผลเป็ปติคในประเทศไทย. คลินิก 2531;4(8): 567-70.

16. Timmreck TC, Randolph JF. Smoking cessation: clinical steps to improve compliance. Geriatrics 1993;48(4):63-6,69-70.

17. Kato I, Nomura Am, Stemmermann GN, Cyou PH. A prospective study of gastric and duodenal ulcer and its relation to smoking, alcohol, and diet. Am J Epidemiol 1992;135(5):521-30.

18. อัจฉรา รอดเกิด, พินิจ กุลละวณิชย์. Peptic ulcer. จุฬาอายุรศาสตร์ 2539;9(9):2534-51.

19. McIntosh JH, Fung CS, Berry G, Piper DW. Smoking, nonsteroidal anti-inflammatory drugs, and acetaminophen in gastric ulcer. A study of associations and of the effect of previous diagnosis or exposur patterns. Am J Epidemiol 1998;128(4);761-70.

20. Seager JM, Hawkey CJ. NSAID gastropathy. In: Porro GB, Cremer M, Krejs G, Ramadori G, Madsen JR, editors. Gastroenterology and hepatology. 1st ed. Italy: Mcgraw-Hill international (UK); 1999. p. 181-192.

Copyright by Mahidol University

21. นงลักษณ์ สุขวานิชย์ศิลป์. ยาลดอักเสบที่ไม่ใช่สเตียรอยด์.ใน: นันทนา พฤกษคุ้มวงษ์ บรรณาธิการ, ธิดา นังสานนท์ บรรณาธิการร่วม. ผู้สูงอายุกับการใช้ ยา. กรุงเทพมหานคร: คณะเภสัชศาสตร์ มหาวิทยาลัยมหิดล; 2534. หน้า 30-49.

22. Langman MJS, Kovacs TOG, Soll AH, Porro GB, Lazzaroni M, Gustavsson S. Piptic ulcer disease. In: Gustavsson S, Kumar D, Graham DY, editors. The stomach. 1st ed. Great Britain: Butler & tanner; 1992. p. 219-277.

23. Lam SK, Hui WM, Ching CK. Peptic ulcer disease. In: Haubrich WS, Schaffner F, editors. Gastroenterology volume1. 5th ed. Pennsylvania: W.B, saunders ; 1991. p. 700-748.

24. Wilson JAP and Roger EL. Gastroenterologic disorders. In: Cassel CK, Cohen EB, Larson EB, et al., editors. Geriatric medicine. 3rd ed. United States of America: Spring-Verlag New York; 1997. p. 637-654.

25. Wang JY, Liu SB, Chen SY, Dobson A. Risk factors of peptic ulcer in shanghai. Int J Epidemiol 1996;25:638-43.

26. พิศาล ไม้เรียง. โรคทางเดินอาหาร. การวินิจฉัยและการรักษา. ขอนแก่น; โรงพิมพ์คลังนานาวิทยา; 2536.

27. Hilton D, Iman N, Burke GJ, Moore A, O'Mara G, Signorini D, et al. Absence of abdominal pain in older persons with endoscopic ulcers: a prospective study. Am J Gastroenterol 2001;96(2):380-4.

28. ปรีชา กิตติคุณ. ภาวะเลือดออกจากแผลเป็ปติก ในโรงพยาบาลชลบุรี. วารสารโรงพยาบาลชลบุรี 2541;23(2):37-40.

29. สุวิทย์ ศรีอัษฎาพร, ชาญวิทย์ ตันติพิพัฒน์, สมหมาย วิไลรัตน์. เลือดออกเฉียบพลันจากส่วนต้นของระบบทางเดินอาหาร: การศึกษาย้อยหลังในผู้ป่วย 1,338 ราย. จุฬาลงกรณ์เวชสาร 2531;32:165-74.

30. อนุชา อิศรางกูร ณ อยุธยา. อัตราการตายและโรคแผลเปปติคทะลุในผู้ป่วยอายุมากและผู้ป่วยอายุน้อย ในโรงพยาบาลพะเยา. วารสารแพทย์ เขต 7 2538;14(1):57-62.

Copyright by Mahidol University

31. สุดาพรรณ ควรสถาพรทวี. ลดาวัลย์ อุ่นประเสริฐพงศ์, เพ็ญจันท์ ส.โมไนยพงศ์, วันดี เศวตมาลย์. การศึกษาปัจจัยที่มีอิทธิพลต่อพฤติกรรมสุขภาพของผู้ป่วยโรคแผลในกระเพาะอาหาร. วารสารพยาบาล 2535;41:20-31.

32. เลี้ยง ตั้งสิทธิโชค, สมบัติ ภูนวกุล. การศึกษาเรื่องแผลเปปติดกับปัจจัยบางอย่าง. วารสารวิชาการแพทย์ เขต 6 2535;6(1):33-45.

33. สุรศักดิ์ โควสุภัทร์, อรพรรณ เมธาดิลกกุล. สถานการณ์การป่วยและตายจากแผลเปปติดในประเทศไทย. คลินิก 2534;7:880.

34. Everhart JE, Byrd-Holt D, Sonnenberg A. Incidence and risk factors for self-reported peptic ulcer disease in the United States. Am J Epidemiol 1998;147:529-36.

35. Johnsen R, Foede OH, Straume B, Burhol PG. A etiology of peptic ulcer. J Epidemiol Community Health 1994;48:156-60.

36. Schoon IM, Mellstrom D, Oden A, Ytterberg BO. Incidence of peptic ulcer disease in Gothenburg 1985. BMJ 1989;299(6708):1131-4.

37. Fock KM. Peptic ulcer disease in the 1990s: an Asian perspective. J Gastroenterol Hepatol 1997;12(6):S23-8.

38. Henry D, Dobson A, Turner C. Variability in the risk of major gastrointestinal complications from nonaspirin nonsteroidal anti-inflammatory drugs. Gastroenterology 1993;105(4):1078-88.

39. สมศักดิ์ ศรีสันติสุข. สังคมวิทยาภาวะผู้สูงอายุ ความเป็นจริงและการคาดการณ์ในสังคมไทย. กรุงเทพมหานคร: โรงพิมพ์จุฬาลงกรณ์ มหาวิทยาลัย; 2539.

40. ศรีเรือน แก้วกังวาล. วัยสูงอายุ. ในเอกสารประกอบการสัมมนา เรื่องการวิจัยผู้สูงอายุในประเทศไทย. คณะกรรมการการบริหารโครงการผู้สูงอายุในประเทศไทย; 2536. หน้า 3-5.

Copyright by Mahidol University

41. Enribht PL. Aging of the respiratory system. In: Hazzard WR, Blass JP, Ettinger WH, Halter JB, Ouslander JG, editors. Principles of geriatric medicine and gerontology. 4th ed. United States of America: McGraw-Hill Companies; 1999. p. 721-728.

42. Baum BJ, Ship JA. The oral cavity. In: Hazzard WR, Bierman EL, Blass JP, Ettinger WH, Halter JB, editors. Principles of geriatric medicine and gerontology. 3rd ed. United States of America: McGraw-Hill Companies; 1994. p. 431-440.

43. Hall KE, Wiley JH. Age-associated changes in gastrointestinal function. In: Hazzard WR, Blass JP, Ettinger WH, Halter JB, Ouslander JG, editors. Principles of geriatric medicine and gerontology. 4th ed. United States of America: McGraw-Hill Companies; 1999. p. 835-842.

44. Moss AJ. Diagnosis and management of hearth disease. In: Reichel W, editor. Care of the elderly clinical aspects of aging. 4th ed. United States of America: Williams & Wilkins; 1995. p. 69-86.

45. Meier DE. Osteoporosis and other disorders of skeletal aging. In: Cassel CK, Cohen EB, Larson EB, et al., editors. Geriatric medicine. 3rd ed. United States of America: Spring-Verlag New York; 1997. p. 411-432.

46. Sorensen LB, Blair JM. Rheumatologic diseases. In: Cassel CK, Cohen EB, Larson EB, et al., editors. Geriatric medicine. 3rd ed. United States of America: Spring-Verlag New York; 1997. p. 449-480.

Copyright by Mahidol University

47. Beck LH. Aging changes in renal function. In: Hazzard WR, Blass JP, Ettinger WH, Halter JB, Ouslander JG, editors. Principles of geriatric medicine and gerontology. 4th ed. United States of America: McGraw-Hill Companies; 1999. p. 767-776.

48. Michael SL. Manual of gerontologic nursing. 1st ed . United States of America: Mosby-Year Book; 1995.

49. Gambert SR. Endocrinology and aging. In: Reichel W, editor. Care of the elderly clinical aspects of aging. 4th ed. United States of America: Williams & Wilkins; 1995. p. 365-372.

50. Mattson MP. Cellular and neurochemical aspects of the aging human brain. In: Hazzard WR, Blass JP, Ettinger WH, Halter JB, Ouslander JG, editors. Principles of geriatric medicine and gerontology. 4th ed. United States of America: McGraw-Hill Companies; 1999. p. 1193-1208.

51. Goldfarb MT, Ellis CN. Voorhees JJ. Dermatologic diseases and problems. In: Cassel CK, Cohen EB, Larson EB, et al., editors. Griatric medicine. 3rd ed. United States of America: Spring-Verlag New York; 1997. p. 667-682.

52. Ernest JT. Changes and diseases of the aging eye. In: Cassel CK, Cohen EB, Larson EB, et al.. editors. Geriatric medicine. 3rd ed. United States of America: Spring-Verlag New York; 1997. p. 683-698.

53. Paul ER, Elizabeth LR. editors. Multidisciplinary education in geriatrics & aging [Online] Columbia: HRSA; 2002. Available from: http:// cpmcnet.columbia.edu /.../Gerontology_and_Geriatric_Dentistry/ NORMAL_AGING/PHYSIOLOGIC_CHANGES.html [Accessed 2002 Feb 12].

Copyright by Mahidol University

LIBRARY AND INFORMATION CENTER MAHIDOL UNIVERSITY

54. Yoder MG. Geriatic ear, nose, and throat problems. In: Reichel W, editor. Care of the elderly clinical aspects of aging. 4th ed. United States of America: Williams & Wilkins; 1995. p. 441-450.

55. เพื่อนใจ รัตนากร. กิจกรรมบำบัดในผู้สูงอายุ. ม.ป.ท.; ม.ป.ป..

56. สถาบันพัฒนาการกำลังคนด้านสาธารณสุข สำนักงานปลัดกระทรวง กระทรวงสาธารณสุข. การพยาบาลผู้ใหญ่และผู้สูงอายุ เล่ม 1. กรุงเทพมหานคร: โรงพิมพ์สามเจริญ; 2538.

57. Sleisenger MH, Fordtran JS, editors. Gastrointestinal disease: pathophysiology, diagnosis, management. 4th ed. Philadelphia: W.B. saunders company; 1989.

58. Eastwood GL, Avunduk C. Manual of gastroenterology. 2nd ed. United States of America: Little, Brown and company; 1994.

59. Norton JG. Gastrointestinal disorders. 4th ed.United States of America: Year Book Medical; 1989.

60. Colley,S. Modern management of peptic ulcer. วารสารแพทย์หลังปริญญา 2536; 7(1):29-34.

61. อรพินท์ อินทรนุกูลกิจ. การศึกษาพฤติกรรมสุขภาพของผู้ป่วยโรคแผลในกระเพาะอาหาร [วิทยานิพนธ์ปริญญาวิทยาศาสตรมหาบัณฑิต สาขาวิชาพยาบาลศาสตร์]. กรุงเทพมหานคร: บัณฑิตวิทยาลัย มหาวิทยาลัยมหิดล; 2536.

62. มาลิน มีประเสริฐ. การศึกษาวิเคราะห์ การดูแลตนเองของผู้ป่วยโรคแผลในกระเพาะอาหาร. วารสารโรงพยาบาลอุตรดิตถ์ 2537;9(1):24-27.

63. Bobadilla J,Vargas-Vorackova F, Gomez A,Jesus Villalobos J. Incidence of peptic ulcer at the Instituto Nacional de la Nutricion "Salvador Zubiran": study of localization, associated factors and temporal trends. Rev Gastroenterol Mex 1996;61(1):31-5.

64. Watanabe Y, Kurata JH, Kawamoto K, Kawai K. Epidemiological study of peptic ulcer disease among Japanese and Koreans in Japan. J Clin Gastroenterol 1992;15(1):68-74.

Copyright by Mahidol University

65. Schlemper RJ, van der Werf SD, Vandenbroucke JP, Biemond I, Lamers CB. Risk factors of peptic ulcer disease: different impact of *Helicobacter pylori* in Dutch and Japanese populations? J Gastroenterol Hepatol 1996;11(9):825-31.

66. Tuchesn F, Jeppesen HJ and Bach E. Employment status, non-daytime work and gastric ulcer in men. Int J Epidemiol 1994; 23: 365-70.

67. วริยา วชิราวัธน์. อิทธิพลของวิถีชีวิต บุคลิกภาพก้าวร้าว ความเครียดเรื้อรัง และภาวะติดเชื้อเฮลิโคแบคเตอร์ไพลอไร ต่อการเกิดโรคแผลในกระเพาะอาหารและลำไส้เล็ก [วิทยานิพนธ์ปริญญาพยาบาลศาสตร์ดุษฎีบัณฑิต]. กรุงเทพมหานคร: บัณฑิตวิทยาลัย มหาวิทยาลัยมหิดล; 2544.

68. ยุคล กาญจนรักษ์. การศึกษาผู้ป่วยเลือดออกในทางเดินอาหารส่วนต้น ในกลุ่มงานอายุรกรรม โรงพยาบาลอินทร์บุรี. พุทธชินราชเวชสาร 2537; 11(2): 69-77.

69. Ostensen H, Gudmundsen TE, Ostensen M, Burhol PG, Bonnevie O. Smoking, alcohol, coffee, and familial factors: any associations with peptic ulcer disease? A clinically and radiologically prospective study. Scand J Gastroenterol 1985; 20(10):1227-35.

70. Adami HO, Bergstrom R, Nyren O, Forhaug K, Gustavsson S, Loof L, et al. Is duodenal ulcer really a psychosomatic disease? A population-based case-control study. Scand J Gastroenterol 1987;22(7):889-96.

71. Seinela L, Ahvenainen J. Peptic ulcer in the very old patients. Gerontology 2000;46(5):271-5.

72. Griffin MR, Piper JM, Daugherty JR, Snowden M, Ray WA. Nonsteroidal anti-inflammatory drug use and increased risk for peptic ulcer disease in elderly persons. Ann Intern Med 1991;114(4):257-63.

Copyright by Mahidol University

73. Voskuyl AE, Van de Laar MA, Bernelot Moens HJ, Van de Korst JK. Extra-articular manifestations of rheumatoid arthritis: risk factors for serious gastrointestinal events. Ann Rheum Dis 1993; 52(11): 771-75.

74. Garcia Rodriguez LA, Jick H. Risk of upper gastrointestinal bleeding and perforation associated with individual non-steroidal anti-inflammatory drugs. Lancet 1994; 343(8900): 769-72.

75. Spiro HM. Clinical gastroenterology. 4th ed. United States of America: McGraw-Hill; 1993.

76. วิบูล อุทัยแสงสุข. *Helicobacter pylori* infection in peptic ulcer disease. พุทธชินราชเวชสาร 2539; 13(2): 87-92.

77. Kemppainen H, Raiha I, Kujari H, Sourander L. Characteristics of *Helicobacter pylori*-negative and -positive peptic ulcer disease. Age Aging 1998; 27(4):427-31.

78. Schlesselman JJ. Case-control studies: design, conduct, analysis. New York: Oxford University Press; 1982.

79. Euronut SENECA investigators. Life-style: physical activities and activities of daily living.Eur J Clin Nutr 1991; 45: 169-82.

80. Gordis L, editor. Epidemiology. 2nd ed. United States of America: W.B. Saunders; 1996.

81. Greenberg RS, Daniels SR, Flanders D, Eley JW, Boring JR, editors. Medical epidemiology. 1st ed. United States of America: Appleton & Lange; 1993.

82. Austin H, Hill HA, Flanders WD, Dreengerg RS. Limitation in the application of case-control methodology. Epidemiol Reviews 1994; 16: 65-74.

Copyright by Mahidol University

83. Choi BCK, Noseworthy AL. Classification, direction, and prevention of bias in epidemiologic research. J Occup Med 1992; 34: 256-71.

84. Laine L. Approaches to nonsteroidal anti-inflammatory drug use in the high-risk patient. Gastroenterology 2001; 120: 594-606.

Copyright by Mahidol University

APPENDIX

Copyright by Mahidol University

APPENDIX

Questionnaire (English)

Factors associated with peptic ulcer in the elderly

Faculty of Medicine, Siriraj Hospital, Mahidol University

Form No.....

☐ 1. Control ☐ 2. Case

Hospital ☐ 1. Siriraj ☐ 2. Phramongkultklao

H.N._____ A.N._____ ward _____

Address_____

TEL. _____

Date of interview _____ Date of gastroscopy _____

Part 1 Socio-demographic, health behavior, and gastroscopy data

1. Sex

☐ 1. Male ☐ 2. Female

2. Age ..... years (full years)

3. Marrital status

☐ 1. Single ☐ 2. Married ☐ 3. Windowed ☐ 4. Divorced ☐ 5. Separate

4. Past occupation

☐ 1. Unemployed

☐ 2. Merchant

☐ 3. Labourer

☐ 4. Employee

☐ 5. Agriculturist

☐ 6. Government officer

☐ 7.Other .....

Copyright by Mahidol University

5. Educational level

☐ 1. No formal education

☐ 2. Primary School or lower

☐ 3. Mathayom 3 or lower

☐ 4. Mathayom 6 or lower

☐ 5. Mathayom 8 or lower

☐ 6. Diploma

☐ 7. Bechelor degree or higher

☐ 8. Other .....

6. Monthly income .....baht.

7. Monthly family income .....baht.

8. Is family income sufficient to the expenses?

☐ 1. Insufficient

☐ 2. Sufficient

☐ 3. Some money left for saving

9. Blood group

☐ 1. A

☐ 2. B

☐ 3. AB

☐ 4. O

☐ 5. Not known

10. Underlying disease

☐ 1. No

☐ 2. Ischemic heart disease .....year

☐ 3. Diabetes mellitus .....year

☐ 4. Chronic obstructive pulmonary disease .....year

☐ 5. Arthralgia .....year

☐ 6. Other .....

Copyright by Mahidol University

11. History of peptic ulcer

□ 1. No

□ 2. Yes .....year

Type □ Gastric ulcer

□ Duodenal ulcer

□ Gastric ulcer and duodenal ulcer

□ Other .....

Diagnosed by

□ 1. History of GI bleeding □ 2. Endoscopy and upper GI series □ 3. Both

12. Family history of peptic ulcer

□ 1. No

□ 2. Yes □ Gastric ulcer

□ Duodenal ulcer

□ Gastric ulcer and duodenal ulcer

□ Other .....

Health Behavior data

13. Cigarette smoking

□ 1. Never

□ 2. Still smoking .....cigarette(s)/day for.....years.

□ 3. Used to smoke .....cigarette(s)/day for.....years.

Quit smoking .....years.

Copyright by Mahidol University

14. Alcohol drinking

☐ 1. Never

☐ 2. Still drinking .....glass(es)/bottle(s)/day/week/month

Drank for .....years.

☐ 3. Used to drinking .....glass(es)/bottle(s)/day/week/month

Quit drinking .....years.

15. Tea consumption

☐ 1. Never

☐ 2. Still consumption.....glass(es)/day/week/month for .....years.

☐ 3. Used to consumption .....glass(es)/day/week/month

Quit consumption .....years.

16. Coffee consumption

☐ 1. Never

☐ 2. Still consumption.....glass(es)/day/week/month for .....years.

☐ 3. Used to consumption .....glass(es)/day/week/month

Quit consumption .....years.

17. Spicy food

☐ 1. No

☐ 2. Yes ☐ Sour

☐ Spicy

☐ Both

Copyright by Mahidol University

18. Medication

□ 1. No

□ 2. Yes □ ...../ day for .....years Quit .....years.

□ ...../ day for .....years Quit .....years.

□ ...../ day for .....years Quit .....years.

□ ...../ day for .....years Quit .....years.

□ ...../ day for .....years Quit .....years.

□ ...../ day for .....years Quit .....years.

□ ...../ day for .....years Quit .....years.

19. NSAIDs use

□ 1. No

□ 2. Yes □ Aspirin...../ day for .....years Quit .....years.

□ Other...../ day for .....years Quit .....years.

□ ...../ day for .....years Quit .....years.

□ ...../ day for .....years Quit .....years.

□ ...../ day for .....years Quit .....years.

Panendoscopy data

20. Indication

□ Abdominal pain □ Anemia

□ G.I. bleeding □ Disphagia

□ Abdominal pain combine with GI bleeding □ Follow up

□ Heartburn □ Others.....

Copyright by Mahidol University

21. Results

☐ Normal

☐ Abnormal ☐ Inflammation ☐ Esophagitis

☐ Gastitis

☐ Duodenitis

☐ Others.....

☐ Ulcer ☐ Gastric ulcer

☐ Duodenal ulcer

☐ Others.....

22. CLO test

☐ Not done

☐ Done ☐ Negative

☐ Positive

23. Biopsy

☐ Not done

☐ done.....

Copyright by Mahidol University

Thai Stress Test

These questions are your feelings that you may have in daily living. Please answer every questions by marking (x) in the blank that describes yours feelings.

	Always	**Seldom**	**Never**
1. Do you feel lonely ?			
2.....			
3.....			
4.....			
5.....			
6.....			
7.....			
8.....			
9.....			
10.....			

Copyright by Mahidol University

Instrumental activity of daily living

(past three month)

activities of daily living	Can do without difficult	Can do with difficult but without help	Can do only with help	Unable to do
1.Move outdoor				
2.Walk between room				
3.Use stairs				
4.Walk at least 400 m.				
5.Carry a heavy object e.g. a shopping bag of 5 kg. For a hundred meters.				
6.Use the toilet				
7.Wash yourself				
8.Dress and undress				
9.Get in and out of bed				
10.Cut toe-nail				
11.Use the telephone				
12.Take own medication				
13.Manage finances				
14.Feed yourself				
15.Do light housework(wash dishes, sweep floors)				
16.Do heavy housework(wash windows and floors, general house cleaning)				

Score.....

Percentile.....

Copyright by Mahidol University

Questionnaire (Thai)

แบบสัมภาษณ์ เรื่องปัจจัยที่มีความสัมพันธ์ต่อการเกิดแผลเป็ปติคในผู้สูงอายุ

คณะแพทยศาสตร์ศิริราชพยาบาล มหาวิทยาลัยมหิดล

แบบสัมภาษณ์เลขที่ .....

☐ 1. Control ☐ 2. Case

โรงพยาบาล ☐ 1. ศิริราช ☐ 2. พระมงกุฎเกล้า

H.N. _____ A.N. _____ ward _____

ที่อยู่_____

โทรศัพท์_____

วันที่สัมภาษณ์_____ เดือน _____ พ.ศ. 2544

วันที่ส่องกล้อง _____ เดือน_____ พ.ศ. 2544

ส่วนที่ 1 ข้อมูลพื้นฐานทางด้านประชากร เศรษฐกิจ พฤติกรรมอนามัย การส่องกล้องตรวจระบบทางเดินอาหาร

1. เพศ

   ☐ 1. ชาย ☐ 2. หญิง

2. อายุ ..... ปี (ปีเต็ม)

3. สถานภาพสมรส

   ☐ 1. โสด ☐ 2. คู่ ☐ 3. หม้าย ☐ 4. หย่า ☐ 5. แยกกันอยู่

4. อาชีพหลักช่วงวัยก่อนเกษียณ

   ☐ 1. ไม่ได้ประกอบอาชีพ

   ☐ 2. ค้าขาย

   ☐ 3. รับจ้างแรงงาน

   ☐ 4. รับจ้างในสำนักงาน

   ☐ 5. เกษตรกรรม (ทำนาทำไร่)

   ☐ 6. รับราชการ

   ☐ 7.อื่นๆ ระบุ .....

Copyright by Mahidol University

5. จบการศึกษาสูงสุด

☐ 1. ไม่ได้เรียนหนังสือ ☐ 5. มัธยมศึกษา ม. 8หรือต่ำกว่า

☐ 2. ประถมศึกษาตอนต้นหรือต่ำกว่า ☐ 6. ประกาศนียบัตร หรือ อาชีวศึกษา

☐ 3. มัธยมศึกษา ม. 3 หรือต่ำกว่า ☐ 7. ปริญญาตรี หรือสูงกว่า

☐ 4. มัธยมศึกษา ม. 6 หรือต่ำกว่า ☐ 8. อื่นๆ ระบุ .....

6. รายได้ส่วนตัวต่อเดือน.....บาท

7. รายได้ครอบครัวเฉลี่ยต่อเดือน.....บาท

8. รายได้ครอบครัวเพียงพอกับค่าใช้จ่าย

☐ 1. ไม่เพียงพอ

☐ 2. เพียงพอ

☐ 3. เพียงพอเหลือเก็บ

9. หมู่เลือด

☐ 1. A

☐ 2. B

☐ 3. AB

☐ 4. O

☐ 5. ไม่ทราบ

10. โรคประจำตัว

☐ 1. ไม่มีโรคประจำตัว

☐ 2. โรคหัวใจขาดเลือด จำนวน.....ปี

☐ 3. โรคเบาหวาน จำนวน.....ปี

☐ 4. โรคถุงลมโป่งพอง จำนวน.....ปี

☐ 5. อาการปวดข้อ จำนวน.....ปี

☐ 6. อื่นๆ ระบุ .....

11. ประวัติการเป็นแผลเป็ปติคของตนเอง

☐ 1. ไม่เคยเป็น

☐ 2. เคยเป็น จำนวน.....ปี

Copyright by Mahidol University

ชนิด ☐ แผลในกระเพาะ

☐ แผลลำไส้เล็กส่วนต้น

☐ ทั้ง 2 อย่าง

☐ อื่นๆ ระบุ .....

ข้อมูลจาก

☐ 1. ประวัติ (การมีเลือดออก) ☐ 2. การตรวจพิเศษ (กลืนแป้ง,ส่องกล้อง) ☐ 3. ทั้ง 2 อย่าง

12. บิดา มารดา ของท่านมีประวัติเป็นโรคแผลในกระเพาะหรือแผลลำไส้เล็กส่วนต้นหรือไม่

☐ 1. ไม่มี

☐ 2. มี ☐ แผลในกระเพาะ

☐ แผลลำไส้เล็กส่วนต้น

☐ ทั้ง 2 อย่าง

☐ อื่นๆ ระบุ .....

ข้อมูลพฤติกรรมอนามัย

13. การสูบบุหรี่

☐ 1. ไม่สูบบุหรี่

☐ 2. สูบบุหรี่ .....มวน/วัน เป็นเวลา.....ปี

☐ 3. เคยสูบบุหรี่ ..... มวน/วัน เป็นเวลา.....ปี เลิกมา.....ปี

14. การดื่มสุรา

☐ 1. ไม่ดื่มสุรา

☐ 2. ดื่มสุรา.....กึ๊งหรือเป๊ก / กั๊ก / ขวดแบน / ขวดกลม ต่อ 1 วัน / สัปดาห์ / เดือน เป็นเวลา.....ปี

☐ 3. เคยดื่มสุรา.....กึ๊งหรือเป๊ก / กั๊ก / ขวดแบน / ขวดกลม ต่อ 1 วัน / สัปดาห์ / เดือน เป็นเวลา .....ปี เลิกมา.....ปี

15. การดื่มชา

☐ 1. ไม่ดื่มชา

☐ 2. ดื่มชา.....แก้ว ต่อ 1 วัน / สัปดาห์ / เดือน เป็นเวลา.....ปี

☐ 3. เคยดื่มชา.....แก้ว ต่อ 1 วัน / สัปดาห์ / เดือน เป็นเวลา.....ปี เลิกมา.....ปี

Copyright by Mahidol University

16. การดื่มกาแฟ

☐ 1. ไม่ดื่มกาแฟ

☐ 2. ดื่มกาแฟ.....แก้ว ต่อ 1 วัน / สัปดาห์ / เดือน เป็นเวลา.....ปี

☐ 3. เคยดื่มกาแฟ.....แก้ว ต่อ 1 วัน / สัปดาห์ / เดือน เป็นเวลา.....ปี เลิกมา.....ปี

17. การรับประทานอาหารรสจัด

☐ 1. ไม่รับประทานอาหารรสจัด

☐ 2. รับประทานอาหารรสจัด ☐ เปรี้ยว

☐ เผ็ด

☐ ทั้งสองอย่าง

18. ยาที่รับประทานเป็นประจำ

☐ 1. ไม่ได้รับประทานยาใดเป็นประจำ

☐ 2. รับประทาน ☐ ชื่อยา.....เม็ดต่อวัน เป็นเวลา.....ปี เลิกมา.....ปี

☐ ชื่อยา.....เม็ดต่อวัน เป็นเวลา.....ปี เลิกมา.....ปี

☐ ชื่อยา.....เม็ดต่อวัน เป็นเวลา.....ปี เลิกมา.....ปี

☐ ชื่อยา.....เม็ดต่อวัน เป็นเวลา.....ปี เลิกมา.....ปี

☐ ชื่อยา.....เม็ดต่อวัน เป็นเวลา.....ปี เลิกมา.....ปี

☐ ชื่อยา.....เม็ดต่อวัน เป็นเวลา.....ปี เลิกมา.....ปี

☐ ชื่อยา.....เม็ดต่อวัน เป็นเวลา.....ปี เลิกมา.....ปี

☐ ชื่อยา.....เม็ดต่อวัน เป็นเวลา.....ปี เลิกมา.....ปี

☐ ชื่อยา.....เม็ดต่อวัน เป็นเวลา.....ปี เลิกมา.....ปี

19. การรับประทานยาแก้อักเสบที่ไม่ใช่สเตียรอยด์

☐ 1. ไม่ได้รับประทาน

☐ 2. รับประทาน ☐ แอสไพริน .....เม็ดต่อวัน เป็นเวลา.....ปี เลิกมา.....ปี

☐ อื่นๆ.....เม็ดต่อวัน เป็นเวลา.....ปี เลิกมา.....ปี

.....เม็ดต่อวัน เป็นเวลา.....ปี เลิกมา.....ปี

.....เม็ดต่อวัน เป็นเวลา.....ปี เลิกมา.....ปี

.....เม็ดต่อวัน เป็นเวลา.....ปี เลิกมา.....ปี

Copyright by Mahidol University

ข้อมูลการส่องกล้องตรวจระบบทางเดินอาหาร

20. สาเหตุที่ตรวจ

☐ ปวดท้อง

☐ เลือดออกในระบบทางเดินอาหาร

☐ ปวดท้องร่วมกับเลือดออกในระบบทางเดินอาหาร

☐ Follow up

☐ อื่นๆ ระบุ .....

21. ผลการตรวจ

☐ ไม่พบสิ่งผิดปกติ

☐ พบสิ่งผิดปกติ ☐ Inflammation ☐ Esophagitis

☐ Gastitis

☐ Duodenitis

☐ อื่นๆ ระบุ.....

☐ Ulcer ☐ Gastric ulcer

☐ Duodenal ulcer

☐ อื่นๆ ระบุ.....

☐ อื่นๆ ระบุ .....

22. การตรวจ CLO

☐ ไม่ตรวจ

☐ ตรวจ ผล ☐ Negative

☐ Positive

23. Biopsy

☐ ไม่ตรวจ

☐ ตรวจ ผล.....

Copyright by Mahidol University

ส่วนที่ 2 แบบวัดความเครียด

แบบวัดความเครียดสำหรับคนไทย

คำถามต่อไปนี้ เป็นความรู้สึกที่ท่านอาจมีในชีวิตประจำวัน ซึ่งแต่ละท่านจะมีความรู้สึกที่แตกต่างกัน ขอให้ท่านเลือกข้อที่ตรงกับความรู้สึกของท่านที่เป็นอยู่ในขณะนี้ โดยกาเครื่องหมาย X ในแต่ละช่องที่ต้องการ

ข้อความ	รู้สึกบ่อย ๆ	รู้สึก เป็นครั้งคราว	ไม่เคย รู้สึกเลย
1. ท่านรู้สึกเหงาและว้าเหว่			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			

รวมคะแนนข้อ 1-12 ..... รวมคะแนนข้อ 13-24 .....

ได้คะแนนอยู่ในระดับ .....

การแปลผลอยู่ในระดับ.....

Copyright by Mahidol University

ส่วนที่ 3 แบบวัดความสามารถในการปฏิบัติกิจวัตรประจำวัน

ความสามารถในการปฏิบัติกิจวัตรประจำวัน ในช่วง 3 เดือนที่ผ่านมา

ความสามารถในการปฏิบัติกิจวัตรประจำวัน ในช่วง 3 เดือนที่ผ่านมา	ทำได้สะดวก	ทำได้บ้าง แต่ช้า	ทำได้แต่ต้องมีคนช่วย	ทำไม่ได้เลย
1. ออกนอกบ้าน				
2. เดินไปมาภายในตัวบ้าน				
3. เดินขึ้นลงบันได				
4. เดินได้ไกลอย่างน้อย 400 เมตร				
5. หิ้วของหนัก เช่น ไปตลาดได้ไกล 100 เมตร				
6. เข้าห้องน้ำ				
7. อาบน้ำ ล้างหน้า				
8. สวมเสื้อผ้าแต่งกาย				
9. ลุกจากเตียงหลังตื่นนอน				
10. ตัดเล็บเท้า				
11. ติดต่อสื่อสารทางโทรศัพท์ จดหมาย				
12. จัดยารับประทาน				
13. เก็บและใช้จ่ายเงิน				
14. รับประทาน				
15. ทำงานบ้านเบาๆ เช่น ล้างจาน กวาดบ้าน ปรุงอาหาร				
16. ทำงานบ้านที่ค่อนข้างหนัก เช่น ถูบ้าน, ซักเสื้อผ้า				

รวมคะแนน.....

เปอร์เซ็นต์ไทล์ที่ .....

Copyright by Mahidol University

BIOGRAPHY

LIBRARY AND INFORMATION CENTER MAHIDOL UNIVERSITY

NAME	Lt. Yaowapa Kongmun
DATE OF BIRTH	21 November 1975
PLACE OF BIRTH	Phitsanulok, Thailand
INSTITUTIONS ATTENDED	Royal Thai Army Nursing College, 1993-1997 : Bachelor of Science in Nursing Mahidol University, 2000-2002 : Master of Science (Epidemiology)
POSITION AND OFFICE	1997-Present: Registered Nurse Phramongkutklao hospital, Bangkok, Thailand

Copyright by Mahidol University